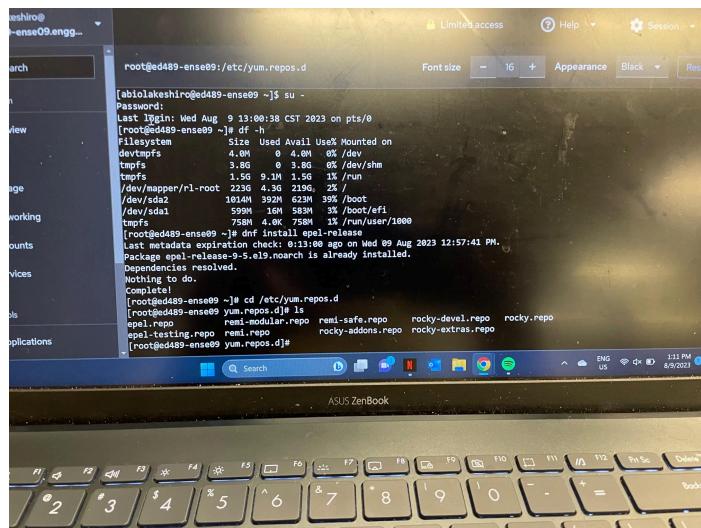


BACKGROUND

This lab focused on getting a GUI on my servers and installing Virtualbox so I can have multiple OSs running on the same machine. Then I created a fully functioning application that lets users subscribe to movies using themoviedb API, PHP, mail verification, javascript, mariadb and many underlying linux applications.

PROCEDURE FOR SERVER SET UP

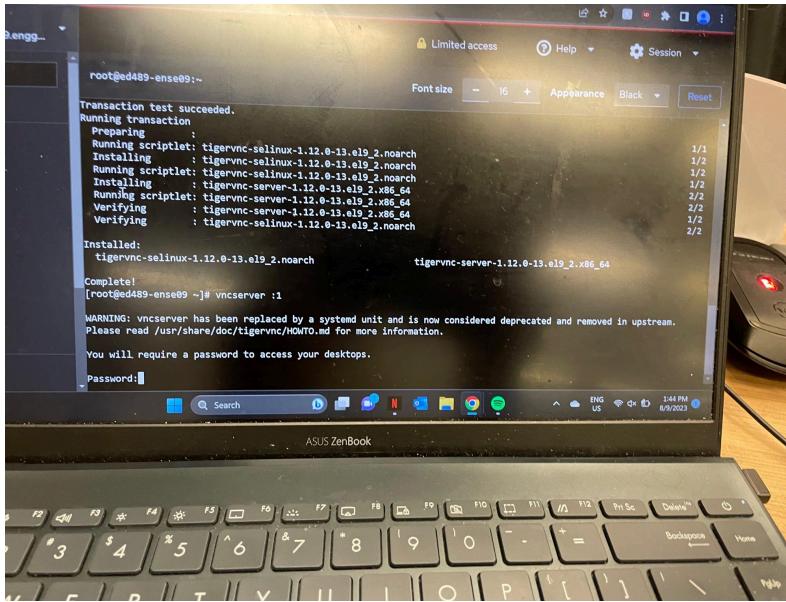
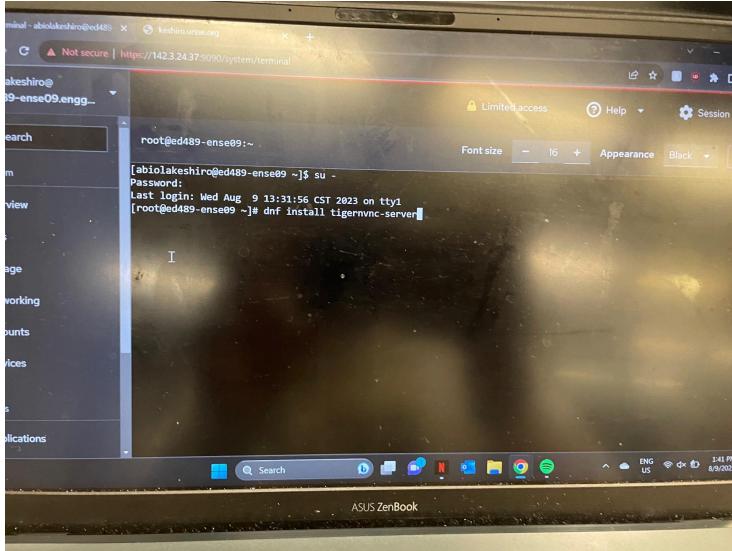
- To get a GUI, the first thing we need is an EPEL repo to help ensure a smoother and more reliable installation process by providing the necessary software packages and dependencies. Using “dnf config-manager – set enabled crb” to enable code ready builder.



- Then I installed the KDE as the GUI using “dnf groupinstall KDE Plasma workspaces”. Then after I started my server and logged in as root, with just the “startx” command I could start up the GUI.



- Using the command “dnf install tigervnc-server” I installed the TigerVNC server package so I can remotely access and control my GUI remotely. Then I set up the vnc server and I could run the vnc server on 5901 “vncserver :1” . After I opened the port 5901 using the firewall-cmd command.



- Then after we opened the port, we could log in remotely using ssh client from a command server. I also installed virtualbox so we could make new instances on the same server. Then I had to install development libraries for virtualbox.

MUBARAK ABIOLA Keshiro 200443413

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\mubuk> ssh -l 5901 localhost:5901 abiolakeshore@142.3.24.37 -p 33333
5901:localhost:5901@142.3.24.37's password:
Permission denied, please try again.
5901:localhost:5901@142.3.24.37's password:
Permission denied, please try again.
5901:localhost:5901@142.3.24.37's password:
5901:localhost:5901@142.3.24.37 Permission denied (publickey,gssapi-keyex,gssapi-with-mic,password).
PS C:\Users\mubuk> ssh -l 5901 localhost:5901 abiolakeshore@142.3.24.37 -p 33333
5901:localhost:5901@142.3.24.37's password:
Permission denied, please try again.
5901:localhost:5901@142.3.24.37's password:
Last login: Wed Aug 9 13:39:09 2023 from ::ffff:142.3.71.18
[abiolakeshore@ed489-ense09 ~]$
```

```
root@ed489-ense09:~# /etc/yum.repos.d
Font size - 16 + Appearance Black Reset
WARNING: vncserver has been replaced by a systemd unit and is now considered deprecated and removed in upstream.
Please read /usr/share/doc/tigervnc/HOWTO.md for more information.

Can't find file /root/.vnc/ed489-ense09.eng.uregina.ca:1.pid
You'll have to kill the Xvnc process manually

[root@ed489-ense09 ~]# cd /root/
[root@ed489-ense09 ~]# lscpu | grep Virtualization
Virtualization: VT-x
[root@ed489-ense09 ~]# cd /etc/yum.repos.d
[root@ed489-ense09 ~]# wget https://download.virtualbox.org/virtualbox/rpm/el/virtualbox.repo
--2023-08-09 14:21:04-- https://download.virtualbox.org/virtualbox/rpm/el/virtualbox.repo
Resolving download.virtualbox.org (download.virtualbox.org)... 23.49.100.106
Connecting to download.virtualbox.org (download.virtualbox.org)|23.49.100.106|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 264 [text/plain]
Saving to: 'virtualbox.repo'

virtualbox.repo 100%[=====] 264 --.KB/s in 0s
2023-08-09 14:21:05 (6.52 MB/s) - 'virtualbox.repo' saved [264/264]
[root@ed489-ense09 yum.repos.d]#
```

```
root@ed489-ense09:~# .vnc
Font size - 16 + Appearance Black Reset
Virtualization:
[root@ed489-ense09 ~]# cd /etc/yum.repos.d
[root@ed489-ense09 yum.repos.d]# wget https://download.virtualbox.org/virtualbox/rpm/el/virtualbox.repo
--2023-08-09 14:21:04-- https://download.virtualbox.org/virtualbox/rpm/el/virtualbox.repo
Resolving download.virtualbox.org (download.virtualbox.org)... 23.49.100.106
Connecting to download.virtualbox.org (download.virtualbox.org)|23.49.100.106|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 264 [text/plain]
Saving to: 'virtualbox.repo'

virtualbox.repo 100%[=====] 264 --.KB/s in 0s
2023-08-09 14:21:05 (6.52 MB/s) - 'virtualbox.repo' saved [264/264]
[root@ed489-ense09 yum.repos.d]# ls
epel.repo epel-testing.repo remi.repo rocky-addons.repo rocky-extras.repo virtualbox.repo
epel.repo remi-modular.repo remi-safe.repo rocky-devel.repo rocky.repo
[root@ed489-ense09 yum.repos.d]# cd /root/
[root@ed489-ense09 ~]# dnf install kernel-devel kernel-headers glibc-devel binutils libgcc make patch
gcc dkms
```

- We set up VPNs and proxy servers. I installed openvpn, then I installed easy rsa to use with open vpn so i can use private and public keys to ensure vpn connections are secure. I followed to generate a diffie hellman key so two parties can exchange a shared secret securely. I also generated requests for the severe and then signed the vpn certificates using my open vpn passphrase. Then I had to run some commands below that helped make the vpn run publicly.

```

root@ed489-ense09:~# cd /etc/openvpn
root@ed489-ense09:~# ls
client server
[root@ed489-ense09 openvpn]# mkdir easy-rsa
[root@ed489-ense09 openvpn]# ls
client easy-rsa server
[root@ed489-ense09 openvpn]# cd easy-rsa
[root@ed489-ense09 easy-rsa]# cp -Rv /usr/share/easy-rsa/3.1.5/ .
/usr/share/easy-rsa/3.1.5/easyrsa -> ./easyrsa
/usr/share/easy-rsa/3.1.5/openssl-easyrsa.cnf -> './openssl-easyrsa.cnf'
/usr/share/easy-rsa/3.1.5/x509-types -> './x509-types'
/usr/share/easy-rsa/3.1.5/x509-types/common -> './x509-types/common'
/usr/share/easy-rsa/3.1.5/x509-types/ca -> './x509-types/ca'
/usr/share/easy-rsa/3.1.5/x509-types/client -> './x509-types/client'
/usr/share/easy-rsa/3.1.5/x509-types/code-signing -> './x509-types/code-signing'
/usr/share/easy-rsa/3.1.5/x509-types/email -> './x509-types/email'
/usr/share/easy-rsa/3.1.5/x509-types/kdc -> './x509-types/kdc'
/usr/share/easy-rsa/3.1.5/x509-types/server -> './x509-types/server'
/usr/share/easy-rsa/3.1.5/x509-types/serverClient -> './x509-types/serverClient'
[root@ed489-ense09 easy-rsa]# ls

```

```

root@ed489-ense09:~# ./easyrsa sign-req server server
* No Easy-RSA 'vars' configuration file exists!
* Using SSL: openssl OpenSSL 3.0.7 1 Nov 2022 (Library: OpenSSL 3.0.7 1 Nov 2022)

You are about to sign the following certificate.
Please check over the details shown below for accuracy. Note that this request
has not been cryptographically verified. Please be sure it came from a trusted
source or that you have verified the request checksum with the sender.

Request subject, to be signed as a server certificate
for '825' days:
subject=CommonName = server

Type the word 'yes' to continue, or any other input to abort.
Confirm request details: yes
Using configuration from /etc/openvpn/easy-rsa/pki/temp_2.1
Enter pass phrase for /etc/openvpn/easy-rsa/pki/private/ca.key:

```

```

root@ed489-ense09:/etc/systemd/system
tls-auth Private Key found: /keys/pfs.key
Done! client.ovpn Successfully Created.
[root@ed489-ense09 openvpn]# ls
client client.ovpn common.txt easy-rsa keys pfs.key server vpn_ovpn2823.sh
[root@ed489-ense09 openvpn]# wget gelowitz.org/server.conf
2023-08-09 15:29:24 -> [https://gelowitz.org/server.conf]
Resolving gelowitz.org (gelowitz.org)
gathering addresses... done.
Connecting to gelowitz.org (gelowitz.org)|184.169.66.80|:80... connected.
HTTP request sent, awaiting response... 301 Moved Permanently
Location: https://gelowitz.org/server.conf [following]
--2023-08-09 15:29:24-- https://gelowitz.org/server.conf
Connecting to gelowitz.org (gelowitz.org)|184.169.66.80|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 563 [text/plain]
Saving to: 'server.conf'

server.conf                                     100%[=====]   563     --KB/s   in 0s

2023-08-09 15:29:24 (8.00 MB/s) - 'server.conf' saved [563/563]

[root@ed489-ense09 openvpn]# emacs server.conf
[root@ed489-ense09 openvpn]# cd /etc/systemd/system
[root@ed489-ense09 system]#

```



```

root@ed489-ense09:/etc/systemd/system
public (active)
  target: default
  icmp-block-inversion: no
  icmp-blocks: enp0s3!f6
  sources:
  services: cockpit dhcpcv6-client dns http https smtp ssh
  ports: 3333/tcp 5901/tcp 1194/udp
  protocols:
    forward: yes
    masquerade: no
    forward-ports:
    source-ports:
    icmp-blocks:
    rich rules:
[root@ed489-ense09 system]# firewall-cmd --permanent --new-zone=vpn
success
[root@ed489-ense09 system]# firewall-cmd --permanent --zone=vpn --add-source=10.8.0.0/24
success
[root@ed489-ense09 system]# firewall-cmd --permanent --zone=public --add-masquerade
success
[root@ed489-ense09 system]# firewall-cmd --permanent --new-policy=vpn to public
success
[root@ed489-ense09 system]# firewall-cmd --permanent --policy=vpn_to_public

```

CONCLUSION

In this lab, the focus was on setting up a GUI on servers and installing VirtualBox for multiple OS instances. The process involved enabling the EPEL repo for smoother installation, installing KDE as the GUI, and configuring TigerVNC for remote access. OpenVPN and EasyRSA were employed to establish secure VPN connections using public and private keys. A Diffie-Hellman key was generated for secure key exchange. The process concluded with successful setup of GUI, remote access, VirtualBox, and secure VPN connections.