



**IE3020**

**Directory Structure and Network  
Management**

**3<sup>rd</sup> Year, 2<sup>nd</sup> Semester**

Assignment

**Implementation of Linux-based Domain  
Controller with Active Directory and  
Zabbix Monitoring**

Submitted to  
Sri Lanka Institute of Information Technology

In partial fulfilment of the requirements for the  
Bachelor of Science Special Honors Degree in Information Technology

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## **Declaration**

I certify that this report does not incorporate without acknowledgement, any material previously submitted for a degree or diploma in any university, and to the best of my knowledge and belief, it does not contain any material previously published or written by another person, except where due reference is made in text.

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## Table of Contents

<i>Introduction</i> .....	- 1 -
<b>1. Setting up the Domain Controller</b> .....	- 2 -
<b>1.1. Preparing the System</b> .....	- 2 -
<b>1.2. Configuring Samba</b> .....	- 6 -
<b>1.3. Configuring Kerberos</b> .....	- 10 -
<b>1.4. Starting the Samba Service</b> .....	- 12 -
<b>1.5. Testing the Samba Server</b> .....	- 13 -
<b>1.6. Configuring the DHCP Server</b> .....	- 15 -
<b>1.7. Adding Users to the Domain</b> .....	- 17 -
<b>2. Join Ubuntu Clients to the AD Domain</b> .....	- 18 -
<b>2.1. Preparing the client machine/s</b> .....	- 18 -
<b>2.2. Join the Domain</b> .....	- 20 -
<b>2.3. Domain Login</b> .....	- 22 -
<b>3. Configuring the Zabbix server</b> .....	- 26 -
<b>3.1. Installing LAMP Server</b> .....	- 26 -
<b>3.2. Creating a Zabbix Database</b> .....	- 32 -
<b>3.3. Installing Zabbix Server</b> .....	- 33 -
<b>3.4. Accessing Zabbix Web Installation</b> .....	- 38 -
<b>4. Monitoring Hosts with Zabbix</b> .....	- 42 -
<b>4.1. Setting up the host machine/s</b> .....	- 42 -
<b>4.2. Adding host/s to the Zabbix Monitor</b> .....	- 45 -
<b>4.3. Customizing the dashboard to monitor critical services</b> .....	- 46 -
<b>References</b> .....	- 48 -

## Table of Figures

Figure 1.1. 1 - Update Fedora OS .....	- 2 -
Figure 1.1. 2 - Install required packages for Samba AD-DC.....	- 3 -
Figure 1.1. 3 - Verify packages.....	- 3 -
Figure 1.1. 4 - Set a Static IP via nmtui .....	- 4 -
Figure 1.1. 5 - Set a static hostname .....	- 4 -
Figure 1.1. 6 - /etc/hosts file .....	- 5 -
Figure 1.2. 1 - Set Booleans for SELinux .....	- 6 -
Figure 1.2. 2 - Move the default Samba config file .....	- 7 -
Figure 1.2. 3 - Create the directory /etc/systemd/resolved.conf.d/ .....	- 7 -
Figure 1.2. 4 - Custom DNS resolution file .....	- 8 -
Figure 1.2. 5 - Restart the systemd-resolved service .....	- 8 -
Figure 1.2. 6 - Provision the Samba configuration .....	- 9 -
Figure 1.2. 7 - Verify the Samba configuration file.....	- 9 -
Figure 1.3. 1 - Copy the Kerberos Configuration file to /etc/krb5.conf.d/ directory.....	- 10 -
Figure 1.3. 2 - samba-dc Kerberos Configuration file .....	- 11 -
Figure 1.4. 1 - Start and enable the Samba service .....	- 12 -
Figure 1.4. 2 - Allow TCP and UDP ports through the firewall.....	- 12 -
Figure 1.5. 1 - Local Samba Server connectivity test.....	- 13 -
Figure 1.5. 2 - Administrator login test.....	- 13 -
Figure 1.5. 3 – Name resolution (DNS) test .....	- 14 -
Figure 1.5. 4 - Kerberos test.....	- 14 -
Figure 1.6. 1 - Install the DHCP package .....	- 15 -
Figure 1.6. 2 – /etc/sysconfig/dhcpd file.....	- 15 -
Figure 1.6. 3 - /etc/dhcp/dhcpd.conf file.....	- 16 -
Figure 1.6. 4 - Start and enable the DHCP server.....	- 16 -
Figure 1.7. 1 - Adding users to the domain and verifying .....	- 17 -
Figure 2.1. 1 - Update Ubuntu OS .....	- 18 -
Figure 2.1. 2 - Install the required packages.....	- 19 -
Figure 2.1. 3 - /etc/hosts file .....	- 19 -
Figure 2.2. 1 - Discover the Domain.....	- 20 -
Figure 2.2. 2 - Join the domain .....	- 20 -
Figure 2.2. 3 - /etc/sssd/sssd.conf file .....	- 21 -
Figure 2.3. 1 - Domain login with username 1 .....	- 22 -
Figure 2.3. 2 - Domain login with username 2 .....	- 22 -
Figure 2.3. 3 - Enable home directory creation upon login .....	- 23 -
Figure 2.3. 4 - Domain login for user 1 with GUI .....	- 24 -
Figure 2.3. 5 – Domain information for user 1 .....	- 24 -
Figure 2.3. 6 - Domain login for user 2 with GUI .....	- 25 -
Figure 2.3. 7 - Domain information for user 2.....	- 25 -

Figure 3.1. 1 - Install Apache and MariaDB server.....	- 26 -
Figure 3.1. 2 - Install the PHP remi repository.....	- 27 -
Figure 3.1. 3 - Enable the PHP 8.4 remi module .....	- 27 -
Figure 3.1. 4 - Install PHP extensions.....	- 28 -
Figure 3.1. 5 - /etc/php-fpm.d/www.conf file.....	- 29 -
Figure 3.1. 6 - /etc/php-fpm.d/zabbixconf file.....	- 29 -
Figure 3.1. 7 - /etc/php.ini file (i).....	- 30 -
Figure 3.1. 8 - /etc/php.ini file (ii) .....	- 30 -
Figure 3.1. 9 - /etc/php.ini file (iii) .....	- 31 -
Figure 3.1. 10 - Start and enable services .....	- 31 -
 Figure 3.2. 1 - MariaDB shell for creating the database.....	- 32 -
 Figure 3.3. 1 - Install the Zabbix repo .....	- 33 -
Figure 3.3. 2 – Install Zabbix server and other packages .....	- 33 -
Figure 3.3. 3 - Download the Zabbix source .....	- 34 -
Figure 3.3. 4 - Extract the downloaded file .....	- 34 -
Figure 3.3. 5 - Import database schema, images, and data .....	- 35 -
Figure 3.3. 6 - /etc/zabbix_server.conf file (i) .....	- 36 -
Figure 3.3. 7 - /etc/zabbix_server.conf file (ii) .....	- 36 -
Figure 3.3. 8 - Restart and enable Zabbix services.....	- 37 -
 Figure 3.4. 1 - Zabbix Welcome screen.....	- 38 -
Figure 3.4. 2 - Zabbix database configuration screen.....	- 38 -
Figure 3.4. 3 - Zabbix server details screen .....	- 39 -
Figure 3.4. 4 - Zabbix web installation summary screen .....	- 39 -
Figure 3.4. 5 - Configuration file download screen .....	- 40 -
Figure 3.4. 6 - Zabbix login screen.....	- 40 -
Figure 3.4. 7 - Initial Zabbix Dashboard.....	- 41 -
 Figure 4.1. 1 - Install Zabbix Agent package.....	- 42 -
Figure 4.1. 2 - /etc/zabbix_agentd.conf file (i) .....	- 43 -
Figure 4.1. 3 - /etc/zabbix_agentd.conf file (ii) .....	- 43 -
Figure 4.1. 4 - Start and enable the Zabbix Agent service.....	- 44 -
 Figure 4.2. 1 - Adding a host to the Zabbix monitor .....	- 45 -
Figure 4.2. 2 - Added hosts to the Zabbix monitor .....	- 45 -
 Figure 4.3. 1 - Customized Zabbix Monitoring dashboard (i).....	- 46 -
Figure 4.3. 2 - Customized Zabbix Monitoring dashboard (ii).....	- 47 -
Figure 4.3. 3 - Customized Zabbix Monitoring dashboard (iii).....	- 47 -

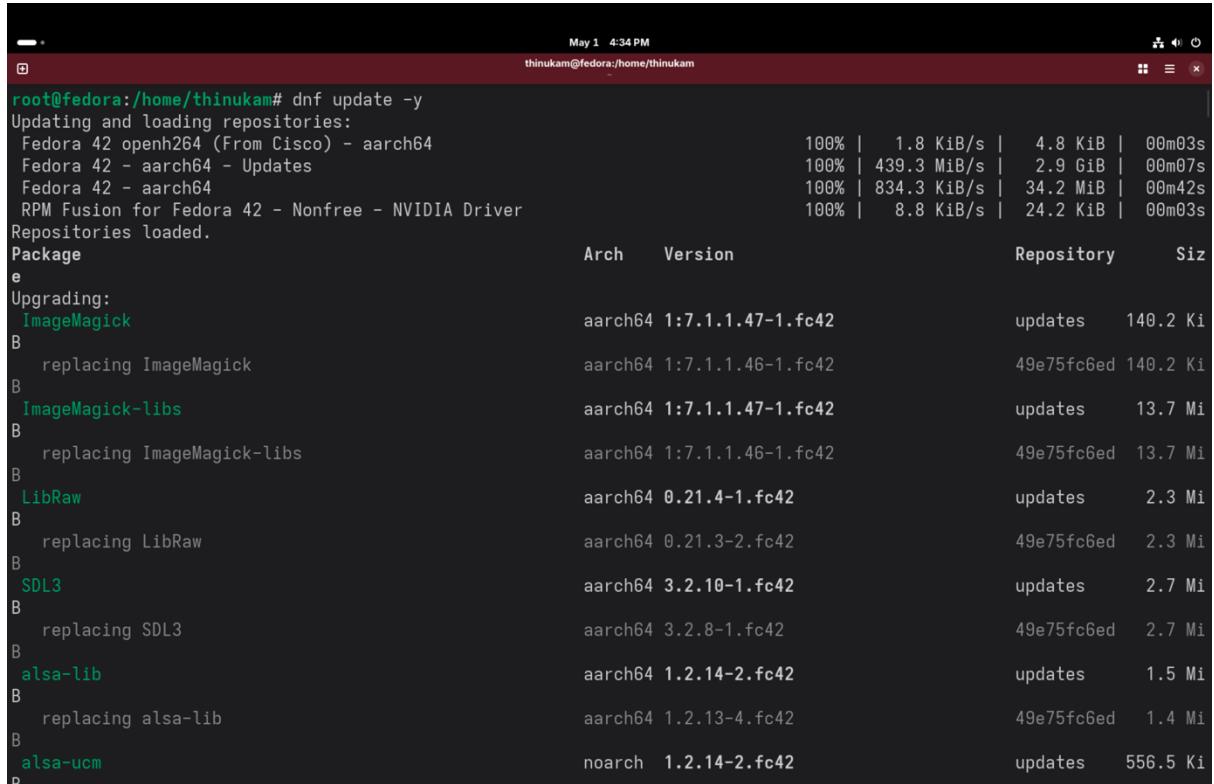
## Introduction

In this project, **Fedora 42** is employed as the operating system for establishing the Active Directory Domain Controller (AD-DC) and Zabbix Monitoring Server. In contrast, **Ubuntu** is utilized for the client machines. The selection of Fedora for server roles was driven by its current package updates, robust SELinux security integration, and comprehensive systemd support, which renders it suitable for running critical services such as Samba (for AD) and Zabbix. Ubuntu was chosen for client machines due to its user-friendly interface, extensive community support, and compatibility with Linux-based enterprise environments. This configuration facilitates centralized authentication and robust infrastructure monitoring across the network.

# 1. Setting up the Domain Controller

## 1.1. Preparing the System

- Update the Fedora 42 operating system



The screenshot shows a terminal window with the following output:

```
root@fedora:/home/thinukam# dnf update -y
Updating and loading repositories:
  Fedora 42 openh264 (From Cisco) - aarch64          100% | 1.8 KiB/s | 4.8 KiB | 00m03s
  Fedora 42 - aarch64 - Updates                      100% | 439.3 MiB/s | 2.9 GiB | 00m07s
  Fedora 42 - aarch64                                100% | 834.3 KiB/s | 34.2 MiB | 00m42s
  RPM Fusion for Fedora 42 - Nonfree - NVIDIA Driver 100% | 8.8 KiB/s | 24.2 KiB | 00m03s
Repositories loaded.
Package                                         Arch   Version      Repository    Size
e
Upgrading:
ImageMagick                                     aarch64 1:7.1.1.47-1.fc42      updates     140.2 Ki
B   replacing ImageMagick                         aarch64 1:7.1.1.46-1.fc42      49e75fc6ed 140.2 Ki
B ImageMagick-libs                               aarch64 1:7.1.1.47-1.fc42      updates     13.7 Mi
B   replacing ImageMagick-libs                   aarch64 1:7.1.1.46-1.fc42      49e75fc6ed 13.7 Mi
B LibRaw                                         aarch64 0.21.4-1.fc42        updates     2.3 Mi
B   replacing LibRaw                            aarch64 0.21.3-2.fc42        49e75fc6ed 2.3 Mi
B SDL3                                           aarch64 3.2.10-1.fc42        updates     2.7 Mi
B   replacing SDL3                             aarch64 3.2.8-1.fc42        49e75fc6ed 2.7 Mi
B als-a-lib                                      aarch64 1.2.14-2.fc42        updates     1.5 Mi
B   replacing als-a-lib                        aarch64 1.2.13-4.fc42        49e75fc6ed 1.4 Mi
B als-a-ucm                                     noarch  1.2.14-2.fc42        updates     556.5 Ki
```

Figure 1.1. 1 - Update Fedora OS

- Install the required packages to run Samba Active Directory Domain Controller services

```
root@fedora:/home/thinukam# dnf install -y samba samba-dc samba-dc-libs samba-client krb5-workstation bind bind-utils
Updating and loading repositories...
Repositories loaded.
Package "samba-client-2:4.22.1-1.fc42.aarch64" is already installed.
Package "bind-utils-32:9.18.35-2.fc42.aarch64" is already installed.

Package                                         Arch   Version            Repository      Size
Installing:
bind                                              aarch64 32:9.18.35-2.fc42          updates       1.2 MiB
krb5-workstation                                aarch64 1.21.3-5.fc42             fedora        2.9 MiB
samba                                             aarch64 2:4.22.1-1.fc42           updates       3.1 MiB
samba-dc                                           aarch64 2:4.22.1-1.fc42           updates       2.1 MiB
Installing dependencies:
krb5-pkinit                                     aarch64 1.21.3-5.fc42             fedora        133.2 KiB
krb5-server                                      aarch64 1.21.3-5.fc42             fedora        1.2 MiB
ldb-tools                                         aarch64 2:4.22.1-1.fc42           updates       108.1 KiB
libkadm5                                         aarch64 1.21.3-5.fc42             fedora        266.1 KiB
libnetapi                                         aarch64 2:4.22.1-1.fc42           updates       498.3 KiB
lmdb                                              aarch64 0.9.33-3.fc42             fedora        274.0 KiB
python3-dns                                       noarch  2.6.1-5.fc42              fedora        2.8 MiB
python3-gpg                                        aarch64 1.24.2-1.fc42             fedora        1.5 MiB
python3-ldb                                         aarch64 2:4.22.1-1.fc42           updates       125.0 KiB
python3-markdown                                    noarch  3.7-4.fc42                fedora        689.1 KiB
python3-samba                                      aarch64 2:4.22.1-1.fc42           updates       20.2 MiB
python3-samba-dc                                 aarch64 2:4.22.1-1.fc42           updates       2.0 MiB
python3-setproctitle                               aarch64 1.3.5-1.fc42              fedora        87.4 KiB
python3-talloc                                      aarch64 2.4.3-2.fc42              fedora        136.6 KiB
python3-tdb                                         aarch64 1.4.13-2.fc42             fedora        78.7 KiB
python3-tevent                                      aarch64 0.16.2-2.fc42             fedora        72.8 KiB
samba-common-tools                               aarch64 2:4.22.1-1.fc42           updates       1.4 MiB
samba-dc-libs                                     aarch64 2:4.22.1-1.fc42           updates       2.6 MiB
samba-dc-provision                               noarch  2:4.22.1-1.fc42           updates       16.9 MiB
```

Figure 1.1. 2 - Install required packages for Samba AD-DC

```
root@fedora:/home/thinukam# rpm -qa | grep samba
samba-common-4.22.1-1.fc42.noarch
samba-client-libs-4.22.1-1.fc42.aarch64
samba-common-libs-4.22.1-1.fc42.aarch64
samba-client-4.22.1-1.fc42.aarch64
samba-libs-4.22.1-1.fc42.aarch64
samba-dc-libs-4.22.1-1.fc42.aarch64
samba-dcerpc-4.22.1-1.fc42.aarch64
samba-winbind-modules-4.22.1-1.fc42.aarch64
python3-samba-4.22.1-1.fc42.aarch64
python3-samba-dc-4.22.1-1.fc42.aarch64
samba-tools-4.22.1-1.fc42.aarch64
samba-dc-provision-4.22.1-1.fc42.noarch
samba-ldb-ldap-modules-4.22.1-1.fc42.aarch64
samba-common-tools-4.22.1-1.fc42.aarch64
samba-4.22.1-1.fc42.aarch64
samba-winbind-4.22.1-1.fc42.aarch64
samba-dc-4.22.1-1.fc42.aarch64
root@fedora:/home/thinukam# rpm -qa | grep krb5
krb5-libs-1.21.3-5.fc42.aarch64
sssd-krb5-common-2.10.2-3.fc42.aarch64
krb5-pkinit-1.21.3-5.fc42.aarch64
krb5-server-1.21.3-5.fc42.aarch64
krb5-workstation-1.21.3-5.fc42.aarch64
root@fedora:/home/thinukam# rpm -qa | grep bind
rpcbind-1.2.7-1.rc1.fc42.4.aarch64
bind-libs-9.18.35-2.fc42.aarch64
bind-utils-9.18.35-2.fc42.aarch64
samba-winbind-modules-4.22.1-1.fc42.aarch64
samba-winbind-4.22.1-1.fc42.aarch64
bind-dnssec-utils-9.18.35-2.fc42.aarch64
bind-9.18.35-2.fc42.aarch64
```

Figure 1.1. 3 - Verify packages

- Set a static IP address and a hostname for the Domain Controller system

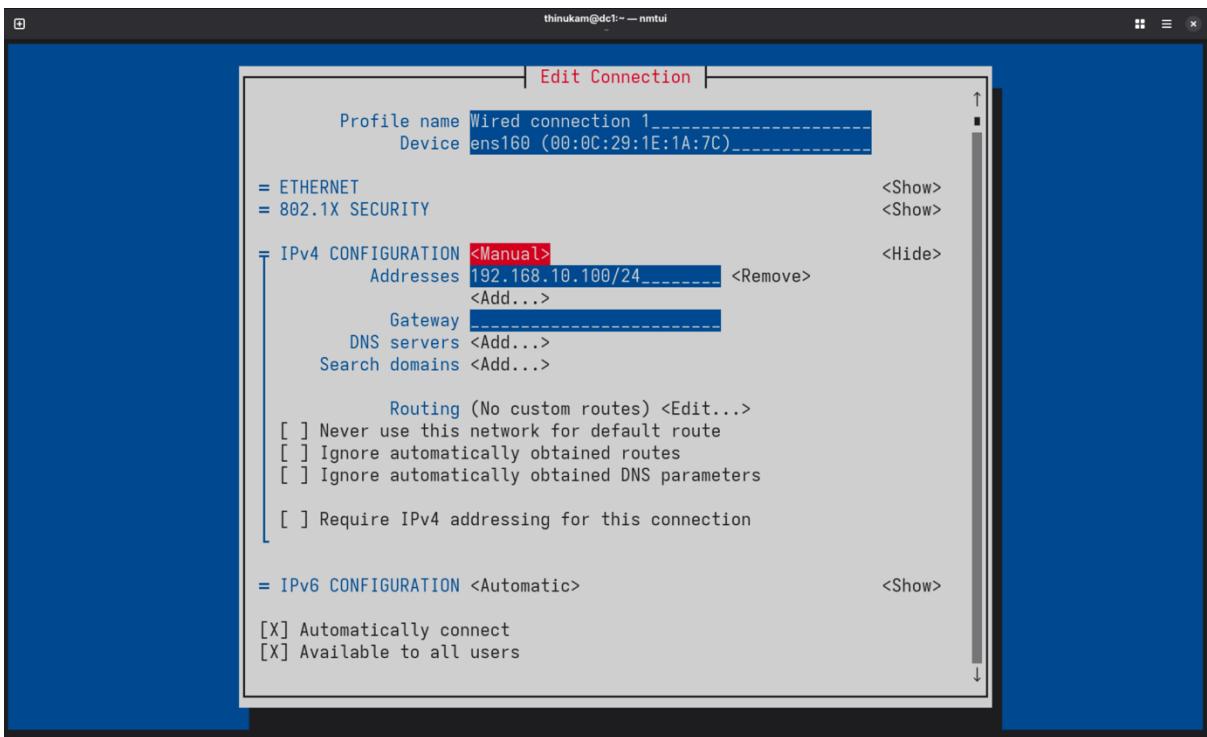
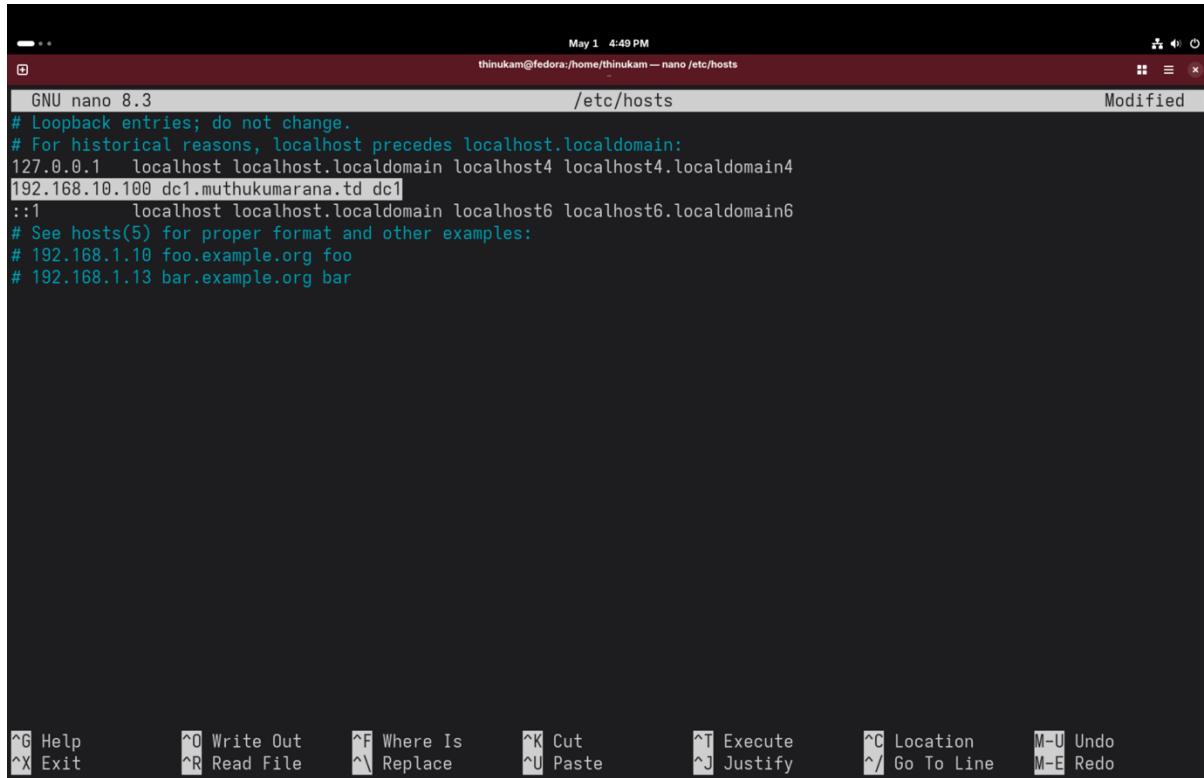


Figure 1.1. 4 - Set a Static IP via nmtui

```
root@fedora:/home/thinukam# hostnamectl set-hostname dc1.muthukumarana.td
root@fedora:/home/thinukam# hostnamectl
      Static hostname: dc1.muthukumarana.td
                  Icon name: computer-vm
                    Chassis: vm
           Machine ID: 5ce9cce928ea44f7a8eecc501b88d651a
             Boot ID: 2ef04f5ee5944ba886d50bf5f6420987
            Product UUID: bfd04d56-8fba-6264-e267-ed87281e1a7c
          AF_VSOCK CID: 673061500
      Virtualization: vmware
Operating System: Fedora Linux 42 (Workstation Edition)
      CPE OS Name: cpe:/o:fedoraproject:fedora:42
        OS Support End: Wed 2026-05-13
OS Support Remaining: 1y 1w 4d
          Kernel: Linux 6.14.4-300.fc42.aarch64
      Architecture: arm64
  Hardware Vendor: VMware, Inc.
  Hardware Model: VMware20_1
Hardware Serial: 62648FBABFD04D56
Firmware Version: VMW201.00V.240006586.BA64.2406042154
  Firmware Date: Tue 2024-06-04
  Firmware Age: 10month 3w 6d
root@fedora:/home/thinukam#
```

Figure 1.1. 5 - Set a static hostname

- Add the static IP address and the hostname to the */etc/hosts* file for name resolution



```

GNU nano 8.3          /etc/hosts          Modified
# Loopback entries; do not change.
# For historical reasons, localhost precedes localhost.localdomain:
127.0.0.1  localhost localhost.localdomain localhost4 localhost4.localdomain4
192.168.10.100 dc1.muthukumarana.td dc1
::1          localhost localhost.localdomain localhost6 localhost6.localdomain6
# See hosts(5) for proper format and other examples:
# 192.168.1.10 foo.example.org foo
# 192.168.1.13 bar.example.org bar

```

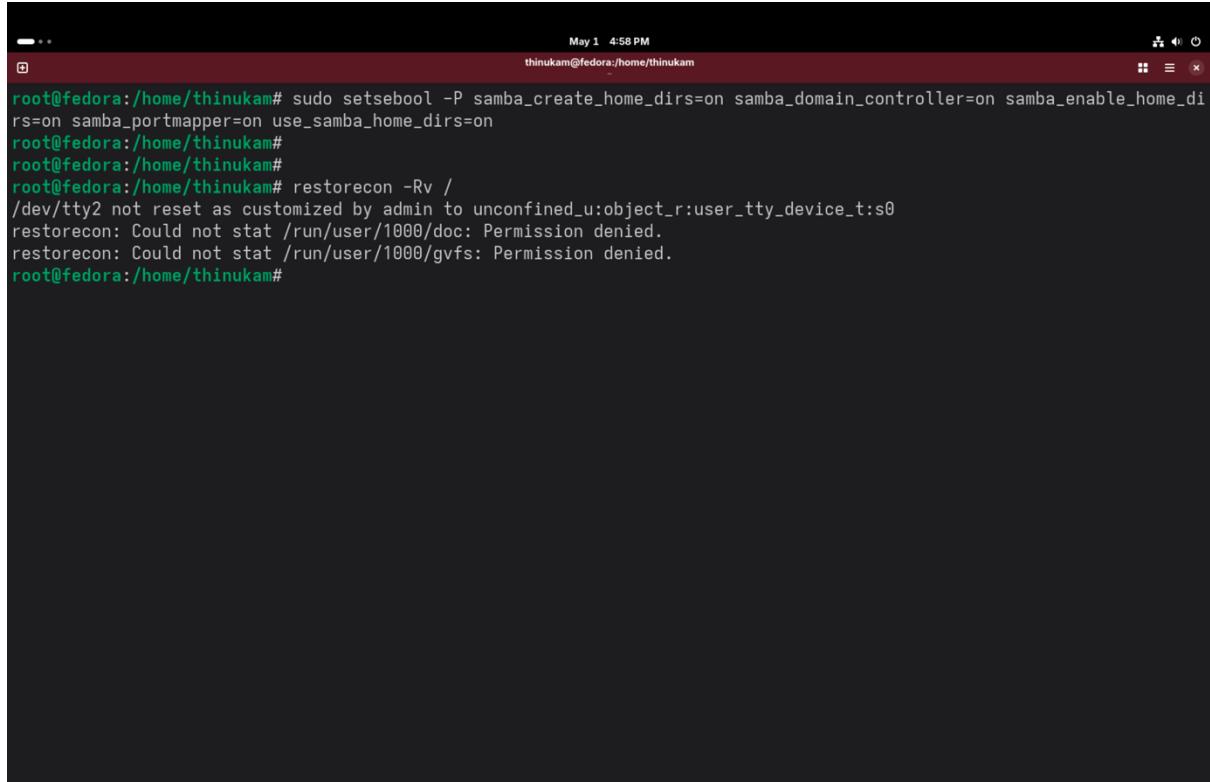
**Key Bindings:**

- ^G Help**
- ^O Write Out**
- ^F Where Is**
- ^K Cut**
- ^T Execute**
- ^C Location**
- M-U Undo**
- ^X Exit**
- ^R Read File**
- ^V Replace**
- ^U Paste**
- ^J Justify**
- ^/ Go To Line**
- M-E Redo**

Figure 1.1. 6 - */etc/hosts* file

## 1.2. Configuring Samba

- Set Samba Booleans for SELinux to run Samba DC with SELinux in enforcing mode.

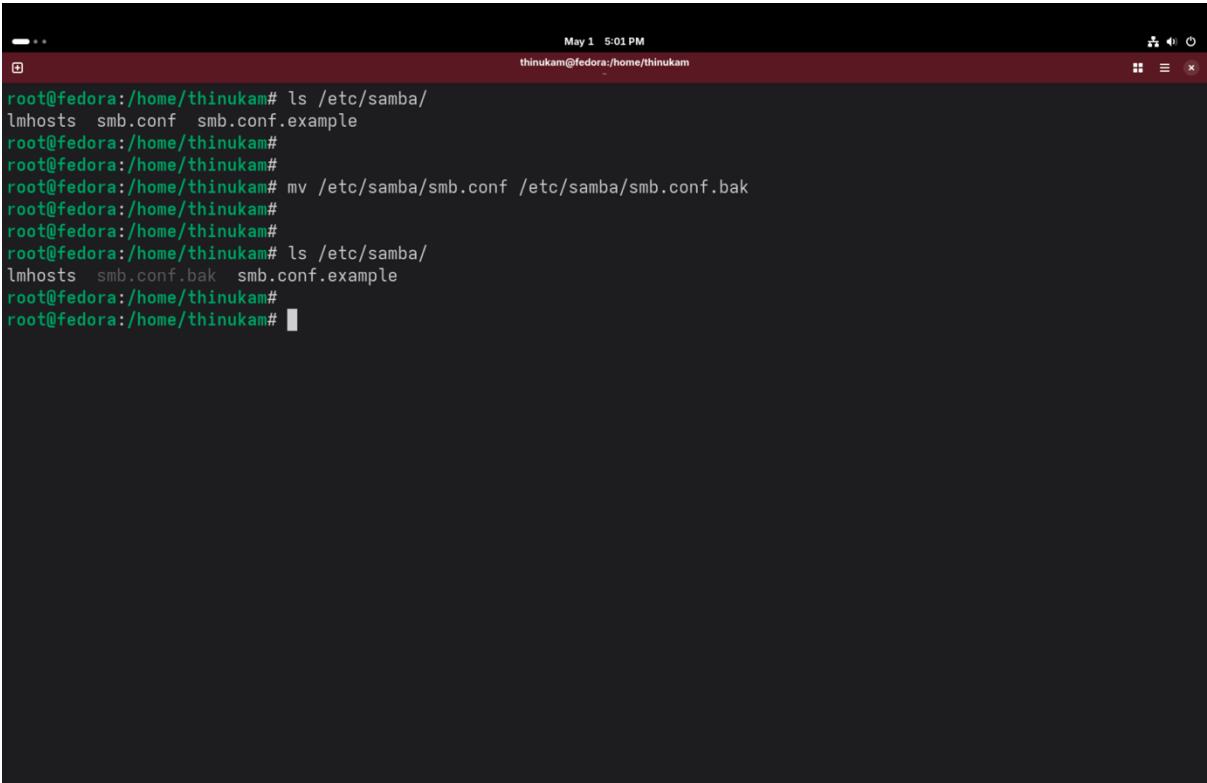


The screenshot shows a terminal window on a Fedora system. The title bar indicates it's running at 4:58 PM on May 1, with the user thinukam@fedora:/home/thinukam. The terminal content shows the root user executing commands to set SELinux booleans for Samba. The commands are:

```
root@fedora:/home/thinukam# sudo setsebool -P samba_create_home_dirs=on samba_domain_controller=on samba_enable_home_dirs=on samba_portmapper=on use_samba_home_dirs=on
root@fedora:/home/thinukam#
root@fedora:/home/thinukam#
root@fedora:/home/thinukam# restorecon -Rv /
/dev/tty2 not reset as customized by admin to unconfined_u:object_r:user_tty_device_t:s0
restorecon: Could not stat /run/user/1000/doc: Permission denied.
restorecon: Could not stat /run/user/1000/gvfs: Permission denied.
root@fedora:/home/thinukam#
```

Figure 1.2. 1 - Set Booleans for SELinux

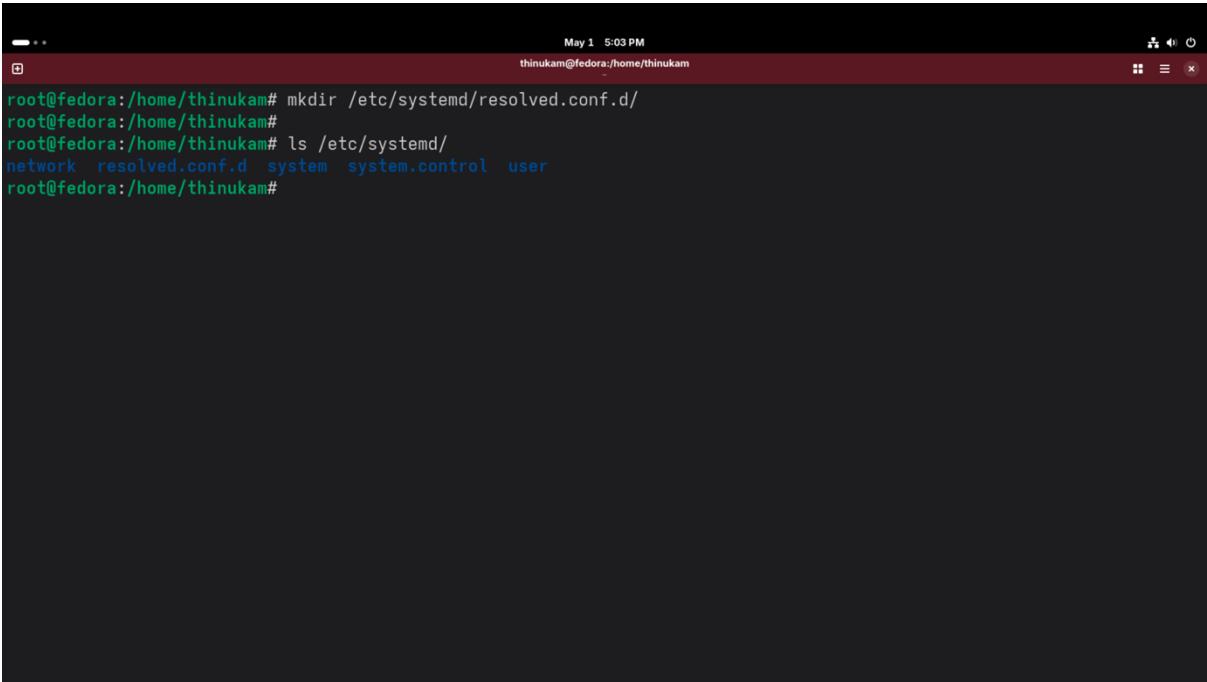
- Move the default Samba config file and rename it as *smb.conf.bak*



```
root@fedora:/home/thinukam# ls /etc/samba/
lmhosts smb.conf smb.conf.example
root@fedora:/home/thinukam#
root@fedora:/home/thinukam#
root@fedora:/home/thinukam# mv /etc/samba/smb.conf /etc/samba/smb.conf.bak
root@fedora:/home/thinukam#
root@fedora:/home/thinukam#
root@fedora:/home/thinukam# ls /etc/samba/
lmhosts smb.conf.bak smb.conf.example
root@fedora:/home/thinukam#
root@fedora:/home/thinukam#
```

Figure 1.2. 2 - Move the default Samba config file

- Create the directory */etc/systemd/resolved.conf.d/* and create a custom DNS resolution config file in the directory, and restart the *systemd-resolved* service



```
root@fedora:/home/thinukam# mkdir /etc/systemd/resolved.conf.d/
root@fedora:/home/thinukam#
root@fedora:/home/thinukam# ls /etc/systemd/
network resolved.conf.d system system.control user
root@fedora:/home/thinukam#
```

Figure 1.2. 3 - Create the directory */etc/systemd/resolved.conf.d/*

- Use the `nano /etc/systemd/resolved.conf.d/custom.conf` command to create the custom file

```
thinukam@fedora:/home/thinukam -- nano /etc/systemd/resolved.conf.d/custom.conf
GNU nano 8.3
[Resolve]
DNSStubListener=no
Domains=muthukumarana.td
DNS=192.168.10.100
```

The screenshot shows a terminal window with the nano text editor open. The title bar indicates the file is `/etc/systemd/resolved.conf.d/custom.conf`. The editor interface includes a menu bar with "Modified" and a toolbar below it with various keyboard shortcut icons. The main area of the editor shows the configuration for DNS resolution, specifically setting `DNSStubListener` to `no` and defining a domain `muthukumarana.td`.

Figure 1.2. 4 - Custom DNS resolution file

```
root@fedora:/home/thinukam#
root@fedora:/home/thinukam# systemctl restart systemd-resolved
root@fedora:/home/thinukam# systemctl status systemd-resolved.service
● systemd-resolved.service - Network Name Resolution
  Loaded: loaded (/usr/lib/systemd/system/systemd-resolved.service; enabled; preset: enabled)
  Drop-In: /usr/lib/systemd/system/service.d
    └─10-timeout-abort.conf, 50-keep-warm.conf
    Active: active (running) since Thu 2025-05-01 17:06:28 +0530; 35s ago
      Invocation: 727c343c7b4c445daa9c46053a8186e4
        Docs: man:systemd-resolved.service(8)
               man:org.freedesktop.resolve1(5)
               https://systemd.io/WRITING_NETWORK_CONFIGURATION_MANAGERS
               https://systemd.io/WRITING_RESOLVER_CLIENTS
    Main PID: 5087 (systemd-resolve)
    Status: "Processing requests..."
      Tasks: 1 (limit: 4552)
     Memory: 4M (peak: 5.3M)
       CPU: 40ms
      CGroup: /system.slice/systemd-resolved.service
              └─5087 /usr/lib/systemd/systemd-resolved

May 01 17:06:28 dc1.muthukumarana.td systemd[1]: Starting systemd-resolved.service - Network Name Resolution...
May 01 17:06:28 dc1.muthukumarana.td systemd-resolved[5087]: Positive Trust Anchors:
May 01 17:06:28 dc1.muthukumarana.td systemd-resolved[5087]: . IN DS 20326 8 2 e06d44b80b8f1d39a95c0b0d7c65d08458e8804>
May 01 17:06:28 dc1.muthukumarana.td systemd-resolved[5087]: . IN DS 38696 8 2 683d2d0acb8c9b712a1948b27f741219298d0a4>
May 01 17:06:28 dc1.muthukumarana.td systemd-resolved[5087]: Negative trust anchors: home.arpa 10.in-addr.arpa 16.172.>
May 01 17:06:28 dc1.muthukumarana.td systemd-resolved[5087]: Using system hostname 'dc1.muthukumarana.td'.
May 01 17:06:28 dc1.muthukumarana.td systemd[1]: Started systemd-resolved.service - Network Name Resolution.
```

The screenshot shows a terminal window with the root user executing the command `systemctl restart systemd-resolved`. The output shows the service status and logs for the restart. The logs indicate the service is starting, processing requests, and establishing trust anchors. It also mentions negative trust anchors for the `home.arpa` and `10.in-addr.arpa` domains, and that it is using the system hostname `dc1.muthukumarana.td`.

Figure 1.2. 5 - Restart the systemd-resolved service

- Using the *samba-tool*, provision the Samba configuration and verify the newly created *smb.conf* Samba configuration file

```

root@fedora:/home/thinukam# samba-tool domain provision --use-rfc2307 --interactive
Realm [MUTHUKUMARANA.TD]:
Domain [MUTHUKUMARANA]:
Server Role (dc, member, standalone) [dc]:
DNS backend (SAMBA_INTERNAL, BIND9_FLATFILE, BIND9_DLZ, NONE) [SAMBA_INTERNAL]:
DNS forwarder IP address (write 'none' to disable forwarding) [192.168.10.100]: none
Administrator password:
Retype password:
INFO 2025-05-01 17:18:46,600 pid:5212 /usr/lib64/python3.13/site-packages/samba/provision/__init__.py #2112: Looking up IPv4 addresses
INFO 2025-05-01 17:18:46,601 pid:5212 /usr/lib64/python3.13/site-packages/samba/provision/__init__.py #2129: Looking up IPv6 addresses
WARNING 2025-05-01 17:18:46,602 pid:5212 /usr/lib64/python3.13/site-packages/samba/provision/__init__.py #2136: No IPv6 address will be assigned
INFO 2025-05-01 17:18:46,722 pid:5212 /usr/lib64/python3.13/site-packages/samba/provision/__init__.py #2302: Setting up share.ldb
INFO 2025-05-01 17:18:46,733 pid:5212 /usr/lib64/python3.13/site-packages/samba/provision/__init__.py #2306: Setting up secrets.ldb
INFO 2025-05-01 17:18:46,739 pid:5212 /usr/lib64/python3.13/site-packages/samba/provision/__init__.py #2311: Setting up the registry
INFO 2025-05-01 17:18:46,765 pid:5212 /usr/lib64/python3.13/site-packages/samba/provision/__init__.py #2314: Setting up the privileges database
INFO 2025-05-01 17:18:46,775 pid:5212 /usr/lib64/python3.13/site-packages/samba/provision/__init__.py #2317: Setting up idmap db
INFO 2025-05-01 17:18:46,787 pid:5212 /usr/lib64/python3.13/site-packages/samba/provision/__init__.py #2324: Setting up SAM db
INFO 2025-05-01 17:18:46,789 pid:5212 /usr/lib64/python3.13/site-packages/samba/provision/__init__.py #887: Setting up sam.ldb partitions and settings
INFO 2025-05-01 17:18:46,789 pid:5212 /usr/lib64/python3.13/site-packages/samba/provision/__init__.py #899: Setting up sam.ldb rootDSE
INFO 2025-05-01 17:18:46,792 pid:5212 /usr/lib64/python3.13/site-packages/samba/provision/__init__.py #1312: Pre-loading the Samba 4 and AD schema

```

Figure 1.2. 6 - Provision the Samba configuration

```

root@fedora:/home/thinukam# ls /etc/samba/
lmhosts smb.conf smb.conf.bak smb.conf.example
root@fedora:/home/thinukam#
root@fedora:/home/thinukam# cat /etc/samba/smb.conf
# Global parameters
[global]
    netbios name = DC1
    realm = MUTHUKUMARANA.TD
    server role = active directory domain controller
    workgroup = MUTHUKUMARANA
    idmap_ldb:use rfc2307 = yes

[sysvol]
    path = /var/lib/samba/sysvol
    read only = No

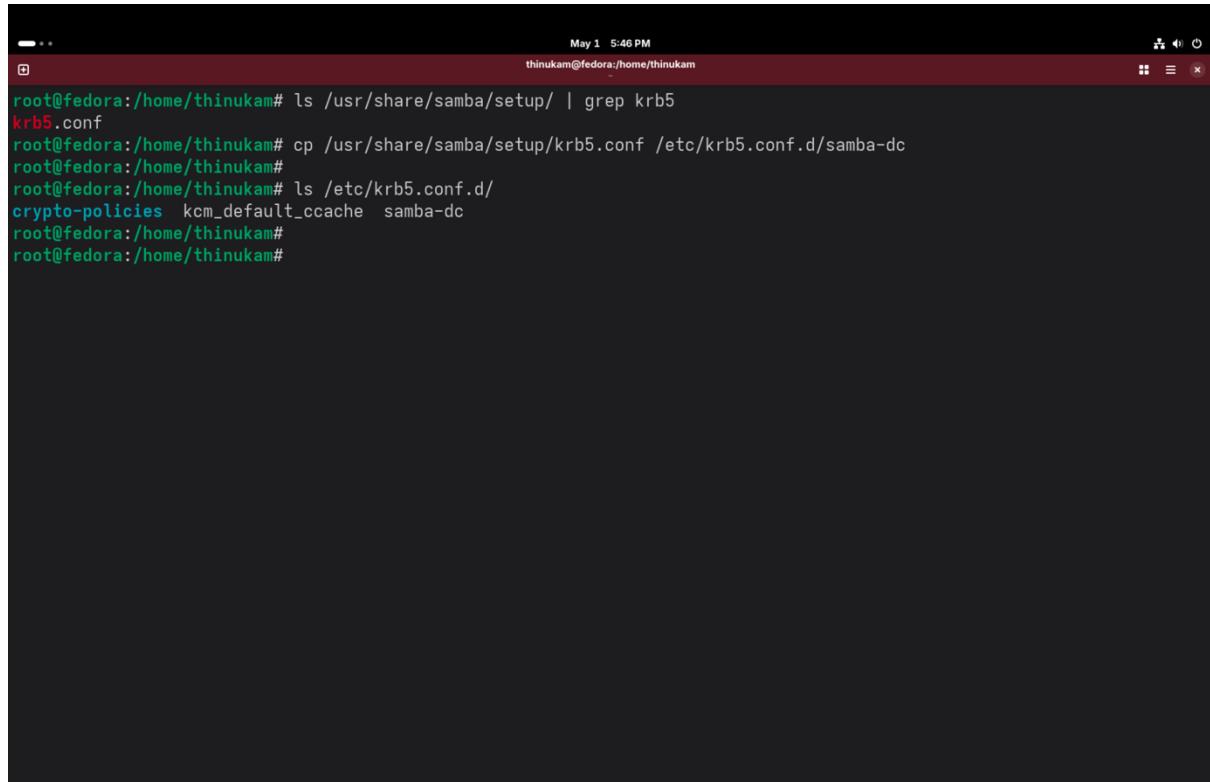
[netlogon]
    path = /var/lib/samba/sysvol/muthukumarana.td/scripts
    read only = No
root@fedora:/home/thinukam#

```

Figure 1.2. 7 - Verify the Samba configuration file

### 1.3. Configuring Kerberos

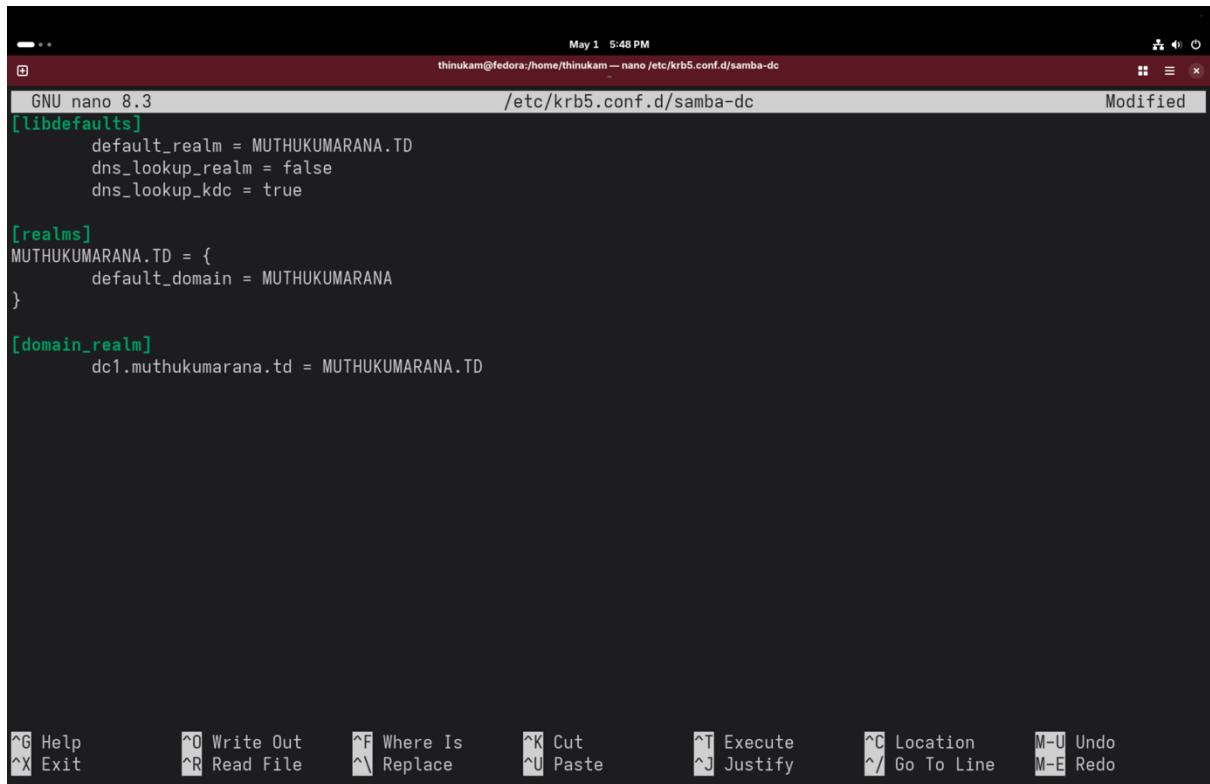
- The Kerberos configuration file *krb5.conf* is stored in the directory */usr/share/samba/setup/* by default.
- Copy the *krb5.conf* Kerberos configuration file from the default location to the directory */etc/krb5.conf.d/* as *samba-dc*



```
root@fedora:/home/thinukam# ls /usr/share/samba/setup/ | grep krb5
krb5.conf
root@fedora:/home/thinukam# cp /usr/share/samba/setup/krb5.conf /etc/krb5.conf.d/samba-dc
root@fedora:/home/thinukam#
root@fedora:/home/thinukam# ls /etc/krb5.conf.d/
crypto-policies  kcm_default_ccache  samba-dc
root@fedora:/home/thinukam#
root@fedora:/home/thinukam#
```

Figure 1.3. 1 - Copy the Kerberos Configuration file to */etc/krb5.conf.d/* directory

- Modify the *samba-dc* Kerberos configuration file to match the domain information



```

May 1 5:48 PM
thinukam@fedora:/home/thinukam — nano /etc/krb5.conf.d/samba-dc
Modified

GNU nano 8.3
/etc/krb5.conf.d/samba-dc

[libdefaults]
    default_realm = MUTHUKUMARANA.TD
    dns_lookup_realm = false
    dns_lookup_kdc = true

[realms]
MUTHUKUMARANA.TD = {
    default_domain = MUTHUKUMARANA
}

[domain_realm]
dc1.muthukumarana.td = MUTHUKUMARANA.TD

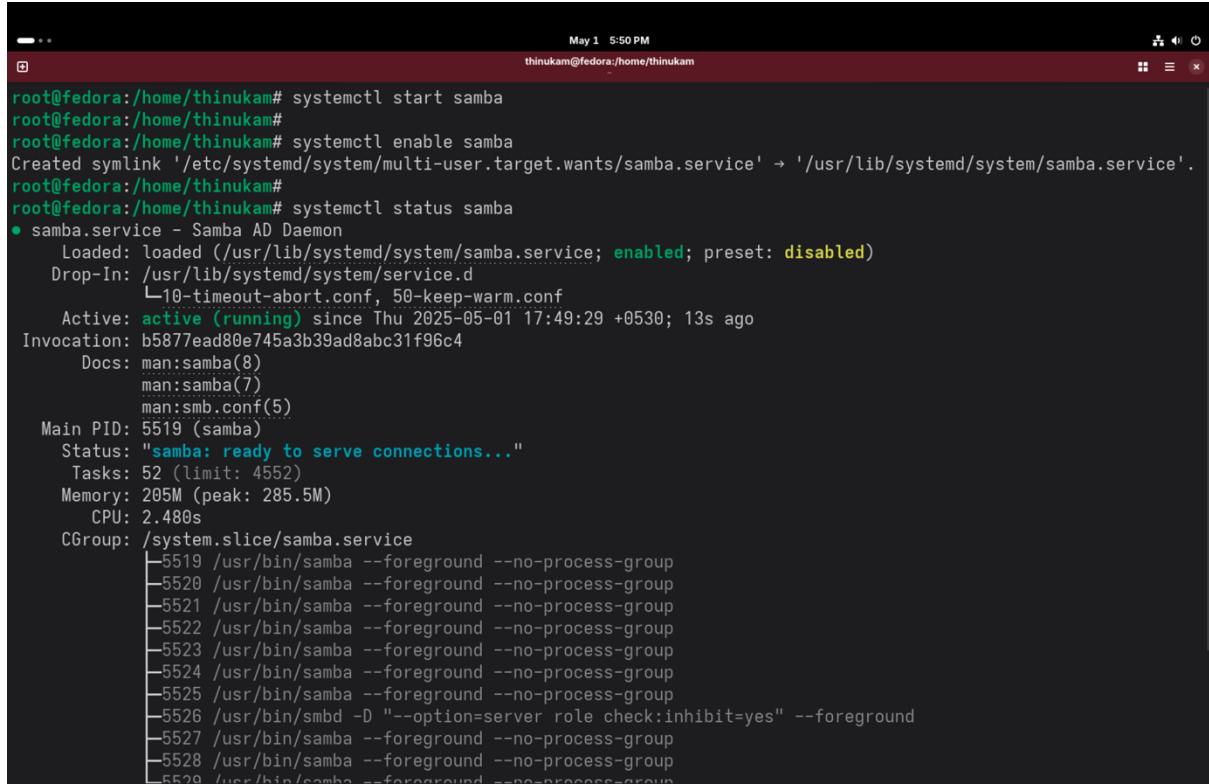
^G Help      ^O Write Out     ^F Where Is     ^K Cut        ^T Execute     ^C Location   M-U Undo
^X Exit      ^R Read File     ^\ Replace      ^U Paste      ^J Justify     ^/ Go To Line  M-E Redo

```

Figure 1.3. 2 - *samba-dc* Kerberos Configuration file

## 1.4. Starting the Samba Service

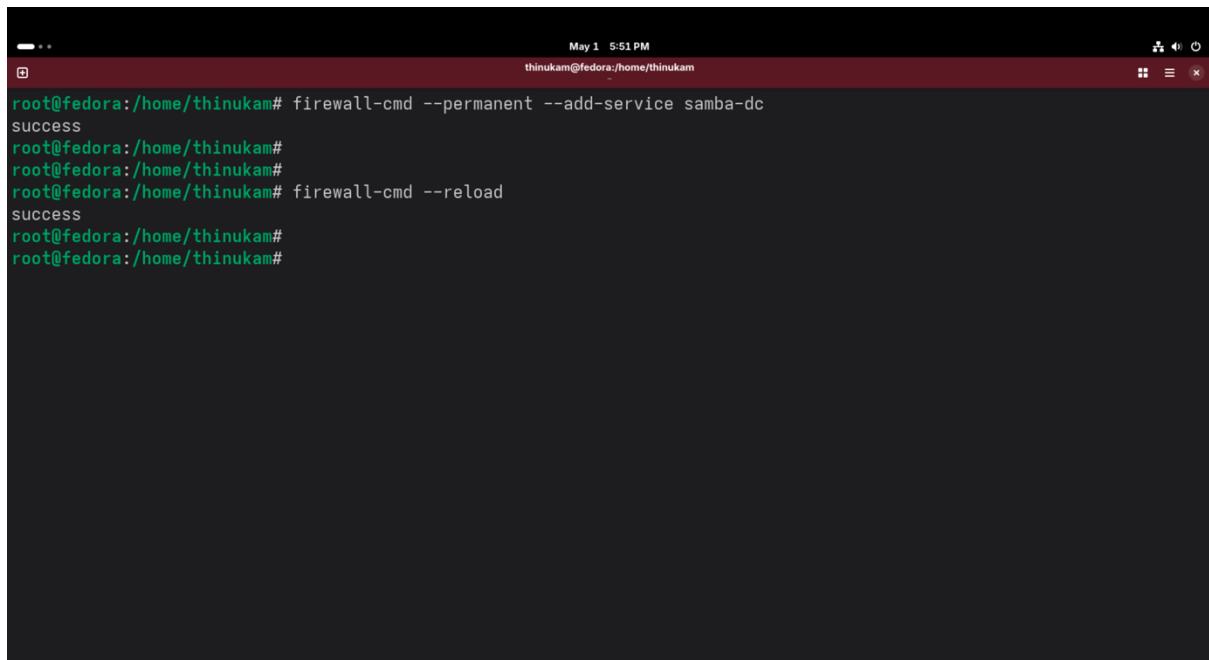
- Start and enable the Samba service to ensure the service starts on system initialization



```
root@fedora:/home/thinukam# systemctl start samba
root@fedora:/home/thinukam# systemctl enable samba
Created symlink '/etc/systemd/system/multi-user.target.wants/samba.service' → '/usr/lib/systemd/system/samba.service'.
root@fedora:/home/thinukam#
root@fedora:/home/thinukam# systemctl status samba
● samba.service - Samba AD Daemon
   Loaded: loaded (/usr/lib/systemd/system/samba.service; enabled; preset: disabled)
   Drop-In: /usr/lib/systemd/system/service.d
             └─10-timeout-abort.conf, 50-keep-warm.conf
     Active: active (running) since Thu 2025-05-01 17:49:29 +0530; 13s ago
   Invocation: b5877ead80e745a3b39ad8abc31f96c4
     Docs: man:samba(8)
           man:samba(7)
           man:smb.conf(5)
   Main PID: 5519 (samba)
     Status: "samba: ready to serve connections..."
      Tasks: 52 (limit: 4552)
     Memory: 205M (peak: 285.5M)
        CPU: 2.480s
      CGroup: /system.slice/samba.service
              ├─5519 /usr/bin/samba --foreground --no-process-group
              ├─5520 /usr/bin/samba --foreground --no-process-group
              ├─5521 /usr/bin/samba --foreground --no-process-group
              ├─5522 /usr/bin/samba --foreground --no-process-group
              ├─5523 /usr/bin/samba --foreground --no-process-group
              ├─5524 /usr/bin/samba --foreground --no-process-group
              ├─5525 /usr/bin/samba --foreground --no-process-group
              ├─5526 /usr/bin/smbd -D "--option=server role check:inhibit=yes" --foreground
              ├─5527 /usr/bin/samba --foreground --no-process-group
              ├─5528 /usr/bin/samba --foreground --no-process-group
              ├─5529 /usr/bin/samba --foreground --no-process-group
```

Figure 1.4. 1 - Start and enable the Samba service

- Allow TCP and UDP ports through the firewall so the clients will be able to connect to the Domain Controller

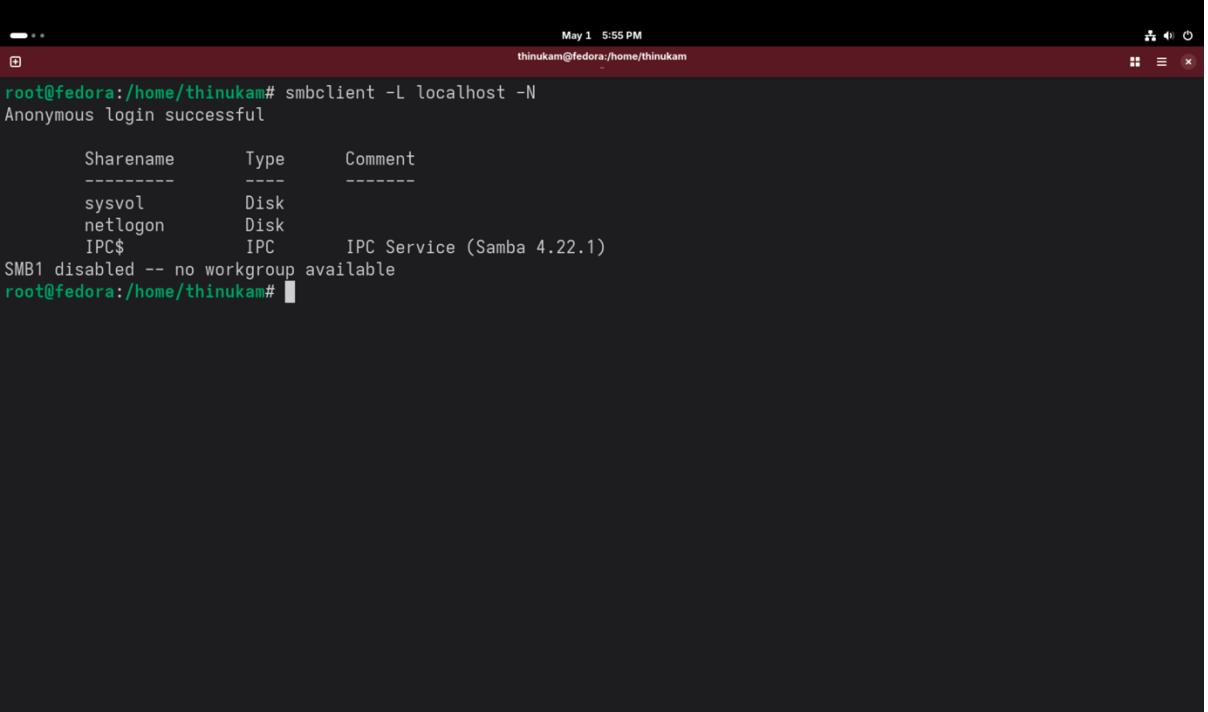


```
root@fedora:/home/thinukam# firewall-cmd --permanent --add-service samba-dc
success
root@fedora:/home/thinukam#
root@fedora:/home/thinukam#
root@fedora:/home/thinukam# firewall-cmd --reload
success
root@fedora:/home/thinukam#
root@fedora:/home/thinukam#
```

Figure 1.4. 2 - Allow TCP and UDP ports through the firewall

## 1.5. Testing the Samba Server

- Test connectivity to the local Samba Server

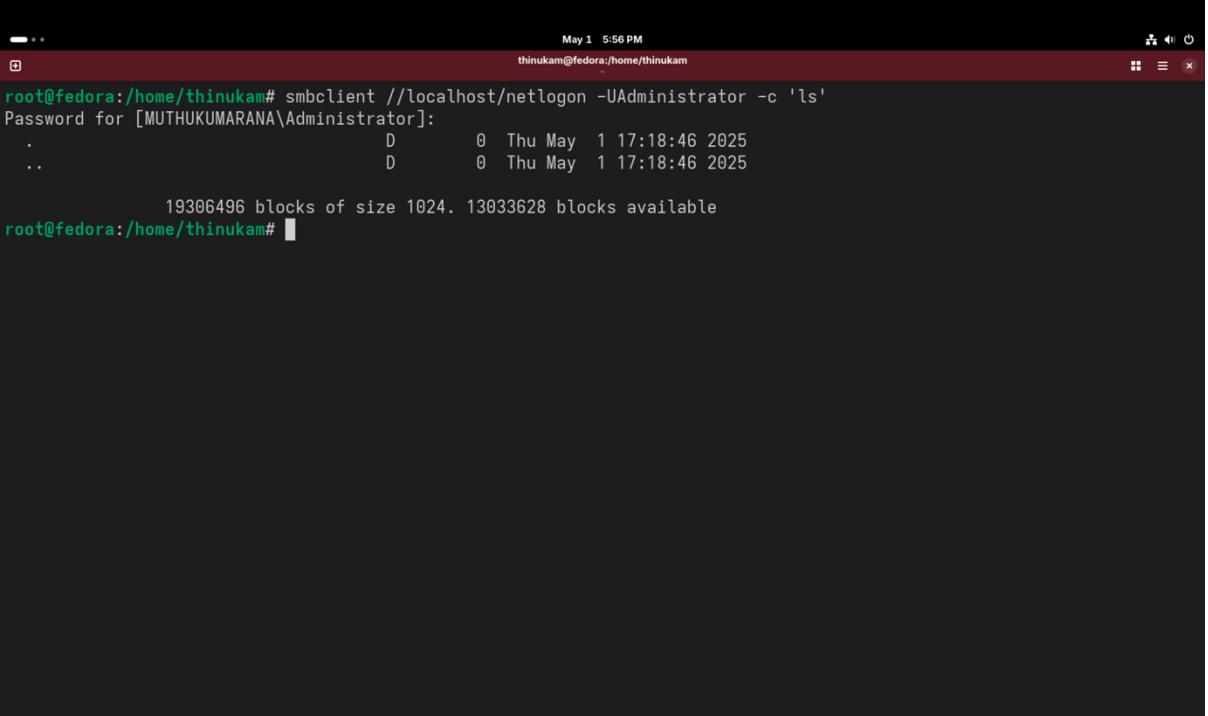


```
root@fedora:/home/thinukam# smbclient -L localhost -N
Anonymous login successful

  Sharename      Type      Comment
  -----        ----      -----
  sysvol        Disk
  netlogon       Disk
  IPC$          IPC       IPC Service (Samba 4.22.1)
SMB1 disabled -- no workgroup available
root@fedora:/home/thinukam#
```

Figure 1.5. 1 - Local Samba Server connectivity test

- Test the *Administrator* login to the *netlogon* share



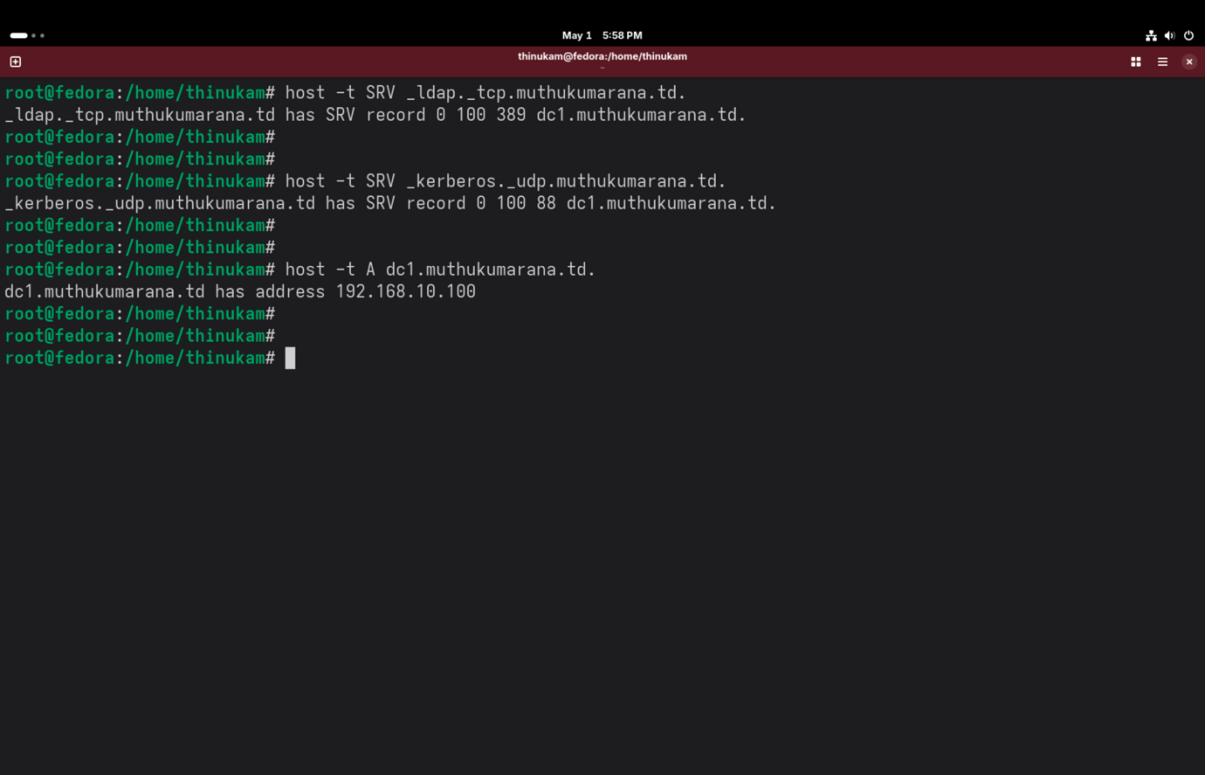
```
root@fedora:/home/thinukam# smbclient //localhost/netlogon -UAdministrator -c 'ls'
Password for [MUTHUKUMARANA\Administrator]:
.

D          0 Thu May  1 17:18:46 2025
.

19306496 blocks of size 1024. 13033628 blocks available
root@fedora:/home/thinukam#
```

Figure 1.5. 2 - Administrator login test

- Test if the name resolution is working

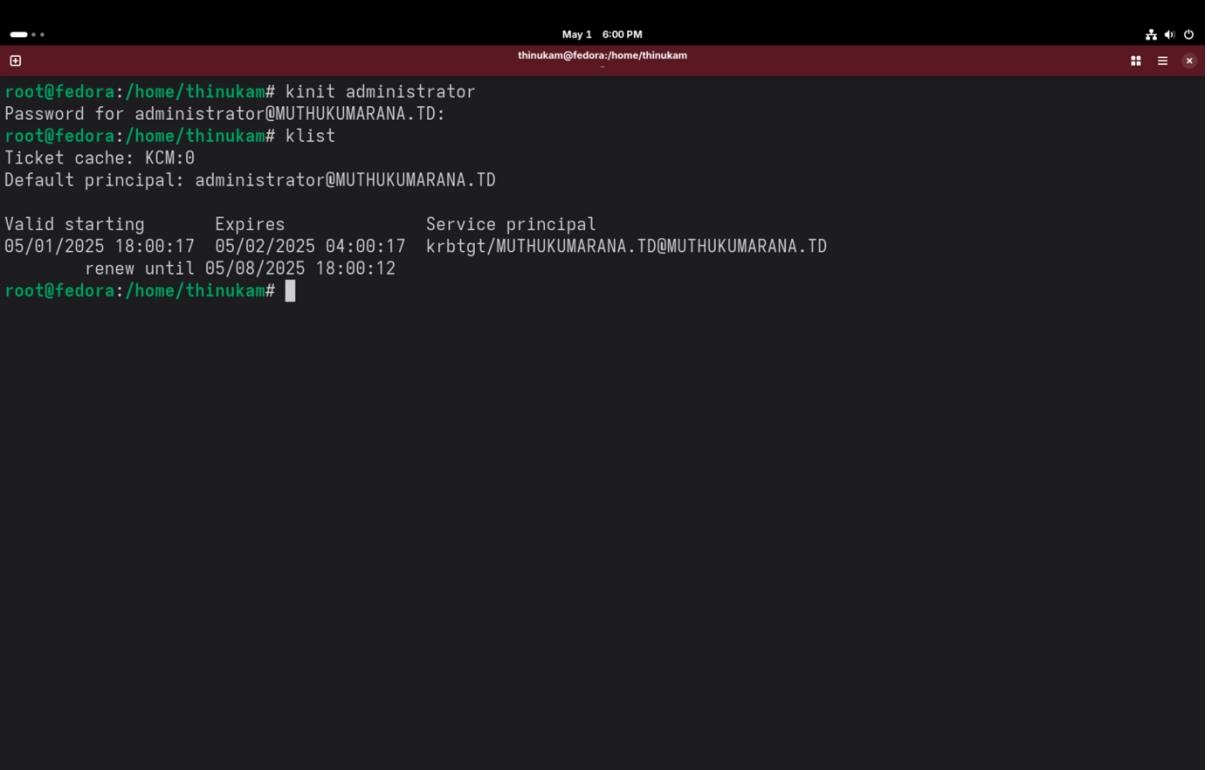


```

root@fedora:/home/thinukam# host -t SRV _ldap._tcp.muthukumarana.td.
_ldap._tcp.muthukumarana.td has SRV record 0 100 389 dc1.muthukumarana.td.
root@fedora:/home/thinukam#
root@fedora:/home/thinukam# host -t SRV _kerberos._udp.muthukumarana.td.
_kerberos._udp.muthukumarana.td has SRV record 0 100 88 dc1.muthukumarana.td.
root@fedora:/home/thinukam#
root@fedora:/home/thinukam# host -t A dc1.muthukumarana.td.
dc1.muthukumarana.td has address 192.168.10.100
root@fedora:/home/thinukam#
root@fedora:/home/thinukam#
root@fedora:/home/thinukam# 
```

Figure 1.5. 3 – Name resolution (DNS) test

- Test if Kerberos Authentication is working



```

root@fedora:/home/thinukam# kinit administrator
Password for administrator@MUTHUKUMARANA.TD:
root@fedora:/home/thinukam# klist
Ticket cache: KCM:0
Default principal: administrator@MUTHUKUMARANA.TD

Valid starting     Expires            Service principal
05/01/2025 18:00:17  05/02/2025 04:00:17  krbtgt/MUTHUKUMARANA.TD@MUTHUKUMARANA.TD
    renew until 05/08/2025 18:00:12
root@fedora:/home/thinukam# 
```

Figure 1.5. 4 - Kerberos test

## 1.6. Configuring the DHCP Server

- Install the required DHCP Server package

```
root@fedora:/home/thinukam# dnf install dhcp-server -y
Updating and loading repositories:
Repositories loaded.
Package           Arch      Version       Repository      Size
Installing:
  dhcp-server     aarch64  12:4.4.3-16.P1.fc42          fedora    4.0 MiB

Transaction Summary:
  Installing: 1 package

Total size of inbound packages is 1 MiB. Need to download 1 MiB.
After this operation, 4 MiB extra will be used (install 4 MiB, remove 0 B).
[1/1] dhcp-server-12:4.4.3-16.P1.fc42.aarch64
[1/1] Total
Running transaction
[1/3] Verify package files
[2/3] Prepare transaction
>>> Running sysusers scriptlet: dhcp-server-12:4.4.3-16.P1.fc42.aarch64
>>> Finished sysusers scriptlet: dhcp-server-12:4.4.3-16.P1.fc42.aarch64
>>> Scriptlet output:
>>> Creating group 'dhcpd' with GID 177.
>>> Creating user 'dhcpd' (DHCP server) with UID 177 and GID 177.
>>>
[3/3] Installing dhcp-server-12:4.4.3-16.P1.fc42.aarch64
Complete!
root@fedora:/home/thinukam# rpm -qa | grep dhcp
dhcp-common-4.4.3-16.P1.fc42.noarch
dhcp-client-4.4.3-16.P1.fc42.aarch64
dhcp-server-4.4.3-16.P1.fc42.aarch64
root@fedora:/home/thinukam#
```

Figure 1.6. 1 - Install the DHCP package

- Specify the interface that distributes DHCP leases by modifying the /etc/sysconfig/dhcpd file

```
thinukam@fedora:/home/thinukam — nano /etc/sysconfig/dhcpd
GNU nano 8.3
/etc/sysconfig/dhcpd
# WARNING: This file is NOT used anymore.

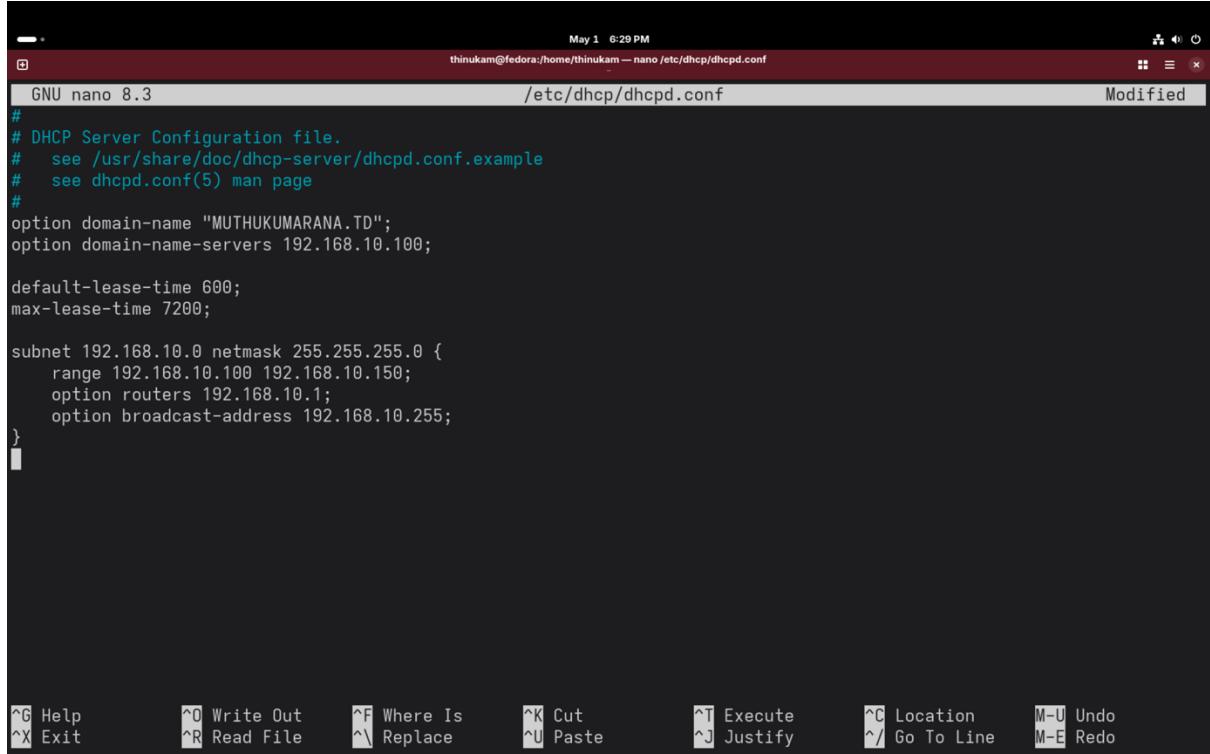
# If you are here to restrict what interfaces should dhcpcd listen on,
# be aware that dhcpcd listens *only* on interfaces for which it finds subnet
# declaration in dhcpcd.conf. It means that explicitly enumerating interfaces
# also on command line should not be required in most cases.

# If you still insist on adding some command line options,
# copy dhcpcd.service from /lib/systemd/system to /etc/systemd/system and modify
# it there.
# https://fedoraproject.org/wiki/Systemd#How_do_I_customize_a_unit_file.2F_add_a_custom_unit_file.3F

# example:
# $ cp /usr/lib/systemd/system/dhcpcd.service /etc/systemd/system/
# $ vi /etc/systemd/system/dhcpcd.service
# $ ExecStart=/usr/sbin/dhcpcd -f -of /etc/dhcp/dhcpcd.conf -user dhcpcd -group dhcpcd --no-pid <your_interface_name(s)>
# $ systemctl --system daemon-reload
# $ systemctl restart dhcpcd.service
DHCPDARGS=ens160
```

Figure 1.6. 2 – /etc/sysconfig/dhcpd file

- Modify the DHCP configuration file `/etc/dhcp/dhcpd.conf` to distribute IP addresses by defining the pool



```

GNU nano 8.3                               May 1 6:29 PM
thinukam@fedora:/home/thinukam -- nano /etc/dhcp/dhcpd.conf
/etc/dhcp/dhcpd.conf                         Modified

#
# DHCP Server Configuration file.
#   see /usr/share/doc/dhcp-server/dhcpd.conf.example
#   see dhcpd.conf(5) man page
#
option domain-name "MUTHUKUMARANA.TD";
option domain-name-servers 192.168.10.100;

default-lease-time 600;
max-lease-time 7200;

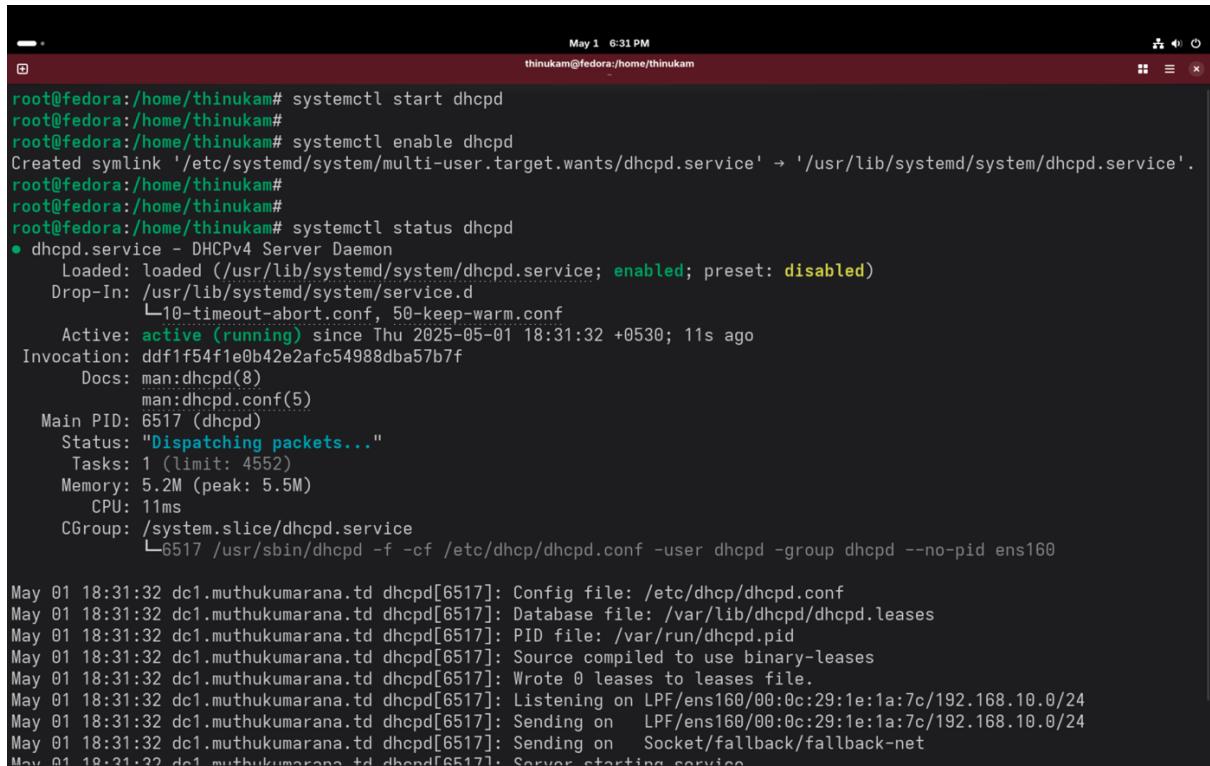
subnet 192.168.10.0 netmask 255.255.255.0 {
    range 192.168.10.100 192.168.10.150;
    option routers 192.168.10.1;
    option broadcast-address 192.168.10.255;
}

```

^G Help ^O Write Out ^F Where Is ^K Cut ^T Execute ^C Location  
 ^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^/ Go To Line M-U Undo  
 M-E Redo

Figure 1.6. 3 - `/etc/dhcp/dhcpd.conf` file

- Start and enable the DHCP server, and verify the status of the server



```

root@fedora:/home/thinukam# systemctl start dhcpcd
root@fedora:/home/thinukam#
root@fedora:/home/thinukam# systemctl enable dhcpcd
Created symlink '/etc/systemd/system/multi-user.target.wants/dhcpcd.service' → '/usr/lib/systemd/system/dhcpcd.service'.
root@fedora:/home/thinukam#
root@fedora:/home/thinukam# systemctl status dhcpcd
● dhcpcd.service - DHCPv4 Server Daemon
   Loaded: loaded (/usr/lib/systemd/system/dhcpcd.service; enabled; preset: disabled)
   Drop-In: /usr/lib/systemd/system/service.d
             └─10-timeout-abort.conf, 50-keep-warm.conf
     Active: active (running) since Thu 2025-05-01 18:31:32 +0530; 11s ago
   Invocation: ddf1f54f1e0b42e2afc54988dba57b7f
     Docs: man:dhcpcd(8)
           man:dhcpcd.conf(5)
   Main PID: 6517 (dhcpcd)
     Status: "Dispatching packets..."
     Tasks: 1 (limit: 4552)
    Memory: 5.2M (peak: 5.5M)
      CPU: 11ms
     CGroup: /system.slice/dhcpcd.service
             └─6517 /usr/sbin/dhcpcd -f -cf /etc/dhcp/dhcpd.conf -user dhcpcd -group dhcpcd --no-pid ens160

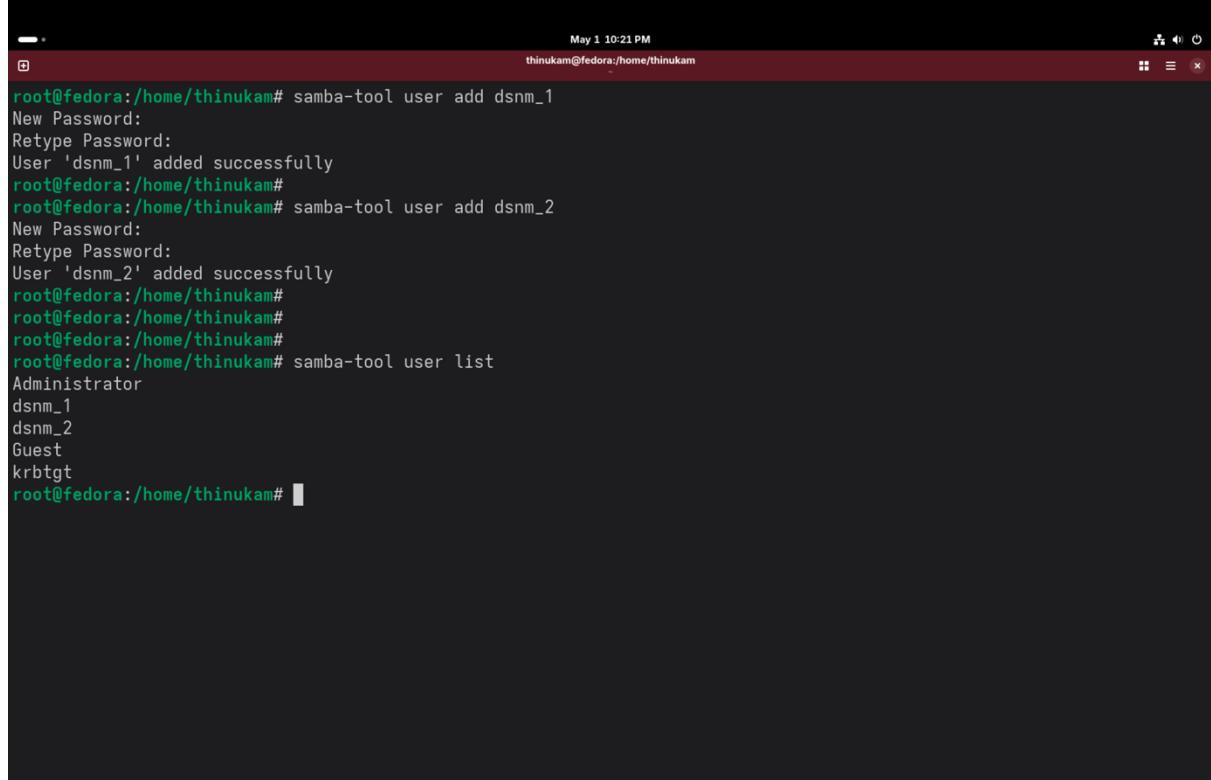
May 01 18:31:32 dc1.muthukumarana.td dhcpcd[6517]: Config file: /etc/dhcp/dhcpd.conf
May 01 18:31:32 dc1.muthukumarana.td dhcpcd[6517]: Database file: /var/lib/dhcpd/dhcpd.leases
May 01 18:31:32 dc1.muthukumarana.td dhcpcd[6517]: PID file: /var/run/dhcpcd.pid
May 01 18:31:32 dc1.muthukumarana.td dhcpcd[6517]: Source compiled to use binary-leases
May 01 18:31:32 dc1.muthukumarana.td dhcpcd[6517]: Wrote 0 leases to leases file.
May 01 18:31:32 dc1.muthukumarana.td dhcpcd[6517]: Listening on LPF/ens160/00:0c:29:1e:1a:7c/192.168.10.0/24
May 01 18:31:32 dc1.muthukumarana.td dhcpcd[6517]: Sending on LPF/ens160/00:0c:29:1e:1a:7c/192.168.10.0/24
May 01 18:31:32 dc1.muthukumarana.td dhcpcd[6517]: Sending on Socket/fallback/fallback-net
May 01 18:31:32 dc1.muthukumarana.td dhcpcd[6517]: Server starting service

```

Figure 1.6. 4 - Start and enable the DHCP server

## 1.7. Adding Users to the Domain

- Use the *samba-tool* to add users to the domain and specify authentication passwords, and verify that the users are added to the list



The screenshot shows a terminal window on a Fedora system. The user is root, and the command `samba-tool user add dsnm_1` is run. The user is prompted for a new password and then re-typed. The message "User 'dsnm\_1' added successfully" is displayed. This is followed by another `samba-tool user add dsnm_2` command, which also adds the user successfully. Finally, the `samba-tool user list` command is run, showing the administrator and the newly created users `dsnm_1` and `dsnm_2`.

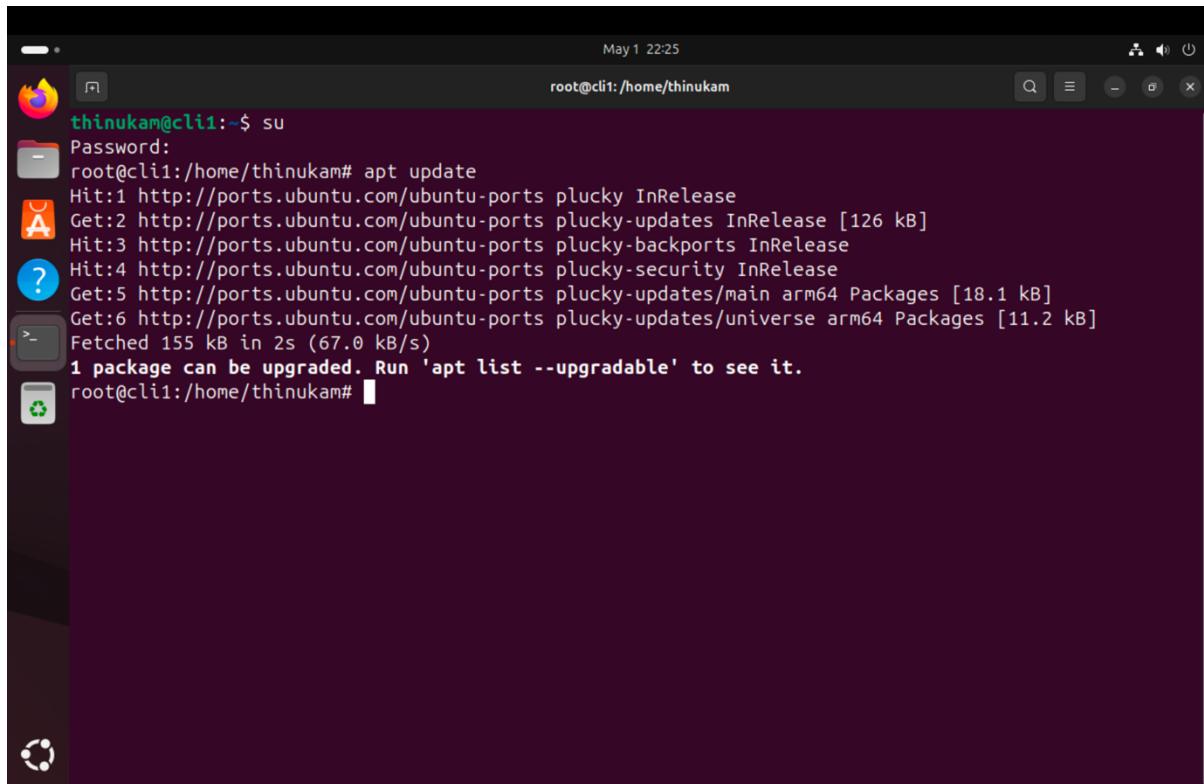
```
root@fedora:/home/thinukam# samba-tool user add dsnm_1
New Password:
Retype Password:
User 'dsnm_1' added successfully
root@fedora:/home/thinukam#
root@fedora:/home/thinukam# samba-tool user add dsnm_2
New Password:
Retype Password:
User 'dsnm_2' added successfully
root@fedora:/home/thinukam#
root@fedora:/home/thinukam#
root@fedora:/home/thinukam# samba-tool user list
Administrator
dsnm_1
dsnm_2
Guest
krbtgt
root@fedora:/home/thinukam#
```

Figure 1.7. 1 - Adding users to the domain and verifying

## 2. Join Ubuntu Clients to the AD Domain

### 2.1. Preparing the client machine/s

- Update the Ubuntu operating system

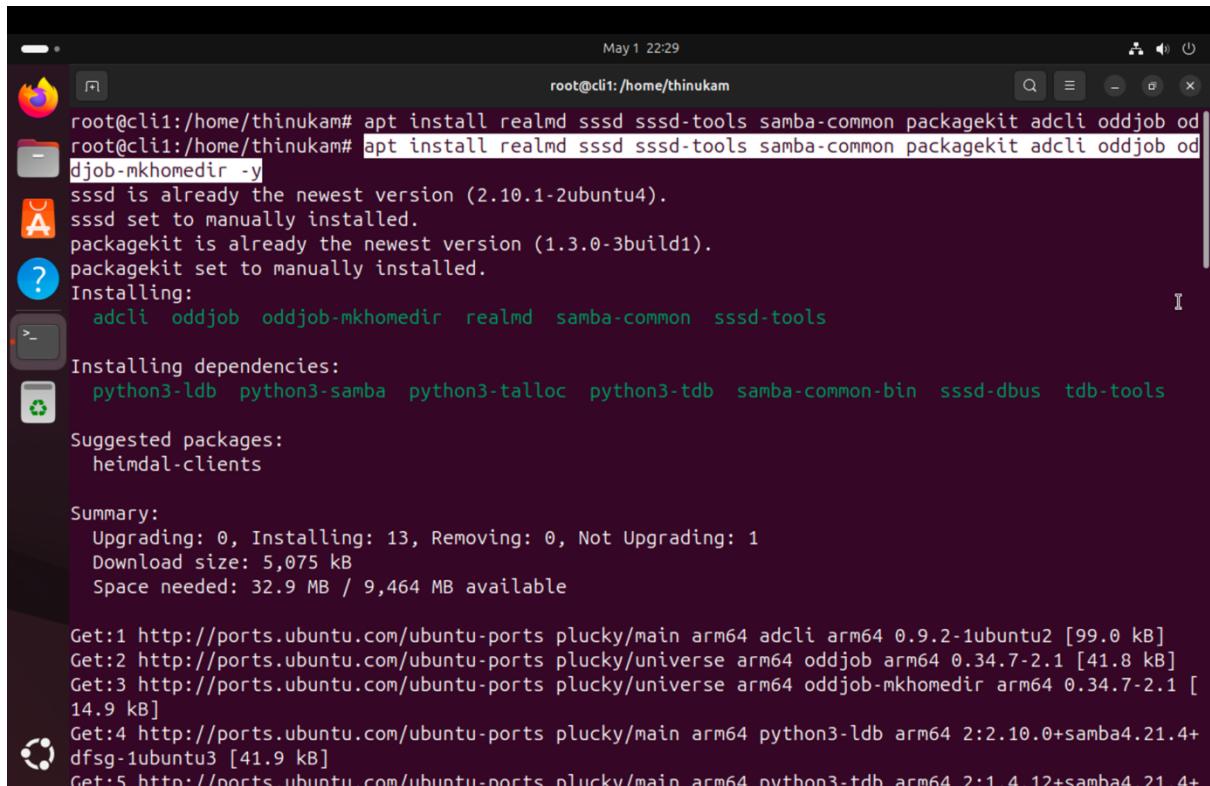


A screenshot of a terminal window titled "thinukam@cli1:/home/thinukam". The window shows the command "apt update" being run by root. The output indicates that 1 package can be upgraded. The desktop environment visible in the background includes icons for a file manager, terminal, and system settings.

```
thinukam@cli1:~$ su
Password:
root@cli1:/home/thinukam# apt update
Hit:1 http://ports.ubuntu.com/ubuntu-ports plucky InRelease
Get:2 http://ports.ubuntu.com/ubuntu-ports plucky-updates InRelease [126 kB]
Hit:3 http://ports.ubuntu.com/ubuntu-ports plucky-backports InRelease
Hit:4 http://ports.ubuntu.com/ubuntu-ports plucky-security InRelease
Get:5 http://ports.ubuntu.com/ubuntu-ports plucky-updates/main arm64 Packages [18.1 kB]
Get:6 http://ports.ubuntu.com/ubuntu-ports plucky-updates/universe arm64 Packages [11.2 kB]
Fetched 155 kB in 2s (67.0 kB/s)
1 package can be upgraded. Run 'apt list --upgradable' to see it.
root@cli1:/home/thinukam#
```

Figure 2.1. 1 - Update Ubuntu OS

- Install the required packages to join the domain



```
root@cli1:/home/thinukam# apt install realmd sssd sssd-tools samba-common packagekit adcli oddjob oddjob-mkhomedir -y
sssd is already the newest version (2.10.1-2ubuntu4).
sssd set to manually installed.
packagekit is already the newest version (1.3.0-3build1).
packagekit set to manually installed.
Installing:
  adcli oddjob oddjob-mkhomedir realmd samba-common sssd-tools

Installing dependencies:
  python3-ldb python3-samba python3-talloc python3-tdb samba-common-bin sssd-dbus tdb-tools

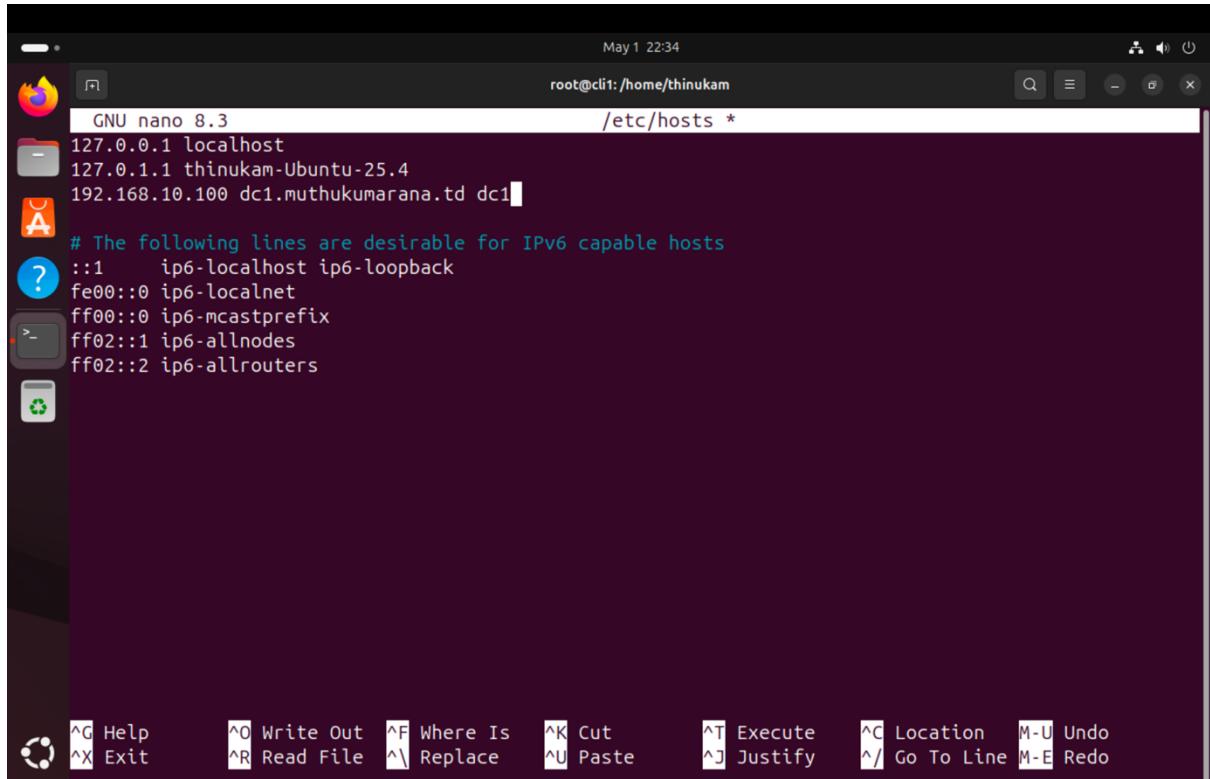
Suggested packages:
  heimdal-clients

Summary:
  Upgrading: 0, Installing: 13, Removing: 0, Not Upgrading: 1
  Download size: 5,075 kB
  Space needed: 32.9 MB / 9,464 MB available

Get:1 http://ports.ubuntu.com/ubuntu-ports plucky/main arm64 adcli arm64 0.9.2-1ubuntu2 [99.0 kB]
Get:2 http://ports.ubuntu.com/ubuntu-ports plucky/universe arm64 oddjob arm64 0.34.7-2.1 [41.8 kB]
Get:3 http://ports.ubuntu.com/ubuntu-ports plucky/universe arm64 oddjob-mkhomedir arm64 0.34.7-2.1 [14.9 kB]
Get:4 http://ports.ubuntu.com/ubuntu-ports plucky/main arm64 python3-ldb arm64 2:2.10.0+samba4.21.4+dfsg-1ubuntu3 [41.9 kB]
Get:5 http://ports.ubuntu.com/ubuntu-ports plucky/main arm64 python3-tdb arm64 2.1.4-12+samba4.21.4+dfsg-1ubuntu3 [41.9 kB]
```

Figure 2.1. 2 - Install the required packages

- Modify the */etc/hosts* to ensure the DC is resolvable by the hostname

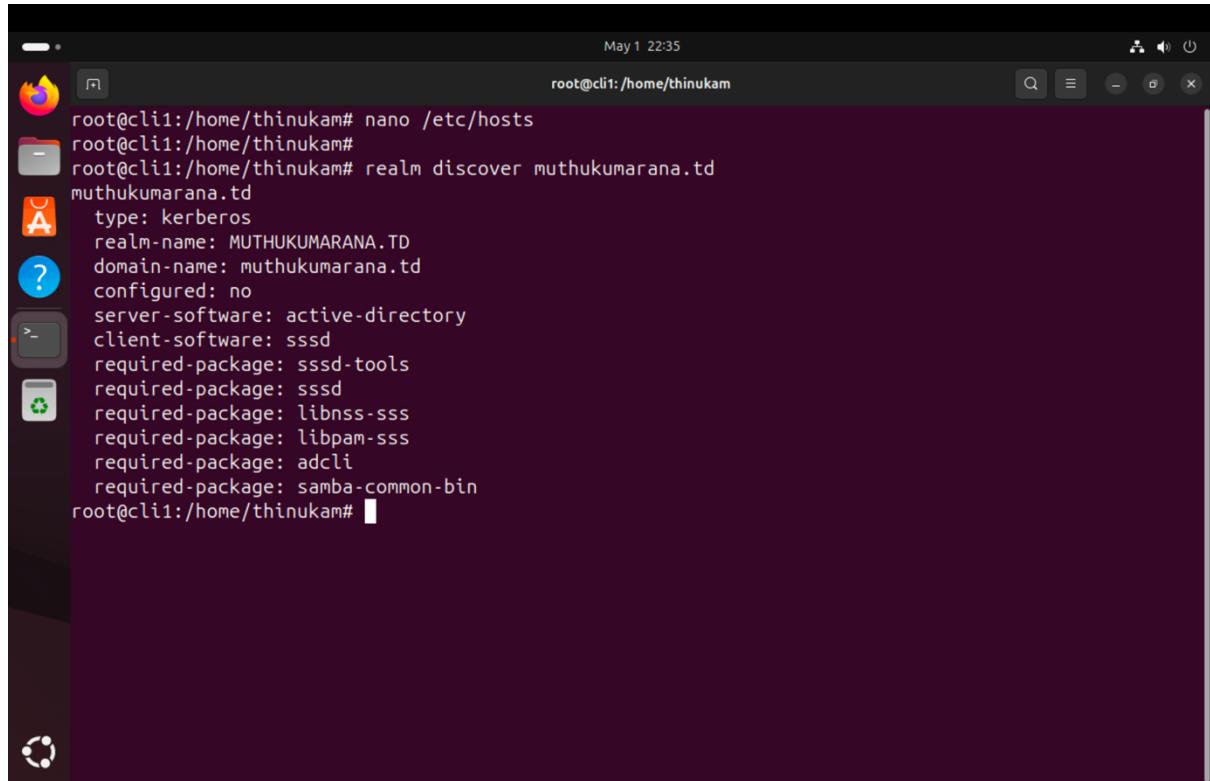


```
root@cli1:/home/thinukam# nano /etc/hosts
GNU nano 8.3
127.0.0.1 localhost
127.0.1.1 thinukam-Ubuntu-25.4
192.168.10.100 dc1.muthukumarana.td dc1
# The following lines are desirable for IPv6 capable hosts
::1      ip6-localhost ip6-loopback
fe00::0  ip6-localnet
ff00::0  ip6-mcastprefix
ff02::1  ip6-allnodes
ff02::2  ip6-allrouters
```

Figure 2.1. 3 - /etc/hosts file

## 2.2. Join the Domain

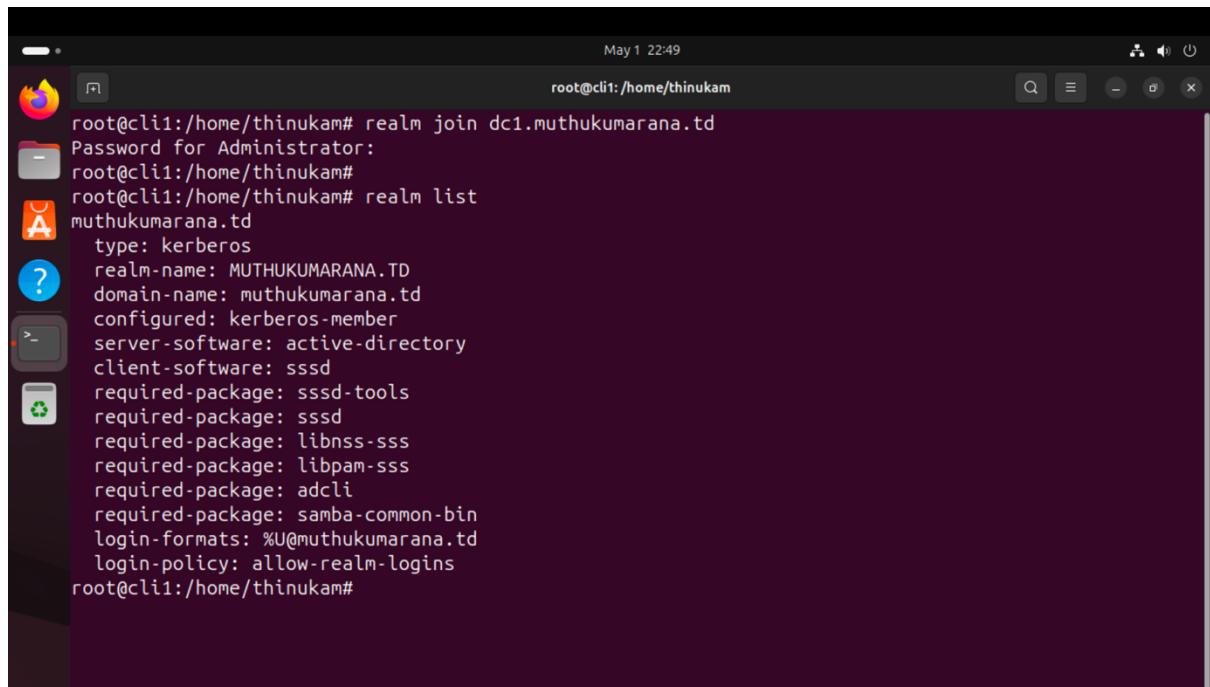
- Discover the domain with the *realm* and retrieve domain configuration information



```
root@cli1:/home/thinukam# nano /etc/hosts
root@cli1:/home/thinukam#
root@cli1:/home/thinukam# realm discover muthukumarana.td
muthukumarana.td
  type: kerberos
  realm-name: MUTHUKUMARANA.TD
  domain-name: muthukumarana.td
  configured: no
  server-software: active-directory
  client-software: sssd
  required-package: sssd-tools
  required-package: sssd
  required-package: libnss-sss
  required-package: libpam-sss
  required-package: adcli
  required-package: samba-common-bin
root@cli1:/home/thinukam#
```

Figure 2.2. 1 - Discover the Domain

- Join the domain with the *realm* and verify the join



```
root@cli1:/home/thinukam# realm join dc1.muthukumarana.td
Password for Administrator:
root@cli1:/home/thinukam#
root@cli1:/home/thinukam# realm list
muthukumarana.td
  type: kerberos
  realm-name: MUTHUKUMARANA.TD
  domain-name: muthukumarana.td
  configured: kerberos-member
  server-software: active-directory
  client-software: sssd
  required-package: sssd-tools
  required-package: sssd
  required-package: libnss-sss
  required-package: libpam-sss
  required-package: adcli
  required-package: samba-common-bin
  login-formats: %U@muthukumarana.td
  login-policy: allow-realm-logins
root@cli1:/home/thinukam#
```

Figure 2.2. 2 - Join the domain

- Verify the SSSD configuration file `/etc/sssd/sssd.conf`

The screenshot shows a terminal window titled "GNU nano 8.3" with the file "/etc/sssd/sssd.conf" open. The file contains the following configuration:

```
[sssd]
domains = muthukumarana.td
config_file_version = 2
services = nss, pam

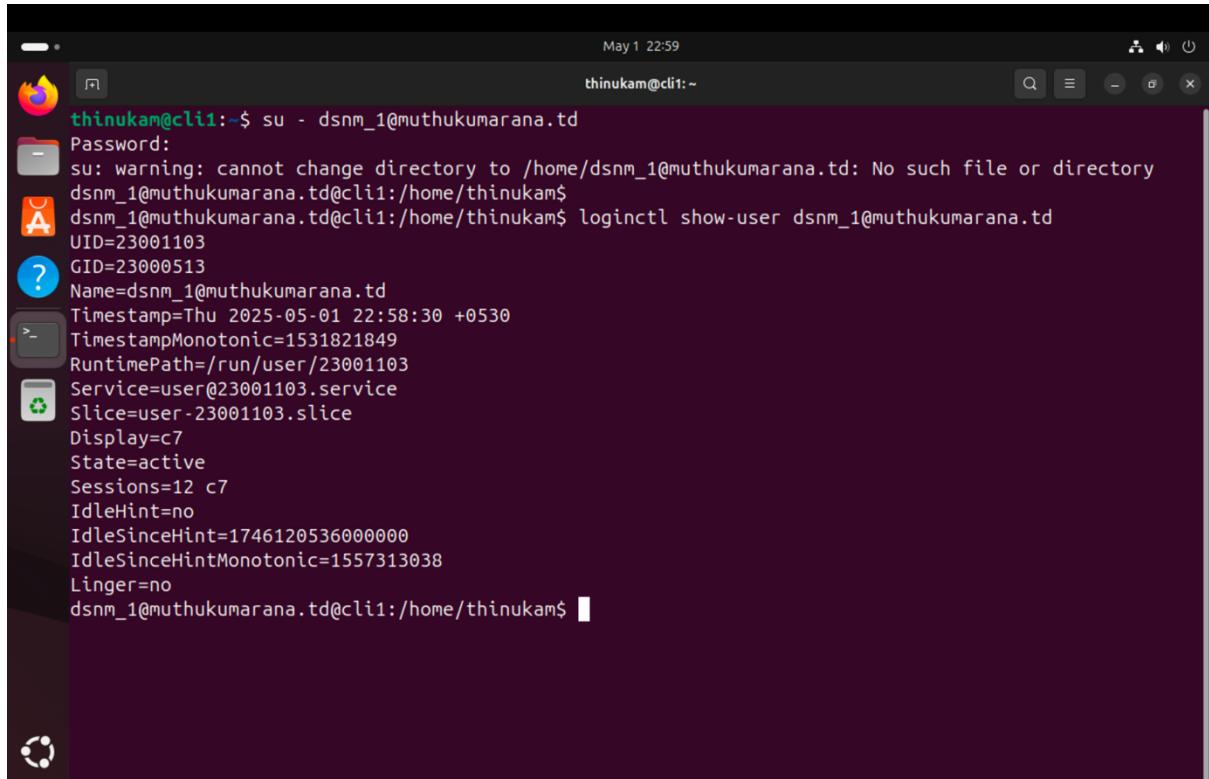
[domain/muthukumarana.td]
default_shell = /bin/bash
ad_server = dc1.muthukumarana.td
krb5_store_password_if_offline = True
cache_credentials = True
krb5_realm = MUTHUKUMARANA.TD
realm_tags = manages-system joined-with-adcli
id_provider = ad
fallback_homedir = /home/%u@%d
ad_domain = muthukumarana.td
use_fully_qualified_names = True
ldap_id_mapping = True
access_provider = ad
```

The terminal window has a dark background and includes standard nano editor key bindings at the bottom.

Figure 2.2. 3 - `/etc/sssd/sssd.conf`file

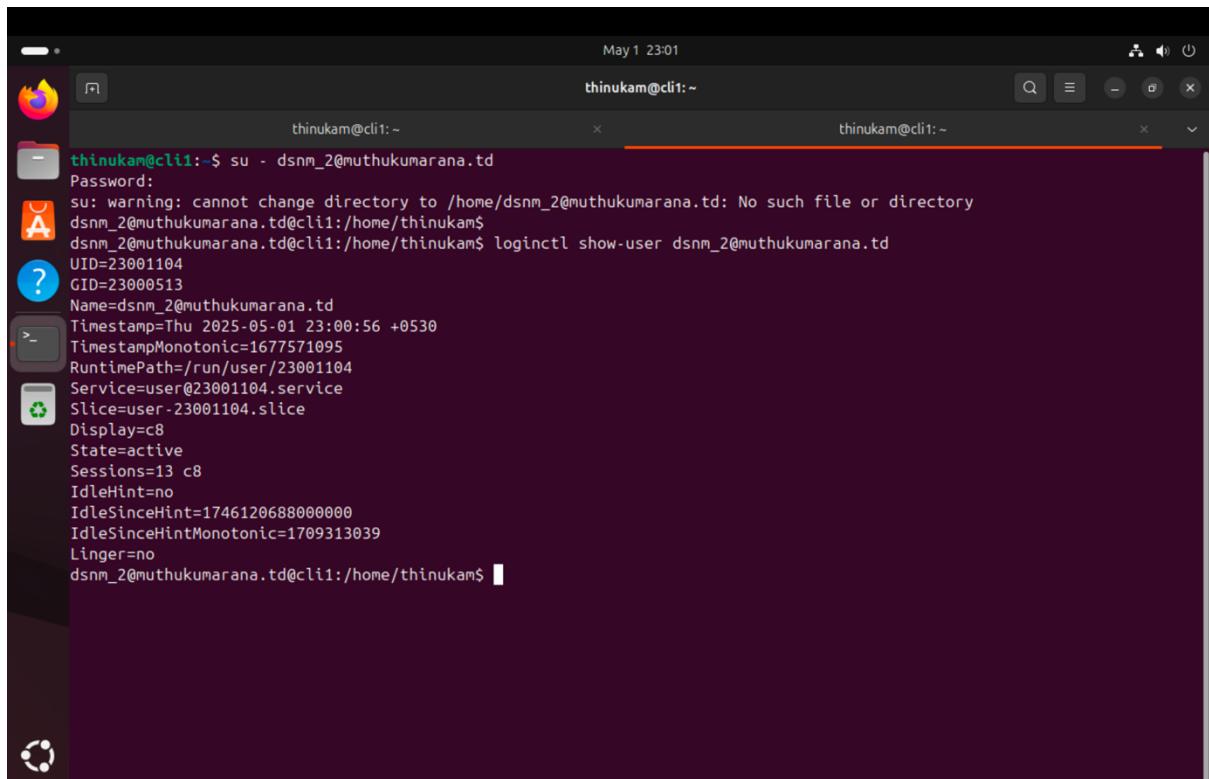
## 2.3. Domain Login

- Log in to the domain using the username and password created



thinukam@cli1:~\$ su - dsnm\_1@muthukumarana.td  
Password:  
su: warning: cannot change directory to /home/dsnm\_1@muthukumarana.td: No such file or directory  
dsnm\_1@muthukumarana.td@cli1:/home/thinukam\$  
dsnm\_1@muthukumarana.td@cli1:/home/thinukam\$ loginctl show-user dsnm\_1@muthukumarana.td  
UID=23001103  
GID=23000513  
Name=dsnm\_1@muthukumarana.td  
Timestamp=Thu 2025-05-01 22:58:30 +0530  
TimestampMonotonic=1531821849  
RuntimePath=/run/user/23001103  
Service=user@23001103.service  
Slice=user-23001103.slice  
Display=c7  
State=active  
Sessions=12 c7  
IdleHint=no  
IdleSinceHint=1746120536000000  
IdlesinceHintMonotonic=1557313038  
Linger=no  
dsnm\_1@muthukumarana.td@cli1:/home/thinukam\$

Figure 2.3. 1 - Domain login with username 1



thinukam@cli1:~\$ su - dsnm\_2@muthukumarana.td  
Password:  
su: warning: cannot change directory to /home/dsnm\_2@muthukumarana.td: No such file or directory  
dsnm\_2@muthukumarana.td@cli1:/home/thinukam\$  
dsnm\_2@muthukumarana.td@cli1:/home/thinukam\$ loginctl show-user dsnm\_2@muthukumarana.td  
UID=23001104  
GID=23000513  
Name=dsnm\_2@muthukumarana.td  
Timestamp=Thu 2025-05-01 23:00:56 +0530  
TimestampMonotonic=1677571095  
RuntimePath=/run/user/23001104  
Service=user@23001104.service  
Slice=user-23001104.slice  
Display=c8  
State=active  
Sessions=13 c8  
IdleHint=no  
IdleSinceHint=1746120688000000  
IdlesinceHintMonotonic=1709313039  
Linger=no  
dsnm\_2@muthukumarana.td@cli1:/home/thinukam\$

Figure 2.3. 2 - Domain login with username 2

- Optionally enable the creation of a home directory upon domain login for domain users with the command *pam-auth-update*

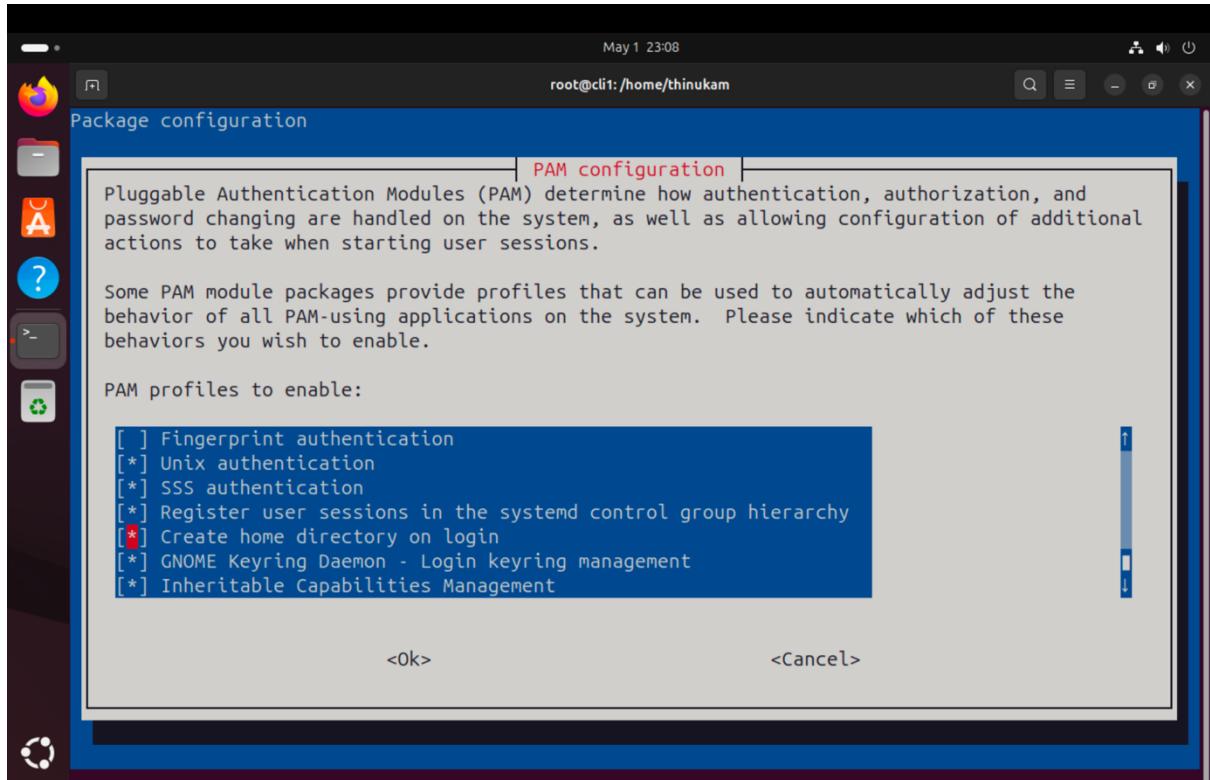


Figure 2.3. 3 - Enable home directory creation upon login

- Upon completion, analogous procedures are employed to establish the remaining client machines.
- To enable domain login upon initialization using the GUI,
  - i. Reboot the machine and select the '*not listed*' option displayed in the login window
  - ii. Enter the correct domain credentials
  - iii. Verify domain information
  - iv. Reboot the system, and the domain user will be visible

- Reboot the client machine/s and ensure domain login with the GUI

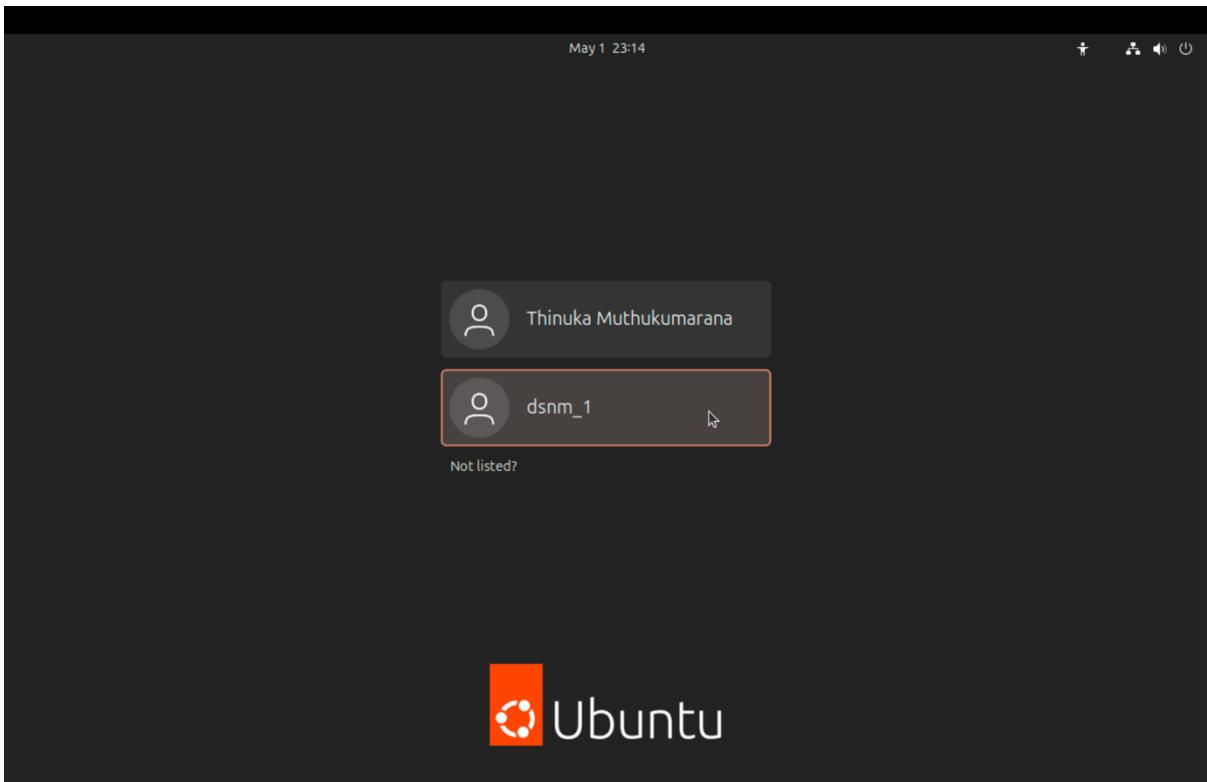


Figure 2.3. 4 - Domain login for user 1 with GUI

```

May 1 23:21
dsnm_1@muthukumarana.td@cli1:~$ id
uid=23001103(dsnm_1@muthukumarana.td) gid=23000513(domain users@muthukumarana.td) groups=23000513(domain users@muthukumarana.td)
dsnm_1@muthukumarana.td@cli1:~$ dsnm_1@muthukumarana.td@cli1:~$ realm list
muthukumarana.td
  type: kerberos
  realm-name: MUTHUKUMARANA.TD
  domain-name: muthukumarana.td
  configured: kerberos-member
  server-software: active-directory
  client-software: sssd
  required-package: sssd-tools
  required-package: sssd
  required-package: libnss-sss
  required-package: libpam-sss
  required-package: adcli
  required-package: samba-common-bin
  login-formats: %U@muthukumarana.td
  login-policy: allow-realm-logins
dsnm_1@muthukumarana.td@cli1:~$ 

```

Figure 2.3. 5 – Domain information for user 1

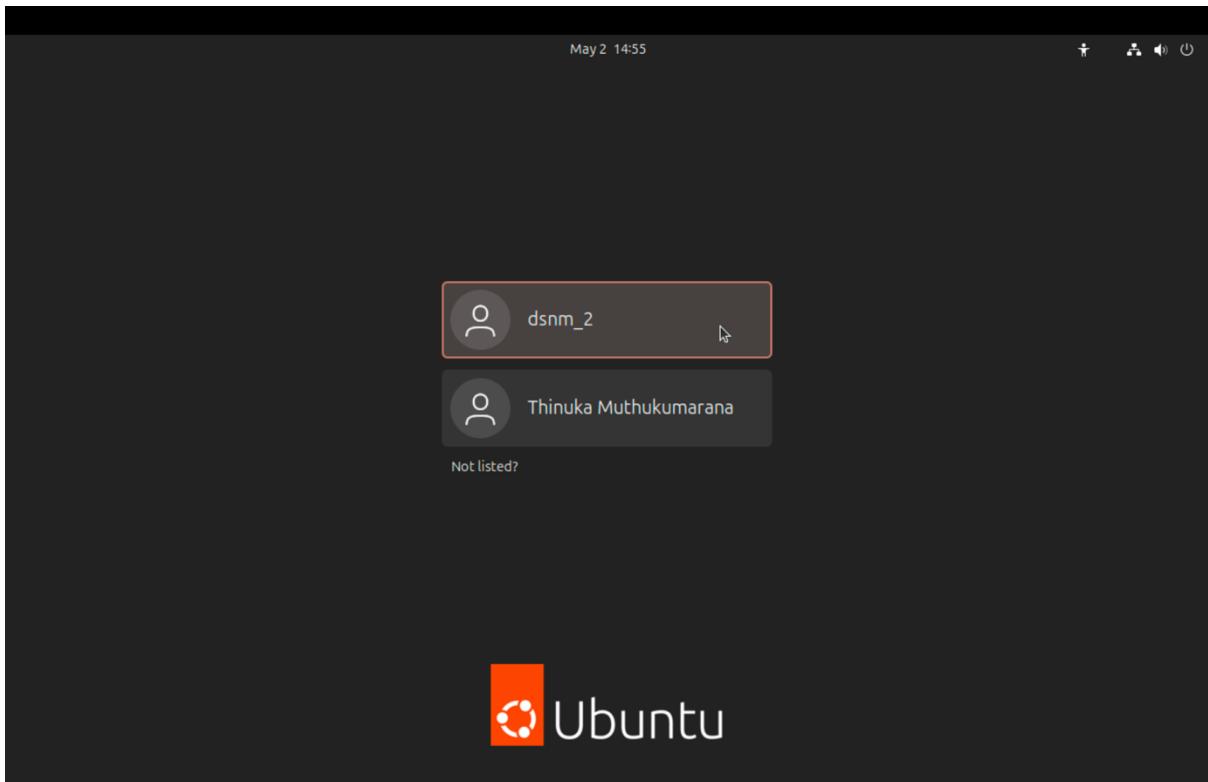


Figure 2.3. 6 - Domain login for user 2 with GUI

```
dsnm_2@muthukumarana.td@cli2:~$ id
uid=23001104(dsnm_2@muthukumarana.td) gid=23000513(domain users@muthukumarana.td) groups=23000513(do
main users@muthukumarana.td)
dsnm_2@muthukumarana.td@cli2:~$ realm list
muthukumarana.td
    type: kerberos
    realm-name: MUTHUKUMARANA.TD
    domain-name: muthukumarana.td
    configured: kerberos-member
    server-software: active-directory
    client-software: sssd
    required-package: sssd-tools
    required-package: sssd
    required-package: libnss-sss
    required-package: libpam-sss
    required-package: adcli
    required-package: samba-common-bin
    login-formats: %U@muthukumarana.td
    login-policy: allow-realm-logins
dsnm_2@muthukumarana.td@cli2:~$
```

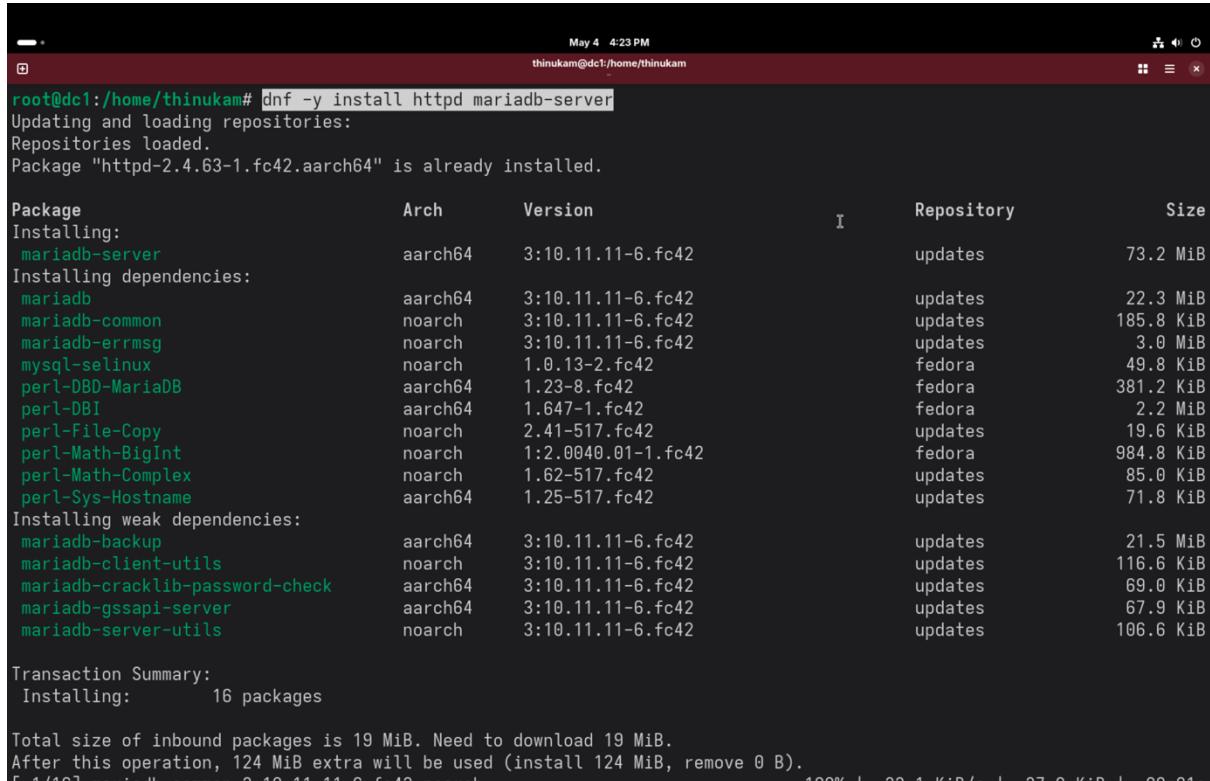
A screenshot of a terminal window on an Ubuntu desktop. The title bar shows the session name "dsnm\_2@muthukumarana.td@cli2:~". The window contains a command-line session. The user runs the "id" command, which outputs their user ID, group ID, and the groups they belong to. Then, the user runs the "realm list" command, which displays information about the domain "muthukumarana.td", including its type (kerberos), realm name (MUTHUKUMARANA.TD), domain name (muthukumarana.td), and various software components it uses (sssd, libnss-sss, libpam-sss, adcli, samba-common-bin). The terminal window has a dark background and light-colored text.

Figure 2.3. 7 - Domain information for user 2

### 3. Configuring the Zabbix server

#### 3.1. Installing LAMP Server

- Install Apache and MariaDB server packages



```
root@dc1:/home/thinukam# dnf -y install httpd mariadb-server
May 4 4:23 PM
thinukam@dc1:/home/thinukam
Updating and loading repositories:
Repositories loaded.
Package "httpd-2.4.63-1.fc42.aarch64" is already installed.

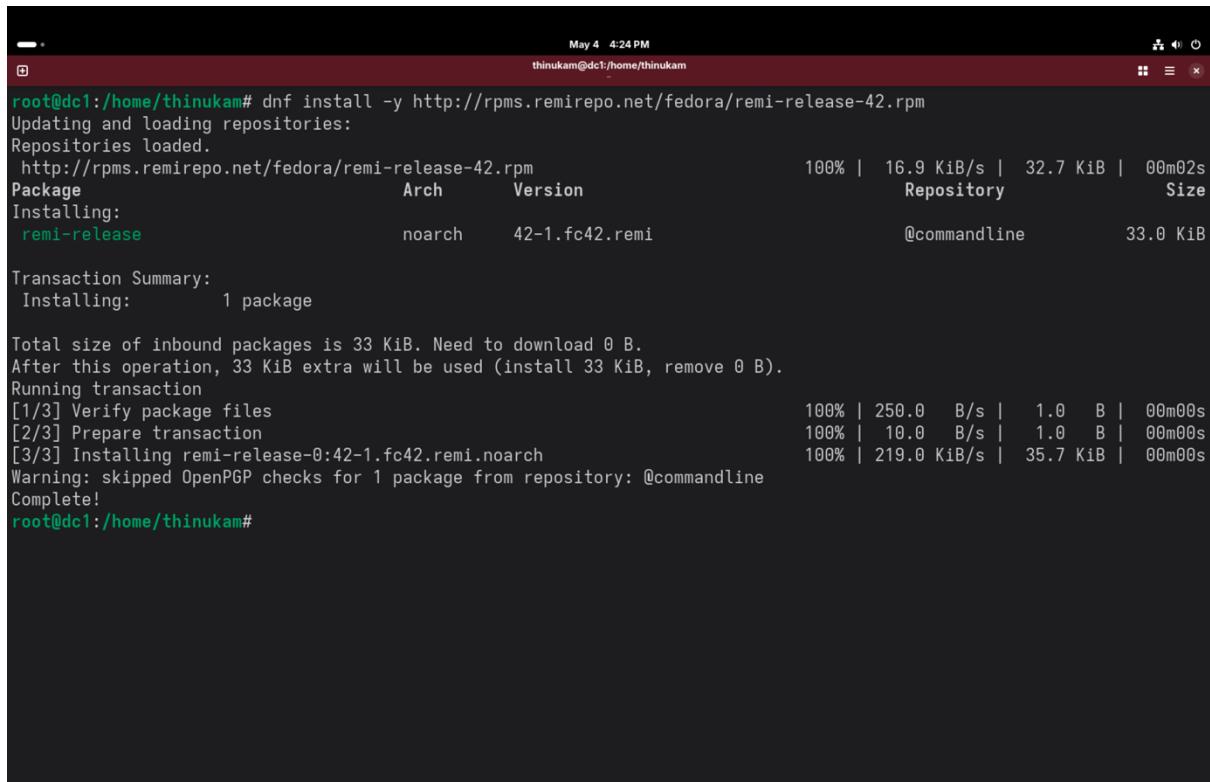
Transaction Summary:
  Installing: 16 packages

Total size of inbound packages is 19 MiB. Need to download 19 MiB.
After this operation, 124 MiB extra will be used (install 124 MiB, remove 0 B).
F 1/16L mariadb-common-3:10.11.11-6.fc42.noarch
```

Package	Arch	Version	I	Repository	Size
Installing:					
mariadb-server	aarch64	3:10.11.11-6.fc42		updates	73.2 MiB
Installing dependencies:					
mariadb	aarch64	3:10.11.11-6.fc42		updates	22.3 MiB
mariadb-common	noarch	3:10.11.11-6.fc42		updates	185.8 KiB
mariadb-errmsg	noarch	3:10.11.11-6.fc42		updates	3.0 MiB
mysql-selinux	noarch	1.0.13-2.fc42		fedora	49.8 KiB
perl-DBD-MariaDB	aarch64	1.23-8.fc42		fedora	381.2 KiB
perl-DBI	aarch64	1.647-1.fc42		fedora	2.2 MiB
perl-File-Copy	noarch	2.41-517.fc42		updates	19.6 KiB
perl-Math-BigInt	noarch	1:2.0040.01-1.fc42		fedora	984.8 KiB
perl-Math-Complex	noarch	1.62-517.fc42		updates	85.0 KiB
perl-Sys-Hostname	aarch64	1.25-517.fc42		updates	71.8 KiB
Installing weak dependencies:					
mariadb-backup	aarch64	3:10.11.11-6.fc42		updates	21.5 MiB
mariadb-client-utils	noarch	3:10.11.11-6.fc42		updates	116.6 KiB
mariadb-cracklib-password-check	aarch64	3:10.11.11-6.fc42		updates	69.0 KiB
mariadb-gssapi-server	aarch64	3:10.11.11-6.fc42		updates	67.9 KiB
mariadb-server-utils	noarch	3:10.11.11-6.fc42		updates	106.6 KiB
Transaction Summary:					
Installing: 16 packages					
Total size of inbound packages is 19 MiB. Need to download 19 MiB.					
After this operation, 124 MiB extra will be used (install 124 MiB, remove 0 B).					
F 1/16L mariadb-common-3:10.11.11-6.fc42.noarch					

Figure 3.1. 1 - Install Apache and MariaDB server

- Install the PHP remi repository and enable the PHP 8.4 remi module



```

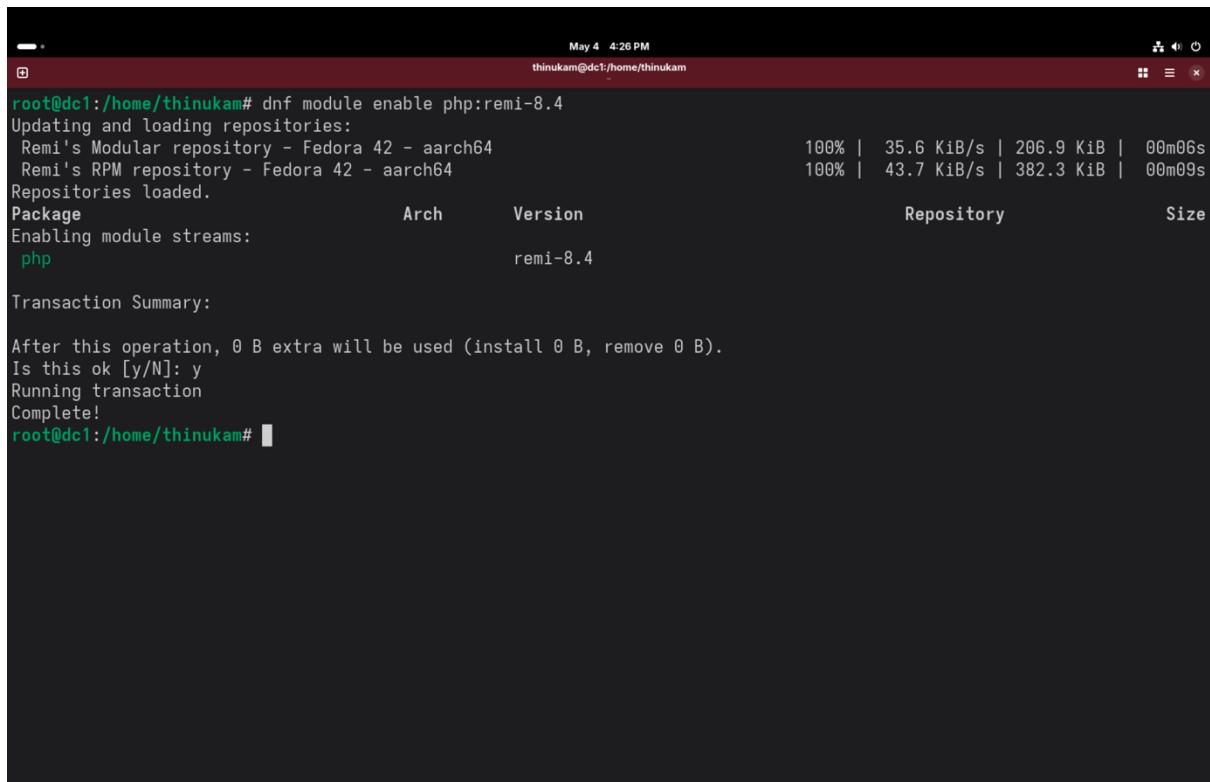
root@dc1:/home/thinukam# dnf install -y http://rpms.remirepo.net/fedora/remi-release-42.rpm
Updating and loading repositories:
Repositories loaded.
http://rpms.remirepo.net/fedora/remi-release-42.rpm                               100% | 16.9 KiB/s | 32.7 KiB | 00m02s
Package          Arch      Version           Repository      Size
Installing:
remi-release     noarch    42-1.fc42.remi   @commandline    33.0 KiB

Transaction Summary:
Installing: 1 package

Total size of inbound packages is 33 KiB. Need to download 0 B.
After this operation, 33 KiB extra will be used (install 33 KiB, remove 0 B).
Running transaction
[1/3] Verify package files                                         100% | 250.0 B/s | 1.0 B | 00m00s
[2/3] Prepare transaction                                         100% | 10.0 B/s | 1.0 B | 00m00s
[3/3] Installing remi-release-0:42-1.fc42.remi.noarch             100% | 219.0 KiB/s | 35.7 KiB | 00m00s
Warning: skipped OpenPGP checks for 1 package from repository: @commandline
Complete!
root@dc1:/home/thinukam#

```

Figure 3.1. 2 - Install the PHP remi repository



```

root@dc1:/home/thinukam# dnf module enable php:remi-8.4
Updating and loading repositories:
Remi's Modular repository - Fedora 42 - aarch64                         100% | 35.6 KiB/s | 206.9 KiB | 00m06s
Remi's RPM repository - Fedora 42 - aarch64                           100% | 43.7 KiB/s | 382.3 KiB | 00m09s
Repositories loaded.
Package          Arch      Version           Repository      Size
Enabling module streams:
php               remi-8.4

Transaction Summary:

After this operation, 0 B extra will be used (install 0 B, remove 0 B).
Is this ok [y/N]: y
Running transaction
Complete!
root@dc1:/home/thinukam# 

```

Figure 3.1. 3 - Enable the PHP 8.4 remi module

- Install other required PHP extensions

```
May 4 4:29 PM
thinukam@dc1:/home/thinukam — dnf install php php-fpm php-gd php-mysqlnd

root@dc1:/home/thinukam# dnf install php php-fpm php-gd php-mysqlnd
Updating and loading repositories:
Repositories loaded.

Transaction Summary:
  Installing: 12 packages

Total size of inbound packages is 9 MiB. Need to download 9 MiB.
After this operation, 37 MiB extra will be used (install 37 MiB, remove 0 B).
Is this ok [y/N]: y

[ 1/12] php-gd-0:8.4.6-1.fc42.remi.aarch64
[ 2/12] php-common-0:8.4.6-1.fc42.remi.aarch64
[ 3/12] php-mysqlnd-0:8.4.6-1.fc42.remi.aarch64
[ 4/12] php-pdo-0:8.4.6-1.fc42.remi.aarch64
[ 5/12] php-0:8.4.6-1.fc42.remi.aarch64
[ 6/12] php-fpm-0:8.4.6-1.fc42.remi.aarch64
[ 7/12] php-xml-0:8.4.6-1.fc42.remi.aarch64
[ 8/12] php-opcache-0:8.4.6-1.fc42.remi.aarch64
[ 9/12] php-mbstring-0:8.4.6-1.fc42.remi.aarch64
[10/12] php-cli-0:8.4.6-1.fc42.remi.aarch64
[11/12] nginx-filesystem-2:1.26.3-1.fc42.aarch64
[12/12] php-sodium-0:8.4.6-1.fc42.remi.aarch64
```

*Figure 3.1. 4 - Install PHP extensions*

- Modify the `/etc/php-fpm.d/www.conf` file as given to allow listening for clients
  - `listen = /run/php-fpm/zabbix.sock`
  - `listen.allowed_clients = 0.0.0.0`

```

May 4 4:36 PM
thinukam@dc1:/home/thinukam -- nano /etc/php-fpm.d/www.conf
Modified

GNU nano 8.3          /etc/php-fpm.d/www.conf
listen = /run/php-fpm/zabbix.sock

; Set listen(2) backlog.
; Default Value: 511
;listen.backlog = 511

; Set permissions for unix socket, if one is used. In Linux, read/write
; permissions must be set in order to allow connections from a web server.
; Default Values: user and group are set as the running user
;                 mode is set to 0660
;listen.owner = nobody
;listen.group = nobody
;listen.mode = 0660

; When POSIX Access Control Lists are supported you can set them using
; these options, value is a comma separated list of user/group names.
; When set, listen.owner and listen.group are ignored
listen.acl_users = apache,nginx
;listen.acl_groups =

; List of addresses (IPv4/IPv6) of FastCGI clients which are allowed to connect.
; Equivalent to the FCGI_WEB_SERVER_ADDRS environment variable in the original
; PHP FCGI (5.2.2+). Makes sense only with a tcp listening socket. Each address
; must be separated by a comma. If this value is left blank, connections will be
; accepted from any ip address.
; Default Value: any
listen.allowed_clients = 0.0.0.0

^G Help      ^O Write Out    ^F Where Is     ^K Cut        ^T Execute     ^C Location    M-U Undo
^X Exit      ^R Read File   ^\ Replace     ^U Paste      ^J Justify    ^/ Go To Line  M-E Redo

```

Figure 3.1. 5 - `/etc/php-fpm.d/www.conf` file

- Create a new Zabbix file `/etc/php-fpm.d/zabbix.conf` to define date and time zone

```

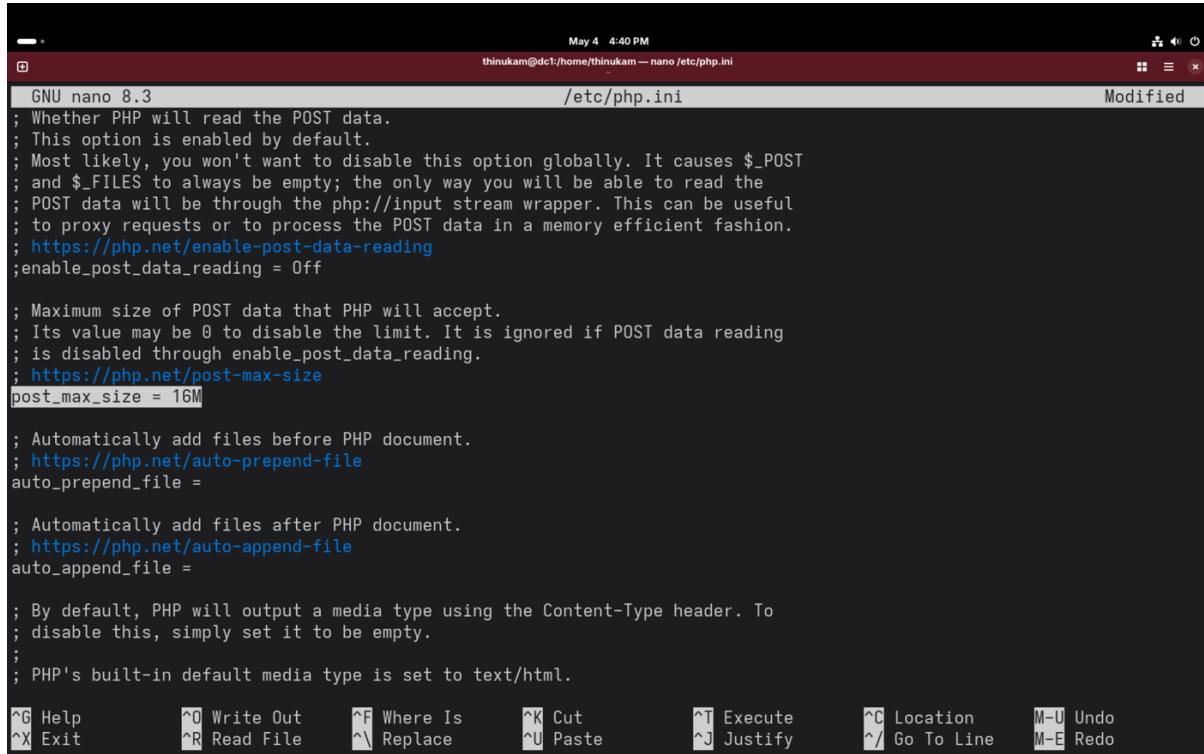
May 4 4:38 PM
thinukam@dc1:/home/thinukam -- nano /etc/php-fpm.d/zabbix.conf
Modified

GNU nano 8.3          /etc/php-fpm.d/zabbix.conf
php_value[date.timezone] = Asia/Colombo

```

Figure 3.1. 6 - `/etc/php-fpm.d/zabbixconf` file

- Modify the /etc/php.ini PHP configuration file as given
  - post\_max\_size = 16M
  - max\_execution\_time = 300
  - max\_input\_time = 300



```

May 4 4:40 PM
thinukam@dc1:/home/thinukam — nano /etc/php.ini Modified
GNU nano 8.3 /etc/php.ini
; Whether PHP will read the POST data.
; This option is enabled by default.
; Most likely, you won't want to disable this option globally. It causes $_POST
; and $_FILES to always be empty; the only way you will be able to read the
; POST data will be through the php://input stream wrapper. This can be useful
; to proxy requests or to process the POST data in a memory efficient fashion.
; https://php.net/enable-post-data-reading
;enable_post_data_reading = Off

; Maximum size of POST data that PHP will accept.
; Its value may be 0 to disable the limit. It is ignored if POST data reading
; is disabled through enable_post_data_reading.
; https://php.net/post-max-size
post_max_size = 16M

; Automatically add files before PHP document.
; https://php.net/auto-prepend-file
auto_prepend_file =

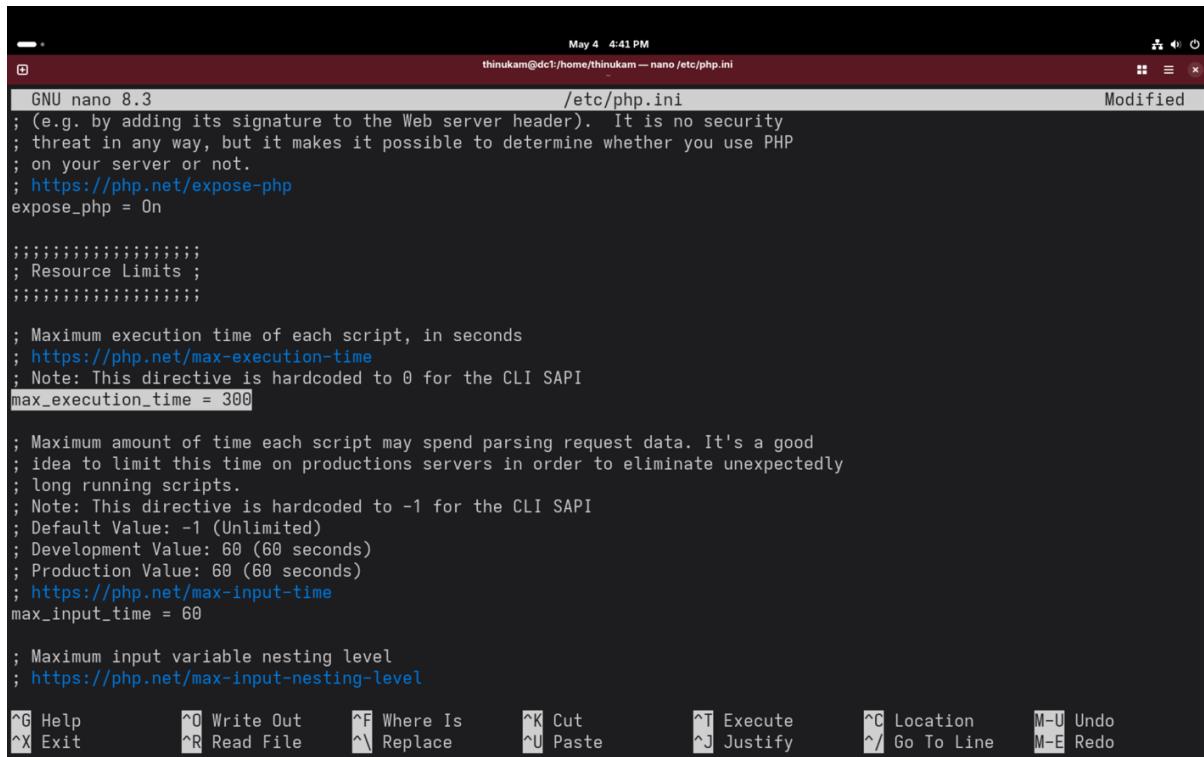
; Automatically add files after PHP document.
; https://php.net/auto-append-file
auto_append_file =

; By default, PHP will output a media type using the Content-Type header. To
; disable this, simply set it to be empty.
;
; PHP's built-in default media type is set to text/html.

^G Help ^O Write Out ^F Where Is ^K Cut ^T Execute ^C Location M-U Undo
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^/ Go To Line M-E Redo

```

Figure 3.1. 7 - /etc/php.ini file (i)



```

May 4 4:41 PM
thinukam@dc1:/home/thinukam — nano /etc/php.ini Modified
GNU nano 8.3 /etc/php.ini
; (e.g. by adding its signature to the Web server header). It is no security
; threat in any way, but it makes it possible to determine whether you use PHP
; on your server or not.
; https://php.net/expose-php
expose_php = On

;;;;;;
; Resource Limits ;
;;;;;;

; Maximum execution time of each script, in seconds
; https://php.net/max-execution-time
; Note: This directive is hardcoded to 0 for the CLI SAPI
max_execution_time = 300

; Maximum amount of time each script may spend parsing request data. It's a good
; idea to limit this time on production servers in order to eliminate unexpectedly
; long running scripts.
; Note: This directive is hardcoded to -1 for the CLI SAPI
; Default Value: -1 (Unlimited)
; Development Value: 60 (60 seconds)
; Production Value: 60 (60 seconds)
; https://php.net/max-input-time
max_input_time = 60

; Maximum input variable nesting level
; https://php.net/max-input-nesting-level

^G Help ^O Write Out ^F Where Is ^K Cut ^T Execute ^C Location M-U Undo
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^/ Go To Line M-E Redo

```

Figure 3.1. 8 - /etc/php.ini file (ii)

```

May 4 4:41 PM
thinukam@dc1:/home/thinukam -- nano /etc/php.ini
Modified

GNU nano 8.3          /etc/php.ini
; Note: This directive is hardcoded to 0 for the CLI SAPI
max_execution_time = 300

; Maximum amount of time each script may spend parsing request data. It's a good
; idea to limit this time on production servers in order to eliminate unexpectedly
; long running scripts.
; Note: This directive is hardcoded to -1 for the CLI SAPI
; Default Value: -1 (Unlimited)
; Development Value: 60 (60 seconds)
; Production Value: 60 (60 seconds)
; https://php.net/max-input-time
max_input_time = 300

; Maximum input variable nesting level
; https://php.net/max-input-nesting-level
max_input_nesting_level = 64

; How many GET/POST/COOKIE input variables may be accepted
max_input_vars = 1000

; How many multipart body parts (combined input variable and file uploads) may
; be accepted.
; Default Value: -1 (Sum of max_input_vars and max_file_uploads)
max_multipart_body_parts = 1500

; Maximum amount of memory a script may consume
; https://php.net/memory-limit

^G Help      ^O Write Out     ^F Where Is     ^K Cut        ^T Execute     ^C Location    M-U Undo
^X Exit      ^R Read File     ^\ Replace      ^U Paste      ^J Justify     ^/ Go To Line  M-E Redo

```

Figure 3.1. 9 - /etc/php.ini file (iii)

- Start and enable Apache, MariaDB, and PHP-FPM services

```

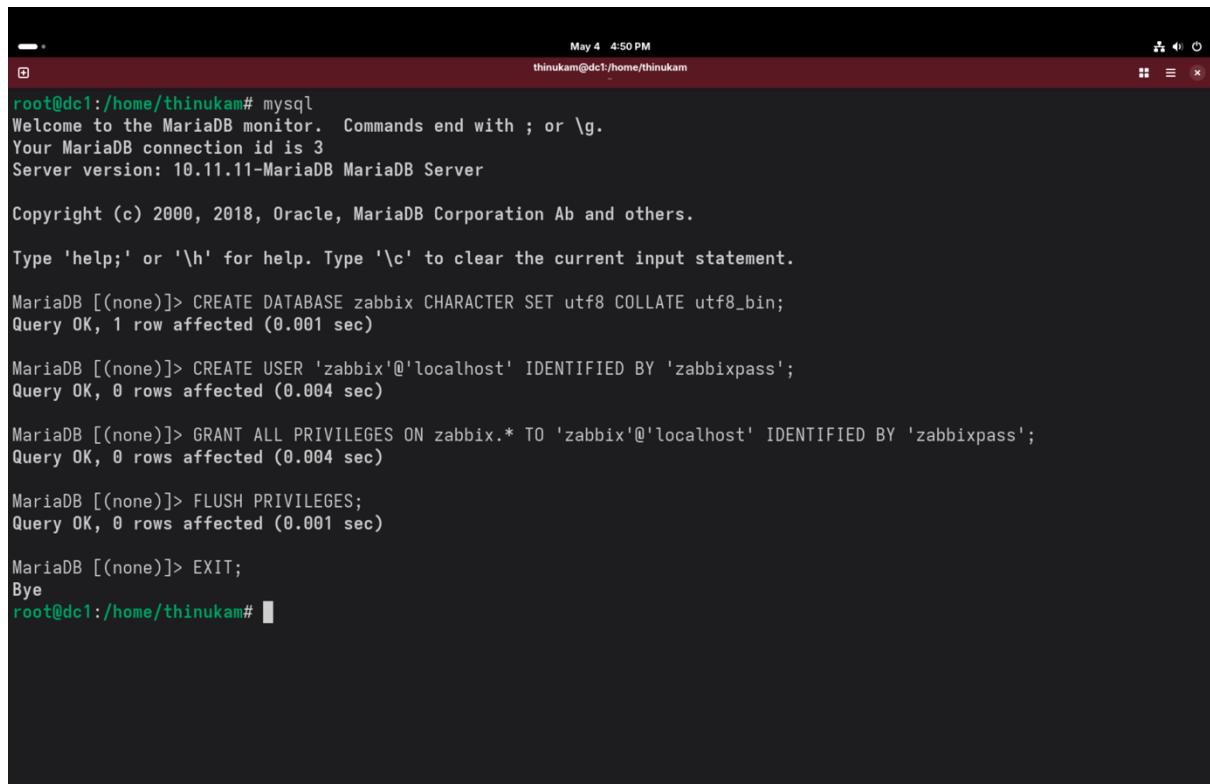
root@dc1:/home/thinukam# systemctl start httpd mariadb php-fpm
root@dc1:/home/thinukam#
root@dc1:/home/thinukam# systemctl enable httpd mariadb php-fpm
Created symlink '/etc/systemd/system/multi-user.target.wants/httpd.service' → '/usr/lib/systemd/system/httpd.service'.
Created symlink '/etc/systemd/system/mysql.service' → '/usr/lib/systemd/system/mariadb.service'.
Created symlink '/etc/systemd/system/mysqld.service' → '/usr/lib/systemd/system/mariadb.service'.
Created symlink '/etc/systemd/system/multi-user.target.wants/mariadb.service' → '/usr/lib/systemd/system/mariadb.servic
e'.
Created symlink '/etc/systemd/system/multi-user.target.wants/php-fpm.service' → '/usr/lib/systemd/system/php-fpm.servic
e'.
root@dc1:/home/thinukam#
root@dc1:/home/thinukam#

```

Figure 3.1. 10 - Start and enable services

## 3.2. Creating a Zabbix Database

- Create the Zabbix database as given
  - Connect to the MariaDB shell
  - Create a database and a user for Zabbix
  - Grant all the privileges to the Zabbix database
  - Flush the privileges and exit from the MariaDB shell



The screenshot shows a terminal window titled 'thinukam@dc1:/home/thinukam' with a timestamp of 'May 4 4:50 PM'. The window contains the following text:

```
root@dc1:/home/thinukam# mysql
Welcome to the MariaDB monitor. Commands end with ; or \g.
Your MariaDB connection id is 3
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 zabbix CHARACTER SET utf8 COLLATE utf8_bin;
Query OK, 1 row affected (0.001 sec)

MariaDB [(none)]> CREATE USER 'zabbix'@'localhost' IDENTIFIED BY 'zabbixpass';
Query OK, 0 rows affected (0.004 sec)

MariaDB [(none)]> GRANT ALL PRIVILEGES ON zabbix.* TO 'zabbix'@'localhost' IDENTIFIED BY 'zabbixpass';
Query OK, 0 rows affected (0.004 sec)

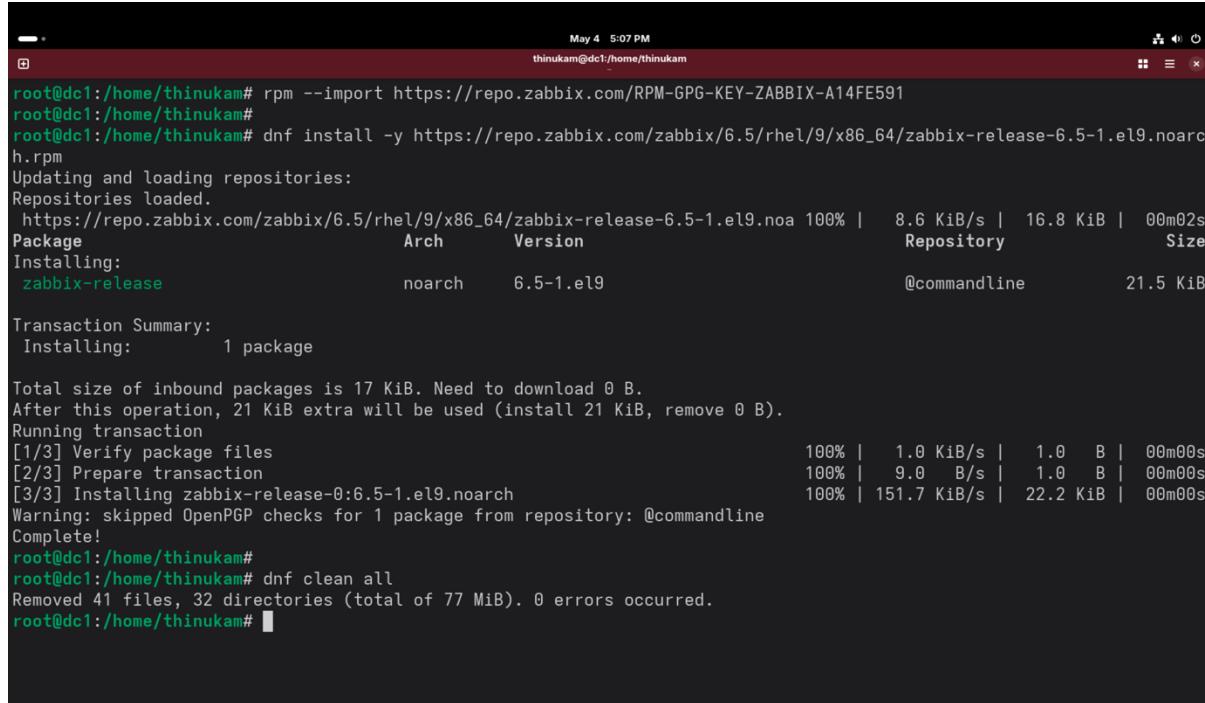
MariaDB [(none)]> FLUSH PRIVILEGES;
Query OK, 0 rows affected (0.001 sec)

MariaDB [(none)]> EXIT;
Bye
root@dc1:/home/thinukam#
```

Figure 3.2. 1 - MariaDB shell for creating the database

### 3.3. Installing Zabbix Server

- Import a new Zabbix GPG key and install the Zabbix repository for the server



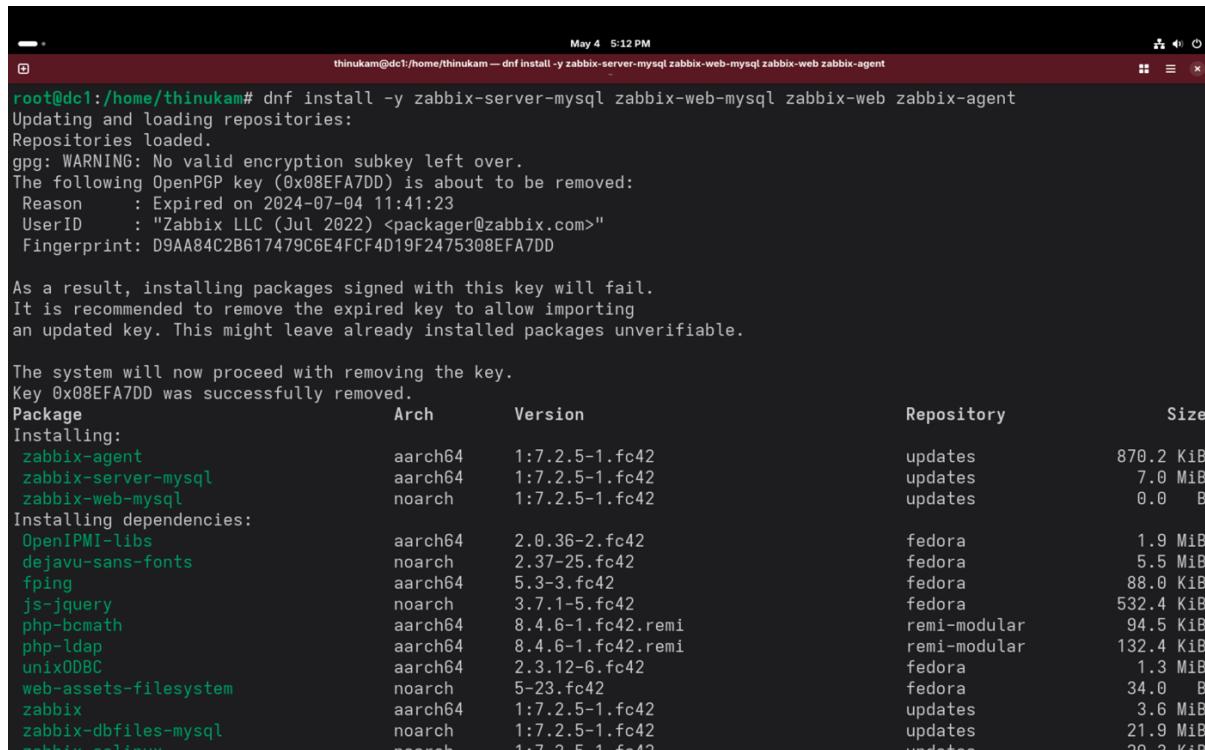
```
root@dc1:/home/thinukam# rpm --import https://repo.zabbix.com/RPM-GPG-KEY-ZABBIX-A14FE591
root@dc1:/home/thinukam#
root@dc1:/home/thinukam# dnf install -y https://repo.zabbix.com/zabbix/6.5/rhel/9/x86_64/zabbix-release-6.5-1.el9.noarch.rpm
Updating and loading repositories:
Repositories loaded.
https://repo.zabbix.com/zabbix/6.5/rhel/9/x86_64/zabbix-release-6.5-1.el9.noarch 100% | 8.6 KiB/s | 16.8 KiB | 00m02s
Package           Arch      Version          Repository          Size
Installing:
zabbix-release   noarch    6.5-1.el9        @commandline       21.5 KiB

Transaction Summary:
Installing: 1 package

Total size of inbound packages is 17 KiB. Need to download 0 B.
After this operation, 21 KiB extra will be used (install 21 KiB, remove 0 B).
Running transaction
[1/3] Verify package files                                         100% | 1.0 KiB/s | 1.0 B | 00m00s
[2/3] Prepare transaction                                         100% | 9.0 B/s | 1.0 B | 00m00s
[3/3] Installing zabbix-release-0:6.5-1.el9.noarch               100% | 151.7 KiB/s | 22.2 KiB | 00m00s
Warning: skipped OpenPGP checks for 1 package from repository: @commandline
Complete!
root@dc1:/home/thinukam#
root@dc1:/home/thinukam# dnf clean all
Removed 41 files, 32 directories (total of 77 MiB). 0 errors occurred.
root@dc1:/home/thinukam#
```

Figure 3.3. 1 - Install the Zabbix repo

- Install the packages for the Zabbix Server and Web Frontend with MySQL



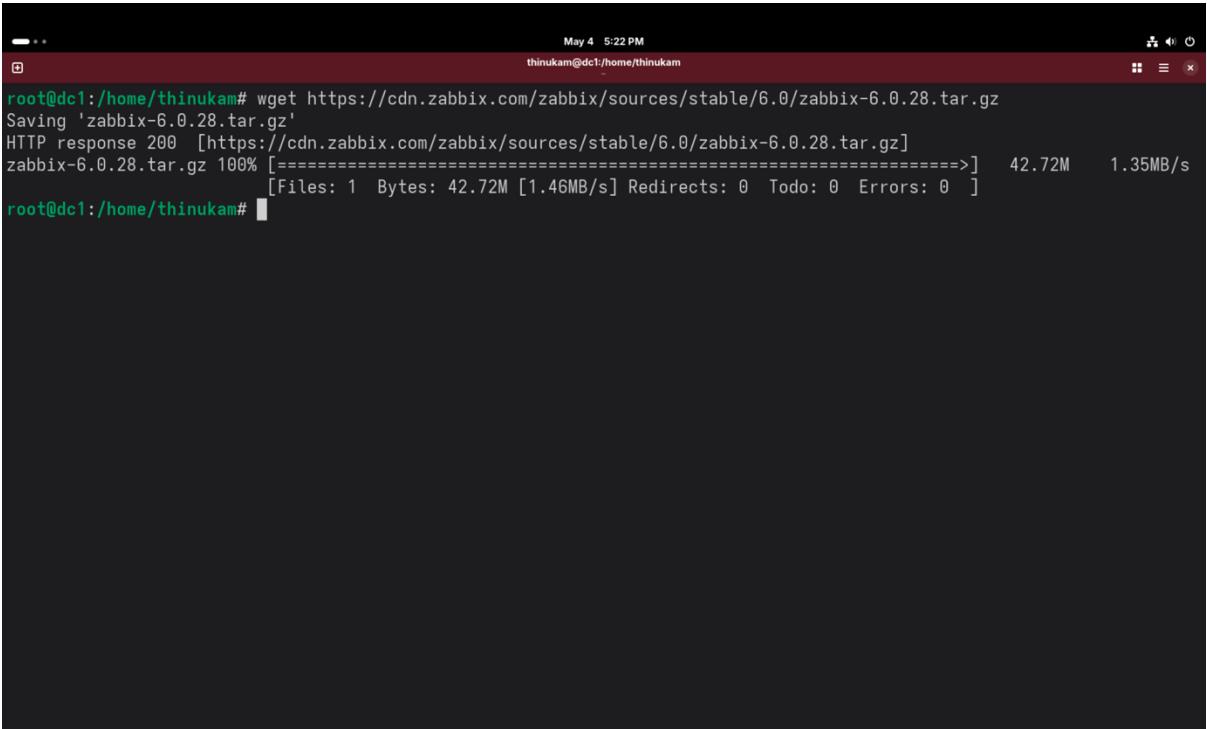
```
root@dc1:/home/thinukam# dnf install -y zabbix-server-mysql zabbix-web-mysql zabbix-web zabbix-agent
Updating and loading repositories:
Repositories loaded.
gpg: WARNING: No valid encryption subkey left over.
The following OpenPGP key (0x08EFA7DD) is about to be removed:
  Reason : Expired on 2024-07-04 11:41:23
  UserID  : "Zabbix LLC (Jul 2022) <packager@zabbix.com>"
  Fingerprint: D9AA84C2B617479C6E4FCF4D19F2475308EFA7DD

As a result, installing packages signed with this key will fail.
It is recommended to remove the expired key to allow importing
an updated key. This might leave already installed packages unverifiable.

The system will now proceed with removing the key.
Key 0x08EFA7DD was successfully removed.
Package           Arch      Version          Repository          Size
Installing:
zabbix-agent     aarch64  1:7.2.5-1.fc42    updates            870.2 KiB
zabbix-server-mysql aarch64  1:7.2.5-1.fc42    updates            7.0 MiB
zabbix-web-mysql  noarch   1:7.2.5-1.fc42    updates            0.0 B
Installing dependencies:
OpenIPMI-libs     aarch64  2.0.36-2.fc42    fedora             1.9 MiB
dejavu-sans-fonts noarch   2.37-25.fc42    fedora             5.5 MiB
fping              aarch64  5.3-3.fc42     fedora             88.0 KiB
js-jquery          noarch   3.7.1-5.fc42    fedora            532.4 KiB
php-bcmath         aarch64  8.4.6-1.fc42.remi  remi-modular      94.5 KiB
php-ldap           aarch64  8.4.6-1.fc42.remi  remi-modular      132.4 KiB
unixODBC           aarch64  2.3.12-6.fc42   fedora             1.3 MiB
web-assets-filesystem noarch  5-23.fc42      fedora            34.0 B
zabbix             aarch64  1:7.2.5-1.fc42    updates            3.6 MiB
zabbix-dbfiles-mysql noarch   1:7.2.5-1.fc42    updates            21.9 MiB
zabbix-devel-linux noarch   1:7.2.5-1.fc42    updates            20.2 KiB
```

Figure 3.3. 2 – Install Zabbix server and other packages

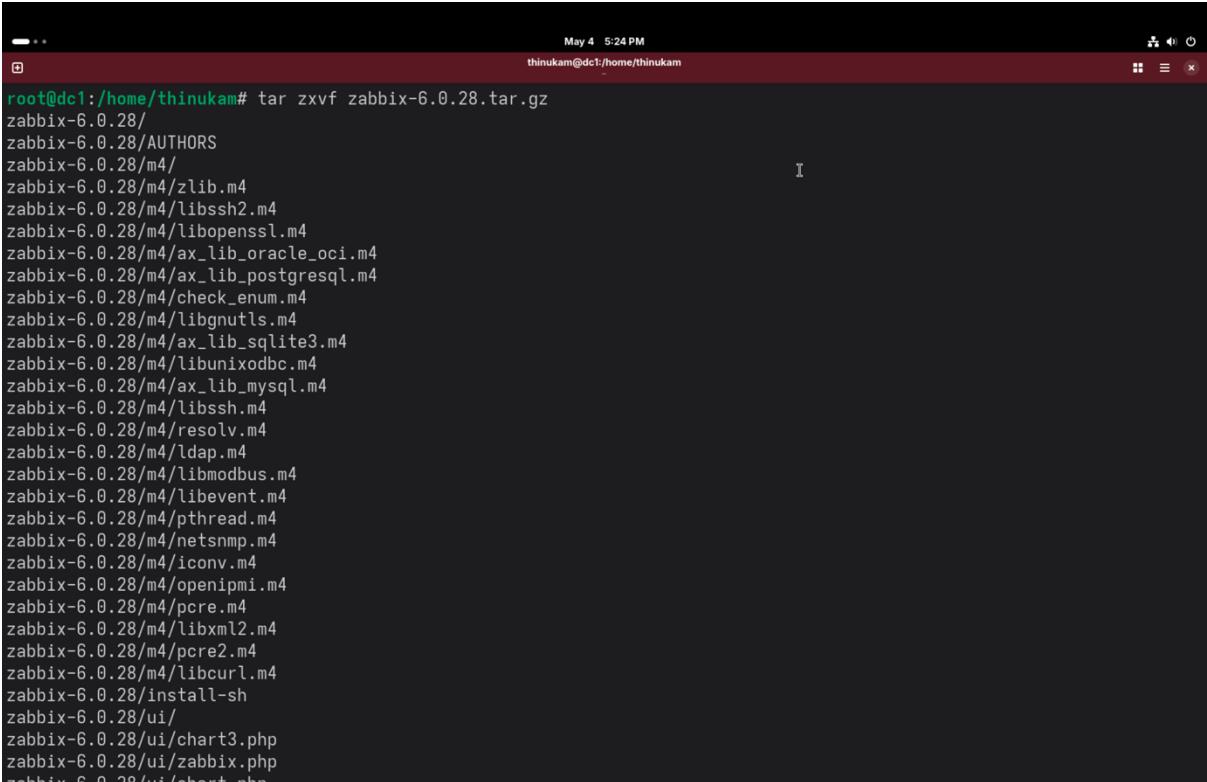
- Download the Zabbix source from Zabbix Cloud Images and Appliances



```
root@dc1:/home/thinukam# wget https://cdn.zabbix.com/zabbix/sources/stable/6.0/zabbix-6.0.28.tar.gz
Saving 'zabbix-6.0.28.tar.gz'
HTTP response 200 [https://cdn.zabbix.com/zabbix/sources/stable/6.0/zabbix-6.0.28.tar.gz]
zabbix-6.0.28.tar.gz 100% [=====] 42.72M 1.35MB/s
[Files: 1 Bytes: 42.72M [1.46MB/s] Redirects: 0 Todo: 0 Errors: 0 ]
root@dc1:/home/thinukam#
```

Figure 3.3. 3 - Download the Zabbix source

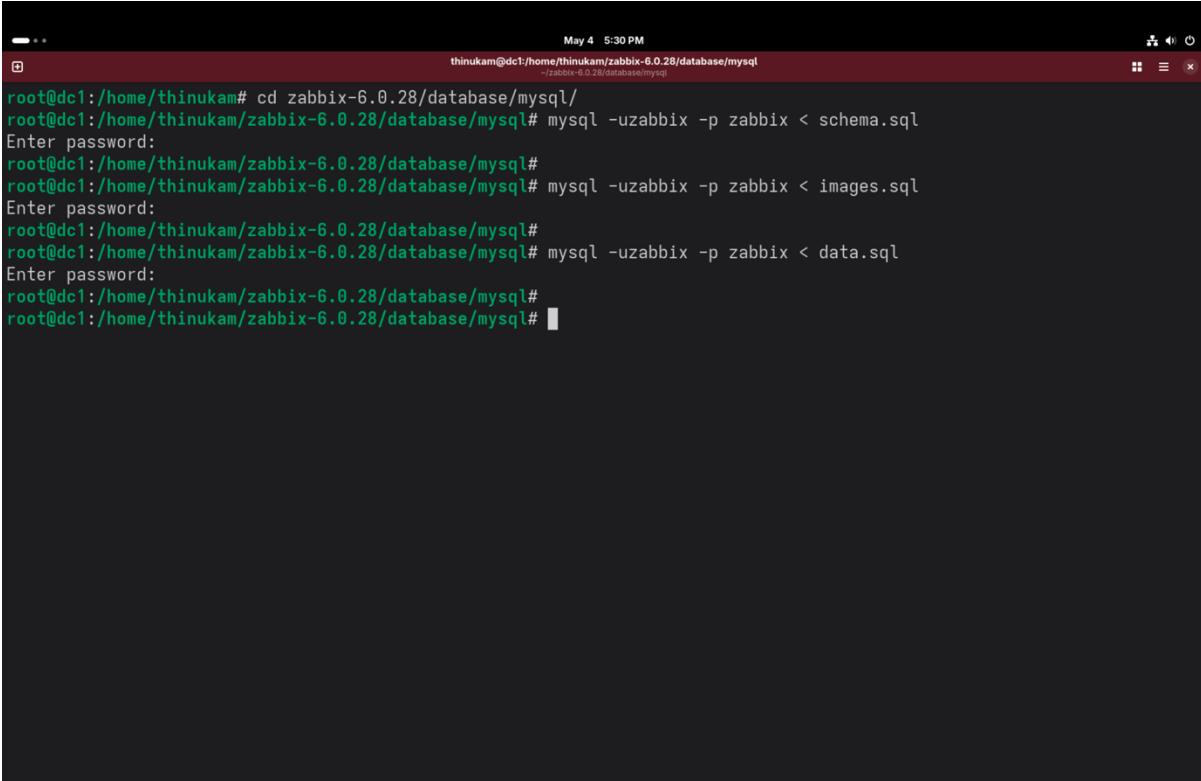
- Extract the downloaded Zabbix source files



```
root@dc1:/home/thinukam# tar zxvf zabbix-6.0.28.tar.gz
zabbix-6.0.28/
zabbix-6.0.28/AUTHORS
zabbix-6.0.28/m4/
zabbix-6.0.28/m4/zlib.m4
zabbix-6.0.28/m4/libssh2.m4
zabbix-6.0.28/m4/libopenssl.m4
zabbix-6.0.28/m4/ax_lib_oracle_oci.m4
zabbix-6.0.28/m4/ax_lib_postgresql.m4
zabbix-6.0.28/m4/check_enum.m4
zabbix-6.0.28/m4/libgnutls.m4
zabbix-6.0.28/m4/ax_lib_sqlite3.m4
zabbix-6.0.28/m4/libunixodbc.m4
zabbix-6.0.28/m4/ax_lib_mysql.m4
zabbix-6.0.28/m4/libssh.m4
zabbix-6.0.28/m4/resolv.m4
zabbix-6.0.28/m4/ldap.m4
zabbix-6.0.28/m4/libmodbus.m4
zabbix-6.0.28/m4/libevent.m4
zabbix-6.0.28/m4/pthread.m4
zabbix-6.0.28/m4/netsnmp.m4
zabbix-6.0.28/m4/iconv.m4
zabbix-6.0.28/m4/openipmi.m4
zabbix-6.0.28/m4/pcre.m4
zabbix-6.0.28/m4/libxml2.m4
zabbix-6.0.28/m4/pcre2.m4
zabbix-6.0.28/m4/libcurl.m4
zabbix-6.0.28/install-sh
zabbix-6.0.28/ui/
zabbix-6.0.28/ui/chart3.php
zabbix-6.0.28/ui/zabbix.php
zabbix-6.0.28/ui/chart.php
```

Figure 3.3. 4 - Extract the downloaded file

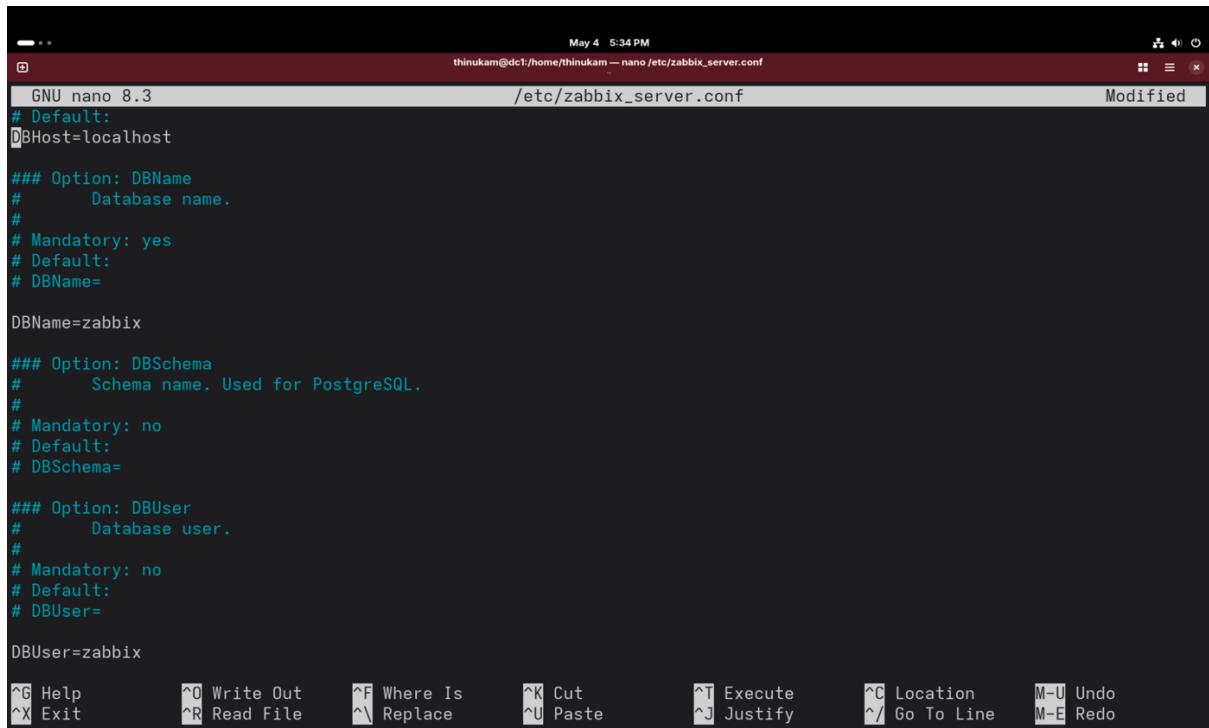
- Change the directory to the extracted directory and import the database schema, images, and data



```
May 4 5:30 PM
thinukam@dc1:/home/thinukam/zabbix-6.0.28/database/mysql
root@dc1:/home/thinukam/zabbix-6.0.28/database/mysql# mysql -uzabbix -p zabbix < schema.sql
Enter password:
root@dc1:/home/thinukam/zabbix-6.0.28/database/mysql#
root@dc1:/home/thinukam/zabbix-6.0.28/database/mysql# mysql -uzabbix -p zabbix < images.sql
Enter password:
root@dc1:/home/thinukam/zabbix-6.0.28/database/mysql#
root@dc1:/home/thinukam/zabbix-6.0.28/database/mysql# mysql -uzabbix -p zabbix < data.sql
Enter password:
root@dc1:/home/thinukam/zabbix-6.0.28/database/mysql#
root@dc1:/home/thinukam/zabbix-6.0.28/database/mysql#
```

Figure 3.3. 5 - Import database schema, images, and data

- Modify the Zabbix configuration file `/etc/zabbix_server.conf` to define the database as given
  - DBHost=localhost
  - DBName=zabbix
  - DBUser=zabbix
  - DBPassword=zabbixpass



```

GNU nano 8.3                               /etc/zabbix_server.conf                         Modified
# Default:
DBHost=localhost

### Option: DBName
#       Database name.
#
# Mandatory: yes
# Default:
# DBName=

DBName=zabbix

### Option: DBSchema
#       Schema name. Used for PostgreSQL.
#
# Mandatory: no
# Default:
# DBSchema=

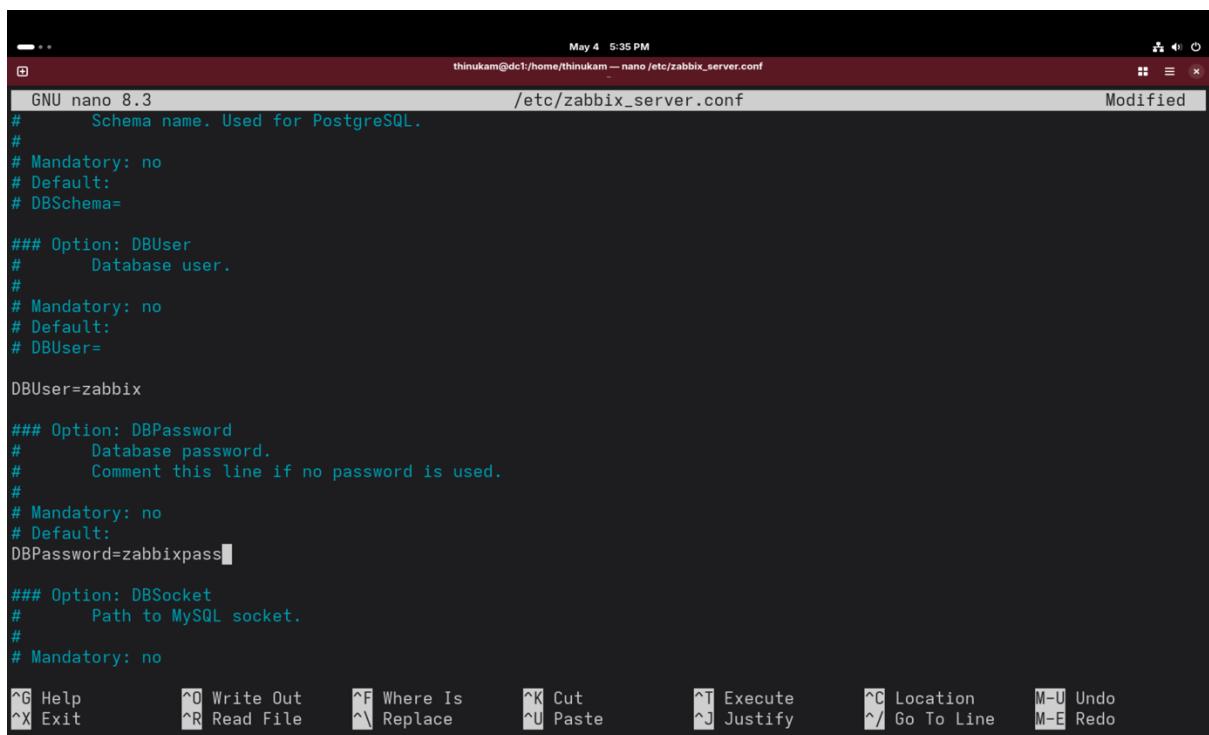
### Option: DBUser
#       Database user.
#
# Mandatory: no
# Default:
# DBUser=

DBUser=zabbix

^G Help          ^O Write Out      ^F Where Is      ^K Cut           ^T Execute      ^C Location      M-U Undo
^X Exit         ^R Read File      ^\ Replace       ^U Paste        ^J Justify     ^/ Go To Line    M-E Redo

```

Figure 3.3. 6 - `/etc/zabbix_server.conf`file (i)



```

GNU nano 8.3                               /etc/zabbix_server.conf                         Modified
#       Schema name. Used for PostgreSQL.
#
# Mandatory: no
# Default:
# DBSchema=

### Option: DBUser
#       Database user.
#
# Mandatory: no
# Default:
# DBUser=

DBUser=zabbix

### Option: DBPassword
#       Database password.
#       Comment this line if no password is used.
#
# Mandatory: no
# Default:
DBPassword=zabbixpass

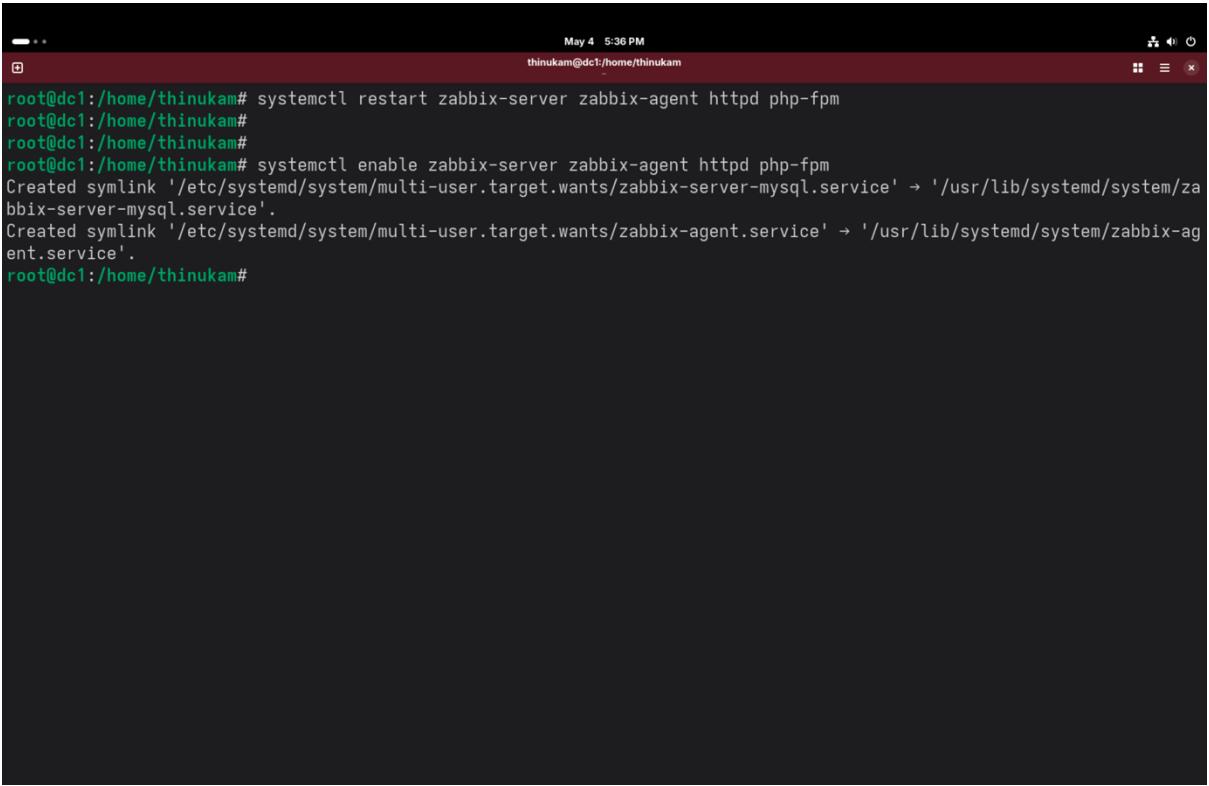
### Option: DBSocket
#       Path to MySQL socket.
#
# Mandatory: no

^G Help          ^O Write Out      ^F Where Is      ^K Cut           ^T Execute      ^C Location      M-U Undo
^X Exit         ^R Read File      ^\ Replace       ^U Paste        ^J Justify     ^/ Go To Line    M-E Redo

```

Figure 3.3. 7 - `/etc/zabbix_server.conf`file (ii)

- Restart all services required by Zabbix and enable them upon system initialization



```
root@dc1:/home/thinukam# systemctl restart zabbix-server zabbix-agent httpd php-fpm
root@dc1:/home/thinukam#
root@dc1:/home/thinukam# systemctl enable zabbix-server zabbix-agent httpd php-fpm
Created symlink '/etc/systemd/system/multi-user.target.wants/zabbix-server-mysql.service' → '/usr/lib/systemd/system/zabbix-server-mysql.service'.
Created symlink '/etc/systemd/system/multi-user.target.wants/zabbix-agent.service' → '/usr/lib/systemd/system/zabbix-agent.service'.
root@dc1:/home/thinukam#
```

Figure 3.3. 8 - Restart and enable Zabbix services

### 3.4. Accessing Zabbix Web Installation

- Open the web browser and access the Zabbix web installation with the URL `http://{server-ip}/zabbix` and complete the installation

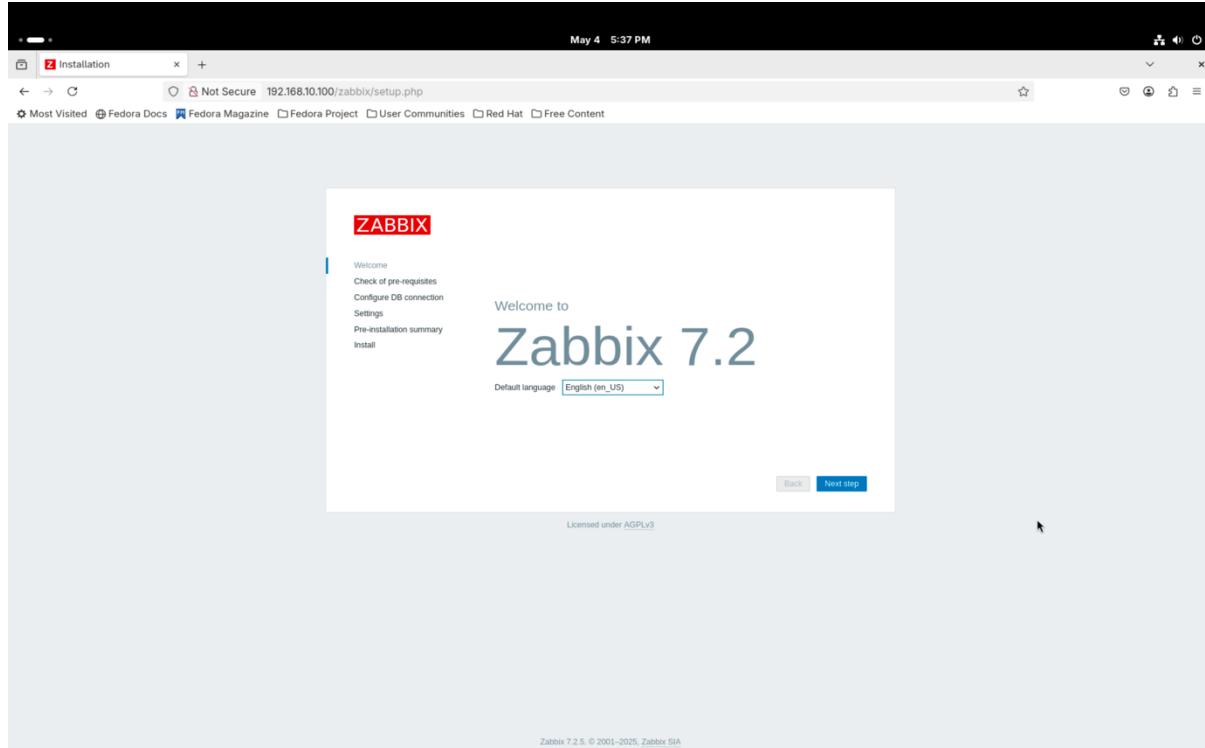


Figure 3.4. 1 - Zabbix Welcome screen

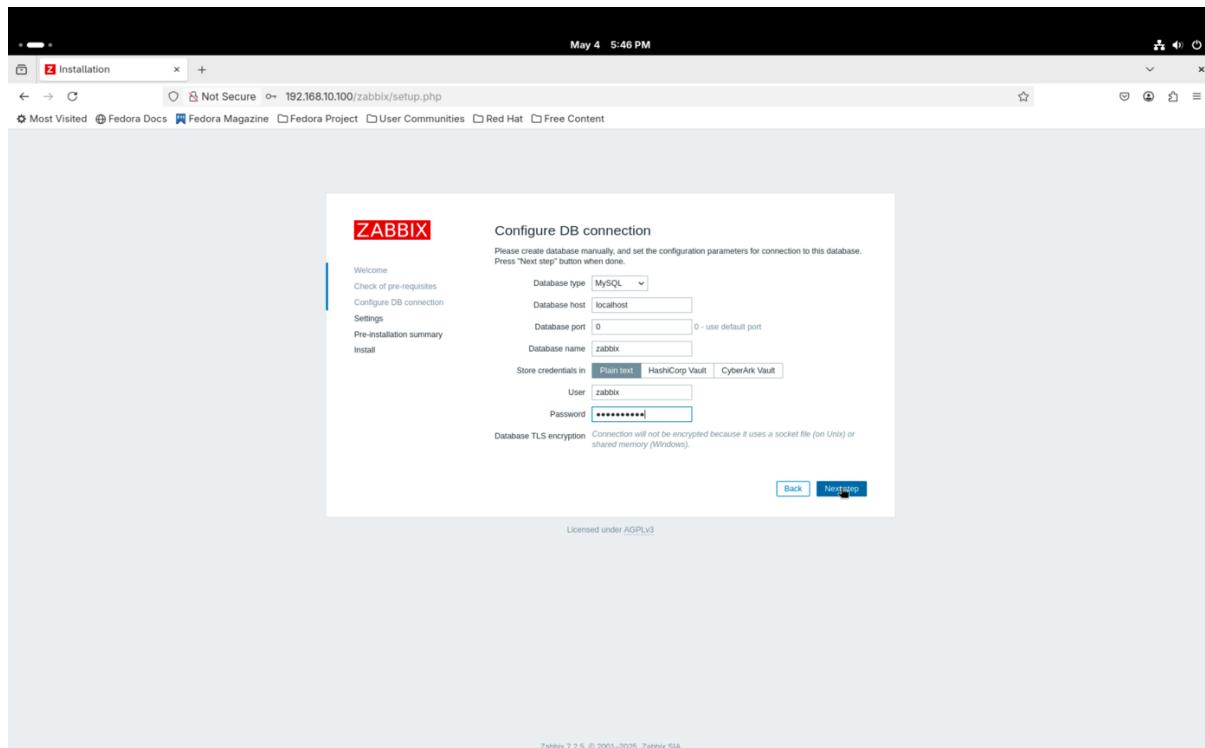


Figure 3.4. 2 - Zabbix database configuration screen

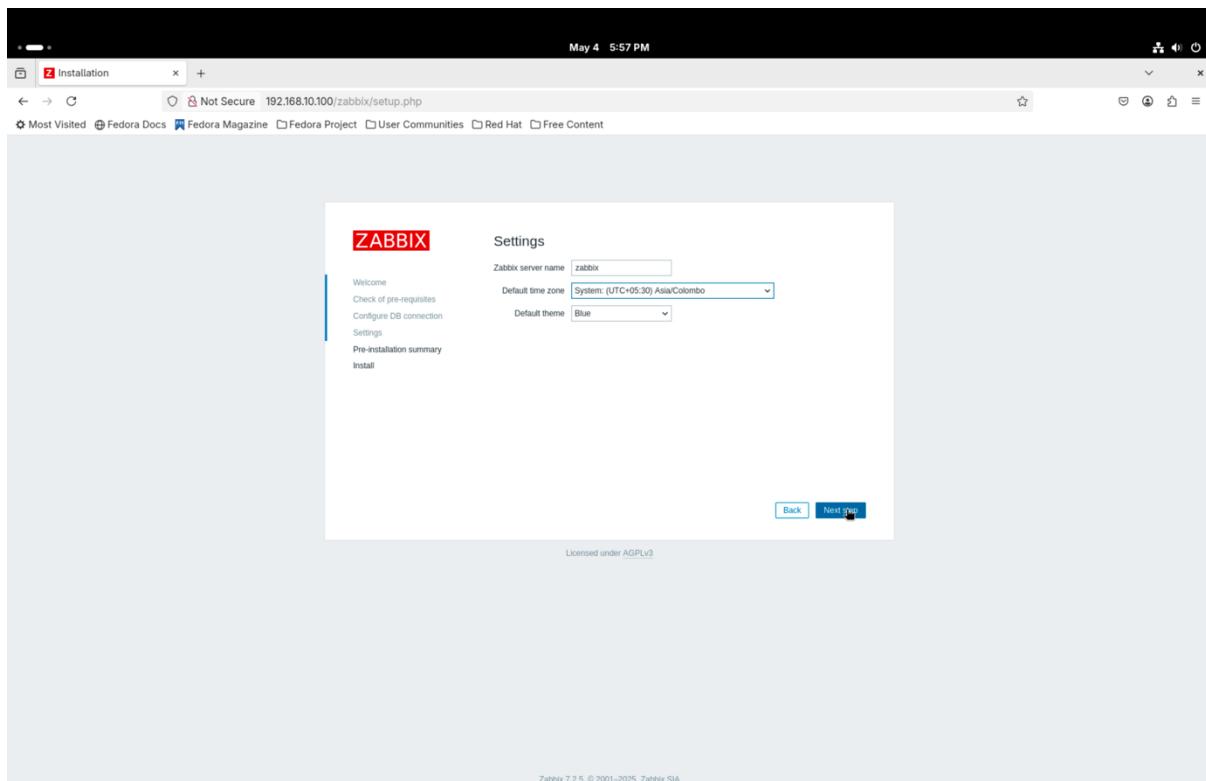


Figure 3.4. 3 - Zabbix server details screen

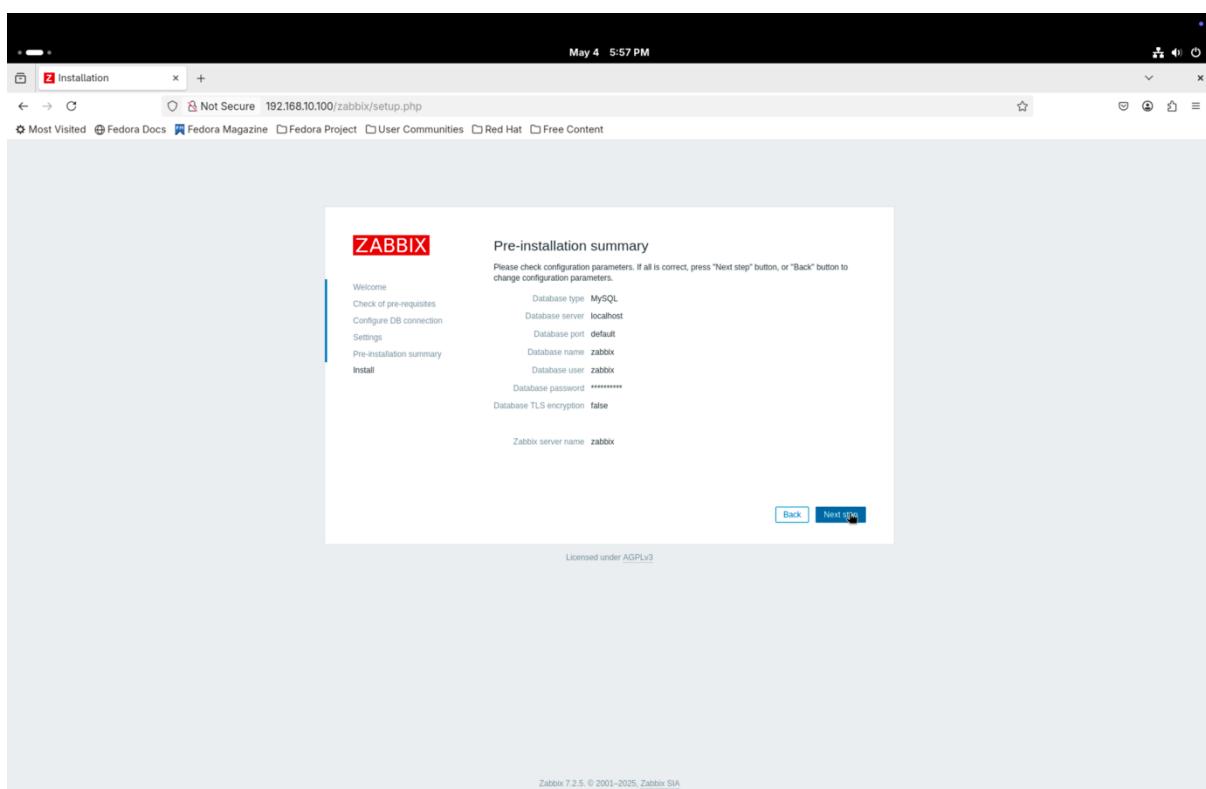


Figure 3.4. 4 - Zabbix web installation summary screen

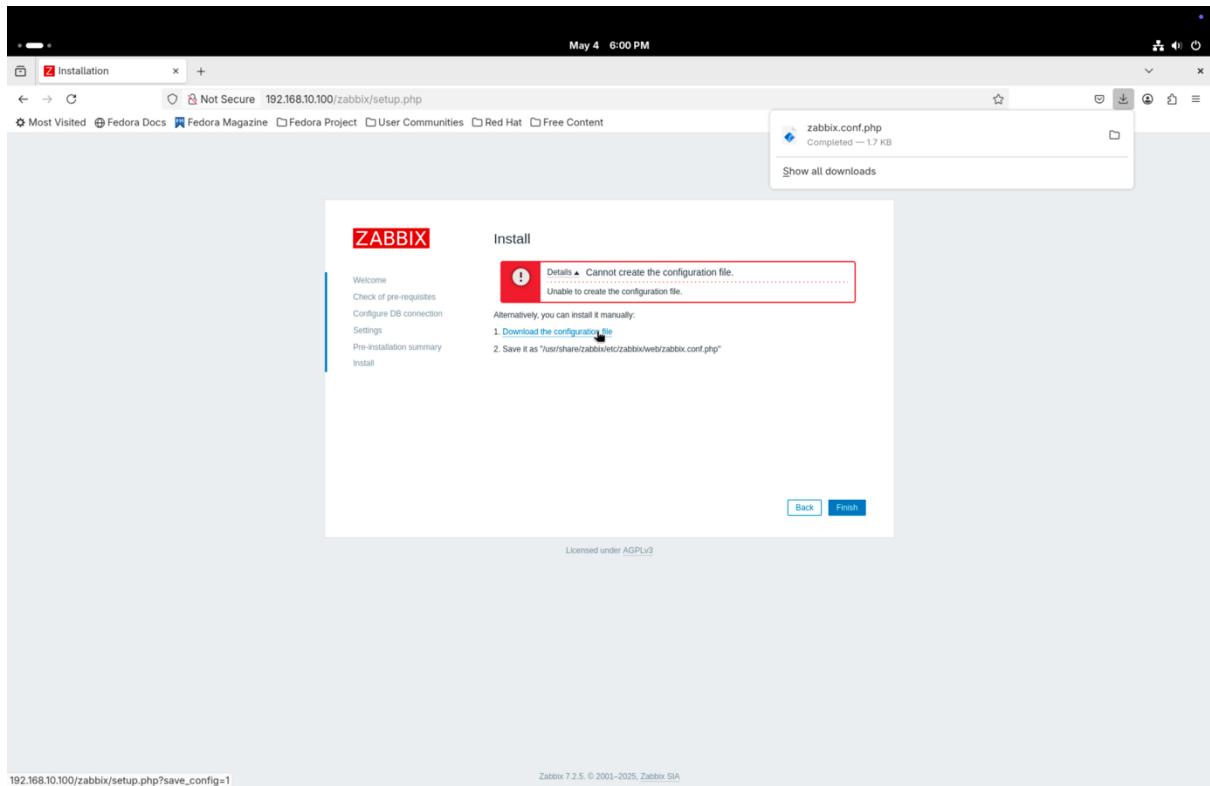


Figure 3.4. 5 - Configuration file download screen

- Download the Zabbix Web installation configuration file (*zabbix.conf.php*) manually from the given link
- Copy or move the downloaded configuration file to the directory */etc/zabbix/web*
- Click ‘Finish’ on the web

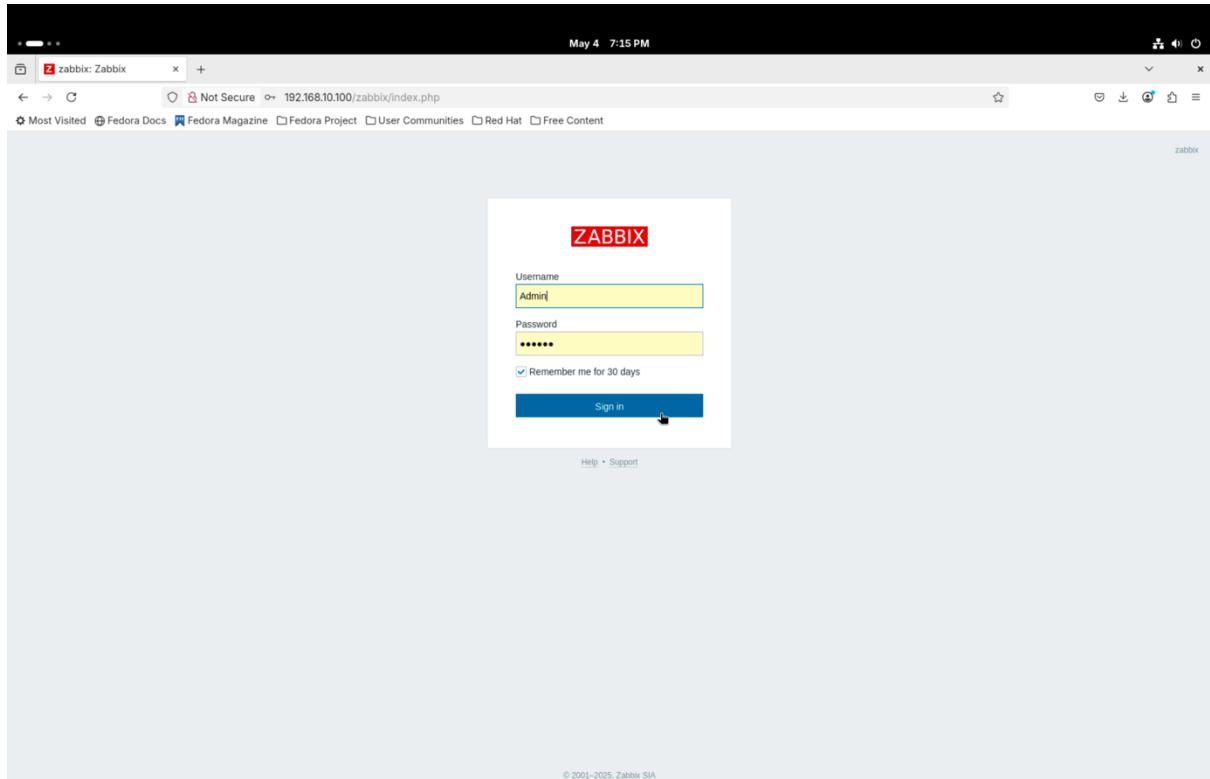


Figure 3.4. 6 - Zabbix login screen

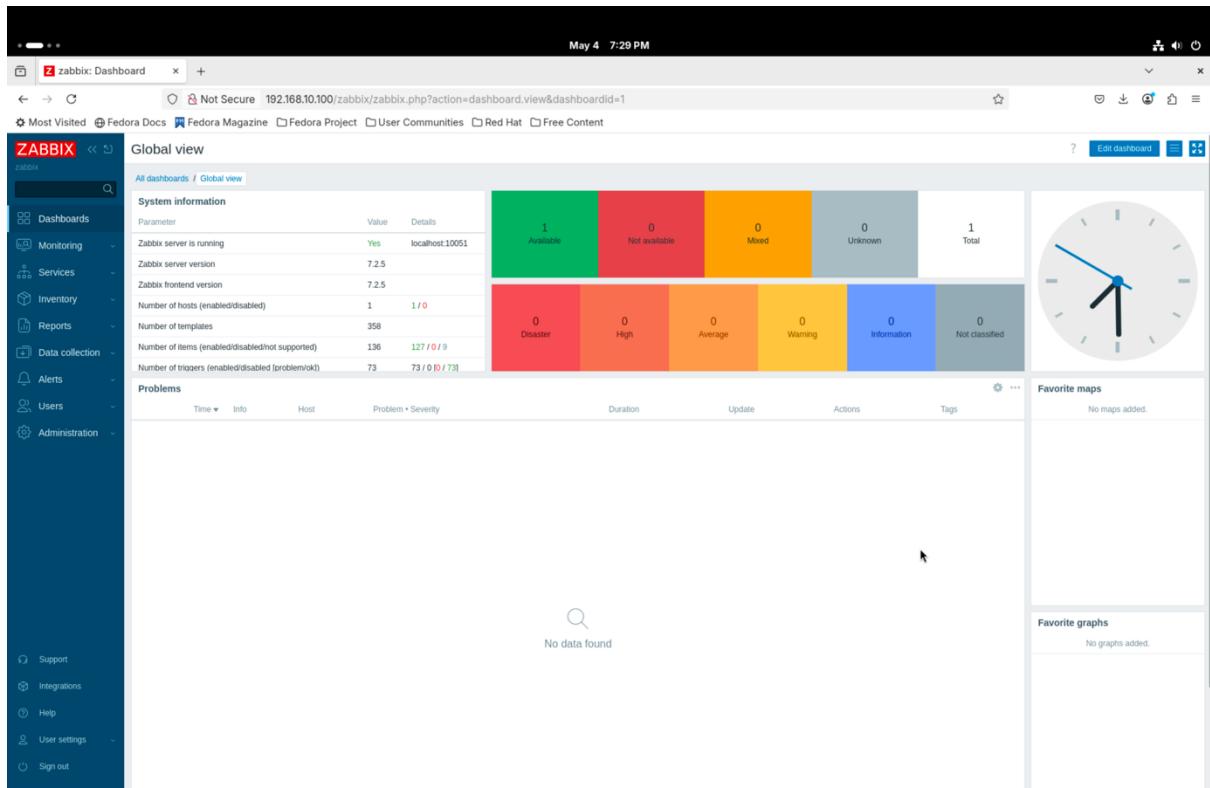
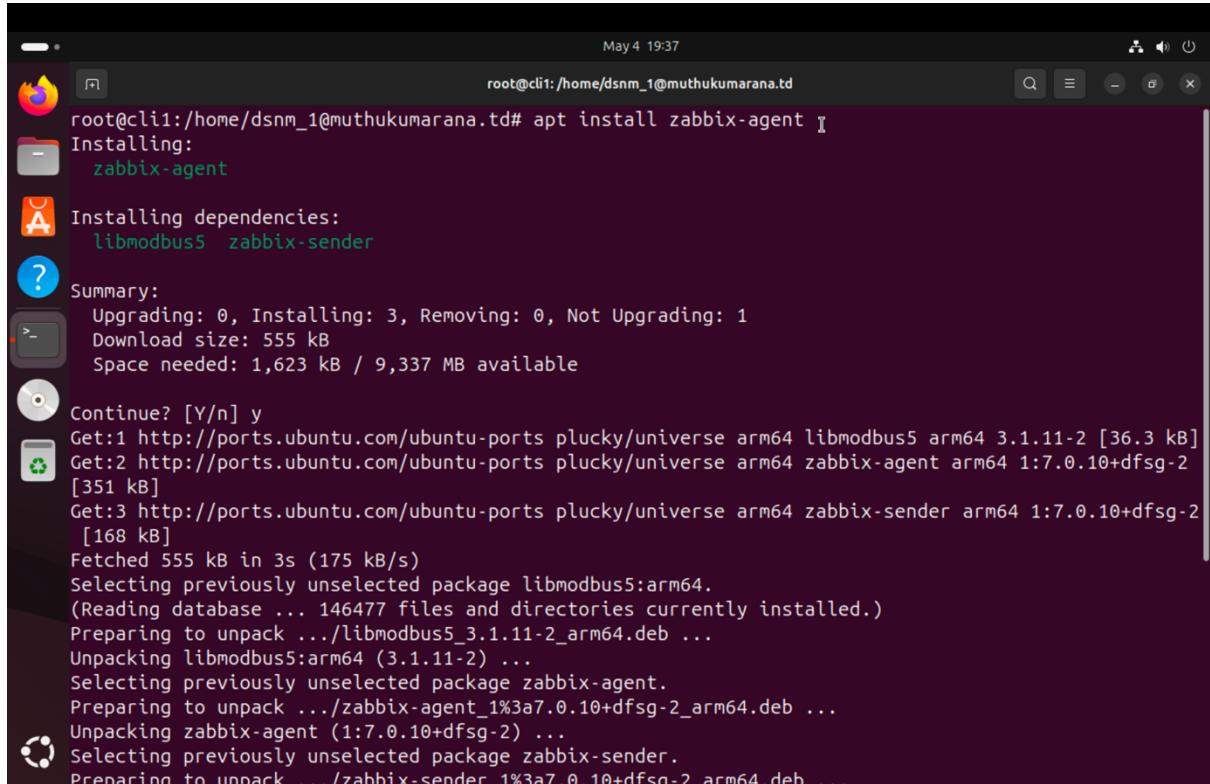


Figure 3.4. 7 - Initial Zabbix Dashboard

## 4. Monitoring Hosts with Zabbix

### 4.1. Setting up the host machine/s

- Install the required package/s for Zabbix Agent

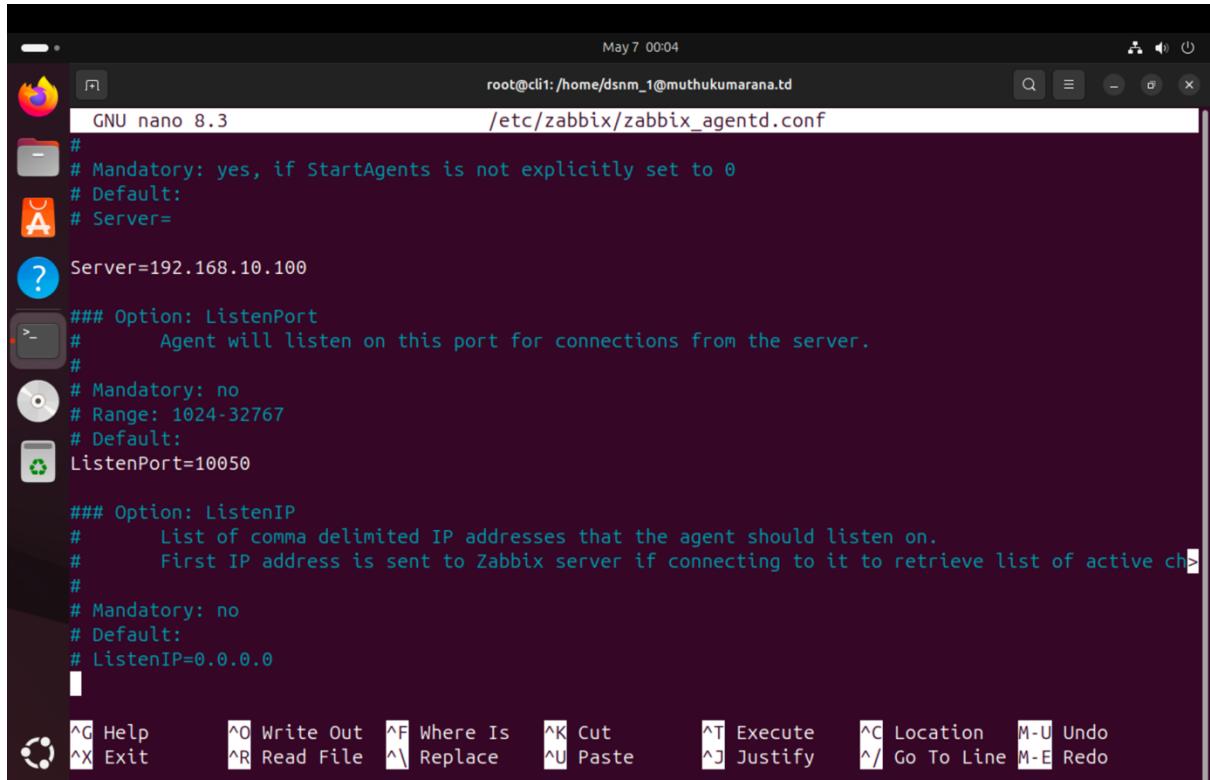


The screenshot shows a terminal window on a Linux system. The title bar indicates it's running on a root shell at May 4 19:37. The command entered is `root@cli1:/home/dsnm_1@muthukumarana.td# apt install zabbix-agent`. The output shows the installation process:

```
root@cli1:/home/dsnm_1@muthukumarana.td# apt install zabbix-agent
Installing:
  zabbix-agent
Installing dependencies:
  libmodbus5  zabbix-sender
Summary:
  Upgrading: 0, Installing: 3, Removing: 0, Not Upgrading: 1
  Download size: 555 kB
  Space needed: 1,623 kB / 9,337 MB available
Continue? [Y/n] y
Get:1 http://ports.ubuntu.com/ubuntu-ports plucky/universe arm64 libmodbus5 arm64 3.1.11-2 [36.3 kB]
Get:2 http://ports.ubuntu.com/ubuntu-ports plucky/universe arm64 zabbix-agent arm64 1:7.0.10+dfsg-2 [351 kB]
Get:3 http://ports.ubuntu.com/ubuntu-ports plucky/universe arm64 zabbix-sender arm64 1:7.0.10+dfsg-2 [168 kB]
Fetched 555 kB in 3s (175 kB/s)
Selecting previously unselected package libmodbus5:arm64.
(Reading database ... 146477 files and directories currently installed.)
Preparing to unpack .../libmodbus5_3.1.11-2_arm64.deb ...
Unpacking libmodbus5:arm64 (3.1.11-2) ...
Selecting previously unselected package zabbix-agent.
Preparing to unpack .../zabbix-agent_1%3a7.0.10+dfsg-2_arm64.deb ...
Unpacking zabbix-agent (1:7.0.10+dfsg-2) ...
Selecting previously unselected package zabbix-sender.
Preparing to unpack .../zabbix-sender_1%3a7.0.10+dfsg-2_arm64.deb ...
```

Figure 4.1. 1 - Install Zabbix Agent package

- Modify the Zabbix Agent configuration file `/etc/zabbix/zabbix_agentd.conf` to define the Zabbix server



```

GNU nano 8.3          /etc/zabbix/zabbix_agentd.conf
#
# Mandatory: yes, if StartAgents is not explicitly set to 0
# Default:
# Server=
#
Server=192.168.10.100
#
### Option: ListenPort
#           Agent will listen on this port for connections from the server.
#
# Mandatory: no
# Range: 1024-32767
# Default:
ListenPort=10050

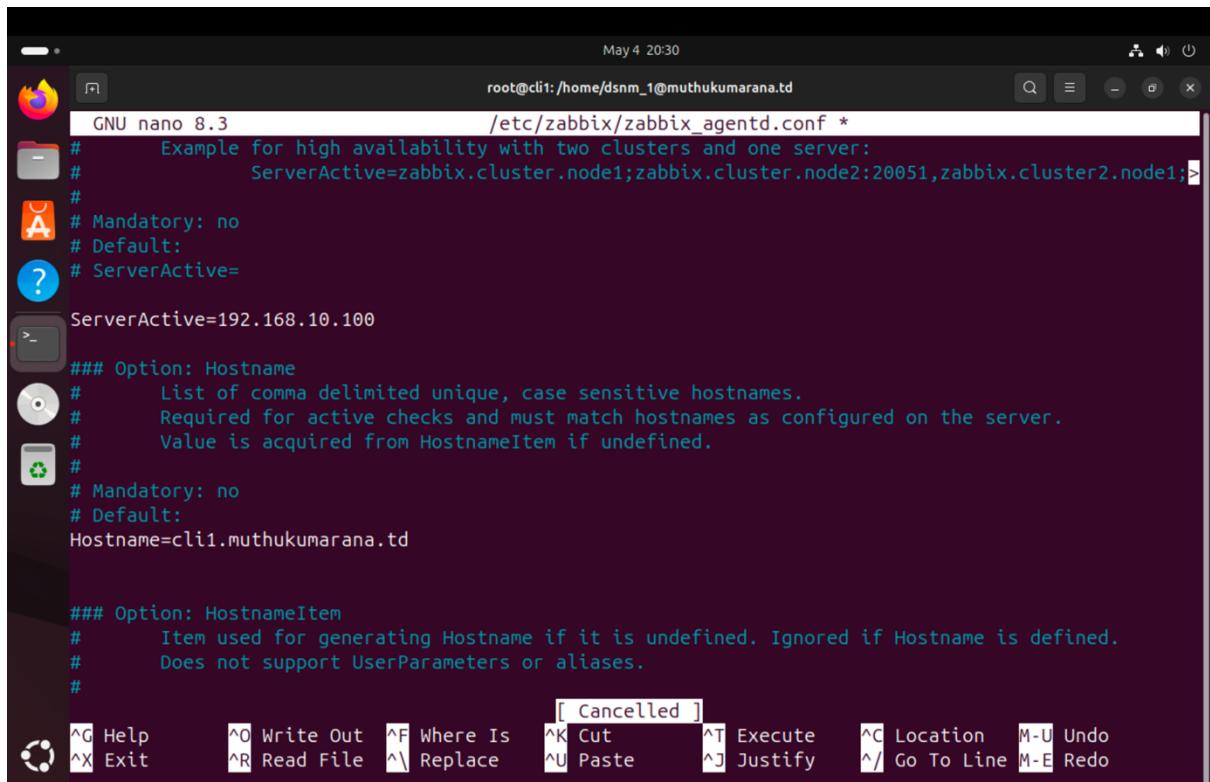
### Option: ListenIP
#           List of comma delimited IP addresses that the agent should listen on.
#           First IP address is sent to Zabbix server if connecting to it to retrieve list of active checks.
#
# Mandatory: no
# Default:
# ListenIP=0.0.0.0
#

```

**Toolbar:**

- ^G Help
- ^O Write Out
- ^F Where Is
- ^K Cut
- ^T Execute
- ^C Location
- M-U Undo
- ^X Exit
- ^R Read File
- ^V Replace
- ^U Paste
- ^J Justify
- ^/ Go To Line
- M-E Redo

Figure 4.1. 2 - `/etc/zabbix/zabbix_agentd.conf` (i)



```

GNU nano 8.3          /etc/zabbix/zabbix_agentd.conf *
#
# Example for high availability with two clusters and one server:
#           ServerActive=zabbix.cluster.node1;zabbix.cluster.node2:20051,zabbix.cluster2.node1;20051
#
# Mandatory: no
# Default:
# ServerActive=
#
ServerActive=192.168.10.100
#
### Option: Hostname
#           List of comma delimited unique, case sensitive hostnames.
#           Required for active checks and must match hostnames as configured on the server.
#           Value is acquired from HostnameItem if undefined.
#
# Mandatory: no
# Default:
Hostname=cli1.muthukumarana.td

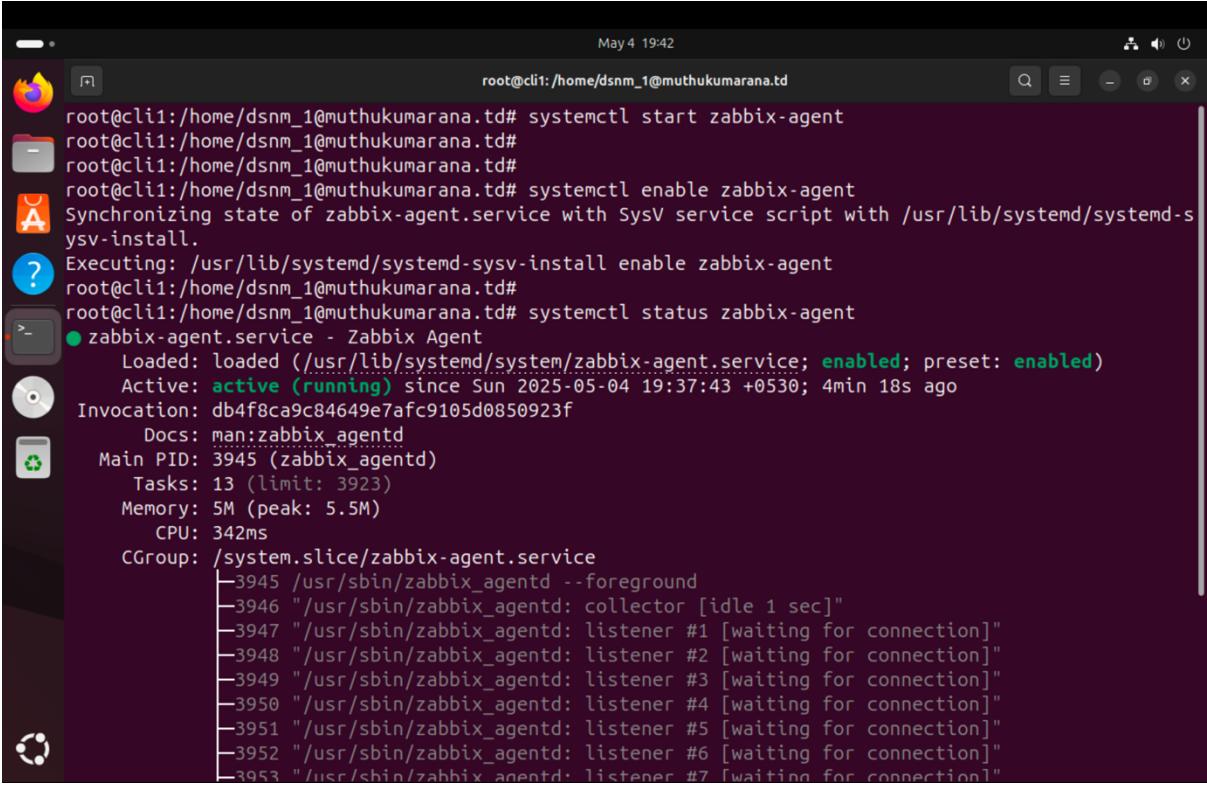
#
### Option: HostnameItem
#           Item used for generating Hostname if it is undefined. Ignored if Hostname is defined.
#           Does not support UserParameters or aliases.
#
```

**Toolbar:**

- ^G Help
- ^O Write Out
- ^F Where Is
- ^K Cut
- ^T Execute
- ^C Location
- M-U Undo
- ^X Exit
- ^R Read File
- ^V Replace
- ^U Paste
- ^J Justify
- ^/ Go To Line
- M-E Redo

Figure 4.1. 3 - `/etc/zabbix/zabbix_agentd.conf` (ii)

- Start the Zabbix Agent service and enable it upon system initialization



```
root@cli1:/home/dsnm_1@muthukumarana.td# systemctl start zabbix-agent
root@cli1:/home/dsnm_1@muthukumarana.td#
root@cli1:/home/dsnm_1@muthukumarana.td#
root@cli1:/home/dsnm_1@muthukumarana.td# systemctl enable zabbix-agent
Synchronizing state of zabbix-agent.service with SysV service script with /usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable zabbix-agent
root@cli1:/home/dsnm_1@muthukumarana.td#
root@cli1:/home/dsnm_1@muthukumarana.td# systemctl status zabbix-agent
● zabbix-agent.service - Zabbix Agent
    Loaded: loaded (/usr/lib/systemd/system/zabbix-agent.service; enabled; preset: enabled)
      Active: active (running) since Sun 2025-05-04 19:37:43 +0530; 4min 18s ago
        Invocation: db4f8ca9c84649e7afc9105d0850923f
       Docs: man:zabbix_agentd
     Main PID: 3945 (zabbix_agentd)
        Tasks: 13 (limit: 3923)
       Memory: 5M (peak: 5.5M)
          CPU: 342ms
      CGroup: /system.slice/zabbix-agent.service
              └─3945 /usr/sbin/zabbix_agentd --foreground
                  ├─3946 "/usr/sbin/zabbix_agentd: collector [idle 1 sec]"
                  ├─3947 "/usr/sbin/zabbix_agentd: listener #1 [waiting for connection]"
                  ├─3948 "/usr/sbin/zabbix_agentd: listener #2 [waiting for connection]"
                  ├─3949 "/usr/sbin/zabbix_agentd: listener #3 [waiting for connection]"
                  ├─3950 "/usr/sbin/zabbix_agentd: listener #4 [waiting for connection]"
                  ├─3951 "/usr/sbin/zabbix_agentd: listener #5 [waiting for connection]"
                  ├─3952 "/usr/sbin/zabbix_agentd: listener #6 [waiting for connection]"
                  ├─3953 "/usr/sbin/zabbix_agentd: listener #7 [waiting for connection]"
```

Figure 4.1. 4 - Start and enable the Zabbix Agent service

- Similar steps are followed to install and establish the Zabbix Agent on other hosts.

## 4.2. Adding host/s to the Zabbix Monitor

- Navigate to **Monitoring > Hosts > Create host**
- Define remote host details

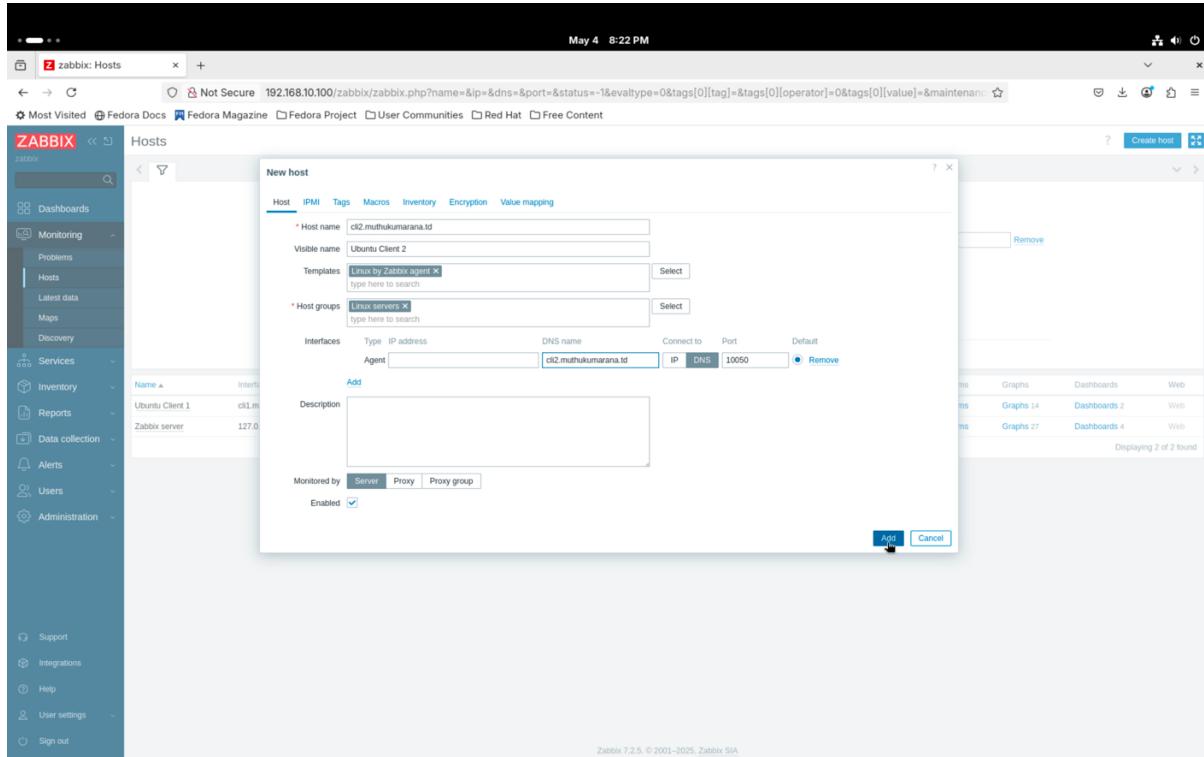


Figure 4.2. 1 - Adding a host to the Zabbix monitor

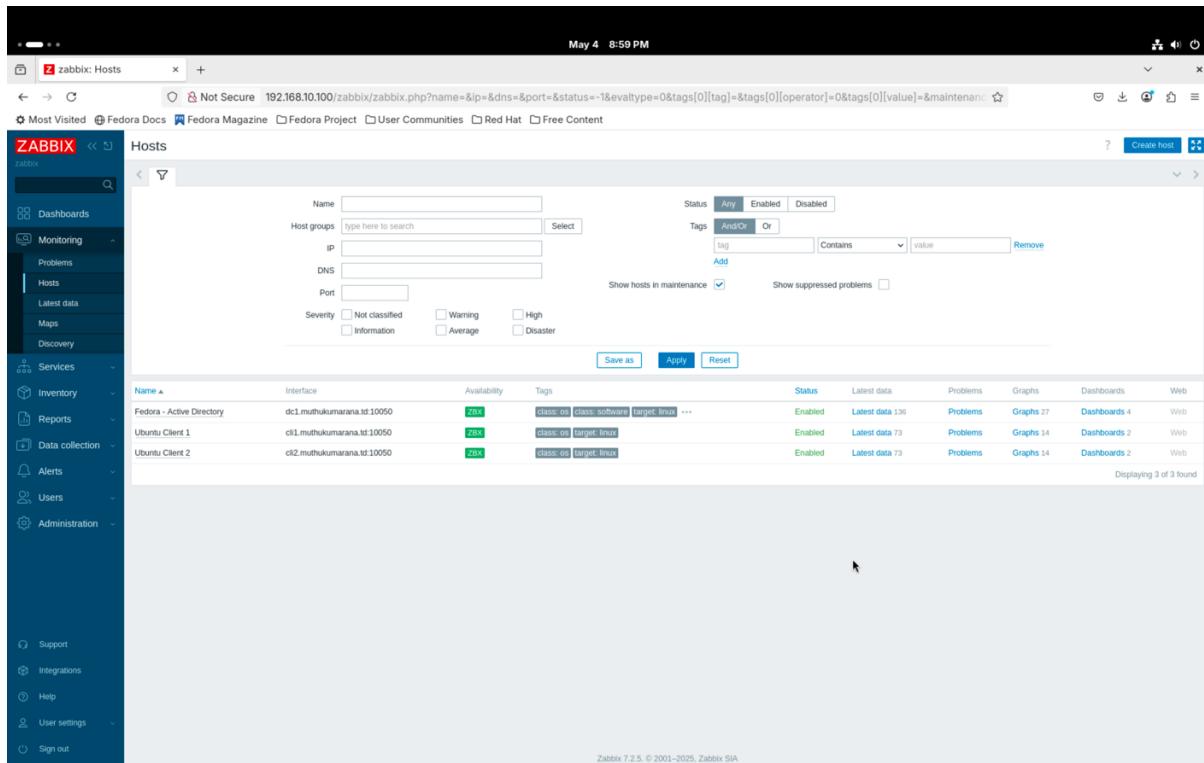


Figure 4.2. 2 - Added hosts to the Zabbix monitor

## 4.3. Customizing the dashboard to monitor critical services

- Navigate to Dashboards > Edit dashboard
- Customize the dashboard accordingly to monitor critical services such as CPU usage and utilization, Memory usage and utilization, Disk usage, and problems

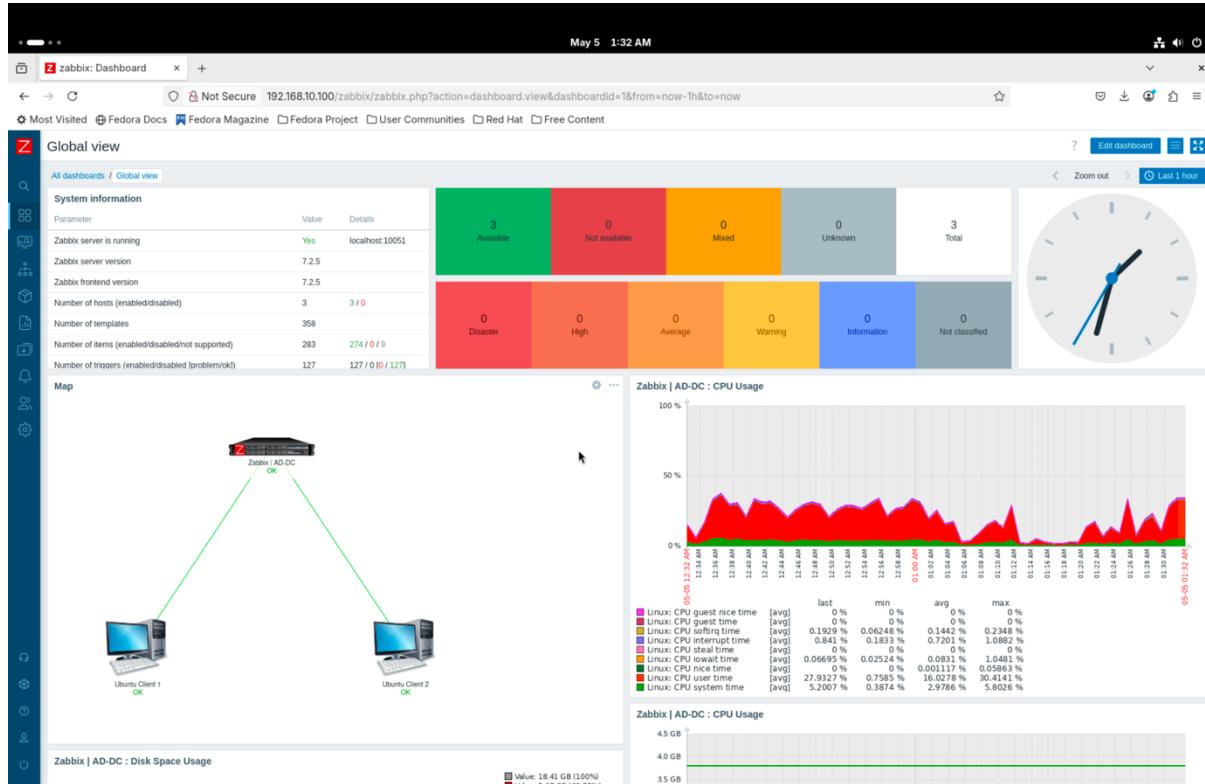


Figure 4.3. 1 - Customized Zabbix Monitoring dashboard (i)

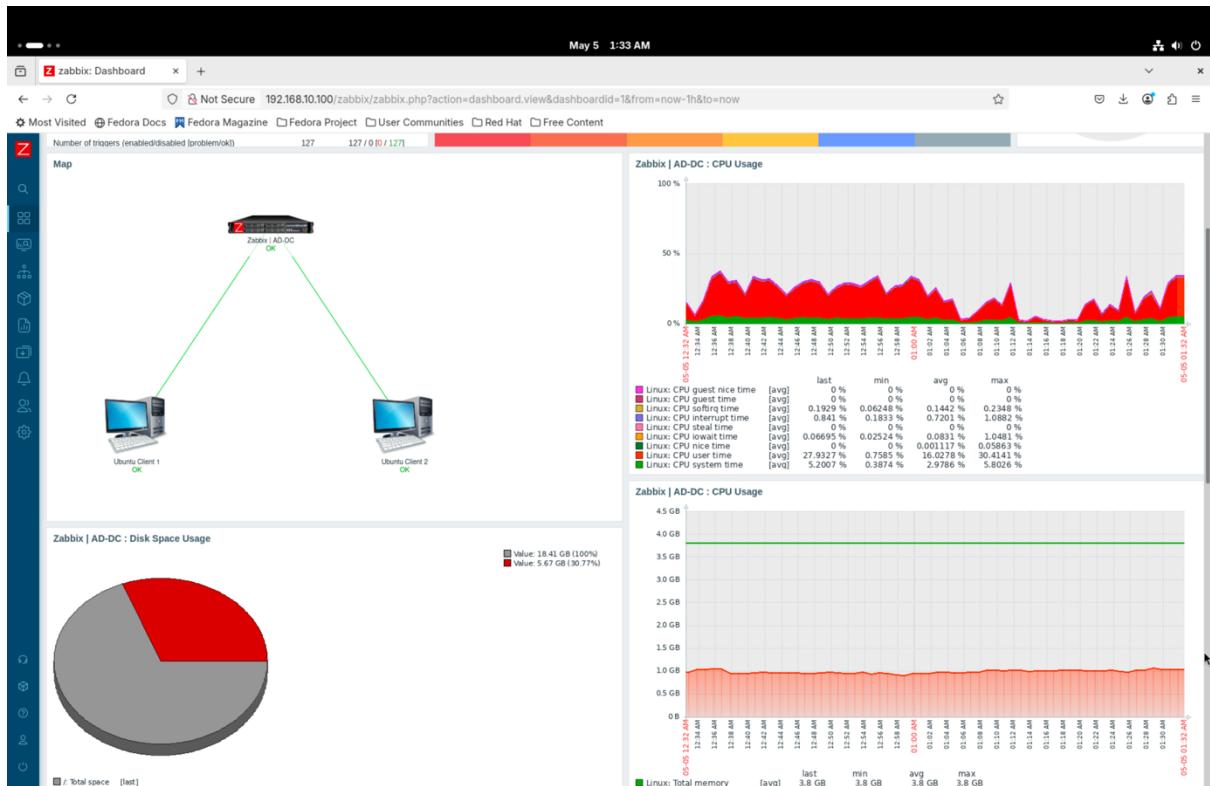


Figure 4.3. 2 - Customized Zabbix Monitoring dashboard (ii)

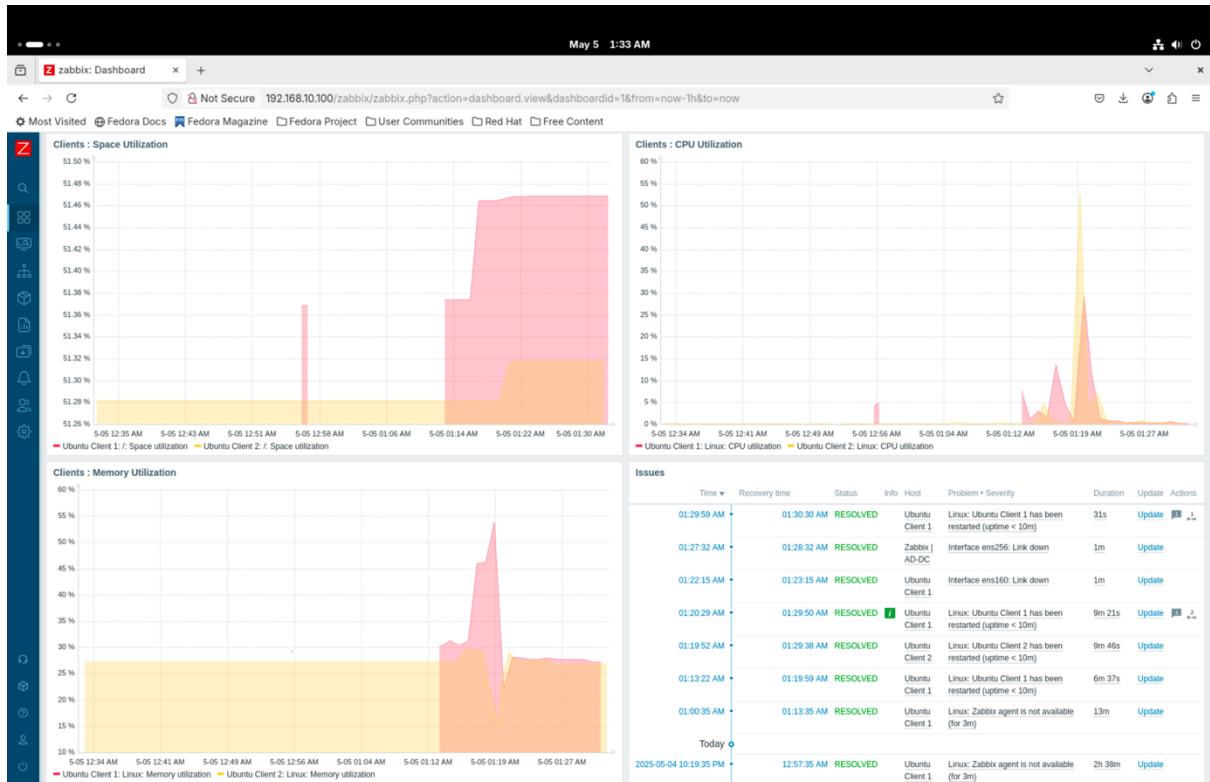


Figure 4.3. 3 - Customized Zabbix Monitoring dashboard (iii)

## References

- [1] <https://fedoramagazine.org/samba-as-ad-and-domain-controller/>
- [2] <https://documentation.ubuntu.com/server/how-to/sssd/with-active-directory/index.html>
- [3] <https://www.atlantic.net/dedicated-server-hosting/how-to-install-zabbix-monitoring-tool-on-fedora/>
- [4] <https://serverspace.io/support/help/installing-zabbix-agent-on-ubuntu/>
- [5] <https://youtu.be/48v0jjrr36o>