

NSP 655 PROJECT SERVER & PERIPHERALS

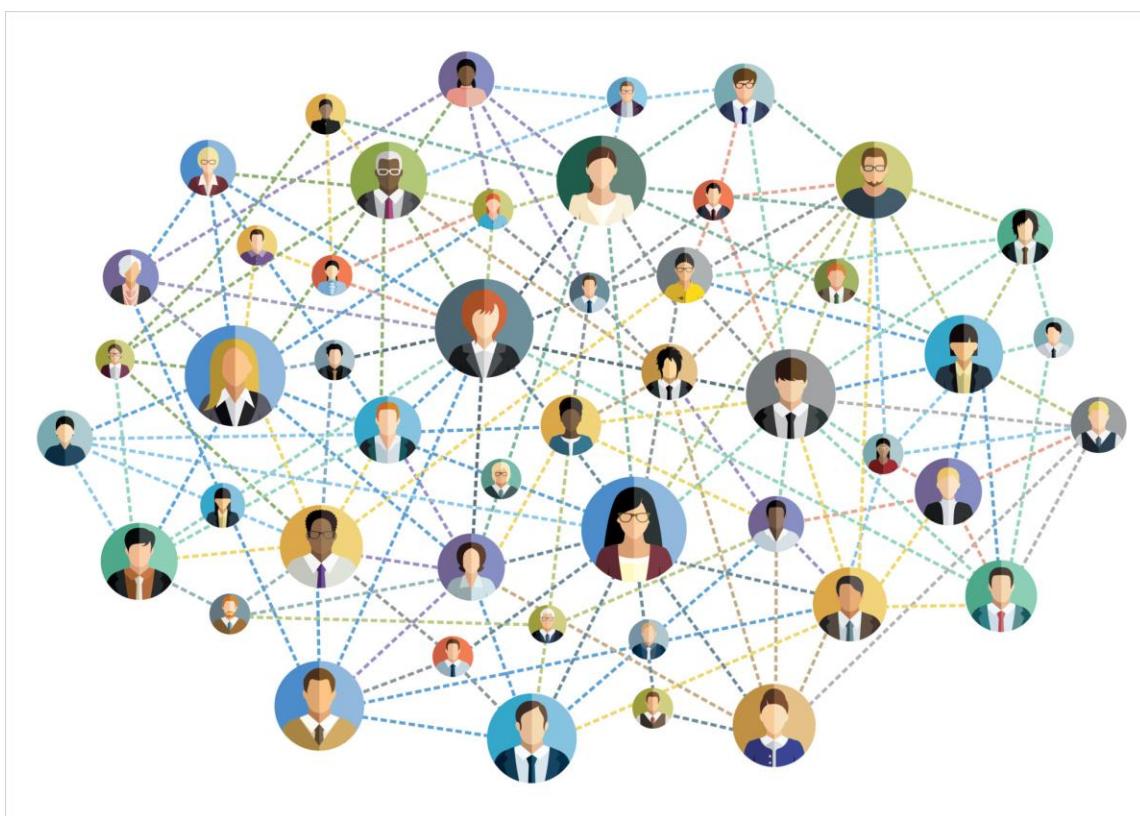
9 AUGUST 2020

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INTRODUCTION

The Final project is based on a VMware-virtualized Fedora 24 Linux server and Fedora 24 Linux client setup and configured with the networking based on the project requests for computers, a network server and all other peripherals, the systems selected meets and exceeds all their needs. This task helped me to upgrade and improve the abilities that I gained from labs.

This project also helped me to learn Install/configure and manage Linux OS as a host operating system in virtualized hardware configurations.

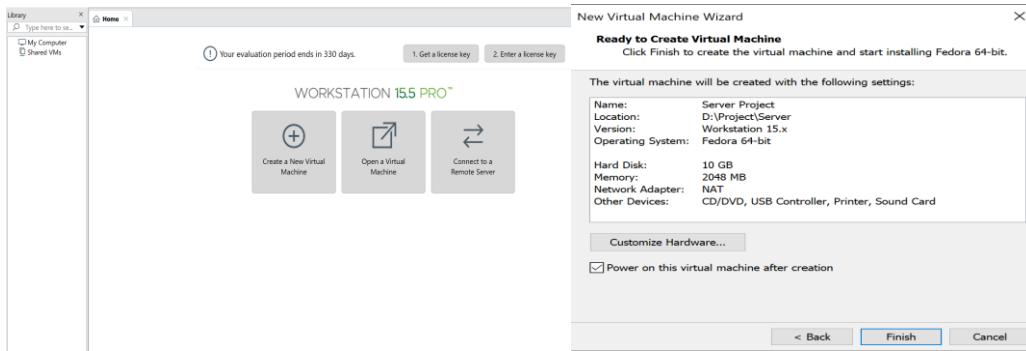
REQUIREMENTS

The required softwares and iso files are:

- *VMware Workstation*
- *SERVER – Fedora 24 (Fedora iso file)*
- *Client – Fedora 24 (Fedora iso file)*

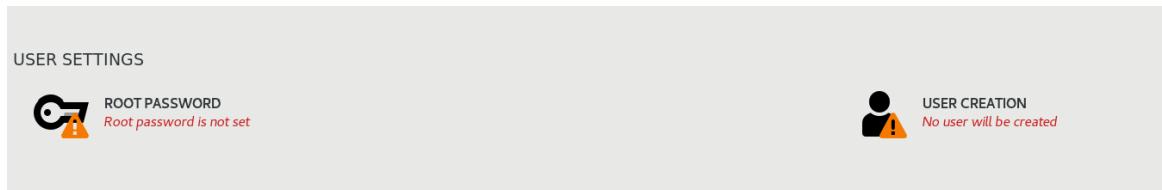
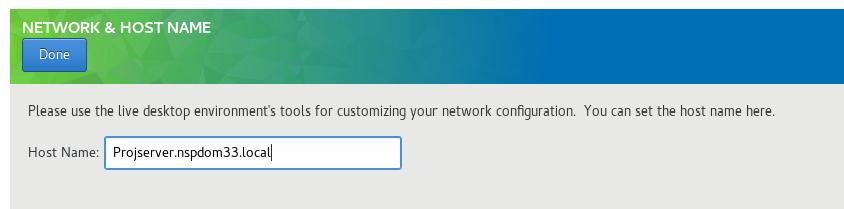
Installing Fedora Linux Sever in a virtualized environment using VMware

- a) Installing Fedora 24 Server: **Create a New Virtual Machine** then select the **disc image (iso)**. Use **10 GB** space to create virtual environment and **store as a single file**.



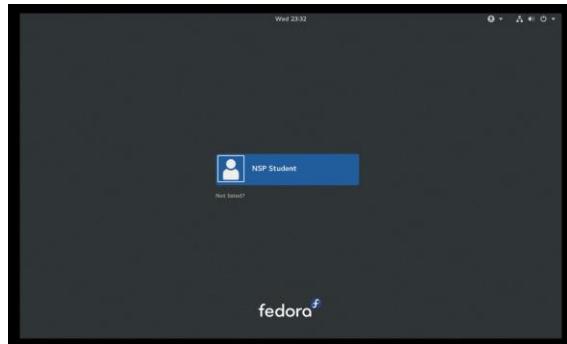
- b) It would look like as the above image, when it restarts select **install to hard drive**.

Press continue for the language part, then click on installation destination and click done. Select **Network & Hostname** and insert **Projserver.nspdom33.local** in the provided Text and click done.



- c) Go for the user settings, which is going to ask you about **Root Password** and **User Creation**. For User Creation, set Full name to **NSP Student** with username as

student and password as **nspstudent**. In the Root Password option, set it as **nsp655**. Then login at the Login Page using password "**nspstudent**".



- d) After login, open terminal by searching in **Activities** and write some commands. Use **ifconfig** command to show **ip addresses** of all the available networks on **Server**. Moreover, use **ping www.yahoo.com** to ping the yahoo website.

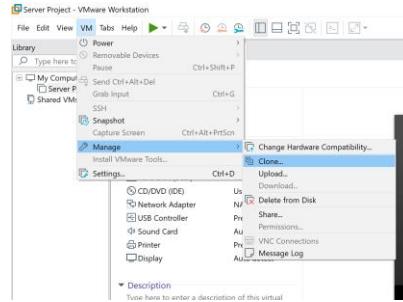
```
root@Projserver:~ 
File Edit View Search Terminal Help
[student@Projserver ~]$ su -
Password:
[root@Projserver ~]# ifconfig
ens33: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
        inet 192.168.49.141 netmask 255.255.255.0 broadcast 192.168.40.255
          inet6 fe80::4631:5bd9:6fd2:d4e5 prefixlen 64 scopeid 0x20<link>
            ether 00:0c:29:fb:73:dc txqueuelen 1000 (Ethernet)
              RX packets 135180 bytes 198109710 (188.9 MiB)
              RX errors 0 dropped 0 overruns 0 frame 0
              TX packets 10899 bytes 820641 (801.4 KiB)
              TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
      inet 127.0.0.1 netmask 255.0.0.0
        inet6 ::1 prefixlen 128 scopeid 0x10<host>
          loop txqueuelen 1 (Local Loopback)
            RX packets 0 bytes 0 (0.0 B)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 0 bytes 0 (0.0 B)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

[root@Projserver ~]# ping www.yahoo.com
PING new-fp-shed.wgl.b.yahoo.com (74.6.143.25) 56(84) bytes of data.
64 bytes from media-router-fp73.prod.media.vip.bf1.yahoo.com (74.6.143.25): icmp_seq=1 ttl=128 time=46.0 ms
64 bytes from media-router-fp73.prod.media.vip.bf1.yahoo.com (74.6.143.25): icmp_seq=2 ttl=128 time=44.8 ms
64 bytes from media-router-fp73.prod.media.vip.bf1.yahoo.com (74.6.143.25): icmp_seq=3 ttl=128 time=42.9 ms
64 bytes from media-router-fp73.prod.media.vip.bf1.yahoo.com (74.6.143.25): icmp_seq=4 ttl=128 time=43.2 ms
64 bytes from media-router-fp73.prod.media.vip.bf1.yahoo.com (74.6.143.25): icmp_seq=5 ttl=128 time=54.9 ms
^C
--- new-fp-shed.wgl.b.yahoo.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4006ms
rtt min/avg/max/mdev = 42.991/46.410/54.903/4.390 ms
[root@Projserver ~]#
```

Installing Fedora Linux Client in a virtualized environment using VMWare

- a) To install the **Linux Client** on virtual environment, first shut down the Linux Server. From the menu bar on the top, click **VM** then forward with **Manage** and then **clone**.



- b) Click Next and then select **Create Full Clone**, give the name, and select the location.
c) Then Login at the **Login Page**.



- d) Open the terminal same as in Server, then type **su** – to change to **root** from student. Type **nsp655** when prompt for password. Type **hostnamectl set-hostname Projclient.nspdom33.local** to change the hostname from server hostname to client's. Close terminal and open new terminal. In root directory type **hostname** to see the new hostname of the current virtual machine.

```

root@Projclient:~#
[student@Projclient -]$ su -
Password:
[root@Projclient -]# hostname
Projclient.nspdom3.local
[root@Projclient -]# 

root@Projserver:~#
[student@Projserver -]$ su -
Password:
[root@Projserver -]# hostnamectl set-hostname Projclient.nspdom3.local
[root@Projserver -]# 

```

- e) Same as the server, type **ifconfig** and ping www.yahoo.com. Moreover, as server we have to disable selinux by opening file /etc/selinux/config through gedit by issuing a command **gedit /etc/selinux/config** and changing “selinux=” to **SELINUX=disabled**. After that you have to stop and disable the firewall using command **systemctl stop firewalld.service** forwarding with **systemctl disable firewalld.service**.

```

root@Projclient:~#
[root@Projclient -]# ifconfig
ens3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
inet 192.168.0.1 brd 192.168.0.255 broadcast 192.168.0.255
      netmask 255.255.255.0      broadcast 192.168.0.255
      inet6 fe80::7114:8179%ens3 brd fe80::ff:fe81%ens3 scopeid 0x20<Link>
        ether 00:0c:29:92:a9:44 txqueuelen 1000 (Ethernet)
      RX packets 161 bytes 57436 (56.0 kB)
      RX errors 0 dropped 0 overruns 0 frame 0
      TX packets 226 bytes 22676 (22.1 kB)
      TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
      inet 127.0.0.1 brd 127.0.0.1 broadcast 127.0.0.1
          netmask 255.255.255.0      broadcast 127.0.0.1
      loop txqueuelen 1 (Local Loopback)
      RX packets 16 bytes 1416 (1.3 kB)
      RX errors 0 dropped 0 overruns 0 frame 0
      TX packets 16 bytes 1416 (1.3 kB)
      TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
[root@Projclient -]# ping www.yahoo.com
PING new-fp-shed.w1.yahoo.com (74.6.231.21) 56(84) bytes of data.
64 bytes from media-router-fp74.prod.media.vip.nel.yahoo.com (74.6.231.21): icmp_seq=1 ttl=128 time=54.3 ms
64 bytes from media-router-fp74.prod.media.vip.nel.yahoo.com (74.6.231.21): icmp_seq=2 ttl=128 time=50.1 ms
64 bytes from media-router-fp74.prod.media.vip.nel.yahoo.com (74.6.231.21): icmp_seq=3 ttl=128 time=49.9 ms
64 bytes from media-router-fp74.prod.media.vip.nel.yahoo.com (74.6.231.21): icmp_seq=4 ttl=128 time=50.9 ms
64 bytes from media-router-fp74.prod.media.vip.nel.yahoo.com (74.6.231.21): icmp_seq=5 ttl=128 time=49.7 ms
64 bytes from media-router-fp74.prod.media.vip.nel.yahoo.com (74.6.231.21): icmp_seq=6 ttl=128 time=53.4 ms
64 bytes from media-router-fp74.prod.media.vip.nel.yahoo.com (74.6.231.21): icmp_seq=7 ttl=128 time=51.1 ms
...
7 packets transmitted, 7 received, 0% packet loss, time 6010ms
rtt min/avg/max/mdev = 49.777/51.393/54.306/1.651 ms
[root@Projclient -]# 

root@Projserver:~#
[student@Projserver -]$ su -
Password:
[root@Projserver -]# gedit /etc/selinux/config
(gedit:2116): Gtk-WARNING **: Calling Inhibit failed: GDBus.Error:org.freedesktop.DBus.Error.ServiceUnknown: The name org.gnome.SessionManager was not provided by any .service files
** (gedit:2116): WARNING **: Set document metadata failed: Setting attribute metadata::gedit-spell-language not supported
** (gedit:2116): WARNING **: Set document metadata failed: Setting attribute metadata::gedit-encoding not supported
** (gedit:2116): WARNING **: Set document metadata failed: Setting attribute metadata::gedit-position not supported
** (gedit:2116): WARNING **: Set document metadata failed: Setting attribute metadata::gedit-spell-language not supported
** (gedit:2116): WARNING **: Set document metadata failed: Setting attribute metadata::gedit-encoding not supported
[root@Projserver -]# systemctl stop firewalld.service
[root@Projserver -]# systemctl disable firewalld.service
Removed symlink /etc/systemd/system/basic.target.wants/firewalld.service.
Removed symlink /etc/systemd/system/dbus-org.fedoraproject.FirewallD1.service.
[root@Projserver -]# 

```

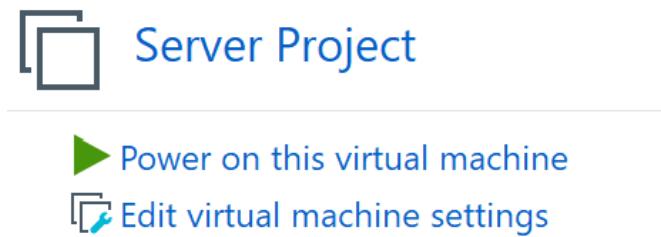
```

root@Projserver:~#
[student@Projserver -]$ su -
Password:
[root@Projserver -]# gedit /etc/selinux/config
(config /etc/selinux/config)
# This file controls the state of SELinux on the system.
# SELINUX can take one of these three values:
#       enforcing - SELinux security policy is enforced.
#       permissive - SELinux prints warnings instead of enforcing.
#       disabled - No SELinux policy is loaded.
SELINUXTYPE=disabled
# SELINUXTYPE can take one of these three values:
#       targeted - Targeted processes are protected,
#           minimum - Modification of targeted policy. Only selected processes are protected.
#           mls - Multi Level Security protection.
SELINUXTYPE=targeted

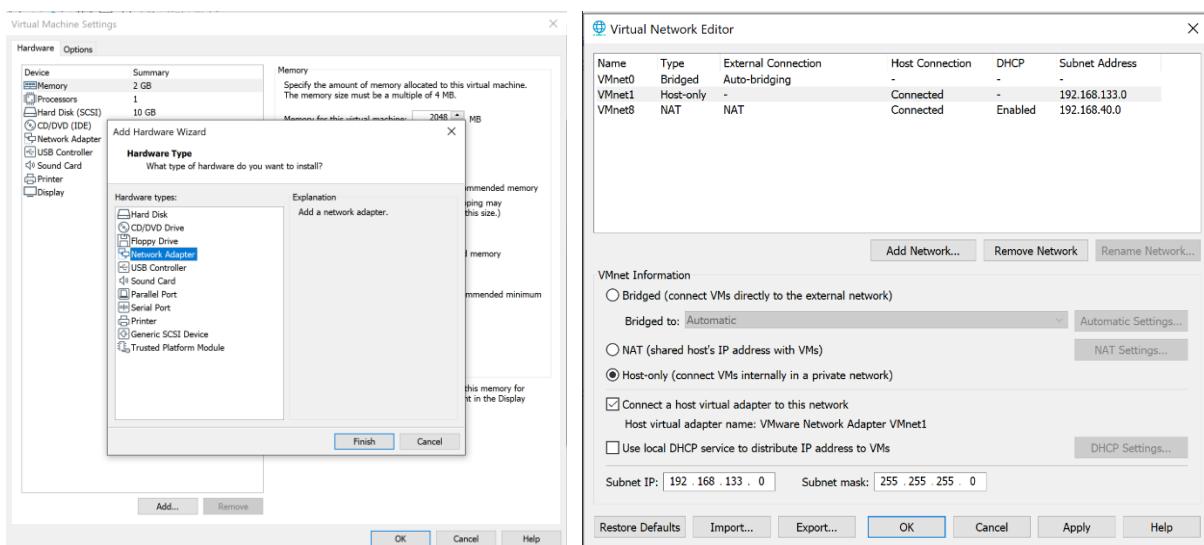
```

The virtual NICs Fedora Linux Server and Client

- a) Close both Server and Client Machine. You will see **Edit virtual machine settings** same as in the image. Open it.



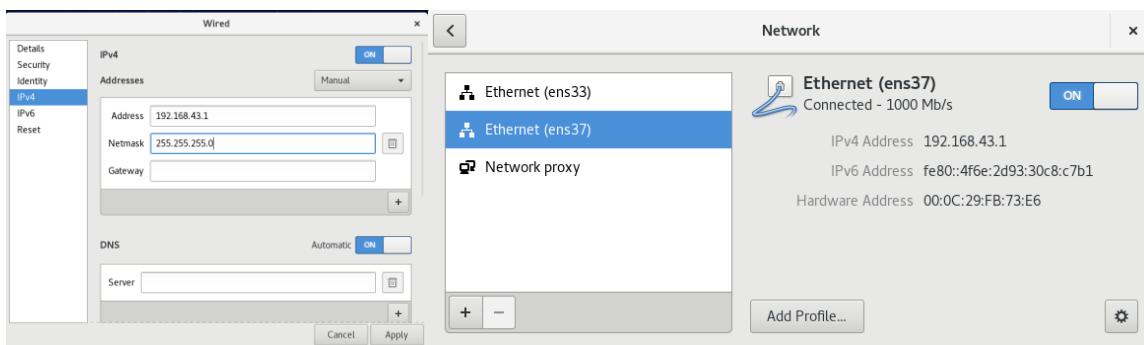
- b) From the bottom click **Add** button, select **Network Adapter**. Select **Network Adapter 2** and click on **host only** on the right side. Do same for the client. After that on the menu bar select **Edit** and then **Virtual Network Editor**, press **change settings** at the bottom and click **yes** when prompts. uncheck the box **Use local DHCP service to distribute IP address to VMs**.



Configuring Fedora Server

1) Configuring the Dynamic Host Configuration Protocol server service (DHCPD) on Fedora server.

1. Power on the Server machine, on the right-top corner press on on/off button, open the wired settings for ens37. Then go to IPv4, select Manual for Addresses and type IP address **192.168.43.1** and Netmask as **255.255.255.0**. Click **Apply**, Turn it off and on again. You will see the updated IP address.



2. Open the Terminal and from the root type **dnf install dhcp**. When prompts for y/N, type y. Issue the commands after installation to back up the files, **cp /etc/dhcp/dhcpd.conf /etc/dhcp/dhcpd.conf.bak**.

```
root@Projserver:~#
[root@Projserver ~]# dnf install dhcp
Last metadata expiration check: 0:57:04 ago on Wed Aug  5 23:42:28 2020.
Dependencies resolved.
=====
| Package           | Arch | Version | Repository | Size |
|=====|
| Installing:      |
|   dhcp-compat    | x86_64 | 12:4.3.4-4.fc24 | updates | 85 k |
|   dhcp-relay     | x86_64 | 12:4.3.4-4.fc24 | updates | 225 k |
|   dhcp-server    | x86_64 | 12:4.3.4-4.fc24 | updates | 515 k |
| Upgrading:       |
|   bind99-libs    | x86_64 | 9.9.10-2.P3.fc24 | updates | 675 k |
|   bind99-license  | noarch | 9.9.10-2.P3.fc24 | updates | 13 k |
|   dhcp-client    | x86_64 | 12:4.3.4-4.fc24 | updates | 305 k |
|   dhcp-common    | noarch | 12:4.3.4-4.fc24 | updates | 197 k |
|   dhcp-libs      | x86_64 | 12:4.3.4-4.fc24 | updates | 138 k |
=====
Transaction Summary
=====
Install 3 Packages
Upgrade 5 Packages

Total download size: 2.1 M
Is this ok [y/N]:
```

3. Next type the command **cp /usr/share/doc/dhcp-server/dhcpd.conf.example /etc/dhcp/dhcpd.conf**

```
Complete!
[root@Projserver ~]# cp /etc/dhcp/dhcpd.conf /etc/dhcp/dhcpd.conf.bak
[root@Projserver ~]# cp /usr/share/doc/dhcp-server/dhcpd.conf.example /etc/dhcp/dhcpd.conf
cp: overwrite '/etc/dhcp/dhcpd.conf'? y
[root@Projserver ~]#
```

4. Use the command **gedit /etc/dhcp/dhcpd.conf** to make the following changes.
1. On top of the file, I set the **domain-name** global option to **nspdom33.local**.
 2. Commented out the **domain-name-servers** using #, uncomment the line **authoritative**.
 3. Deleted the first subnet section and edit the second subnet section and make changes for the network subnet as follows, **subnet 192.168.41.0 netmask 255.255.255.0**. DHCP address range as follows, **range 192.168.41.50 192.168.41.100**;
 4. Deleted all remaining “subnet” and “host” sections leaving only the entry for **host fantasia {..}**
 5. Delete all the lines after **host fantasia {..}**

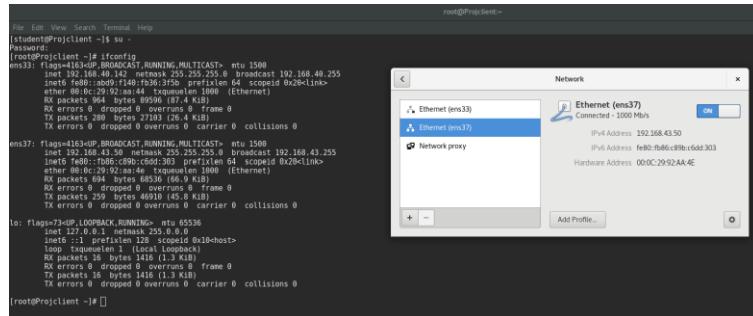
```

root@ProjServer:~#
File Edit View Search Terminal Help
Verifying : bind99-license-9.9.9-1.P1.fc24.march 9/13
Verifying : bind99-libs-9.9.9-1.P1.fc24.x86_64 10/13
Verifying : dhcp-common-12.4.3-4.2.fc24.march 11/13
Verifying : dhcp-libs-12.4.3-4.2.fc24.x86_64 12/13
Verifying : dhcp-client-12.4.3-4.2.fc24.x86_64 13/13
Installed:
dhcp-client,x86_64 12:4.3.4-4.fc24      dhcp-relay,x86_64 12:4.3.4-4.fc24
Upgraded:
bind99-libs,x86_64 9.9.16-2.P3.fc24    bind99-license.norarch 9.9.16-2.P3.fc24
dhcp-client,x86_64 12:4.3.4-4.fc24     dhcp-common.norarch 12:4.3.4-4.fc24
dhcp-libs,x86_64 12:4.3.4-4.fc24
Complete:
[root@ProjServer ~]# cp /etc/dhcp/dhcpd.conf /etc/dhcp/dhcpd.conf.bak
[root@ProjServer ~]# cp /usr/share/doc/dhcp-server/dhcpd.conf.example /etc/dhcp/dhcpd.conf
cp: overwriting '/etc/dhcp/dhcpd.conf' (y/n)? y
[root@ProjServer ~]# gedit /etc/dhcp/dhcpd.conf
[gedit:2805]: Gtk-WARNING**: Calling Inhibit failed: GDBus.Error:org.freedesktop.DBus.Error.ServiceUnknown: The name org.gnome.SessionManager was not provided by any .service files
[]

5s4 dhcpcd.conf
* dhcpcd.conf
#
# Sample configuration file for ISC dhcpcd
#
# option definitions common to all supported networks...
option domain-name "example.org";
option domain-name-servers ns1.example.org, ns2.example.org;
default-lease-time 600;
max-lease-time 7200;
# Use this to enable / disable dynamic dns updates globally.
#ddns-update-style none;
# If this DHCP server is the official DHCP server for the local
# network, then authoritative directive should be uncommented.
#authoritative;
# Use this to send dhcp log messages to a different log file (you also
# have to hack syslog.conf to complete the redirection).
#log-facility local7;
# No service will be given on this subnet, but declaring it helps the
# DHCP server to understand the network topology.
subnet 10.152.187.0 netmask 255.255.255.0 {
}
# This is a very basic subnet declaration.
subnet 10.254.239.0 netmask 255.255.255.224 {
range 10.254.239.10 10.254.239.20;
option routers rtr-239-0-1.example.org, rtr-239-0-2.example.org;
}
# This declaration allows BOOTP clients to get dynamic addresses,

```

5. Start the DHCP server service by **systemctl start dhcpcd.service**
6. Confirm the changes made to the file has no errors by **Systemctl status dhcpcd.service.**
7. Verify the IP address obtained by opening a command window in client and typing **ipconfig**



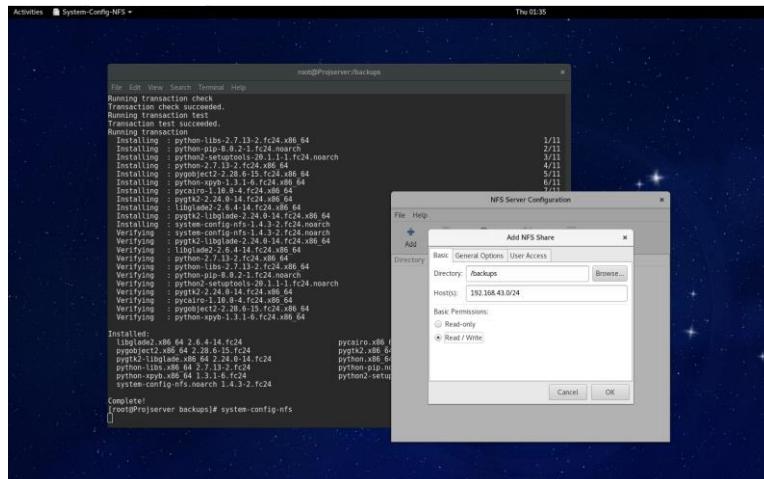
2) Configuring the NFS (Network File System)

1. Open a terminal window and switch user to root. Create and Change to the **/backups** directory.
2. The command **dnf install system-config-nfs** to install the NFS graphical configuration tool.
3. Run the command **system-config-nfs**, which will open the NFS Server Configuration window.
4. Add an NFS share with Field **/backups** and host **192.168.43.0/24** leave the permission Read/Write and verify using the command **cat /etc/backups**.

```

root@Projserver:/backups
File Edit View Search Terminal Help
[student@Projserver ~]$ su -
Password:
[student@Projserver ~]# cd /backups
[bash: cd: /backups: No such file or directory
[student@Projserver ~]# clear
[student@Projserver ~]# mkdir /backups
[student@Projserver ~]# ls -l
total 4
-rw----- 1 root root 1422 Aug 5 23:30 anaconda-ks.cfg
[student@Projserver ~]# cd /backups
[student@Projserver backups]# ls -l
total 0
[student@Projserver backups]# dnf install system-config-nfs
Last metadata expiration check: 1:50:52 ago on Wed Aug 5 23:42:28 2020.
Dependencies resolved.
=====
| Package           | Arch | Version      | Repository | Size |
| ====== | ===== | ====== | ====== | ===== |
Installing:
libblade2          x86_64 2.6.4-14.fc24 fedora    67 k
pycairo            x86_64 1.10.0-4.fc24 fedora    481 k
pygobject2         x86_64 2.28.6-15.fc24 fedora   228 k
pygtk2             x86_64 2.24.0-14.fc24 fedora   915 k
pygtk2-libblade    x86_64 2.24.0-14.fc24 fedora    38 k
python              x86_64 2.7.13-2.fc24 updates   96 k
python-libs         x86_64 2.7.13-2.fc24 updates   6.2 M
python-pip           noarch 8.0.2-1.fc24 fedora   1.7 M
python-xpyb          x86_64 1.3.1-6.fc24 fedora   138 k
python2-setuptools  noarch 20.1.1-1.fc24 fedora   417 k
system-config-nfs   noarch 1.4.3-2.fc24 fedora   203 k
=====
Transaction Summary
=====
Install 11 Packages
Total download size: 10 M
Installed size: 41 M
Is this ok [y/N]: y

```



5. Configure NFS to start and boots automatically by typing following command

systemctl enable rpcbind.service

systemctl start rpcbind.service

systemctl enable nfs-server.service

systemctl start nfs-server.service

```
root@Projserver:~  
File Edit View Search Terminal Help  
[root@Projserver ~]# cd /backups  
[root@Projserver backups]# system-config-nfs  
Redirecting to /bin/systemctl restart rpcbind.service  
Redirecting to /bin/systemctl restart nfs.service  
/usr/share/system-config-nfs/propertiesWindow.py:465: Warning: gsignal.c:2635: instance '0x55ed096b6590' has  
no handler with id '592'  
    self.okButton.disconnect(self.okButtonHandler)  
[root@Projserver backups]# cd ..  
[root@Projserver ~]# su -  
[root@Projserver ~]# cat /etc/exports  
/backups          192.168.43.0/24(rw,sync)  
[root@Projserver ~]# system-config-nfs  
[root@Projserver ~]# system-config-nfs  
Redirecting to /bin/systemctl restart rpcbind.service  
Redirecting to /bin/systemctl restart nfs.service  
/usr/share/system-config-nfs/propertiesWindow.py:465: Warning: gsignal.c:2635: instance '0x55e2f2985590' has  
no handler with id '584'  
    self.okButton.disconnect(self.okButtonHandler)  
[root@Projserver ~]# cat /etc/exports  
/backups          192.168.43.0/24(rw,sync)  
[root@Projserver ~]# systemctl start rpcbind.service  
[root@Projserver ~]# systemctl start nfs-server.service  
[root@Projserver ~]#
```

3) Configuring File sharing between Linux Samba

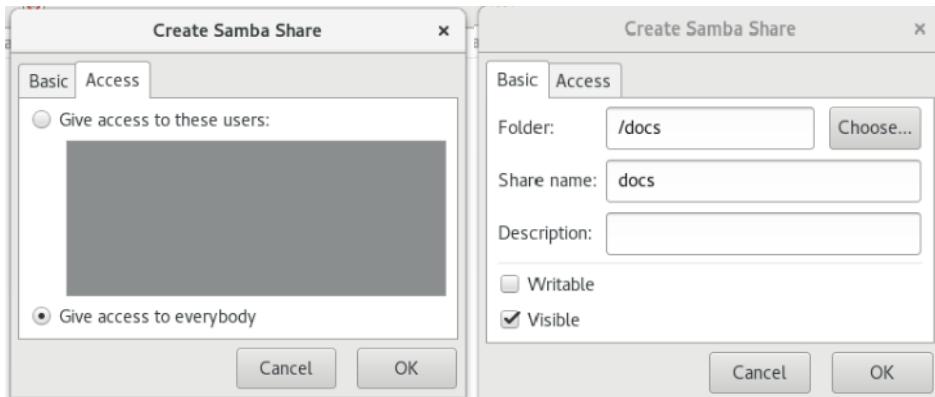
1. The command **dnf install system-config-sshd** to install the Samba graphical configuration tool.
2. First back up the Samba configuration file by using command in terminal **cp /etc/samba/smb.conf /etc/samba/smb.conf.bak**.

```
root@Projserver:~#
File Edit View Search Terminal Help
[student@Projserver ~]$ su -
Password:
[root@Projserver -]# cp /etc/samba/smb.conf /etc/samba/smb.conf.bak
[root@Projserver -]# dnf install system-config-samba
Last metadata expiration check: 2:07:20 ago on Wed Aug  5 23:42:28 2020.
Dependencies resolved.
=====
Package           Arch      Version       Repository   Size
=====
Installing:
dbus-python        x86_64    1.2.4-1.fc24     fedora      130 k
libselinux-python  x86_64    2.5-3.fc24      fedora      240 k
python-six         noarch    1.10.0-2.fc24   fedora      34 k
python-slip         noarch    0.6.4-3.fc24   fedora      36 k
python-slip-dbus   noarch    0.6.4-3.fc24   fedora      36 k
python-talloc        x86_64    2.1.6-1.fc24   fedora      20 k
python2-decorator  noarch    4.0.11-1.fc24  updates      25 k
samba              x86_64    2:4.4.3-1.fc24  fedora      607 k
samba-common-tools x86_64    2:4.4.3-1.fc24  fedora      446 k
samba-libs          x86_64    2:4.4.3-1.fc24  fedora      255 k
system-config-samba noarch    1.2.100-5.fc24  fedora      286 k

Transaction Summary
=====
Install 11 Packages

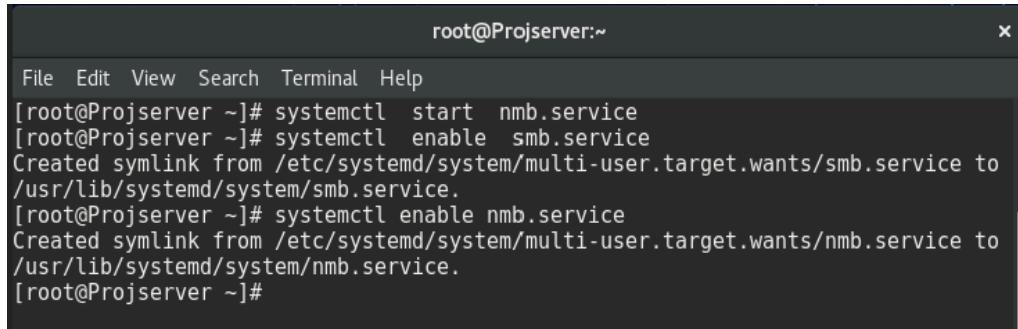
Total download size: 2.1 M
Installed size: 6.0 M
Is this ok [y/N]:
```

3. Run the command **system-config-samba**, to open the NFS Server Configuration window.
4. Add Samba share with Field **/docs** leave the Visible Read only, give access to everybody, and verify using the command **cat /etc/samba/smb.conf**



5. Configure NFS to start and boots automatically by typing following command

```
systemctl start nmb.service
systemctl start smb.service
systemctl enable smb.service
systemctl enable nmb.service
```

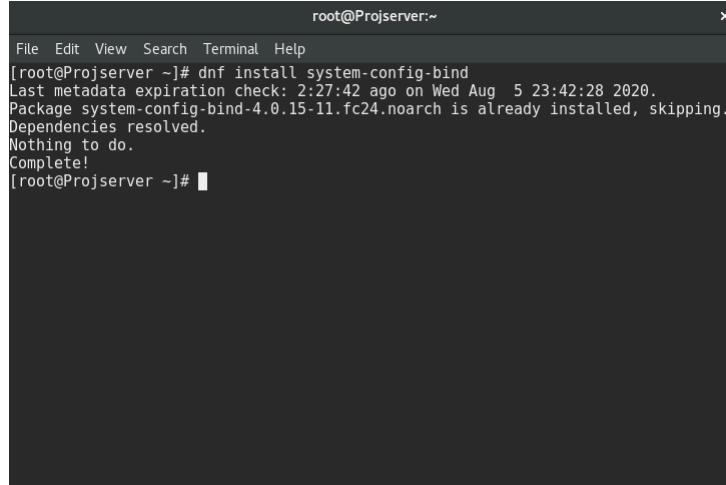


The screenshot shows a terminal window titled "root@Projserver:~". The terminal menu bar includes File, Edit, View, Search, Terminal, and Help. The command history at the bottom of the window shows:

```
[root@Projserver ~]# systemctl start nmb.service
[root@Projserver ~]# systemctl enable smb.service
Created symlink from /etc/systemd/system/multi-user.target.wants/smb.service to
/usr/lib/systemd/system/smb.service.
[root@Projserver ~]# systemctl enable nmb.service
Created symlink from /etc/systemd/system/multi-user.target.wants/nmb.service to
/usr/lib/systemd/system/nmb.service.
[root@Projserver ~]#
```

4) Configuring the DNS (Domain Named Server)

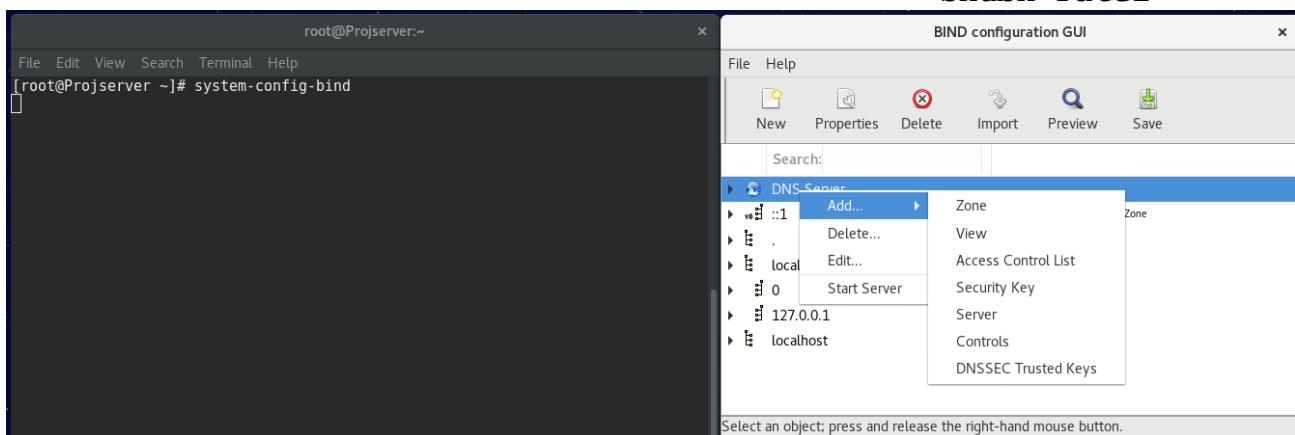
1. Using a terminal as root user, download the BIND/DNS utility, using the command **dnf install system-config-bind**.



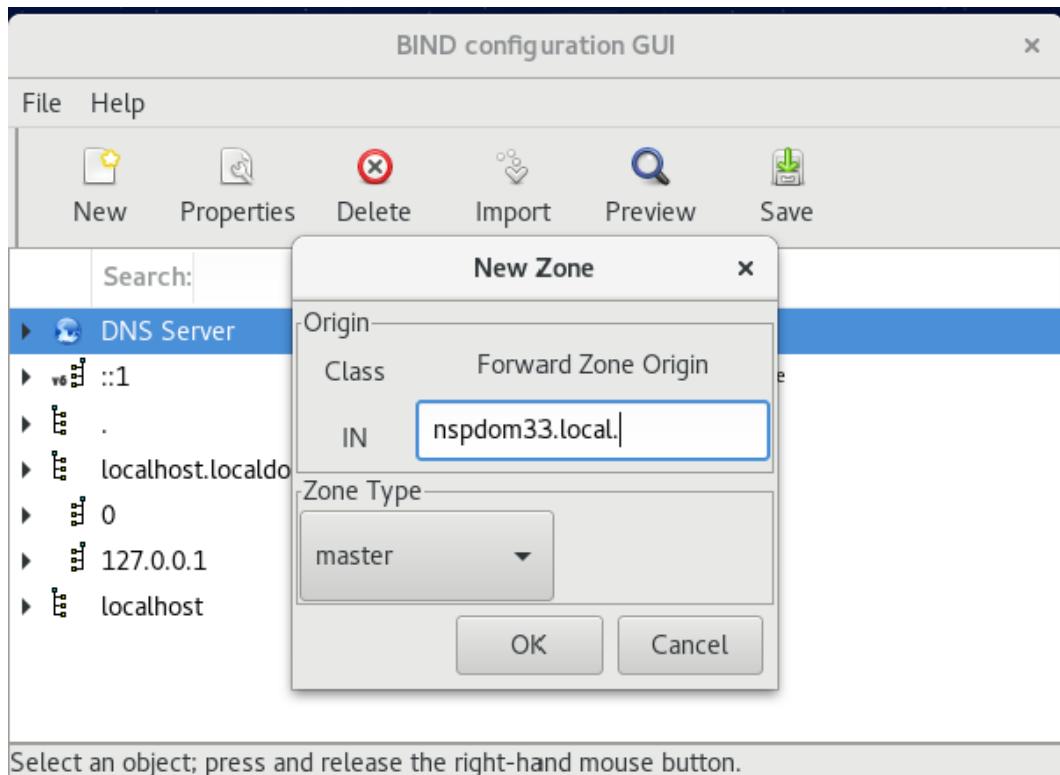
The screenshot shows a terminal window titled "root@Projserver:~". The terminal menu bar includes File, Edit, View, Search, Terminal, and Help. The command history at the bottom of the window shows:

```
[root@Projserver ~]# dnf install system-config-bind
Last metadata expiration check: 2:27:42 ago on Wed Aug  5 23:42:28 2020.
Package system-config-bind-4.0.15-11.fc24.noarch is already installed, skipping.
Dependencies resolved.
Nothing to do.
Complete!
[root@Projserver ~]#
```

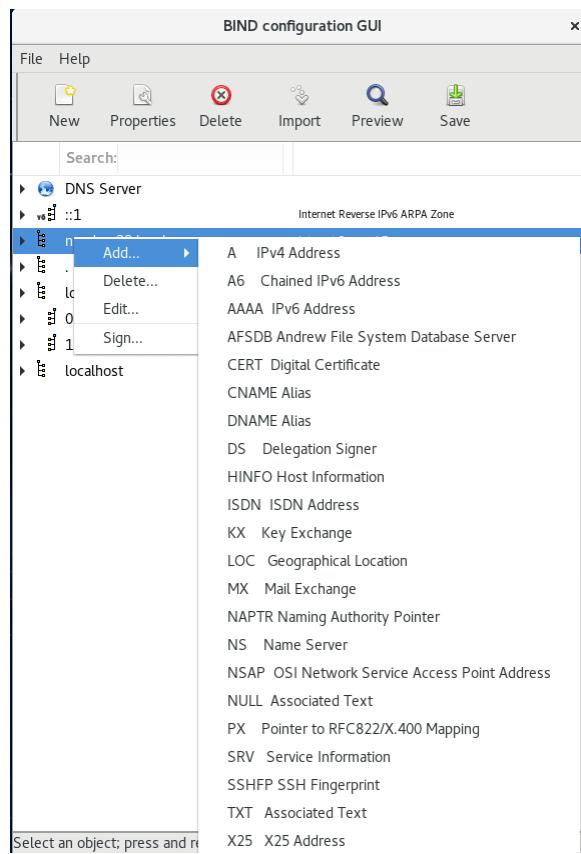
2. Right click the DNS server at the top and selected Add-Zone, clicked OK for class and origin type.



3. Enter **nspdom33.local.** with trailing period in the **forward Zone origin**, then clicked OK with the default master value shown.



4. Add IPv4 address to the new zone are as follows,



Right clicked on **nspdom33.local** zone entry and selected Add-A IPv4 Address.

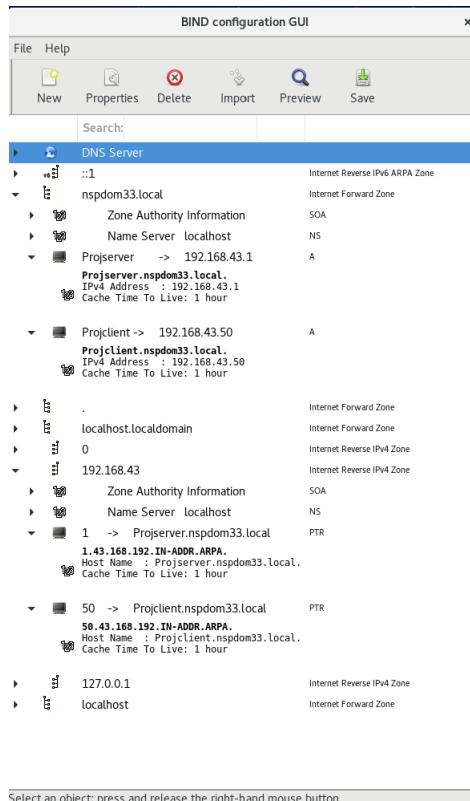
In the IPv4 window,

For Server

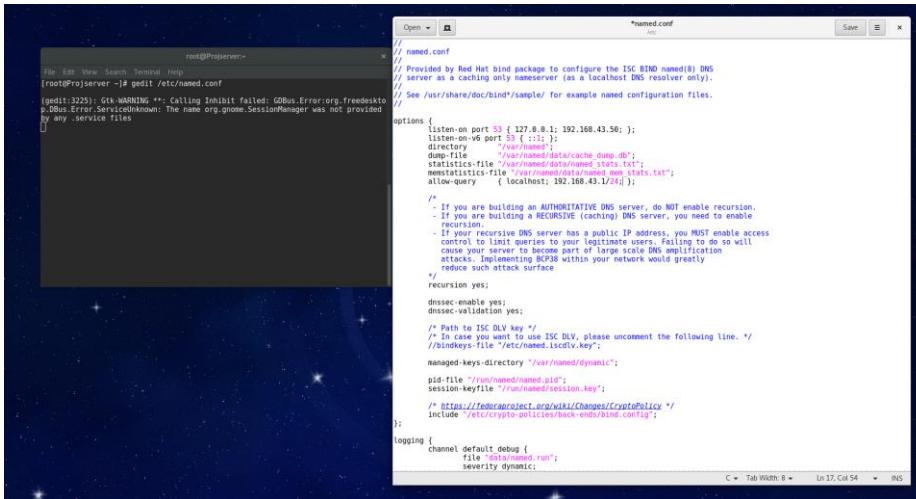
- Domain name field: **Projserver.nspdom33.local.** (with trailing period)
- IPv4 address: **192.168.43.1** and click OK

For Client

- Domain name field: **Projclient.nspdom33.local.** (with trailing period)
- IPv4 address: **192.168.43.50** and click OK



5. Two changes made for the BIND configuration file
6. To edit the field under root in terminal enter **gedit /etc/named.conf**
 - In line, the listen-on port option is appended **192.168.43.50 ;**
 - In line, allow query option to add the appended **192.168.43.1/24 ;**
7. Started the DNS service using the command, **systemctl start named.service**



```

root@Projserver:~#
File Edit View Search Terminal Help
[student@Projserver ~]$ gedit /etc/named.conf
[student@Projserver ~]$ 
[student@Projserver ~]# Glib::WARNING **: Calling Inhibit failed: GDBus.Error:org.freedesktop.DBus.Error.ServiceUnknown: The name org.gnome.SessionManager was not provided by any .service files
[student@Projserver ~]# 

/*
 * named.conf
 *
 * Provided by Red Hat bind package to configure the ISC BIND named() DNS
 * server as a caching only nameserver (as a localhost DNS resolver).
 *
 * See /usr/share/doc/bind-sample/ for example named configuration files.
 */

options {
    listen-on port 33 { 127.0.0.1; 192.168.43.50; };
    listen-on-v6 port 33 { ::1; };
    directory "/var/named";
    dump-file "/var/named/data/cache_dump.db";
    statistics-file "/var/named/data/named.stats.txt";
    memstatistics-file "/var/named/data/named.memstats.txt";
    allow-query { localhost; 192.168.43.1/24; };

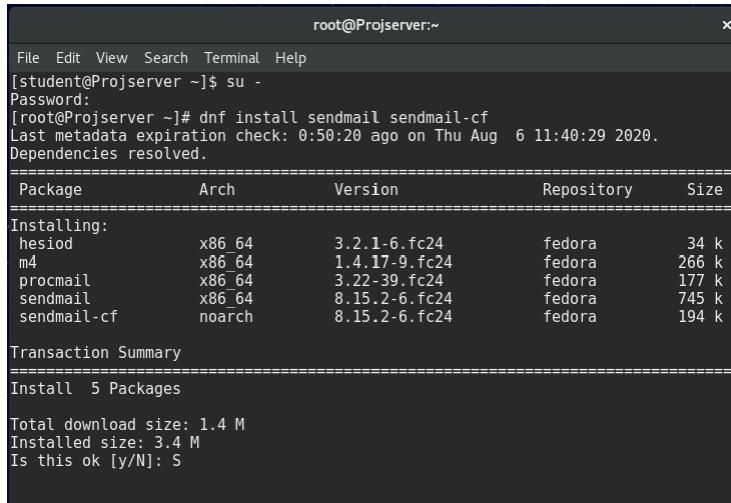
    /*
     * If you are building an AUTHORITATIVE DNS server, do NOT enable recursion.
     * - If you are building a RECURSIVE (caching) DNS server, you need to enable
     *   recursion.
     * - If your recursive DNS server has no "real" IP address, DO NOT enable access
     *   control via the limit directive to prevent legitimate users failing to do so will
     *   cause your server to become part of large scale DNS amplification
     *   attacks. Implementing BCSPB within your network would greatly
     *   reduce such attack surface
     */
    recursion yes;
    dnssec-enable yes;
    dnssec-validation yes;
    /* Path to ISC DLV key */
    /* In case you want to use ISC DLV, please uncomment the following line. */
    //dnskeys-file "/etc/named.iscdlv.key";
    managed-keys-directory "/var/named/dynamic";
    pid-file "/run/named/named.pid";
    session-keyfile "/run/named/session.key";
    /* https://fedoraproject.org/wiki/Changes/CryptoPolicy */
    include "/etc/crypto-policies/back-ends/bnme.config";
};

logging {
    channel default_debug {
        file "/var/run/named/run";
        severity dynamic;
    };
}

```

5) Sendmail, Dovecot and Squirrelmail to provide Mail, POP/IMAP and Webmail services for users.

1. Install the sendmail package as a root user in the terminal, **dnf install sendmail sendmail-cf**

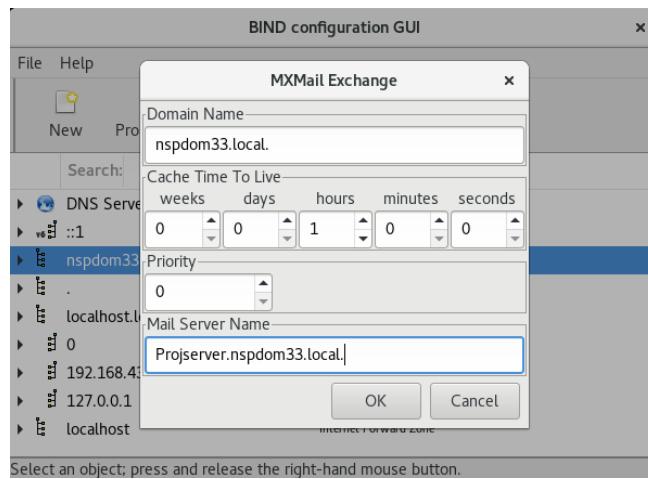


Package	Arch	Version	Repository	Size
hesiod	x86_64	3.2.1-6.fc24	fedora	34 k
m4	x86_64	1.4.17-9.fc24	fedora	266 k
procmail	x86_64	3.22-39.fc24	fedora	177 k
sendmail	x86_64	8.15.2-6.fc24	fedora	745 k
sendmail-cf	noarch	8.15.2-6.fc24	fedora	194 k

Transaction Summary

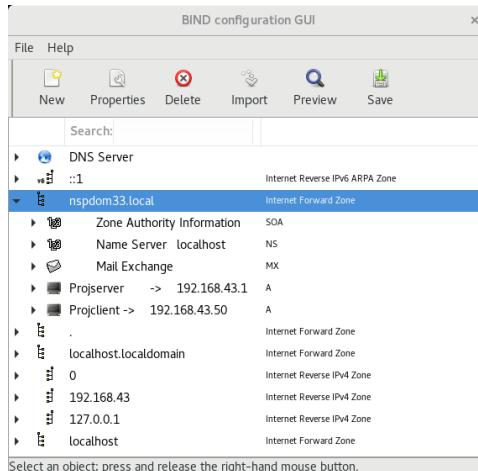
Install	5 Packages
Total download size:	1.4 M
Installed size:	3.4 M
Is this ok [y/N]:	S

2. BIND-DNS is already configured from the previous step.
3. Open BIND utility and select the MX Mail Exchange for local Zone.
4. In the MX Mail window entered the mail server name as **Projserver.nspdom33.local.** (with trailing period)



5. Save, and restart the DNS service using the command, **systemctl restart named.service**

named.service



6. Configure the sendmail.mc file to setup the mail server as follows,

7. Copy the file using the following command to avoid errors,

cp /etc/mail/sendmail.cf /etc/mail/sendmail.cf.bak

8. Using the command **gedit /etc/mail/sendmail.mc** make the following changes to the file sendmail.

9. Change Domain name specified in the **LOCAL_DOMAIN** from **localhost.localdomain** to **nsdom33.local**

10. Configure sendmail as a server for other clients, remove **Addr=127.0.0.1** option of the **DAEMON_OPTIONS**

11. Remove dnl in front of the **MASQUERADE_AS** directive and change the name from **mydomain.com** to **nspdom33.local**, this step helps when one machine acts as a mail gateway for all machines on the network.

12. Uncomment lines **FEATURE(masquerade_envelope)** and **FEATURE(masquerade_entire_domain)**

13. Add **MASQUERADE_DOMAIN(.nspdom33.local)dnl**

```

dnl
dnl # This is the sendmail macro config file for m4. If you make changes to
dnl # /etc/mail/sendmail.mc, you will need to regenerate the
dnl # /etc/mail/sendmail.cf file by confirming that the sendmail-cf package is
dnl # installed and then performing a
dnl # ./configure
dnl # /etc/mail/make
dnl # make
dnl include('/usr/share/sendmail-cf/m4/cf.m4')dnl
VERSIONID(`$Id: sendmail.mc,v 1.12 2008-07-10 15:40:40 shubh Exp $')
OS(`Linux')dnl
dnl # Do not advertise sendmail version.
dnl #
dnl define(`confSMTP_LOGIN_MSG', `$j Sendmail; $b')dnl
dnl #
dnl # default logging level is 9, you might want to set it higher to
dnl # debug the configuration
dnl define(`confLOG_LEVEL', `9')dnl
dnl # Uncomment and edit the following line if your outgoing mail needs to
dnl # be sent out through an external mail server:
dnl #
dnl define(`SMART_HOST', `smtp.your.provider')dnl
dnl #
dnl define(`confDEF_USER_ID', `8:12')dnl
dnl define(`confTO_CONNECT', `l')dnl
dnl define(`confTRY_NULL_MX_LIST', `TRUE')dnl
dnl define(`confDONT_PROBE_INTERFACES', `true')dnl
dnl define(`PROTOCOL_MAILER_PATH', `/usr/bin/procmail')dnl
dnl define(`ALIAS_FILE', `/etc/aliases')dnl
dnl define(`STATUS_FILE', `/var/log/sendmail/statistics')dnl
dnl define(`TCP_MAILER_MAX', `1')dnl
dnl define(`confUSERDB_SPEC', `/etc/mail/userdb.db')dnl
dnl define(`confPRIVACY_FLAGS', `authwarnings,noverify,noexpn,restrictqrun')dnl
dnl define(`confAUTH_OPTIONS', `A p')dnl
dnl #
dnl # The following allows relaying if the user authenticates, and disallows
dnl # plain text authentication (PLAIN/LOGIN) on non-TLS links
dnl #
dnl define(`confAUTH_OPTIONS', `A p')dnl
dnl #
dnl # PLAIN is the preferred plaintext authentication method and used by
dnl # Mozilla Mail and Evolution, though Bulkmail Express and other MAs do
dnl # use LOGIN. Other mechanisms should be used if the connection is not
dnl # guaranteed secure.
dnl #
dnl # Please remember that saulauthd needs to be running for AUTH.

```

14. Allow relay outbound e-mail for all hosts. Add the line at the end of the access file, **Connect:192.168.43.**

RELAY

```

access
/etc/mail
#
# Check the /usr/share/doc/sendmail/README.cf file for a description
# of the format of this file. (search for access_db in that file)
# The /usr/share/doc/sendmail/README.cf is part of the sendmail-doc
# package.
#
# If you want to use AuthInfo with "M:PLAIN LOGIN", make sure to have the
# cyrus-sasl-plain package installed.
#
# By default we allow relaying from localhost...
Connect:localhost.localdomain      RELAY
Connect:localhost                  RELAY
Connect:127.0.0.1                 RELAY
Connect:192.168.41.                RELAY

```

15. Enter the following commands after saving and closing the access file,
- systemctl enable sendmail.service**

systemctl start sendmail.service

16. Test whether sendmail is working using the command,

17. **echo "my sample test mail" | /sbin/sendmail**

student@nspdom33.local

18. Use the command **less /var/spool/mail/student** to see the new mail

```
root@Projserver:~
File Edit View Search Terminal Help
From root@Projserver.nspdom33.local Thu Aug 6 13:37:33 2020
Return-Path: <root@Projserver.nspdom33.local>
Received: from Projserver.nspdom33.local (localhost [127.0.0.1])
        by Projserver.nspdom33.local (B.15.2/B.15.2) with ESMTP id B76GbWVZ005196
        for <student@nspdom33.local>; Thu, 6 Aug 2020 13:37:33 -0300
Received: (from root@localhost)
        by Projserver.nspdom33.local (B.15.2/B.15.2/Submit) id B76GbWT3005195
        for student@nspdom33.local; Thu, 6 Aug 2020 13:37:32 -0300
Date: Thu, 6 Aug 2020 13:37:32 -0300
From: root <root@Projserver.nspdom33.local>
Message-Id: <202000061637.076GbWT3005195@Projserver.nspdom33.local>

"my sample test mail"

/var/spool/mail/student (END)
```

6) Dovecot configuration

1. As a root user in the terminal, installed the dovecot package using the **dnf install dovecot command.**
2. 3 Files are configured before starting the dovecot services,
3. **dovecot.conf** file
4. Make a backup copy using the command, **cp /etc/dovecot/dovecot.conf /etc/dovecot/dovecot.conf.bak**
5. Open the file using **gedit /etc/dovecot/dovecot.conf** and insert the line **protocols = imap pop3** to the end of the file.

```
dovecot.conf
/etc/dovecot
# startup and passed down to all of its child processes. You can also give
# key=value pairs to always set specific settings.
#import_environment = TZ

##
## Dictionary server settings
##

# Dictionary can be used to store key=value lists. This is used by several
# plugins. The dictionary can be accessed either directly or though a
# dictionary server. The following dict block maps dictionary names to URIs
# when the server is used. These can then be referenced using URIs in format
# "proxy:<name>".

dict {
    #quota = mysql:/etc/dovecot/dovecot-dict-sql.conf.ext
    #expire = sqlite:/etc/dovecot/dovecot-dict-sql.conf.ext
}

# Most of the actual configuration gets included below. The filenames are
# first sorted by their ASCII value and parsed in that order. The 00-prefixes
# in filenames are intended to make it easier to understand the ordering.
!include conf.d/*.conf

# A config file can also tried to be included without giving an error if
# it's not found:
!include_try local.conf

protocols = imap pop3
Saving file /etc/dovecot/dovecot.conf...
```

6. Make a backup copy using the command,

```
cp /etc/dovecot/conf.d/10-mail.conf /etc/dovecot/conf.d/10-
mail.conf.bak
```

7. Uncomment the following line on the top of the file,

```
mail_location=mbox:~/mail:INBOX=/var/mail/%u
```

```
10-mail.conf
/etc/dovecot/conf.d
# There are a few special variables you can use, eg.:
#
# %u - username
# %n - user part in user@domain, same as %u if there's no domain
# %d - domain part in user@domain, empty if there's no domain
# %h - home directory
#
# See doc/wiki/Variables.txt for full list. Some examples:
#
# mail_location = maildir:~/Maildir
mail_location = mbox:~/mail:INBOX=/var/mail/%u
# mail_location = mbox:/var/mail/%d/%n/%n:INDEX=/var/indexes/%d/%n/%n
#
# <doc/wiki/MailLocation.txt>
#
#mail_location =
#
# If you need to set multiple mailbox locations or want to change default
# namespace settings, you can do it by defining namespace sections.
#
# You can have private, shared and public namespaces. Private namespaces
# are for user's personal mails. Shared namespaces are for accessing other
# users' mailboxes that have been shared. Public namespaces are for shared
# mailboxes that are managed by sysadmin. If you create any shared or public
# namespaces you'll typically want to enable ACL plugin also, otherwise all
# users can access all the shared mailboxes, assuming they have permissions
# on filesystem level to do so.
namespace inbox {
    # Namespace type: private, shared or public
```

8. Make a backup copy using the command,

```
cp /etc/dovecot/conf.d/10-auth.conf /etc/dovecot/conf.d/10-
auth.conf.bak
```

- Set the option, **disable_plaintext_auth = yes** and **auth_mechanisms = plain login**

```
*10-auth.conf
/etc/dovecot/conf.d

## Authentication processes

# Disable LOGIN command and all other plaintext authentications unless
# SSL/TLS is used (LOGINDISABLED capability). Note that if the remote IP
# matches the local IP (ie. you're connecting from the same computer), the
# connection is considered secure and plaintext authentication is allowed.
# See also ssl=required setting.
disable_plaintext_auth = yes

# Authentication cache size (e.g. 10M). 0 means it's disabled. Note that
# bsdauth, PAM and vpoptmail require cache_key to be set for caching to be used.
#auth_cache_size = 0
# Time to live for cached data. After TTL expires the cached record is no
# longer used, *except* if the main database lookup returns internal failure.
# We also try to handle password changes automatically: If user's previous
# authentication was successful, but this one wasn't, the cache isn't used.
# For now this works only with plaintext authentication.
#auth_cache_ttl = 1 hour
# TTL for negative hits (user not found, password mismatch).
# 0 disables caching them completely.
#auth_cache_negative_ttl = 1 hour

# Space separated list of realms for SASL authentication mechanisms that need
# them. You can leave it empty if you don't want to support multiple realms.
# Many clients simply use the first one listed here, so keep the default realm
# first.
#auth_realms =
```

```
10-auth.conf
/etc/dovecot/conf.d

#auth_ssl_username_from_cert = no

# Space separated list of wanted authentication mechanisms:
# plain login digest-md5 cram-md5 ntlm rpa apop anonymous gssapi otp skey
# gss-spnego
# NOTE: See also disable_plaintext_auth setting.
auth_mechanisms = plain

## Password and user databases
##

# Password database is used to verify user's password (and nothing more).
# You can have multiple passbds and userdb. This is useful if you want to
# allow both system users (/etc/passwd) and virtual users to login without
# duplicating the system users into virtual database.
#
# <doc/wiki/PasswordDatabase.txt>
#
# User database specifies where mails are located and what user/group IDs
# own them. For single-UID configuration use "static" userdb.
#
# <doc/wiki/UserDatabase.txt>
#
#!include auth-deny.conf.ext
#!include auth-master.conf.ext
!include auth-system.conf.ext
```

- Issue the command **chmod 0600 /var/mail/student**, to avoid the group copy permission issue.
- Enable and start the dovecot service using the commands,
systemctl enable dovecot.service

systemctl start dovecot.service

7) Configuring SquirrelMail

1. Install the squirrelmail package using the command, **dnf install squirrelmail -y**
2. Then configure the config file for **squirrelmail** using the following commands,
cd /usr/share/squirrelmail/config/ (for backup)
3. **gedit ./conf.pl** (to make changes)
4. Then add the following lines to the httpd file by using the gedit command to make squirrelmail work,
gedit /etc/httpd/conf/httpd.conf

Alias /webmail /usr/share/squirrelmail

<Directory /usr/share/squirrelmail>

Options Indexes FollowSymLinks

RewriteEngine On

AllowOverride All

DirectoryIndex index.php

Order allow,deny

Allow from all

</Directory>

```

root@Projserver:~#
[root@Projserver ~]# yum install squirrelmail -y
Yum command has been deprecated, redirecting to '/usr/bin/dnf install squirrelmail -y'.
See 'man dnf' and 'man yum2dnf' for more information.
To transfer transaction metadata from yum to DNF, run:
'dnf install python-dnf-plugins-extras-migrate && dnf -2 migrate'

Last metadata expiration check: 2:41:53 ago on Thu Aug 6 11:40:29 2020.
Package squirrelmail-1.4.22-19.fc24.noarch is already installed, skipping.
Dependencies resolved.

Nothing to do.
Complete!
[root@Projserver ~]# gedit /etc/httpd/conf/httpd.conf

(gedit:6427): Gtk-WARNING **: Calling Inhibit failed: GDBus.Error:org.freedesktop.DBus.Error.ServiceUnknown: The name org.gnome.SessionManager was not provided by any .service files

** (gedit:6427): WARNING **: Set document metadata failed: Setting attribute metadata::gedit-spell-language not supported
** (gedit:6427): WARNING **: Set document metadata failed: Setting attribute metadata::gedit-encoding not supported
[]
```

```

httpd.conf
/etc/httpd/conf

Save ×

#
#
# EnableMMAP and EnableSendfile: On systems that support it,
# memory-mapping or the sendfile syscall may be used to deliver
# files. This usually improves server performance, but must
# be turned off when serving from networked-mounted
# filesystems or if support for these functions is otherwise
# broken on your system.
# Defaults if commented: EnableMMAP On, EnableSendfile Off
#
#EnableMMAP off
EnableSendfile on

# Supplemental configuration
#
# Load config files in the "/etc/httpd/conf.d" directory, if any.
IncludeOptional conf.d/*.conf

Alias /webmail /usr/share/squirrelmail
<Directory /usr/share/squirrelmail>
Options Indexes FollowSymLinks
RewriteEngine On
AllowOverride All
DirectoryIndex index.php
Order allow,deny
Allow from all
</Directory>
```

Plain Text ▾ Tab Width: 8 ▾ Ln 364, Col 1 ▾ INS

5. Then restart these services as follows,

systemctl restart httpd

systemctl restart dovecot

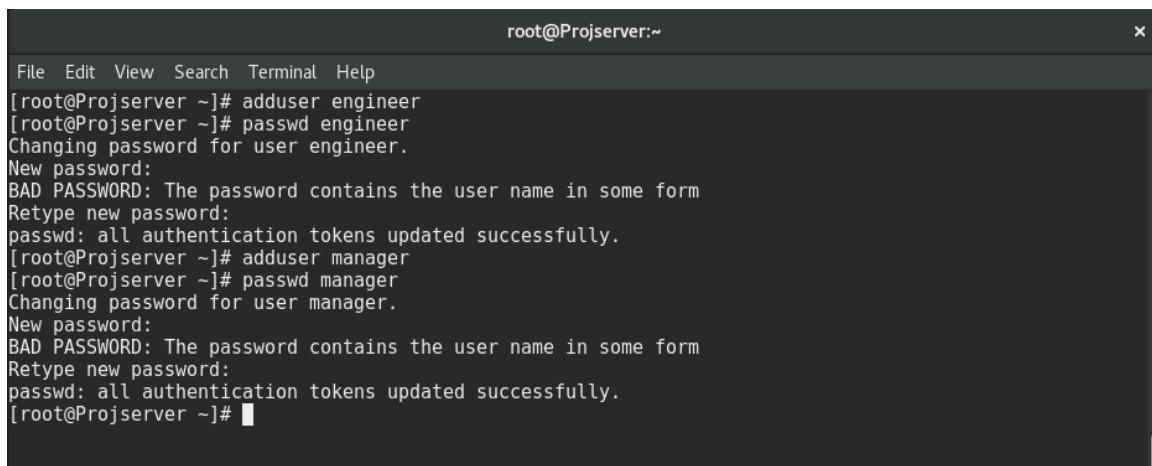
6. Add users and access webmail using this, <http://192.168.43.1/webmail>

7. Create local linux users named engineer and manager (choose appropriate password).

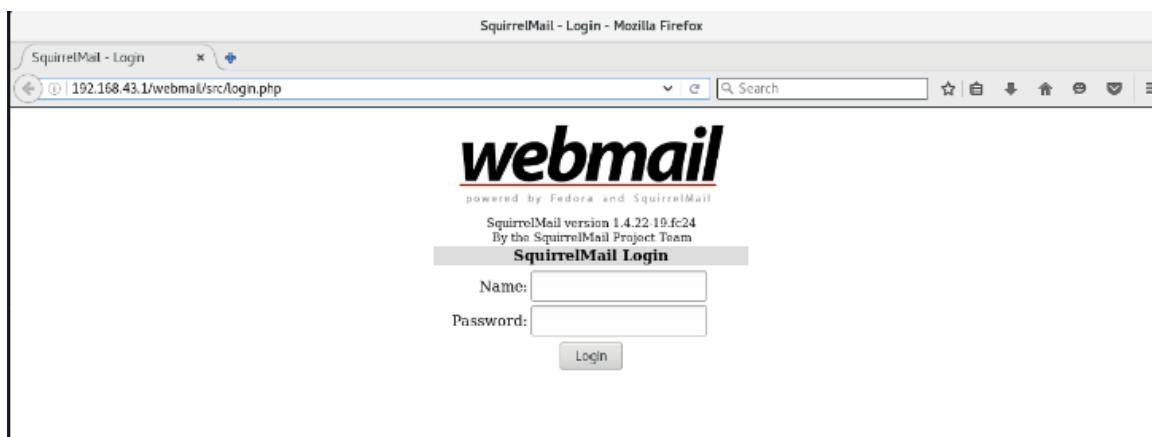
8. Used these commands to add the users,

adduser engineer

passwd engineer as "nsp655"

adduser manager**passwd manager as “nsp655”**


```
root@Projserver:~#
File Edit View Search Terminal Help
[root@Projserver ~]# adduser engineer
[root@Projserver ~]# passwd engineer
Changing password for user engineer.
New password:
BAD PASSWORD: The password contains the user name in some form
Retype new password:
passwd: all authentication tokens updated successfully.
[root@Projserver ~]# adduser manager
[root@Projserver ~]# passwd manager
Changing password for user manager.
New password:
BAD PASSWORD: The password contains the user name in some form
Retype new password:
passwd: all authentication tokens updated successfully.
[root@Projserver ~]#
```



9. Create a **simple HTML** welcome page with the course name, domain name and your name.



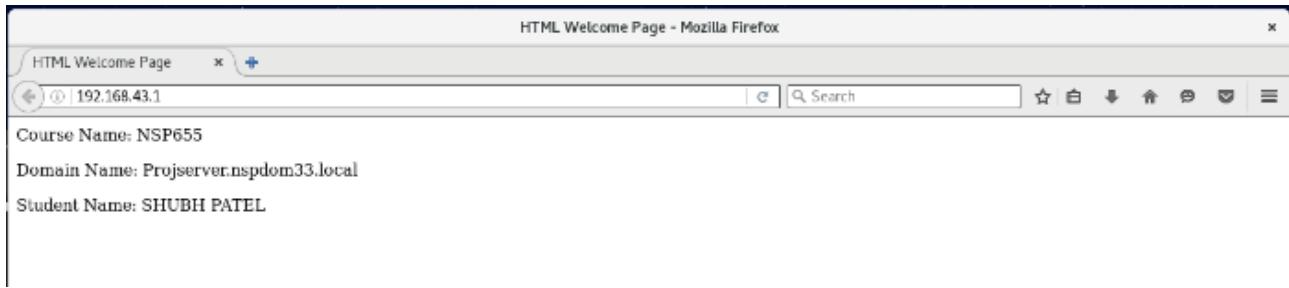
```
index.html
/var/www/html
Save   □  ×

<html>
  <head>
    <title>HTML Welcome Page</title>
  </head>
  <body>
    <p>Course Name: NSP655</p>
    <p>Domain Name: Projserver.nspdom33.local</p>
    <p>Student Name: SHUBH PATEL</p>
  </body>
</html>
```

10. To disable the test page, I simply comment out all the lines in the

/etc/httpd/conf.d/welcome.conf And then made a html file called index.html in the **/var/www/html/ location** and edit the index.html file using the gedit command.

11. After the above steps, open the Mozilla and type **http://192.168.43.1** and the text within the body of the html file will be displayed on the webpage successfully.



8) Create local Linux user vncuser and configure the VNC server for remote X display 4 for this user (use connection password vncpass).

1. As a root user in the terminal type the command **dnf install tigervnc-server tigervnc** to install VNC server and client packages.
2. Setup the server to be used by the VNC clients, so configure the service file using the commands,

```
[root@Projserver ~]# adduser vncuser
[root@Projserver ~]# dnf install tigervnc-server tigervnc
Last metadata expiration check: 1:38:39 ago on Thu Aug  6 14:43:11 2020.
Package tigervnc-server-1.8.0-1.fc24.x86_64 is already installed, skipping.
Package tigervnc-1.8.0-1.fc24.x86_64 is already installed, skipping.
Dependencies resolved.
Nothing to do.
Complete!
[root@Projserver ~]# gedit /etc/systemd/system/vncserver@.service

(gedit:8396): Gtk-WARNING **: Calling Inhibit failed: GDBus.Error:org.freedesktop.DBus.Error.ServiceUnknown: The name org.gnome.SessionManager
was not provided by any .service files
[root@Projserver ~]# cp /lib/systemd/system/vncserver@.service /etc/systemd/system/vncserver@.service
cp: overwrite '/etc/systemd/system/vncserver@.service'? y
[root@Projserver ~]# gedit /etc/systemd/system/vncserver@.service

(gedit:8406): Gtk-WARNING **: Calling Inhibit failed: GDBus.Error:org.freedesktop.DBus.Error.ServiceUnknown: The name org.gnome.SessionManager
was not provided by any .service files
[root@Projserver ~]# su vncuser
[vncuser@Projserver root]$ vncpasswd
Password:
Verify:
Would you like to enter a view-only password (y/n)? n
[vncuser@Projserver root]$ exit
exit
[root@Projserver ~]# systemctl start vncserver@:4.service
Job for vncserver@:4.service failed because a timeout was exceeded. See "systemctl status vncserver@:4.service" and "journalctl -xe" for details.
ls.
[root@Projserver ~]# systemctl start vncserver@:4.service
Job for vncserver@:4.service failed because a timeout was exceeded. See "systemctl status vncserver@:4.service" and "journalctl -xe" for details.
ls.
[root@Projserver ~]# systemctl start sshd.service
[root@Projserver ~]# systemctl start vncserver@:4.service
```

cp /lib/system/system/vncserver@.service

/etc/systemd/system/vncserver@.service

3. Edit the **vncserver@.service** file using the gedit command. In the file,

The line User=student

Replaced <USER> with student

```
vncserver@.service
/etc/systemd/system
[Service]
Description=Remote desktop service (VNC)
After=syslog.target network.target
Type=forking
User=vncuser
[Install]
WantedBy=multi-user.target
```

4. In the terminal, type **su student**, then type **vncpasswd** and entered **vncpass** for password.
5. After making the user and setting the password, go to the root again and type the command **systemctl start vncserver@:4.service**

6. After giving the above command, I restarted the SSH services using the command **systemctl start sshd.service** to allow SSH tunneling.
7. Back on the terminal as a root user issue the final command in the server, **vncviewer -via student@192.168.43.1 192.168.43.50**
8. Enter the system password and the VNC password when prompted.

System password = nspstudent

VNC password = vncpass

```
root@Projserver:~ x
File Edit View Search Terminal Help
by any .service files

** (gedit:11161): WARNING **: Set document metadata failed: Setting attribute me
tadata::gedit-spell-language not supported

** (gedit:11161): WARNING **: Set document metadata failed: Setting attribute me
tadata::gedit-encoding not supported

** (gedit:11161): WARNING **: Set document metadata failed: Setting attribute me
tadata::gedit-position not supported
[root@Projserver ~]# su vncuser
[vncuser@Projserver root]$ vncpasswd
Password:
Verify:
Would you like to enter a view-only password (y/n)? n
[vncuser@Projserver root]$ exit
exit
[root@Projserver ~]# systemctl start vncserver@:4.service
Warning: vncserver@:4.service changed on disk. Run 'systemctl daemon-reload' to
reload units.
Job for vncserver@:4.service failed because a timeout was exceeded. See "systemc
tl status vncserver@:4.service" and "journalctl -xe" for details.
[root@Projserver ~]# systemctl daemon-reload
[root@Projserver ~]# systemctl start vncserver@:4.service
[root@Projserver ~]#
```

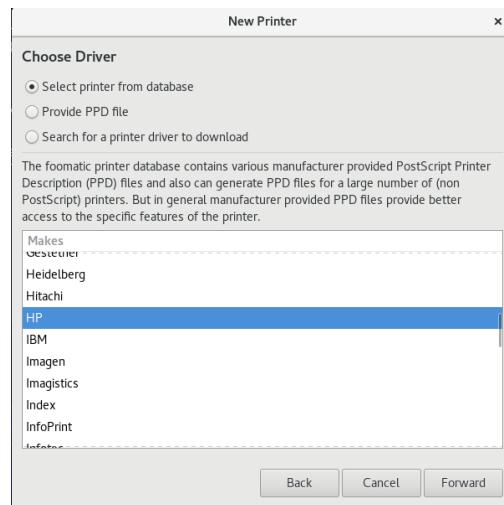
9) Configure a local serial printer

1. Using command **dnf install system-config-printer**, install the printer package.

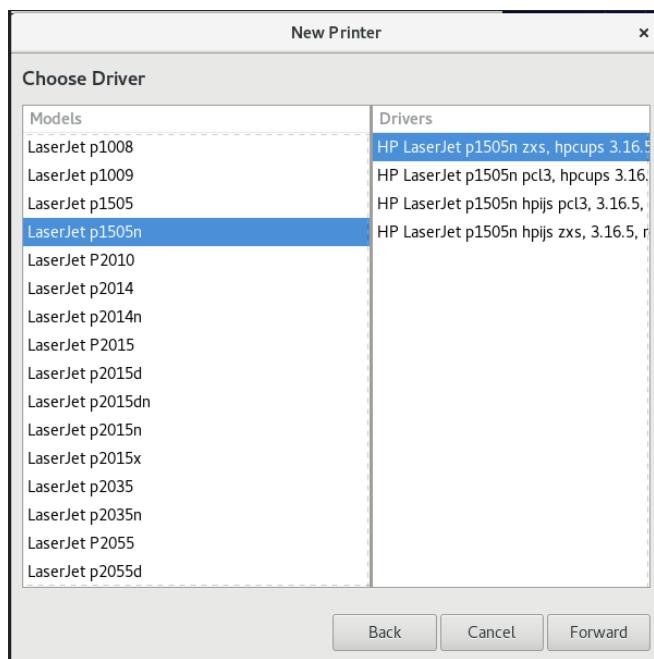
```
root@Projserver:~#
[root@Projserver ~]# dnf install system-config-printer
Last metadata expiration check: 2:07:52 ago on Thu Aug  6 14:43:11 2020.
Dependencies resolved.
=====
Package           Arch      Version       Repository   Size
=====
Installing:
  system-config-printer    x86_64    1.5.7-8.fc24    fedora     236 k
Transaction Summary
=====
Install 1 Package

Total download size: 236 k
Installed size: 1.1 M
Is this ok [y/N]: y
Downloading Packages:
system-config-printer-1.5.7-8.fc24.x86_64.rpm 348 kB/s | 236 kB  00:00
-----
Total                                         162 kB/s | 236 kB  00:01
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Installing : system-config-printer-1.5.7-8.fc24.x86_64          1/1
  Verifying  : system-config-printer-1.5.7-8.fc24.x86_64          1/1
Installed:
  system-config-printer.x86_64 1.5.7-8.fc24
Complete!
[root@Projserver ~]#
```

2. Go into **Print Settings – localhost** by searching printer under Activities.
3. Click the **add** button and the **new printer** window opens
4. Then click **serial port #1** under Devices, and then clicked **forward**
5. Scroll down and select **HP**, then clicked forward.



6. Scroll down the list for **LaserJetp1505n**



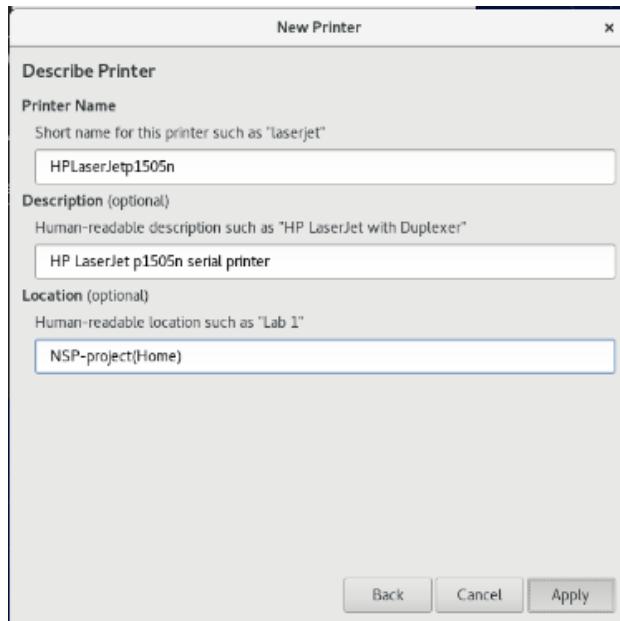
7. Then click forward twice and the drivers are installed now.

8. And add the following lines,

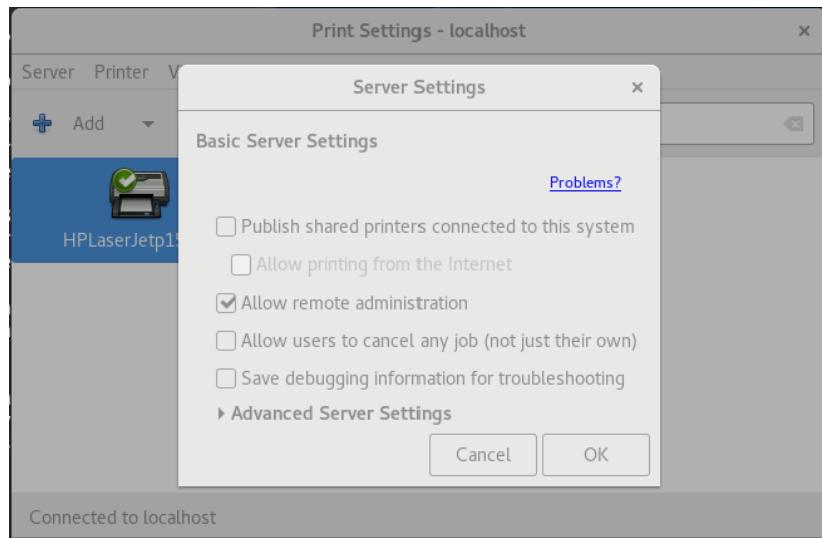
Printer Name: **HP LaserJet p1505n**

Description: **HP LaserJet p1505n serial printer**

Location: **NSP-project(Home)**

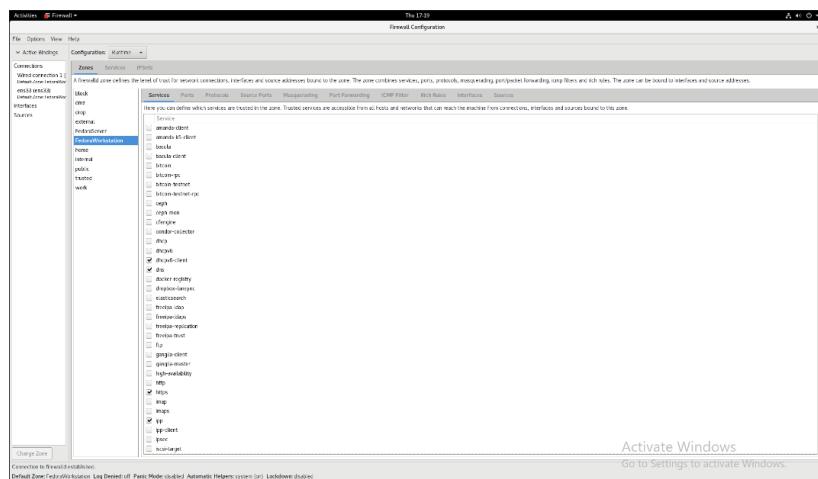


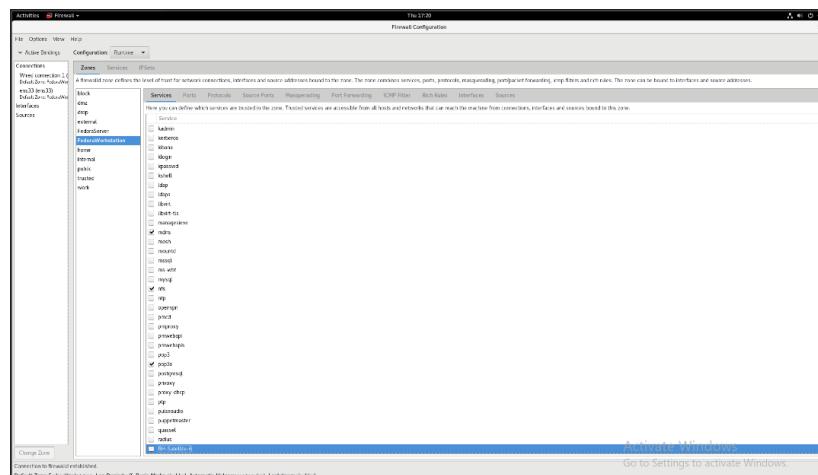
9. Select **Server-Settings** and check the **advertise shared printers** and allow **remote CUPS administration**.



10) Configure the Linux firewall

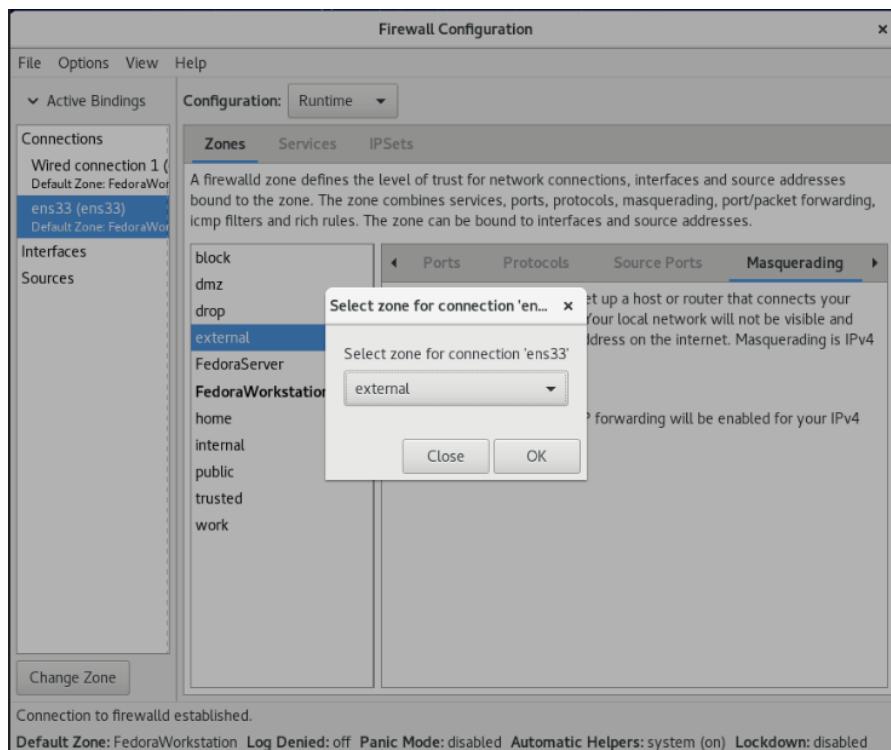
1. As a root user in the terminal install the firewall services using the command, **dnf install firewall-config** followed by, **systemctl start firewalld.service**
 2. Open the utility by searching firewall in activities, in the service tab windowpane, on the right side and tick all the required services.





11) Configure the Linux firewall for SNAT

1. In the firewall utility, under **connections** on the left-hand side, right click on the ens33.
2. Select external from the drop-down list on the window that pops up
3. Under Masquerading, check the Masquerade zone option.

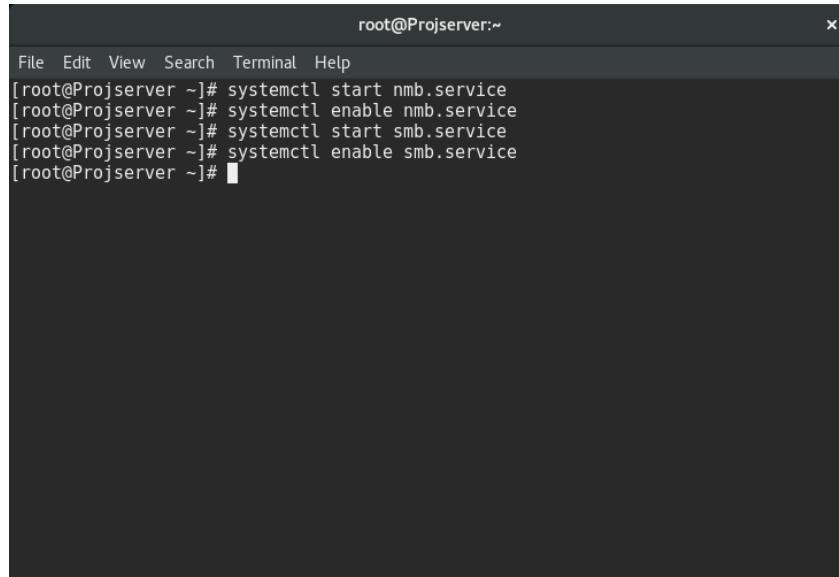


Configuring Fedora Client

1) Configure the system to mount the shared folder docs from the Linux server using the Files utility GUI of the Gnome graphical environment.

- 2) Restart and enable the following commands in the server before coming to the client using the following commands,

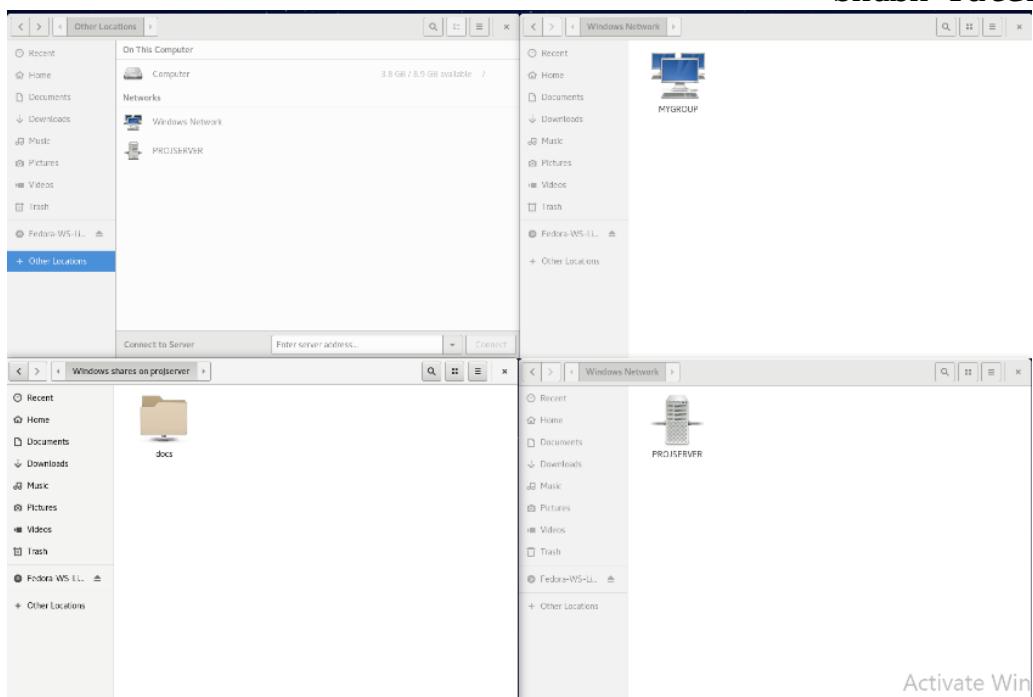
```
systemctl start nmb.service smb.service  
systemctl enable nmb.service smb.service
```



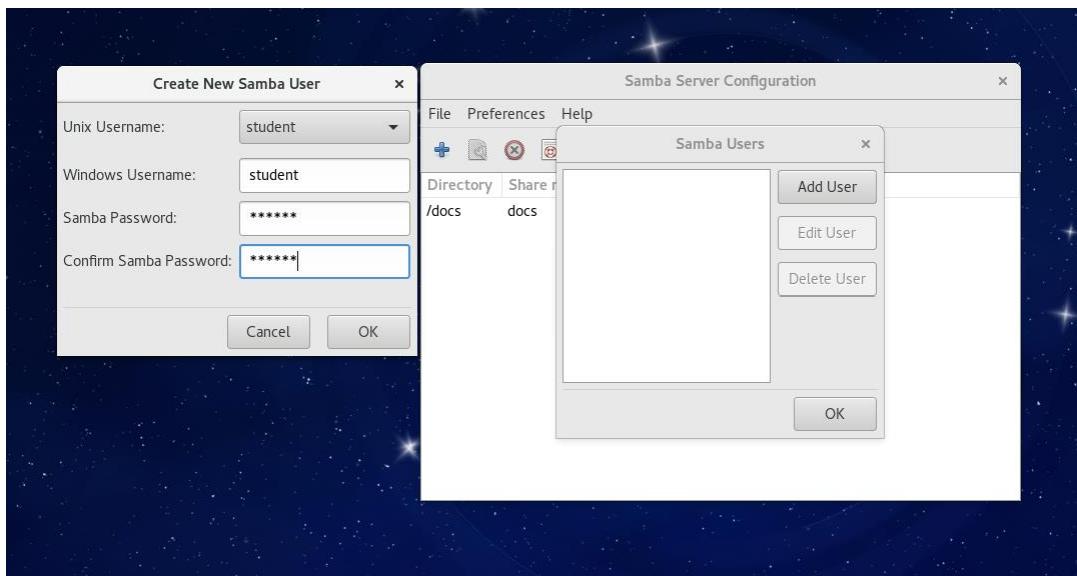
The screenshot shows a terminal window titled "root@Projserver:~". The window has a dark background and white text. At the top, there is a menu bar with options: File, Edit, View, Search, Terminal, and Help. Below the menu, the command line starts with "[root@Projserver ~]#". The user has run several commands to start and enable the nmb and smb services:

```
root@Projserver:~  
File Edit View Search Terminal Help  
[root@Projserver ~]# systemctl start nmb.service  
[root@Projserver ~]# systemctl enable nmb.service  
[root@Projserver ~]# systemctl start smb.service  
[root@Projserver ~]# systemctl enable smb.service  
[root@Projserver ~]#
```

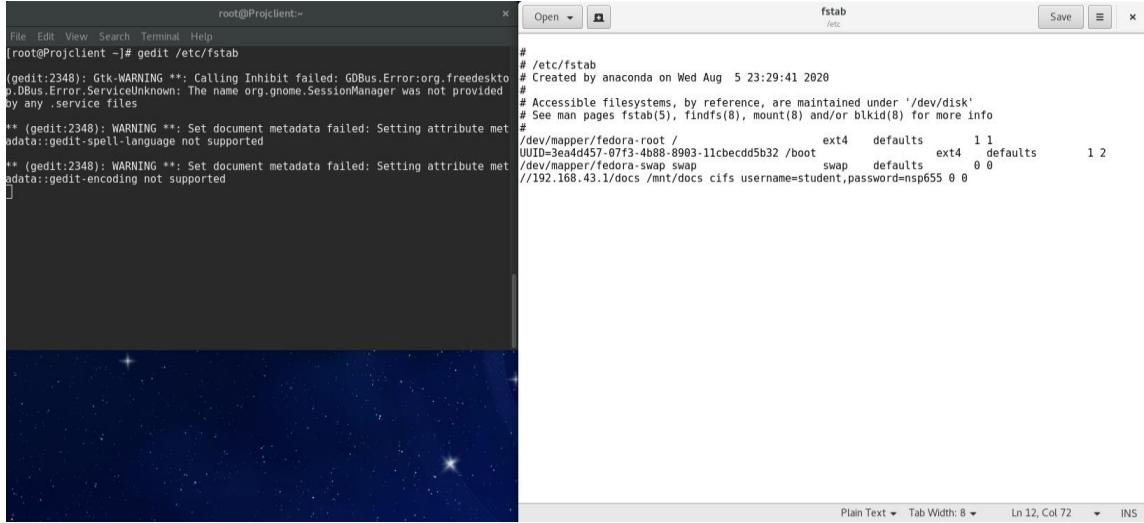
- 3) The following steps are followed to complete this task,
1. Go into the files utility
 2. Click on other locations
 3. Click on Windows Networks
 4. Click on MYGROUP
 5. Click on PROJSERVER
 6. You will be able to see docs.



2) Configure the system to automatically mount (use fstab) the Samba share docs on the Linux server under /mnt/docs.



1. In the terminal as a root user, edit the fstab file using the following command, **gedit /etc/fstab** Add the following line in the fstab file (at the end) to automount during reboot,



```

root@Projclient:~# gedit /etc/fstab
# /etc/fstab
# Created by anaconda on Wed Aug  5 23:29:41 2020
#
# Accessible filesystems, by reference, are maintained under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
#
UUID=3ea4d457-07f3-4b88-8903-11cbebdd5b32 /boot           ext4      defaults    1 1
/dev/mapper/fedora-swap swap             swap      defaults    0 0
//192.168.43.1/docs /mnt/docs cifs    username=student,password=nsp655 0 0

```

//192.168.43.1/docs

/mnt/docs

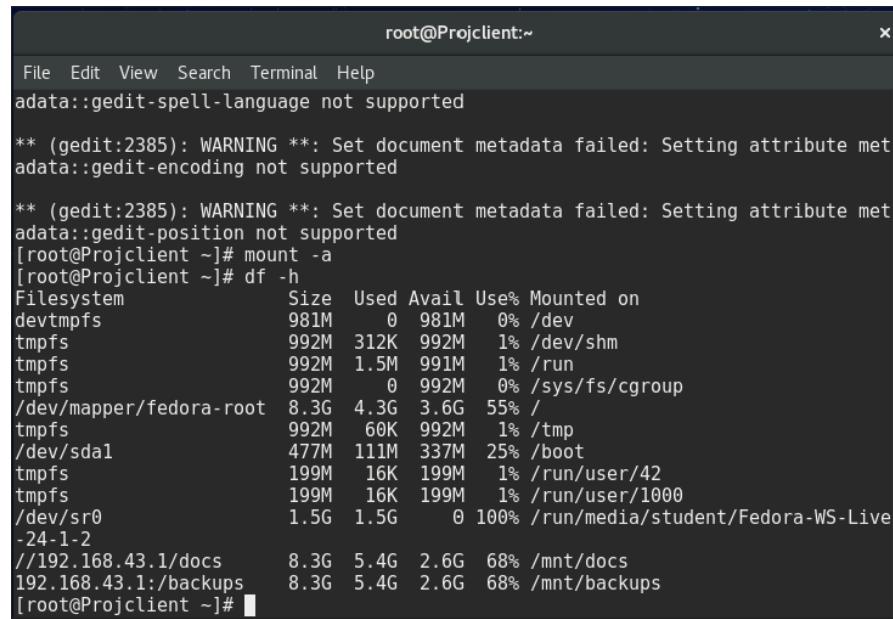
cifs

username=student,password=nsp655 0 0

2. I used this command to mount it successful,

mount -a

3. Use the **df -h** command to see the mounted list



```

root@Projclient:~#
File Edit View Search Terminal Help
adat::gedit-spell-language not supported

** (gedit:2385): WARNING **: Set document metadata failed: Setting attribute met
adata::gedit-encoding not supported

** (gedit:2385): WARNING **: Set document metadata failed: Setting attribute met
adata::gedit-position not supported
[root@Projclient ~]# mount -a
[root@Projclient ~]# df -h
Filesystem      Size  Used Avail Use% Mounted on
devtmpfs        981M    0  981M   0% /dev
tmpfs          992M  312K  992M   1% /dev/shm
tmpfs          992M  1.5M  991M   1% /run
tmpfs          992M    0  992M   0% /sys/fs/cgroup
/dev/mapper/fedora-root  8.3G  4.3G  3.6G  55% /
tmpfs          992M  60K  992M   1% /tmp
/dev/sda1       477M 111M  337M  25% /boot
tmpfs          199M  16K  199M   1% /run/user/42
tmpfs          199M  16K  199M   1% /run/user/1000
/dev/sr0         1.5G  1.5G    0 100% /run/media/student/Fedora-WS-Live
-24-1-2
//192.168.43.1/docs   8.3G  5.4G  2.6G  68% /mnt/docs
192.168.43.1:/backups  8.3G  5.4G  2.6G  68% /mnt/backups
[root@Projclient ~]#

```

3)Configure the system to automatically mount (use fstab) the Linux server NFS share

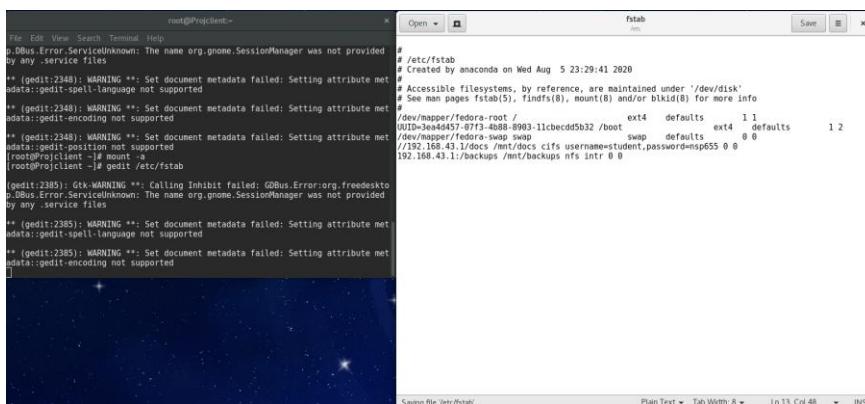
1. Restart the services in the server before mounting, using the following commands,

systemctl restart rpcbind.service

systemctl restart nfs-server.service

2. To restart the services automatically,
3. The following line is added to the end of the fstab using the following command
gedit /etc/fstab

192.168.43.1:/backups /mnt/backups nfs intr 0 0



4. Save the file and close it.
5. Using the commands, **mount -a** or **mount /mnt/backups**, confirm the mount has been done.
6. Use the **df -h** command to verify this mount

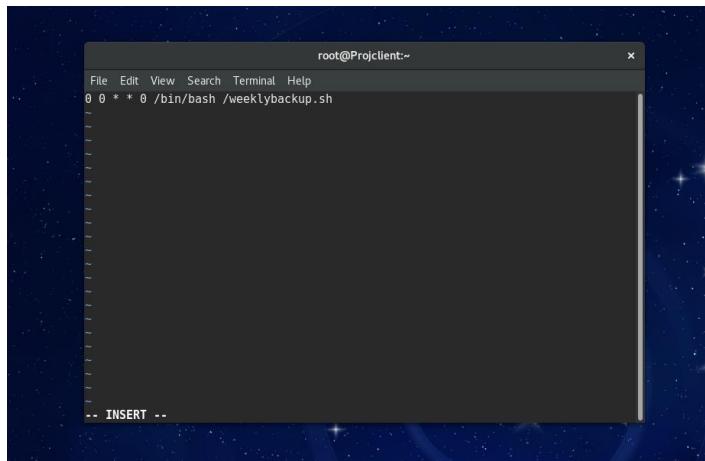
```

root@Projclient:~#
File Edit View Search Terminal Help
adata::gedit-spell-language not supported
** (gedit:2385): WARNING **: Set document metadata failed: Setting attribute met
adata::gedit-encoding not supported
** (gedit:2385): WARNING **: Set document metadata failed: Setting attribute met
adata::gedit-position not supported
[root@Projclient ~]# mount -a
[root@Projclient ~]# df -h
Filesystem      Size  Used Avail Use% Mounted on
devtmpfs        981M    0  981M  0% /dev
tmpfs          992M  312K  992M  1% /dev/shm
tmpfs          992M  1.5M  991M  1% /run
tmpfs          992M    0  992M  0% /sys/fs/cgroup
/dev/mapper/fedora-root  8.3G  4.3G  3.6G  55% /
tmpfs          992M  60K  992M  1% /tmp
/dev/sdal       477M  111M  337M  25% /boot
tmpfs          199M  16K  199M  1% /run/user/42
tmpfs          199M  16K  199M  1% /run/user/1000
/dev/sr0         1.5G  1.5G    0 100% /run/media/student/Fedora-WS-Live
-24-1-2
//192.168.43.1/docs   8.3G  5.4G  2.6G  68% /mnt/docs
192.168.43.1:/backups 8.3G  5.4G  2.6G  68% /mnt/backups
[root@Projclient ~]#

```

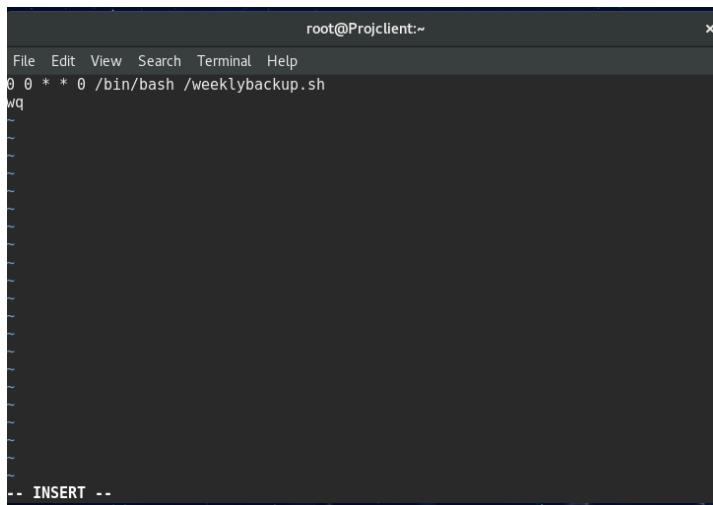
4)Configure the system to backup the /etc directory on the NFS share on a weekly basis using an executable bash script file (hint: use the crond daemon/crontab -e command).

1. These are the steps for the above task,
 2. My backup file will be made in the tar format.
 3. And the backup task is scheduled as follows,
 4. As a root user in the terminal, enter the command **crontab -e**
 5. In the text editor I added the line to make it work weekly, run the job weekly at 12am on a Sunday,
- 0 0 * * 0 /bin/bash /weeklybackup.sh**



A screenshot of a terminal window titled "root@Projclient:~". The window shows a single line of text: "0 0 * * 0 /bin/bash /weeklybackup.sh". Below this, the command "wq" is being typed. The status bar at the bottom of the terminal window displays "-- INSERT --".

6. Save the file using the command: **wq**



A screenshot of a terminal window titled "root@Projclient:~". The window shows a single line of text: "0 0 * * 0 /bin/bash /weeklybackup.sh". Below this, the command "wq" is being typed. The status bar at the bottom of the terminal window displays "-- INSERT --".

7. Create the weekly_backups script file in the root using the command, **touch weeklybackup.sh**
8. Using the gedit command I write the following lines to the script file,

```
#!/bin/bash  
BACKUPTIME=`date +%b-%d-%y`  
DESTINATION=/mnt/backups/-$BACKUPTIME.tar.gz  
SOURCEFOLDER=/etc  
tar -cpzf $DESTINATION $SOURCEFOLDER
```

```

root@Projclient:~#
File Edit View Search Terminal Help
9 0 * * 0 /bin/bash ./weeklybackup.sh
WD
```
-- INSERT --
root@Projclient:~#
File Edit View Search Terminal Help
|root@Projclient ~]# touch weeklybackup.sh
|root@Projclient ~]# gedit weeklybackup.sh
(gedit:2140): Gtk-WARNING **: Calling Inhibit failed: GDBus.Error:org.freedesktop.DBus.Error.ServiceUnknown: The name org.gnome.SessionManager was not provided by any .service files
** (gedit:2140): WARNING **: Set document metadata failed: Setting attribute met
adata:gedit-spell-language not supported
** (gedit:2140): WARNING **: Set document metadata failed: Setting attribute met
adata:gedit-encoding not supported
```
Saving file '/root/weeklybackup.sh...' sh Tab Width: 8 Ln 4, Col 37 INS

```

9. I made this script executable using these commands,

chmod +x weeklybackup.sh

10. Executed the file,

./weeklybackup.sh

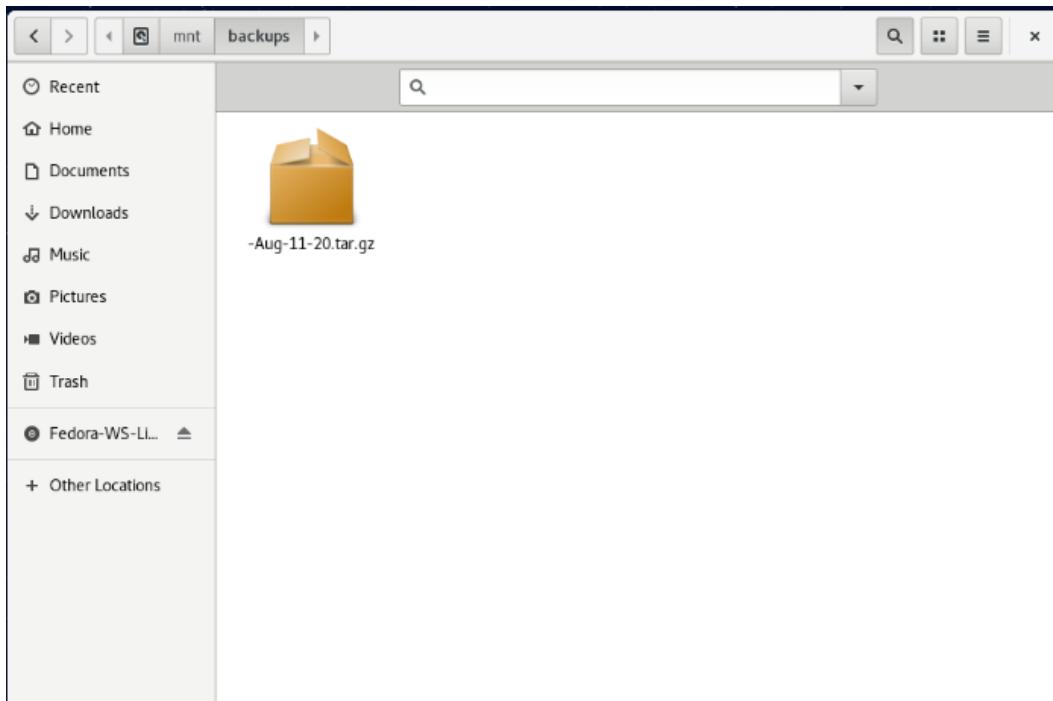
```

root@Projclient:~#
File Edit View Search Terminal Help
[root@Projclient ~]# chmod +x weeklybackup.sh
[root@Projclient ~]# ./weeklybackup.sh
tar: Removing leading `/' from member names
[root@Projclient ~]# /sbin/service crond status
Redirecting to /bin/systemctl status crond.service
● crond.service - Command Scheduler
   Loaded: loaded (/usr/lib/systemd/system/crond.service; enabled; vendor preset: enabled)
     Active: active (running) since Tue 2020-08-11 02:01:13 ADT; 23min ago
       Main PID: 1095 (crond)
          Tasks: 1 (limit: 512)
         CGroup: /system.slice/crond.service
             └─1095 /usr/sbin/crond -n

Aug 11 02:01:13 Projclient.nspdom33.local systemd[1]: Started Command Scheduler.
Aug 11 02:01:13 Projclient.nspdom33.local crond[1095]: (CRON) INFO (Syslog will be used ins
Aug 11 02:01:13 Projclient.nspdom33.local crond[1095]: (CRON) INFO (RANDOM_DELAY will be sc
Aug 11 02:01:13 Projclient.nspdom33.local crond[1095]: (CRON) INFO (running with inotify su
times 1-12/12 [END])

```

11. Checked whether the backup file is available in the **file utility**



12. Using the command **/sbin/service crond status**

13. Checked whether the service is running.

5)Create an executable script to automatically launch the VNC viewer and connect to the Linux server with SSH tunneling

1. Using the command, **systemctl restart sshd.service** in Server terminal, I restart the SSH service to get rid of the errors.

```
root@Projserver:~#
File Edit View Search Terminal Help
[student@Projserver ~]$ su -
Password:
[root@Projserver ~]# systemctl restart sshd.service
[root@Projserver ~]#
```

2. I also restart vnc server using the command

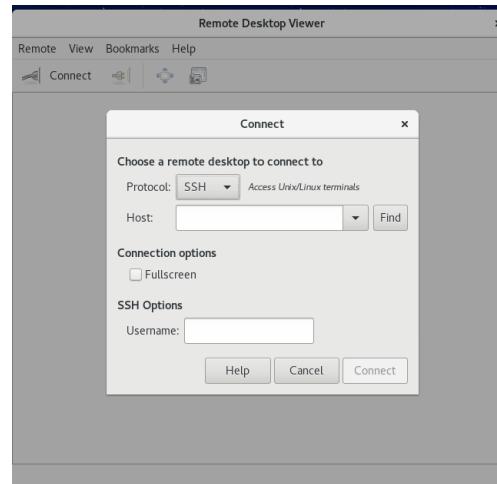
vncserver@:4.service.

```
root@Projserver:~$ su -
[student@Projserver ~]$ systemctl start vncserver@:4.service
[student@Projserver ~]#
```

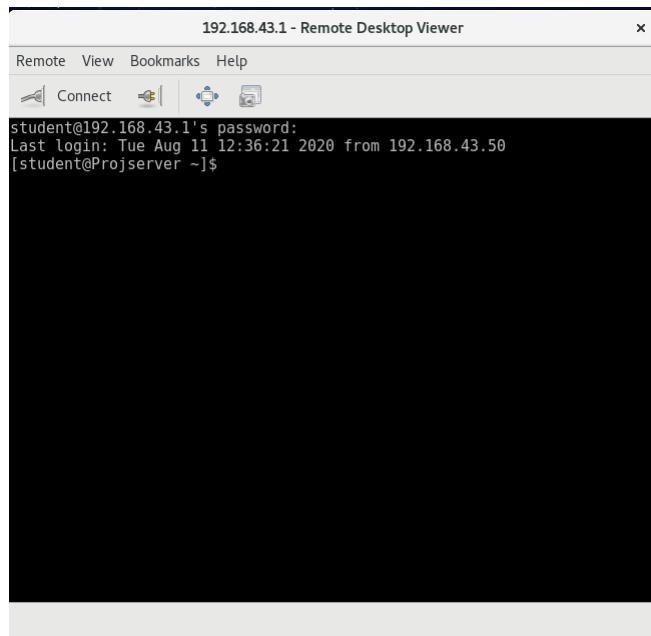
3. Now enter the command, ssh student@192.168.43.1 to connect to vnc. Whenever prompts for password, enter nspstudent.

```
student@Projserver:~$ ssh student@192.168.43.1
The authenticity of host '192.168.43.1 (192.168.43.1)' can't be established.
ECDSA key fingerprint is SHA256:12KZRQN5bH0cBDePhx+tbSJ02X2dJ+Khf4+v4Dk.
ECDSA key fingerprint is MD5:14:c4:bb:63:fa:3e:be:74:54:b3:c2:dl:f6:15:af:4b.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.43.1' (ECDSA) to the list of known hosts.
student@192.168.43.1's password:
[student@Projserver ~]$ vncviewer -via student@192.168.43.1 192.168.43.1:4
TigerVNC Viewer 64-bit v1.8.0
Built on: 2017-05-17 05:45
Copyright (C) 1999-2017 TigerVNC Team and many others (see README.txt)
See http://www.tigervnc.org for information on TigerVNC.
Can't open display:
[student@Projserver ~]$ vncviewer -via student@192.168.43.1 192.168.43.1:4
TigerVNC Viewer 64-bit v1.8.0
Built on: 2017-05-17 05:45
Copyright (C) 1999-2017 TigerVNC Team and many others (see README.txt)
See http://www.tigervnc.org for information on TigerVNC.
Can't open display:
[student@Projserver ~]$
```

4. Under the **Activities** search for the **VNC**, open the **Remote Desktop App**, and click connect.

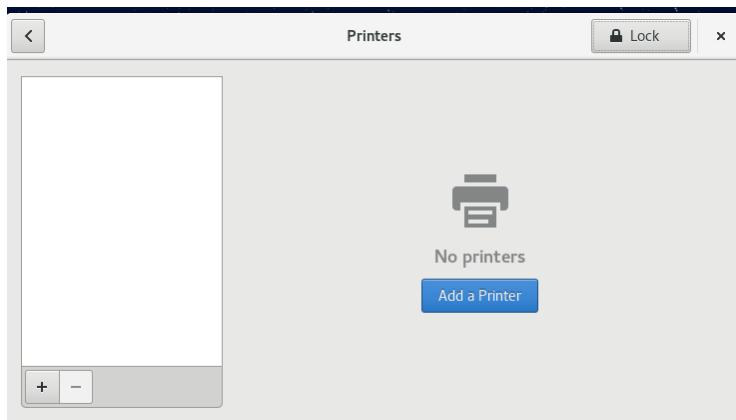


5. When it opens, enter the password **nspstudent**, and you are ready to go.

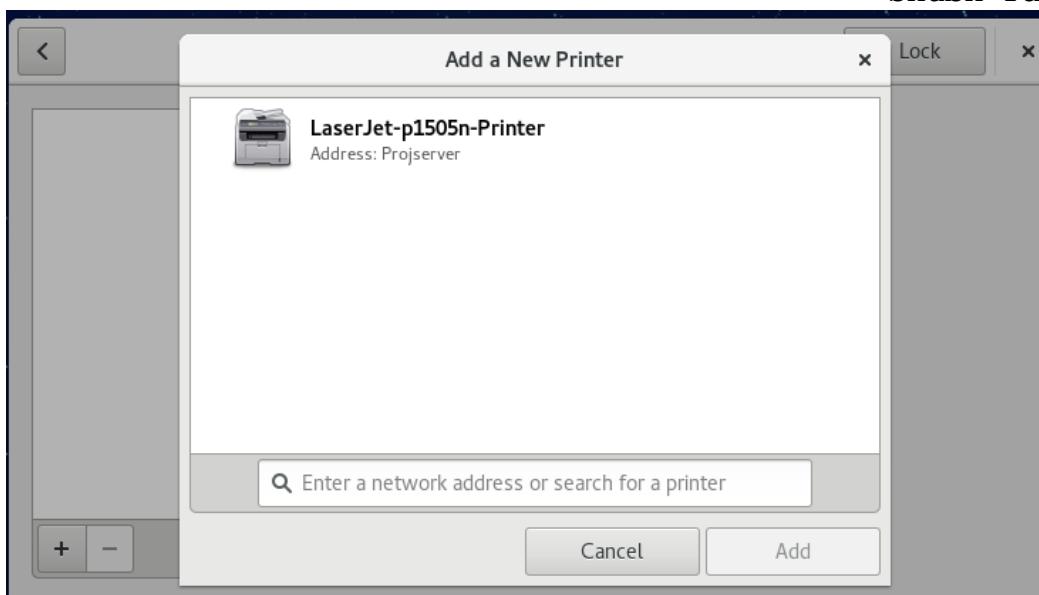


6)Using the Print Settings GUI, connect to the shared network printer (LaserJet p1505n) on Linux server.

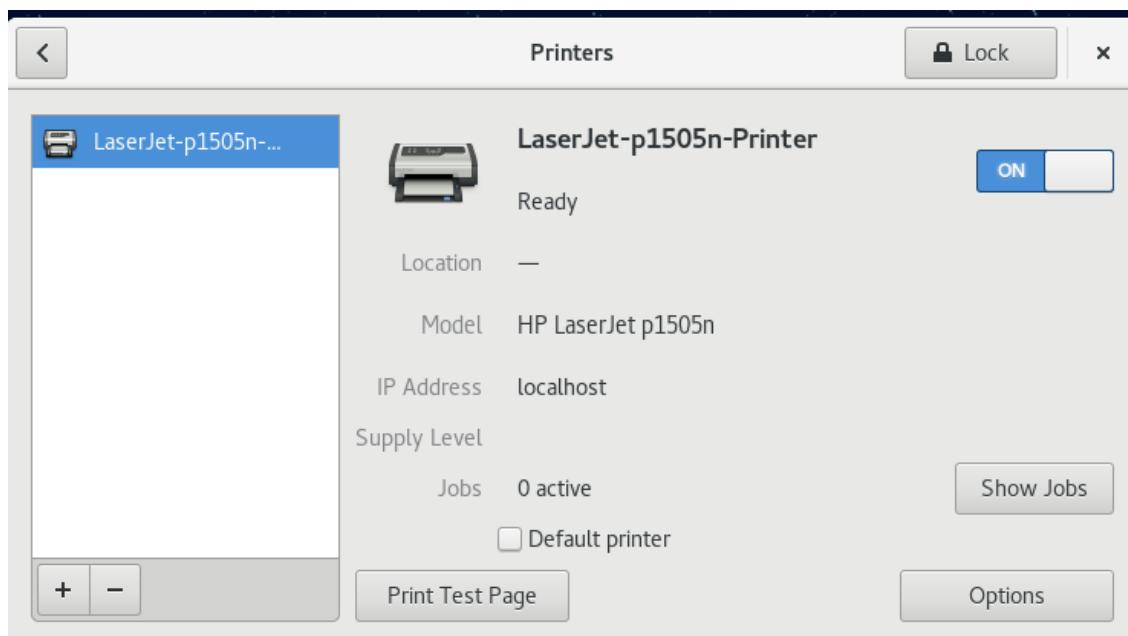
1. Under Activities open **Printer** utility.



2. And then click on the plus sign on the left to open the **Add a new printer** window. After few seconds the printer I configured on the server shows up in the Add a new printer window.

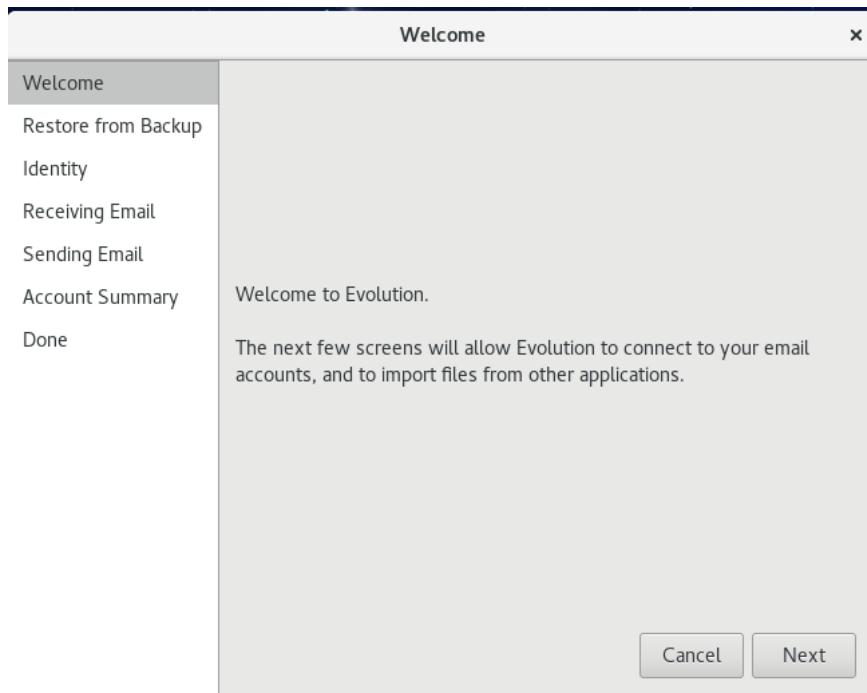


3. Select **LaserJet-p1505n-Printer** and click **Add**. When it's in **Ready** mode
Unlock from the top-right corner by entering password "**nsp655**" and try
to print a test page.

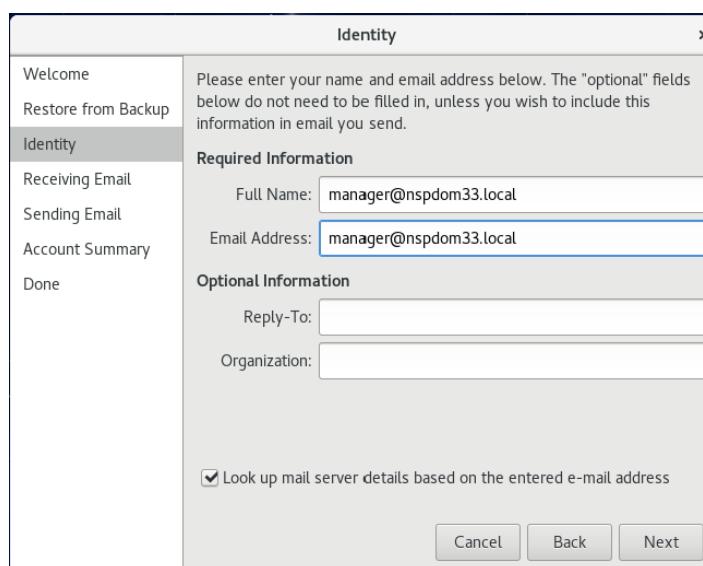


7) Configure the Evolution e-mail client to send/receive mail from the Linux server using the engineering or management accounts.

- Under the Activities, search for Evolution.



- Click **Next**, under the Identity tab type email-address and Full Name as **manager@nspdom33.local**



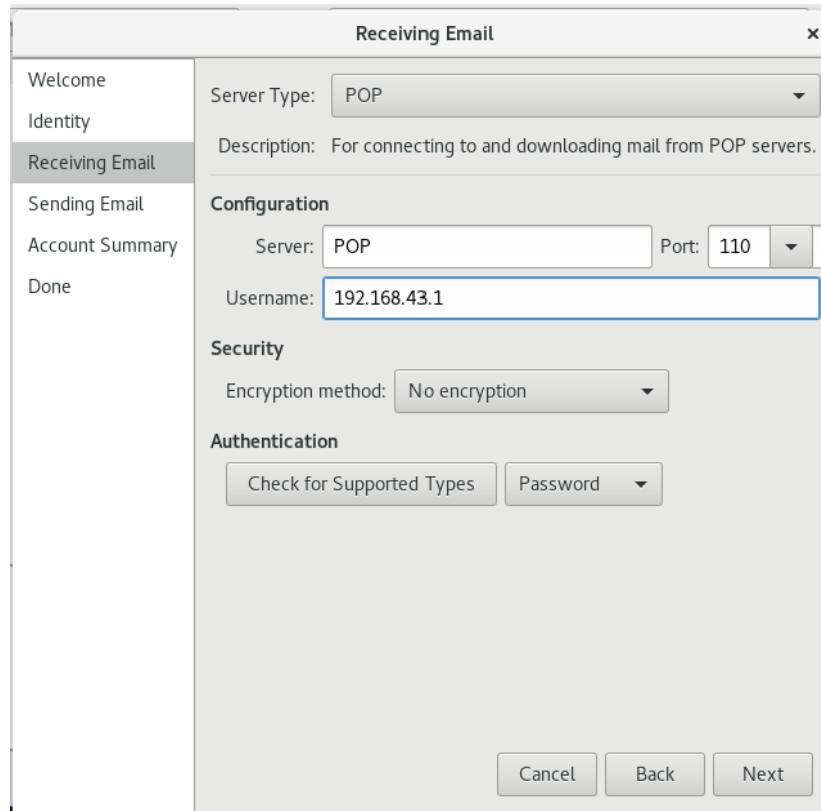
3. Click **Next**, Under the **Receiving Email** tab choose and type following:

Server type = **POP**

Server = **POP**

Port = **110**

Username = **192.168.43.1**

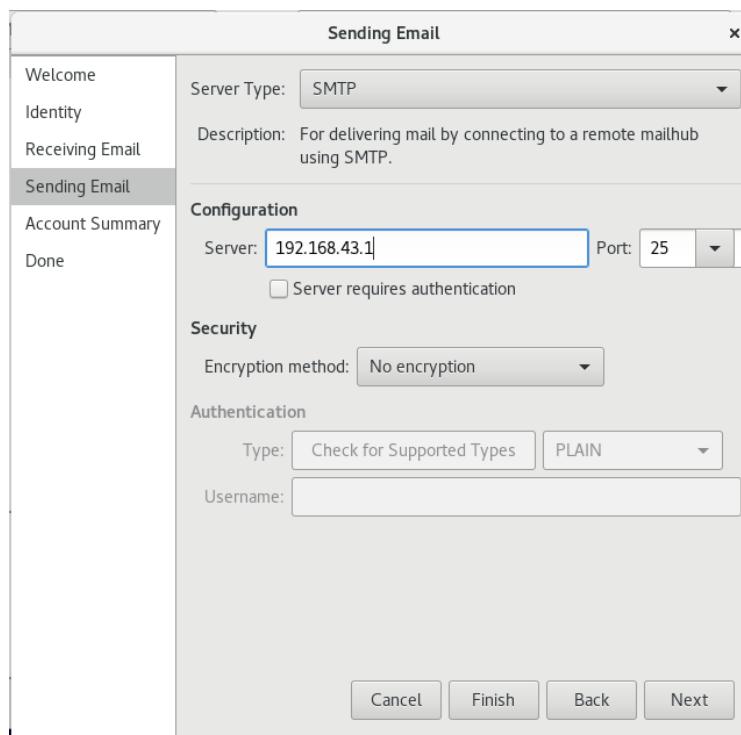


4. Click **Next**, Under the **Sending Email** tab choose the following:

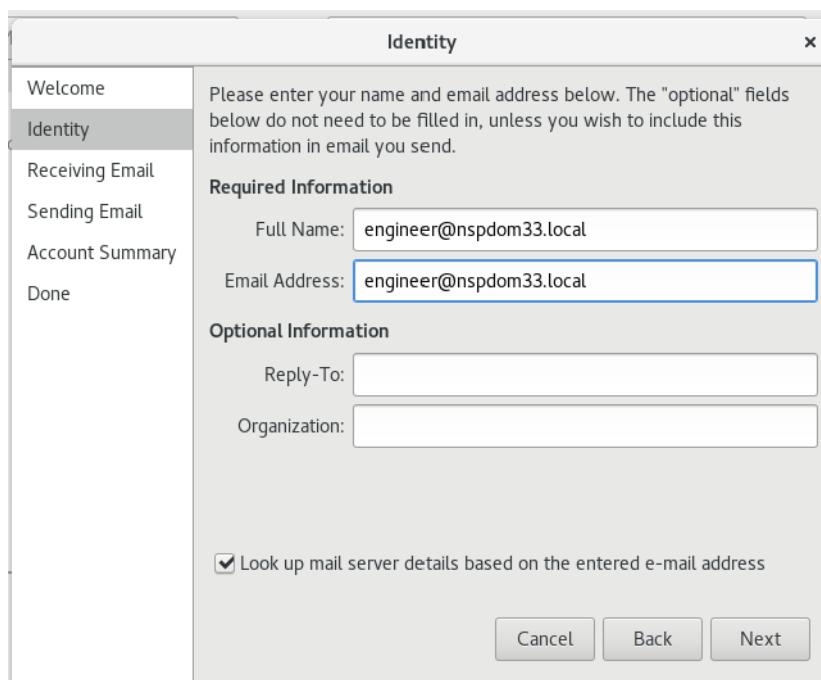
Server type = **SMTP**

Server = **192.168.43.1**

Port = **25**



5. Now go to **File**, click **New**, click **New Mail Account**.
6. Click **Next**, under the **Identity** tab type email-address and Full Name as **engineer@nspdom33.local**



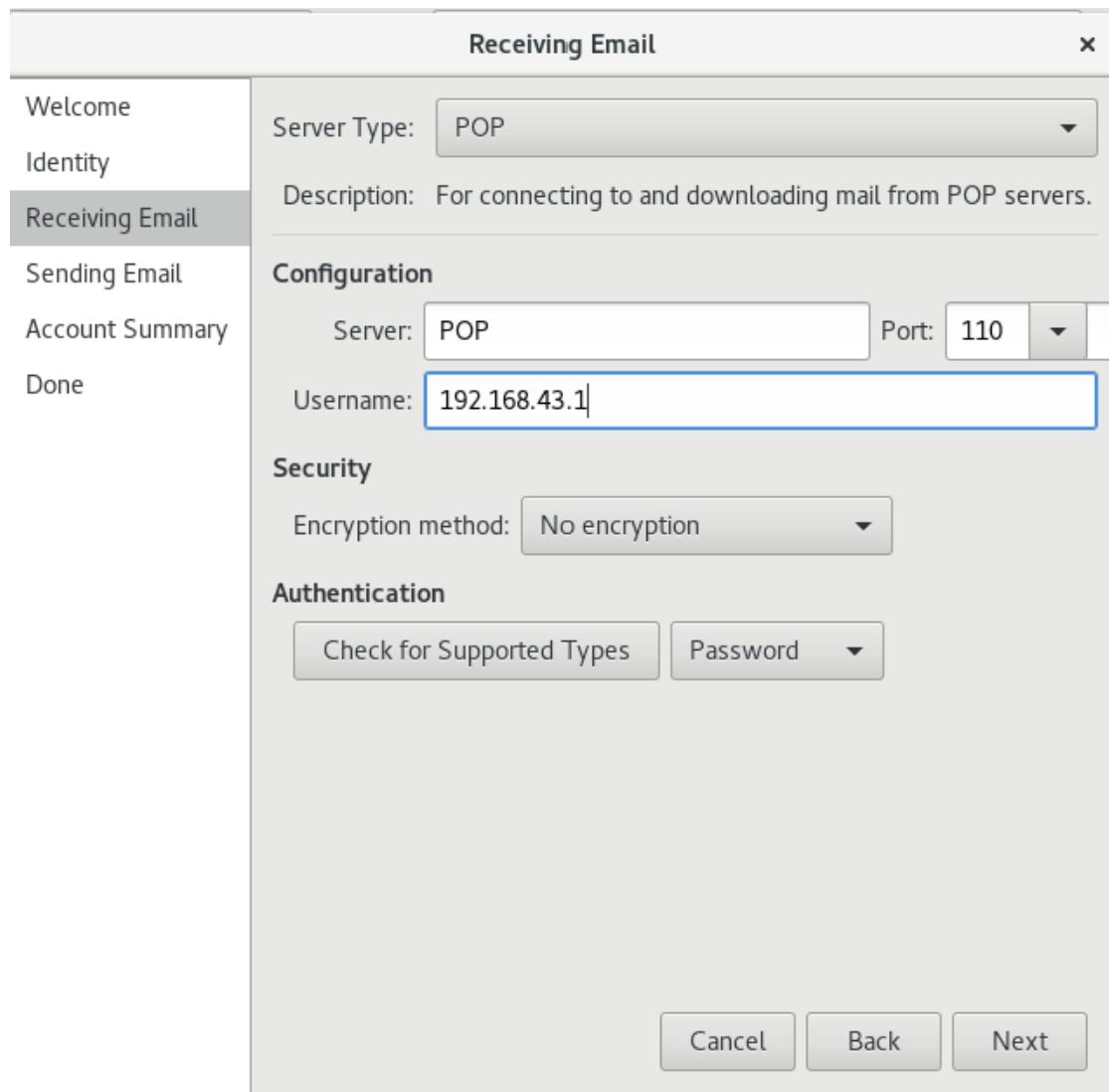
7. Click **Next**, Under the **Receiving Email** tab choose and type following:

Server type = **POP**

Server = **POP**

Port = **110**

Username = **192.168.43.1**



8. Click **Next**, Under the **Sending Email** tab choose the following:

Server type = **SMTP**

Server = **192.168.43.1**

Port = **25**

