Red Hat Enterprise Linux Installation and Setup Lab
By Michael Ambeguia

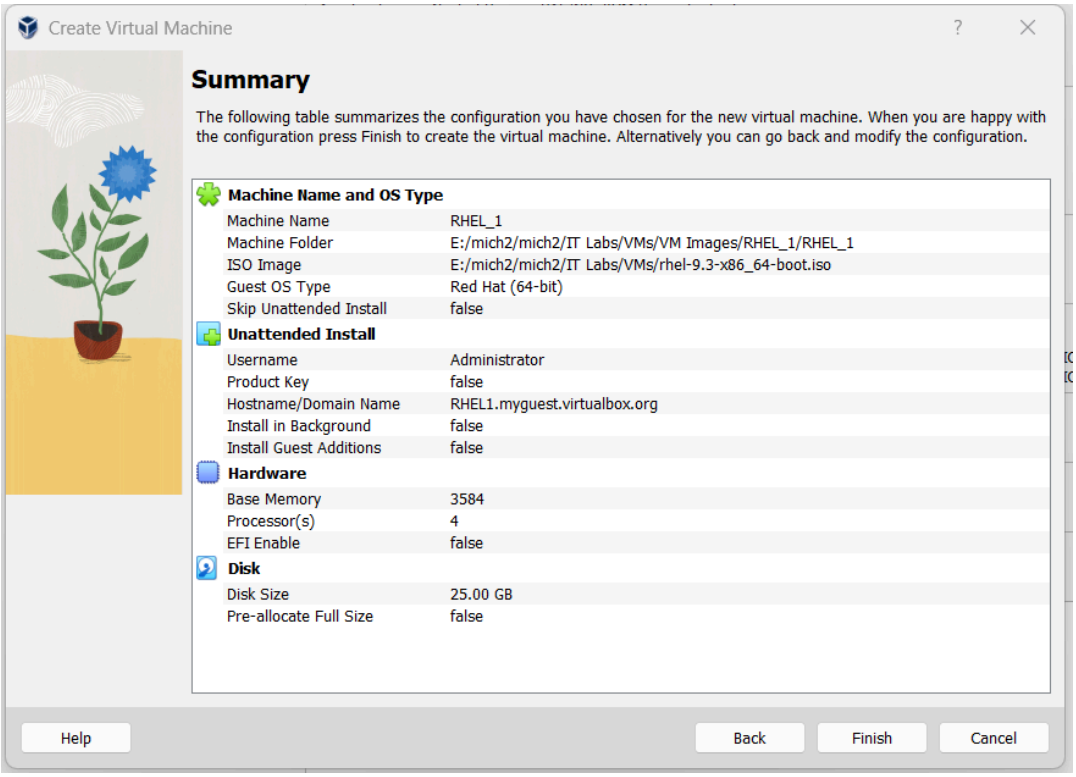
Lab Purpose: The purpose of this lab is to gain hands-on experience installing RHEL. I would also like to practice customizing my RHEL VM, conducting user management, system hardening, and various other post-installation tasks. RHEL is one of the most successful Linux distributions available. It is also one of the most used Linux OSs in an enterprise setting due to its comprehensive support, updates, and security and utility features.

Sections:

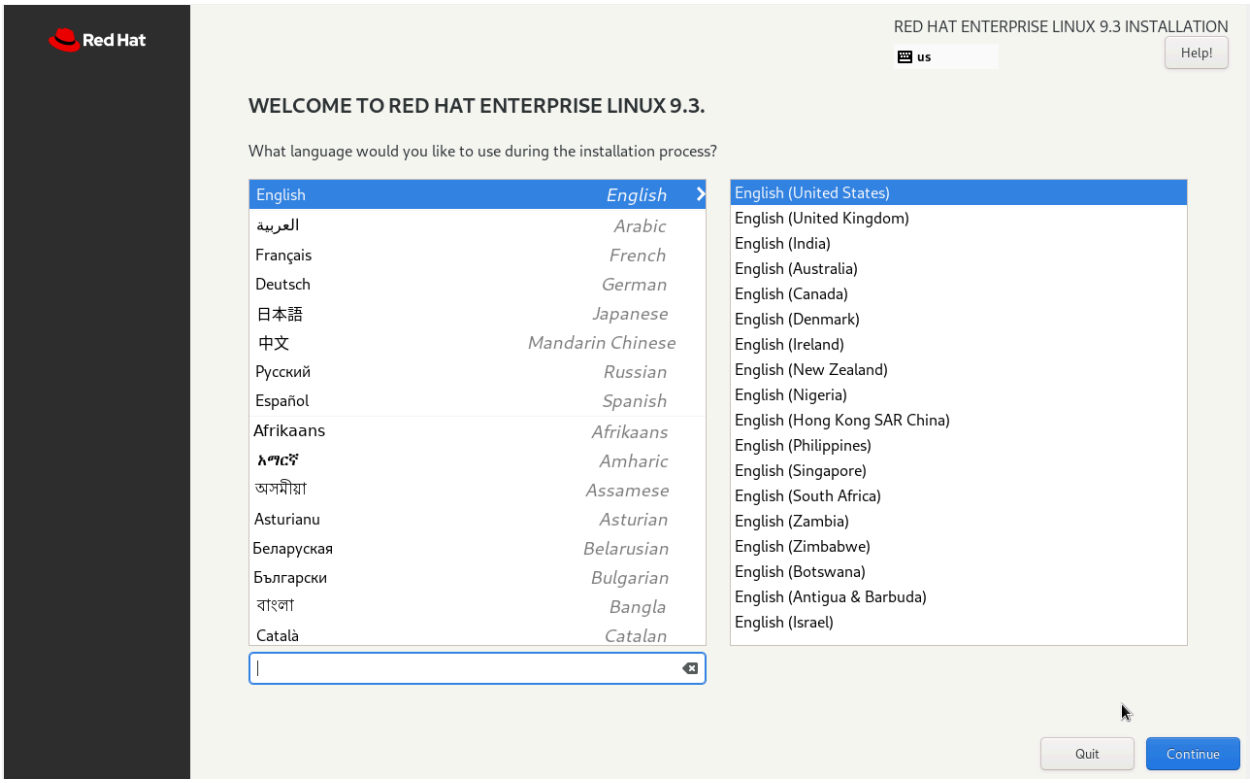
1. Installation
2. User Management
3. System Hardening
4. System customization
5. Installing key services and applications.

Section #1 Installation:

Step #1: Set up a VM in VirtualBox. Configure your VM settings such as storage size and the amount of memory and cpus given to the VM.

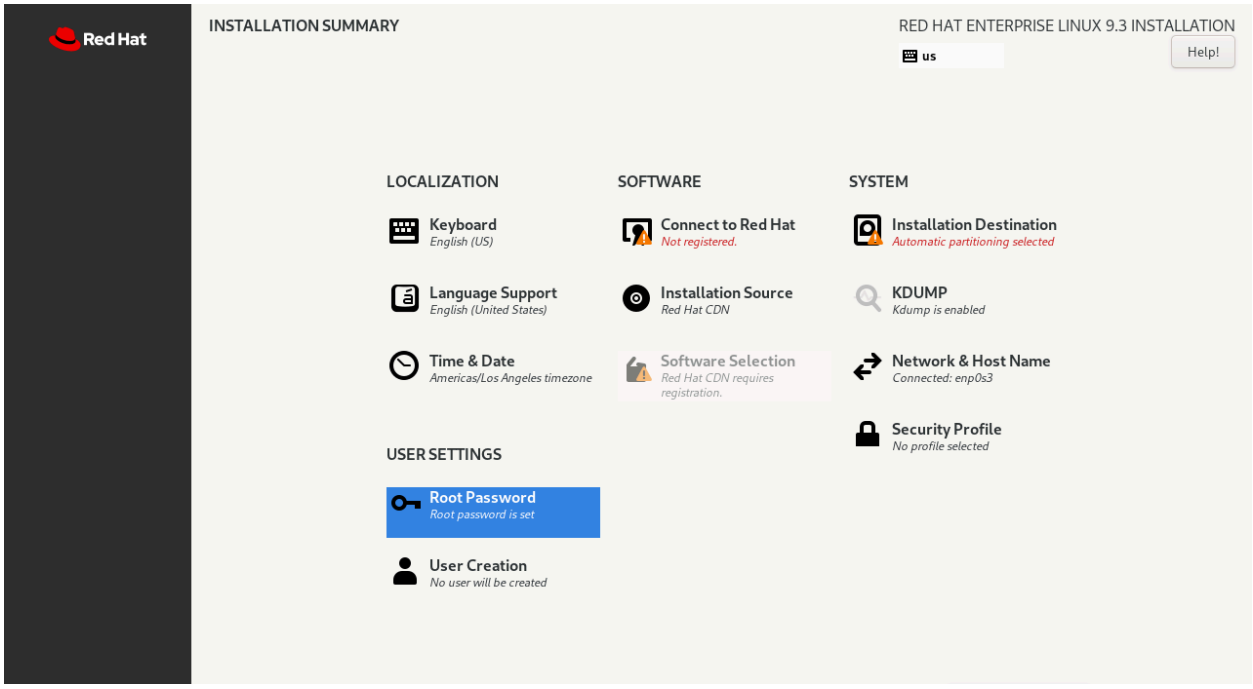


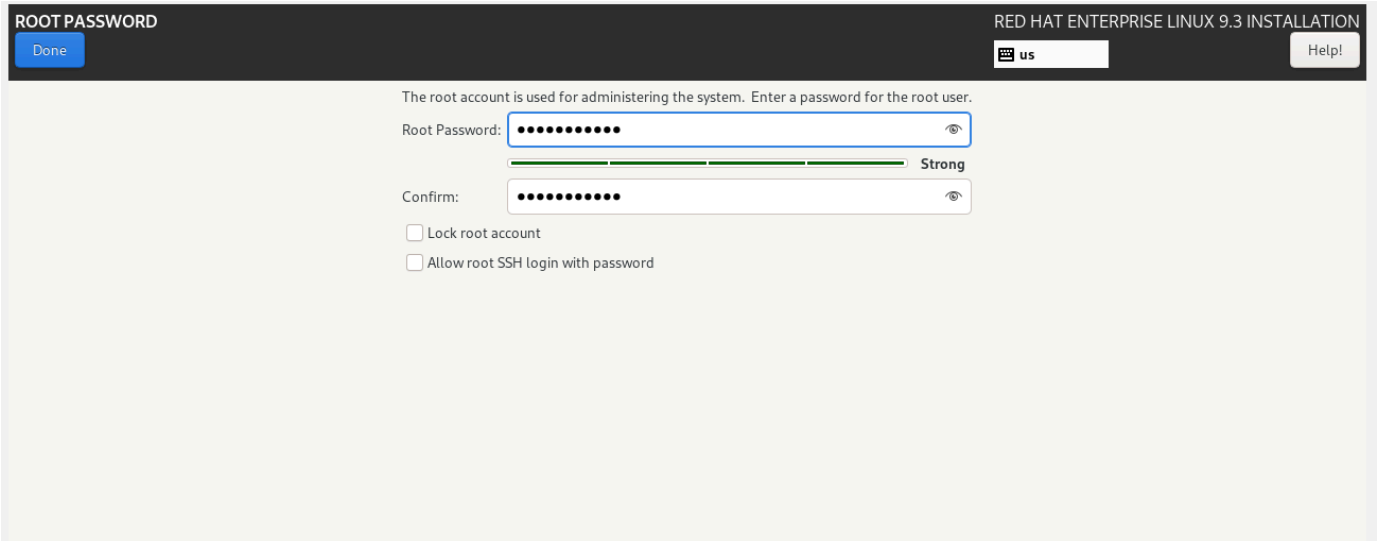
Step #2. Start the installation process once the VM is running. The following screenshots will depict what you will see in order.



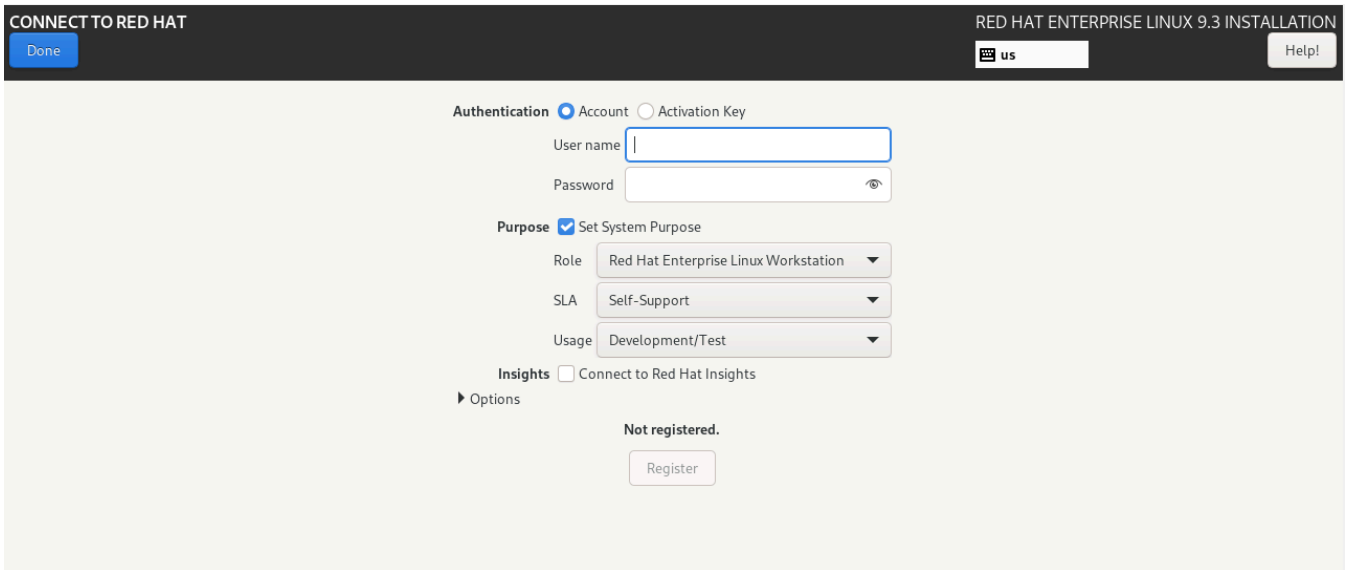
Choose your language and country. You will then see the following screen. You will want to do the following tasks:

1. Set the root password.
2. Connect your VM to your Redhat Account. *This is very important since without registering your vm you will not receive any updates and the rpm/ yum package managers will not work*
3. Next choose your system type and the software you want. I configured my VM to be a RHEL server with a GUI. I chose to skip the installation of software since I will do so during the post installation phase.

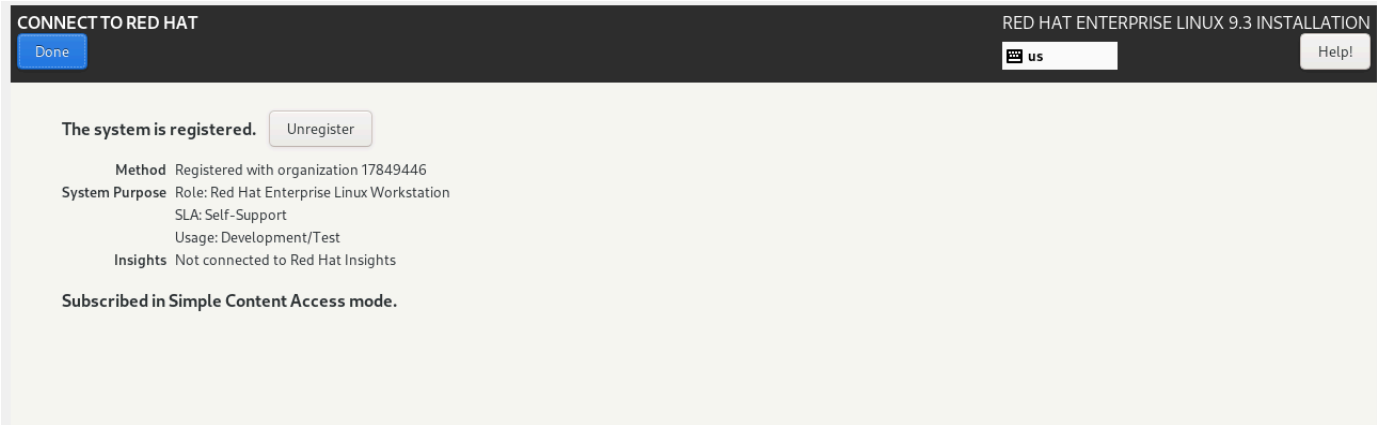




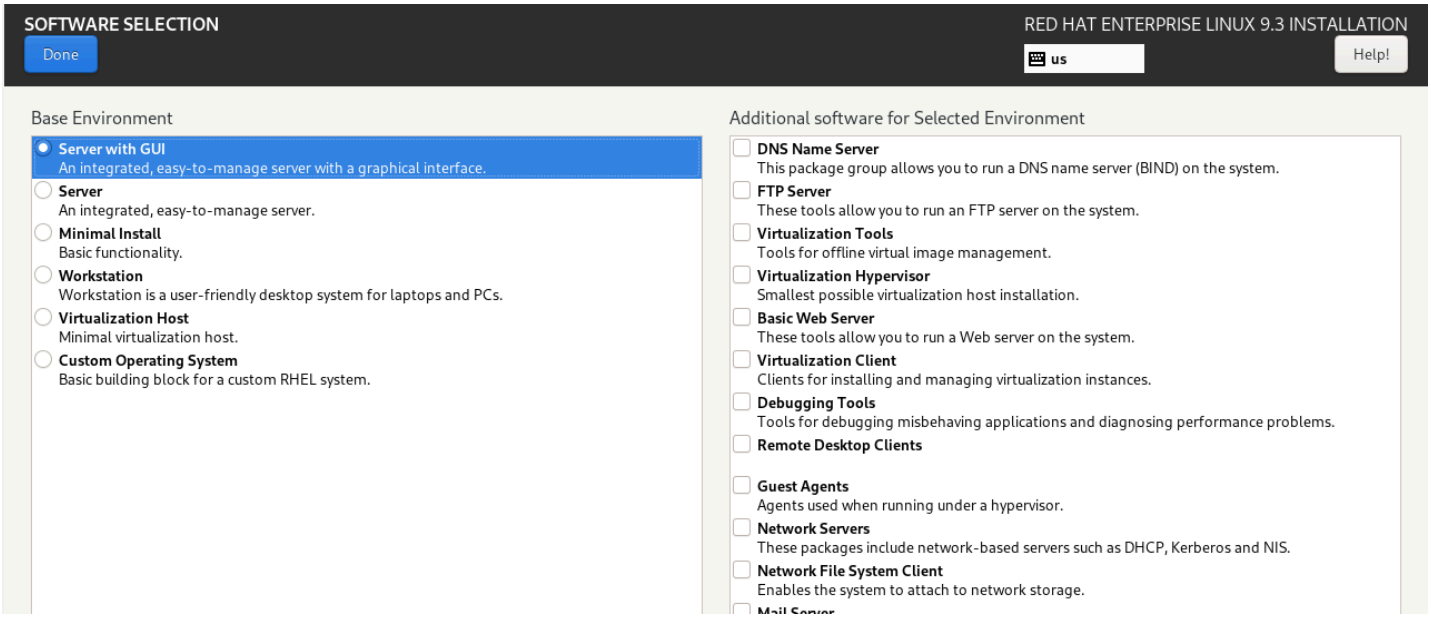
Set the root password.



Connect the VM to your Red Hat Account. You will enter your username and password for the account and set the purpose of your VM. Or you can use an activation key like I did. The activation key can be created from your Red Hat account online.

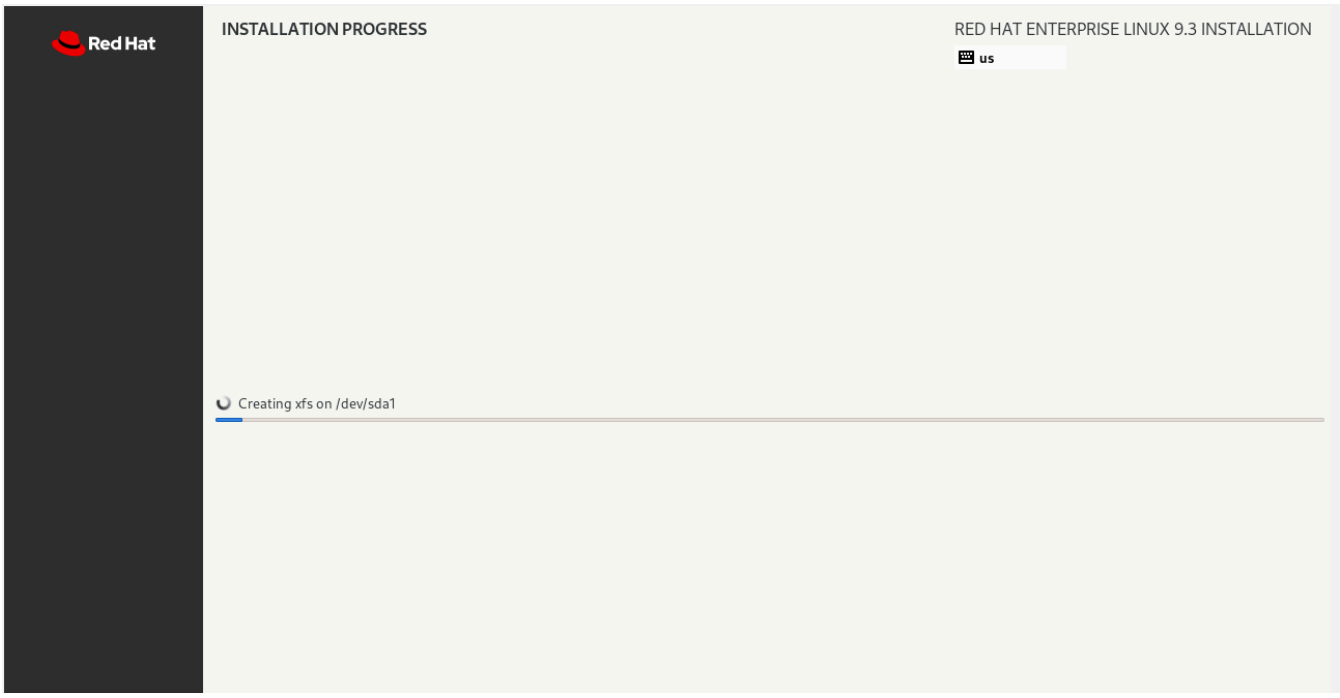


Now my VM is connected to my Red Hat Account.

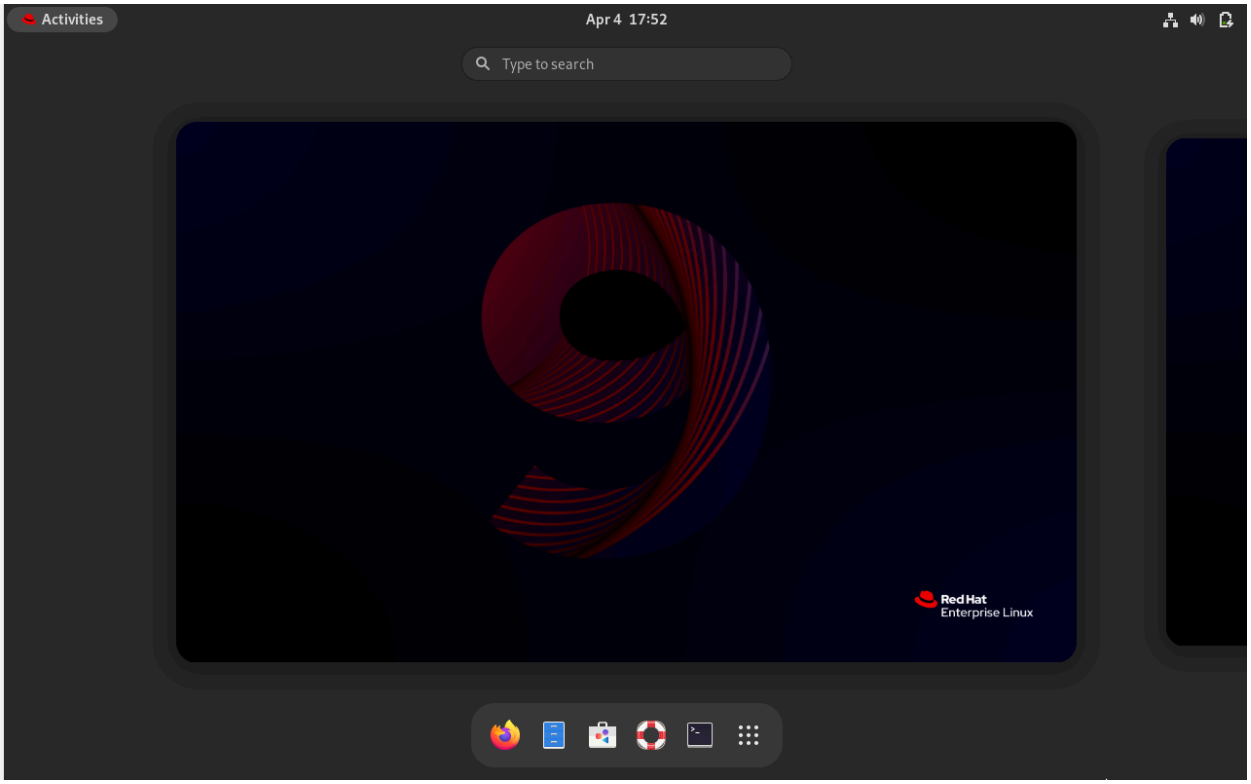


Now I will choose my install type which is a server with a GUI.

Step 4. Install the OS.



Step #5. The installation is done. Sign into the new RHEL VM.

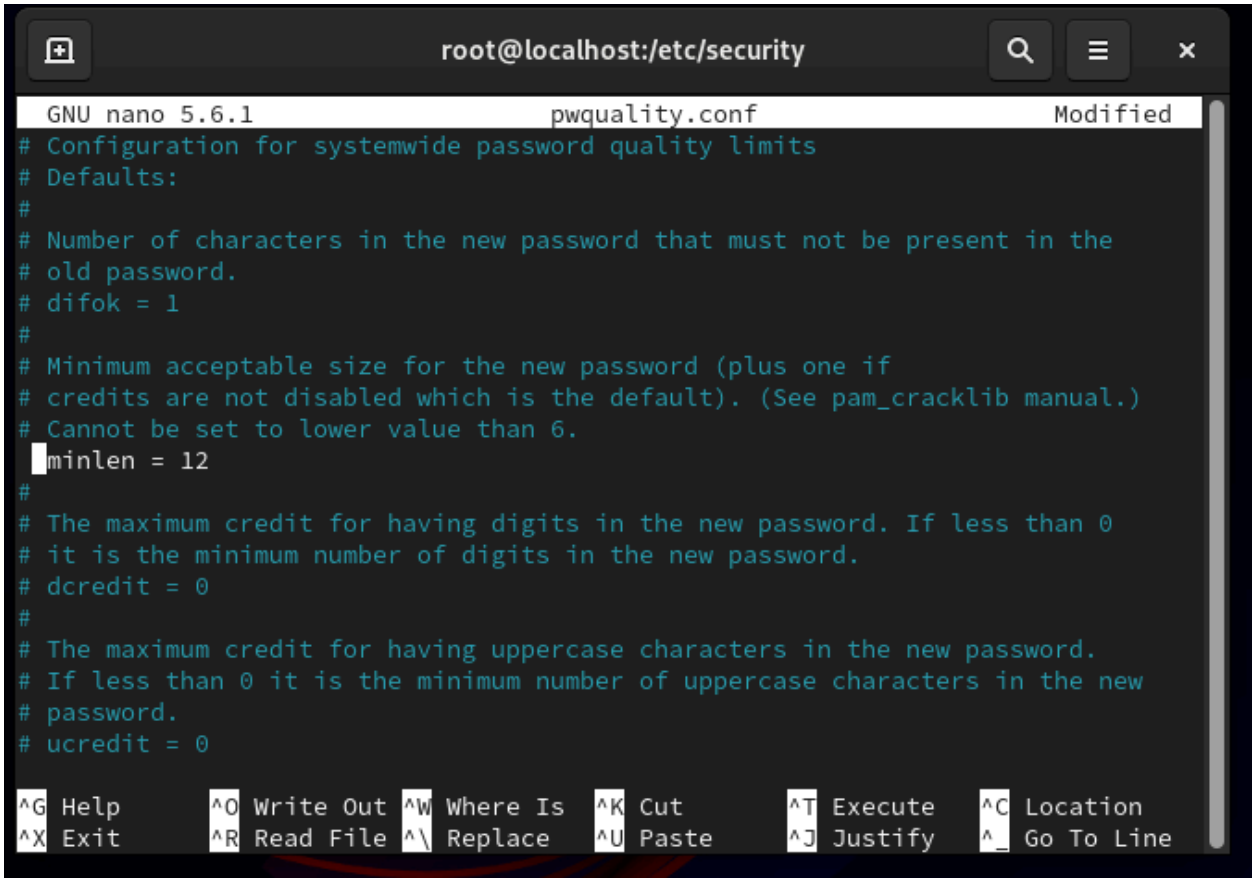


Section #2 User Management:

Step 1. Set the root password. Since this is a new system root will not have a password assigned, so one must be given for it so that privileged tasks can be accomplished on the RHEL server. Even though you created the root password during installation, the password is simply for the first account you created and that user will have sudo privileges, but they are not root.

Step 2. Configure strong password policies for all subsequent users on the system after the root user is created. This can be done by configuring the libpam-pwquality service. This must be done before more users are created since the password policies will not be enforced on users that were created prior to setting them.

Configuring the libpam-pwquality configuration file. To make sure it is enforced get rid of the # to uncomment the setting parameter.



Configurations Made:

1. Minlen = 12 (so passwords must be 12 characters or longer)
2. Minclass = 4 (so upper, lowercase, numbers, and special required)
3. Dictcheck =1 (Compare passwords to ones found in password dictionary)
4. Usercheck =1 (Make sure that username is not used in password)
5. Retry = 5 (Five retries allowed for password authentication)
6. Enforce_for_root (When root password is changed, the settings apply)

Step 3. I will create a sudo user named KGBHandler and add the user to the wheel (sudo) group.
Create KGBHandler user using useradd -m and set their password using passwd

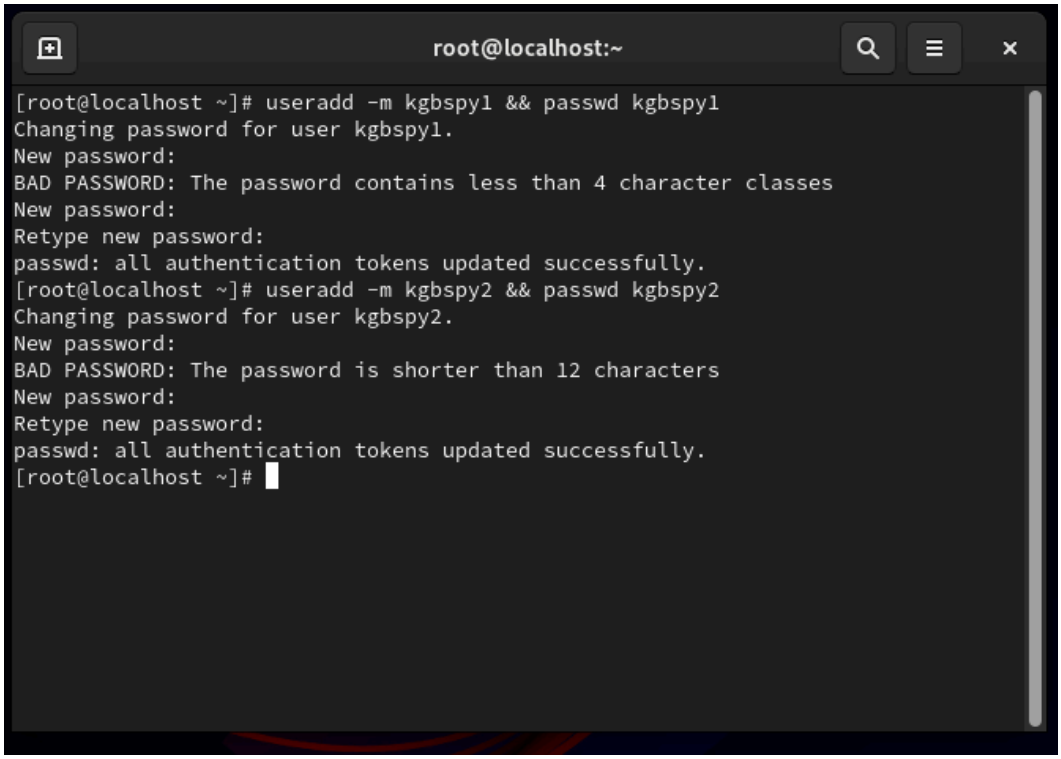
```
root@localhost:/home
[root@localhost home]#  useradd -m kgbhandler
[root@localhost home]# passwd kgbhandler
Changing password for user kgbhandler.
New password:
Retype new password:
passwd: all authentication tokens updated successfully.
[root@localhost home]#
```

Add KGBHandler to wheel group (sudo group) using usermod -aG wheel

```
root@localhost:~
[root@localhost ~]# usermod -aG wheel kgbhandler
[root@localhost ~]# groups kgbhandler
kgbhandler : kgbhandler wheel
[root@localhost ~]#
```

Step 4. I will create two non root or sudo users named KGBSpy1 and KGBSpy2. They will have non administrative permissions.

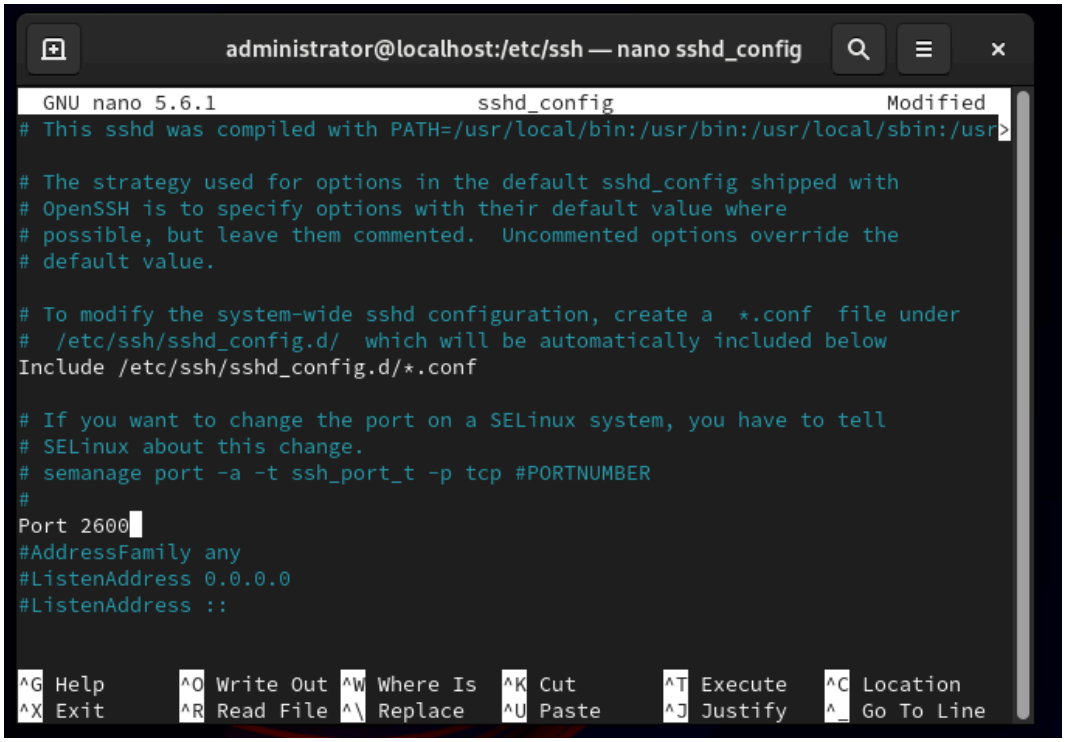
Create the two users using useradd -m and passwd



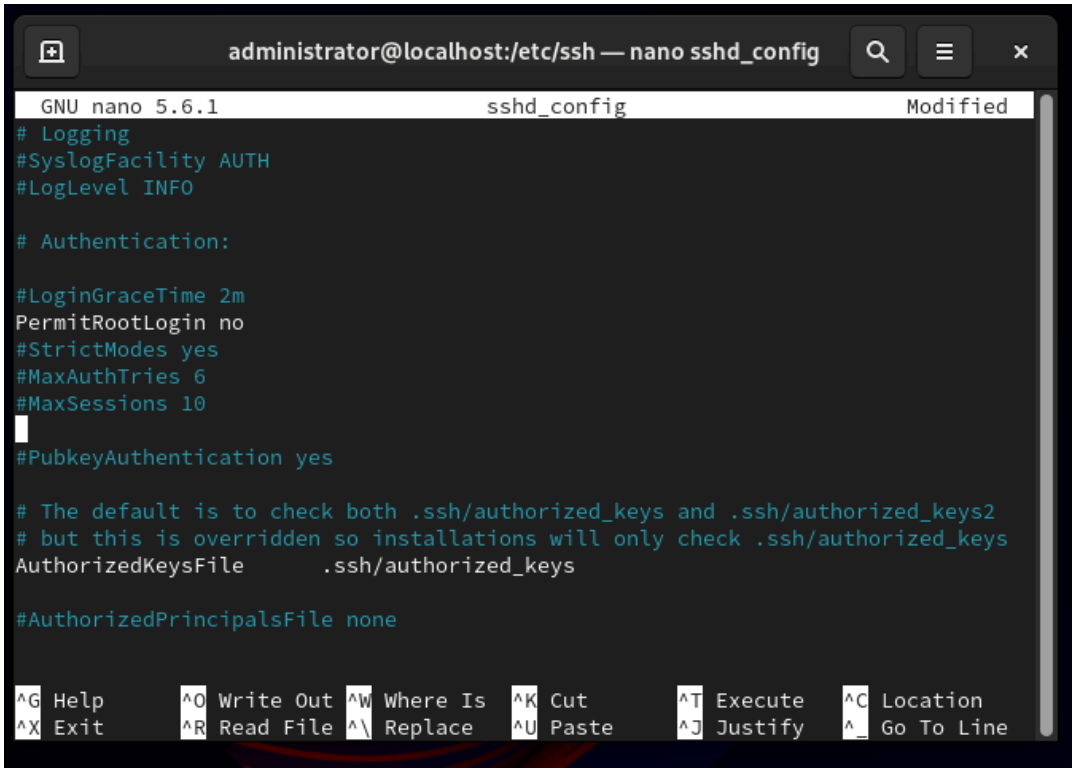
Section #3 System Hardening:

Note: You want to change the setting on the /etc/ssh/sshd_config file since you want to enforce settings for the server SSH software, not the client SSH software.

1. Change the ssh port by editing the /etc/ssh/sshd_config file. You can choose any port that is not being used, I will choose 2600 since it is random. You simply uncomment Port and then change it from 22 to whatever port number you want to use.

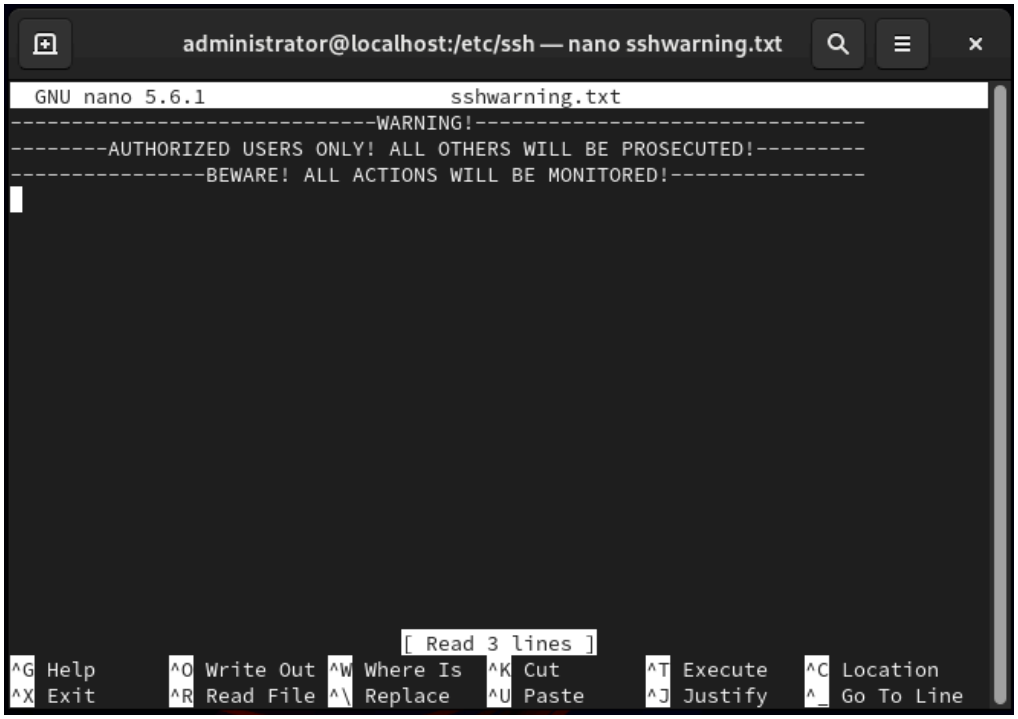


2. Disable root login via ssh. This can be accomplished by editing the /etc/ssh/sshd_config file. You will uncomment the following line and type no (to block root from authenticating via SSH).

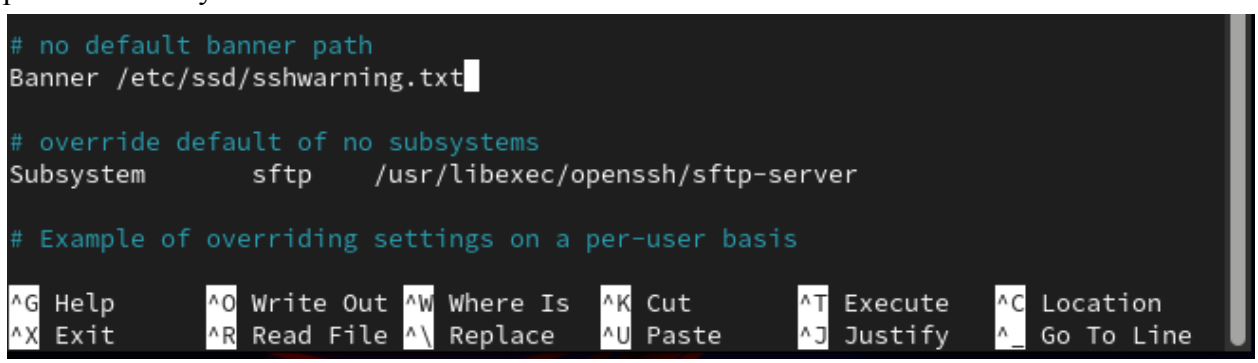


3. Create an ssh warning banner. This banner can serve as a warning to wannabe hackers trying to breach your system informing them that they will be prosecuted if they can be identified and caught in the act.

-First create a warning txt file in the /etc/ssh directory.



- Next, add the SSH banner to the /etc/ssh/sshd_config file. You will have to put the full path of the file you want to use as the banner.



- When testing to see if the SSH banner appears, I ran into an error. Here is what the error entails:

```
root@localhost:/var/log
ort 2500. For complete SELinux messages run: sealert -l bb5a03e2-7c35-41f7-8b82-00c8fe479507
Apr 14 16:07:03 localhost setroubleshoot[3776]: SELinux is preventing /usr/sbin/sshd from name_bind access on the tcp_socket p
ort 2500.#012#012*****  Plugin bind_ports (92.2 confidence) suggests   ************************#012#012If you want to allow /u
sr/sbin/sshd to bind to network port 2500#012Then you need to modify the port type.#012Do#012# semanage port -a -t PORT_TYPE -
p tcp 2500#012    where PORT_TYPE is one of the following: ssh_port_t, vnc_port_t, xserver_port_t.#012#012*****  Plugin catcha
ll_boolean (7.83 confidence) suggests   ******************#012#012If you want to allow nis to enabled#012Then you must tell SE
Linux about this by enabling the 'nis_enabled' boolean.#012#012Do#012setsebool -P nis_enabled 1#012#012*****  Plugin catchall
(1.41 confidence) suggests   **************************#012#012If you believe that sshd should be allowed name_bind access on
the port 2500 tcp_socket by default.#012Then you should report this as a bug.#012You can generate a local policy module to all
ow this access.#012Do#012allow this access for now by executing:#012# ausearch -c 'sshd' --raw | audit2allow -M my-sshd#012# s
emodule -X 300 -i my-sshd.pp#012
Apr 14 16:07:05 localhost setroubleshoot[3776]: SELinux is preventing /usr/sbin/sshd from name_bind access on the tcp_socket p
ort 2500. For complete SELinux messages run: sealert -l bb5a03e2-7c35-41f7-8b82-00c8fe479507
Apr 14 16:07:05 localhost setroubleshoot[3776]: SELinux is preventing /usr/sbin/sshd from name_bind access on the tcp_socket p
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emodule -X 300 -i my-sshd.pp#012
[root@localhost log]#
```

Essentially, I was not aware that SELinux is enabled on my system. SELinux is a strict security enforcement mechanism for Unix/Linux systems that locks down the system using mandatory access control. Organizations that enforce SELinux are typically in the defense, government, or health sectors or any other sector that requires a Linux system to be locked down as much as possible. SELinux was preventing me from changing the default SSH port for the SSH daemon. For the purposes of this lab, I will not enforce SELinux since I am not in need of a highly secure Linux environment.

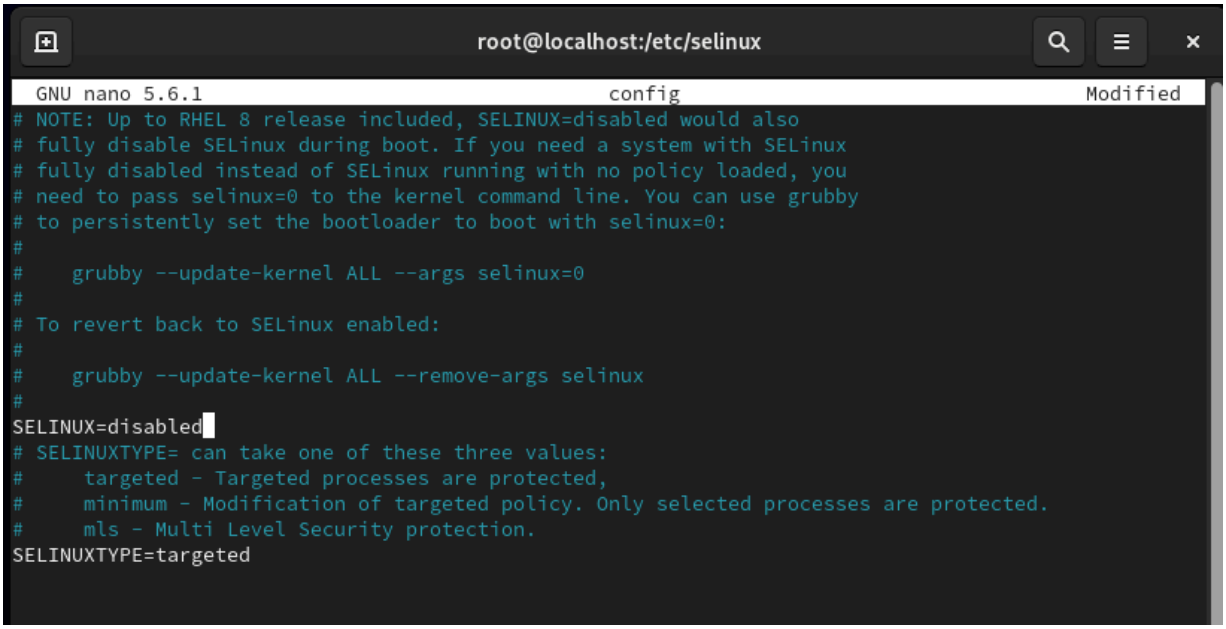
Solution to this issue:

1. I checked the status of SELinux

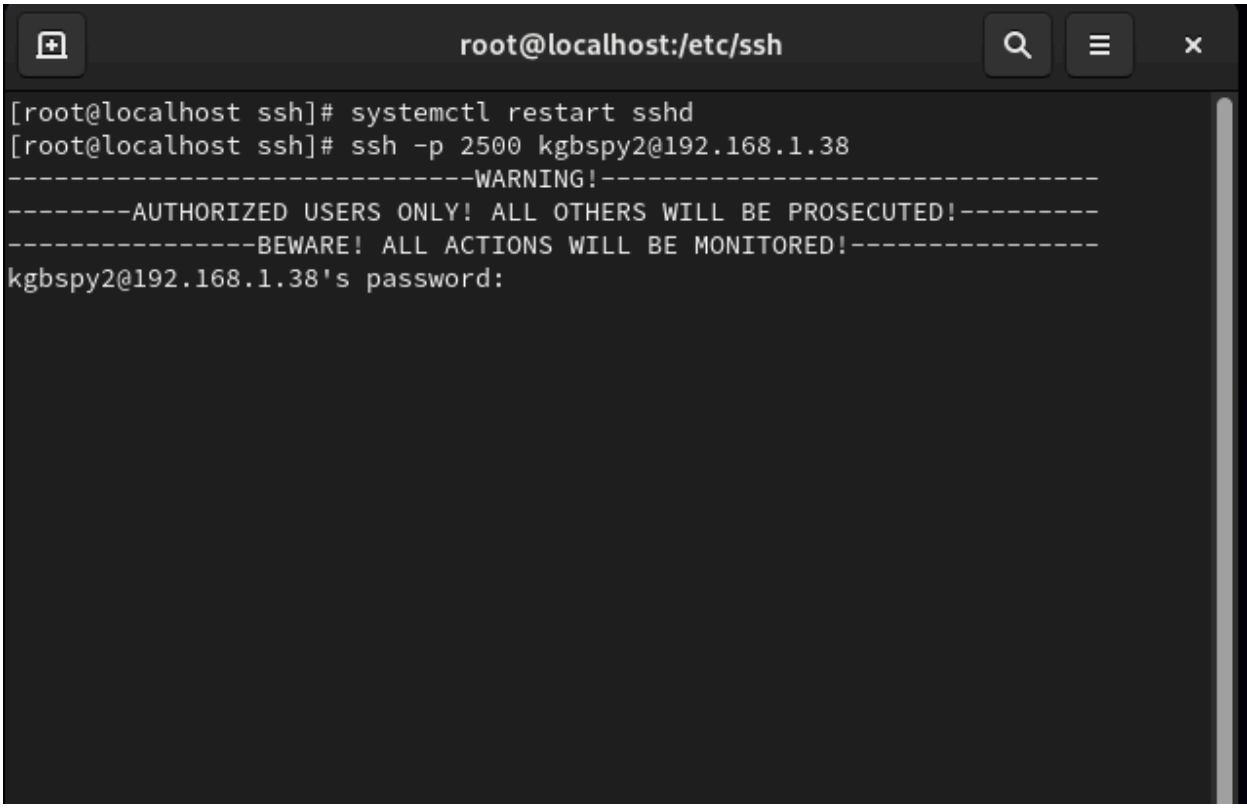
```
root@localhost:/var/log
[root@localhost log]# sestatus
SELinux status:                 enabled
SELinuxfs mount:                /sys/fs/selinux
SELinux root directory:         /etc/selinux
Loaded policy name:             targeted
Current mode:                   enforcing
Mode from config file:          enforcing
Policy MLS status:              enabled
Policy deny_unknown status:     allowed
Memory protection checking:     actual (secure)
Max kernel policy version:      33
[root@localhost log]#
```

Well, it is an SELinux issue since it is enabled and enforced. I do not want it enforced though.

2. I disabled the enforcement of SELinux by editing the /etc/selinux/config configuration file. I set SELINUX=enforcing to SELINUX=disabled.



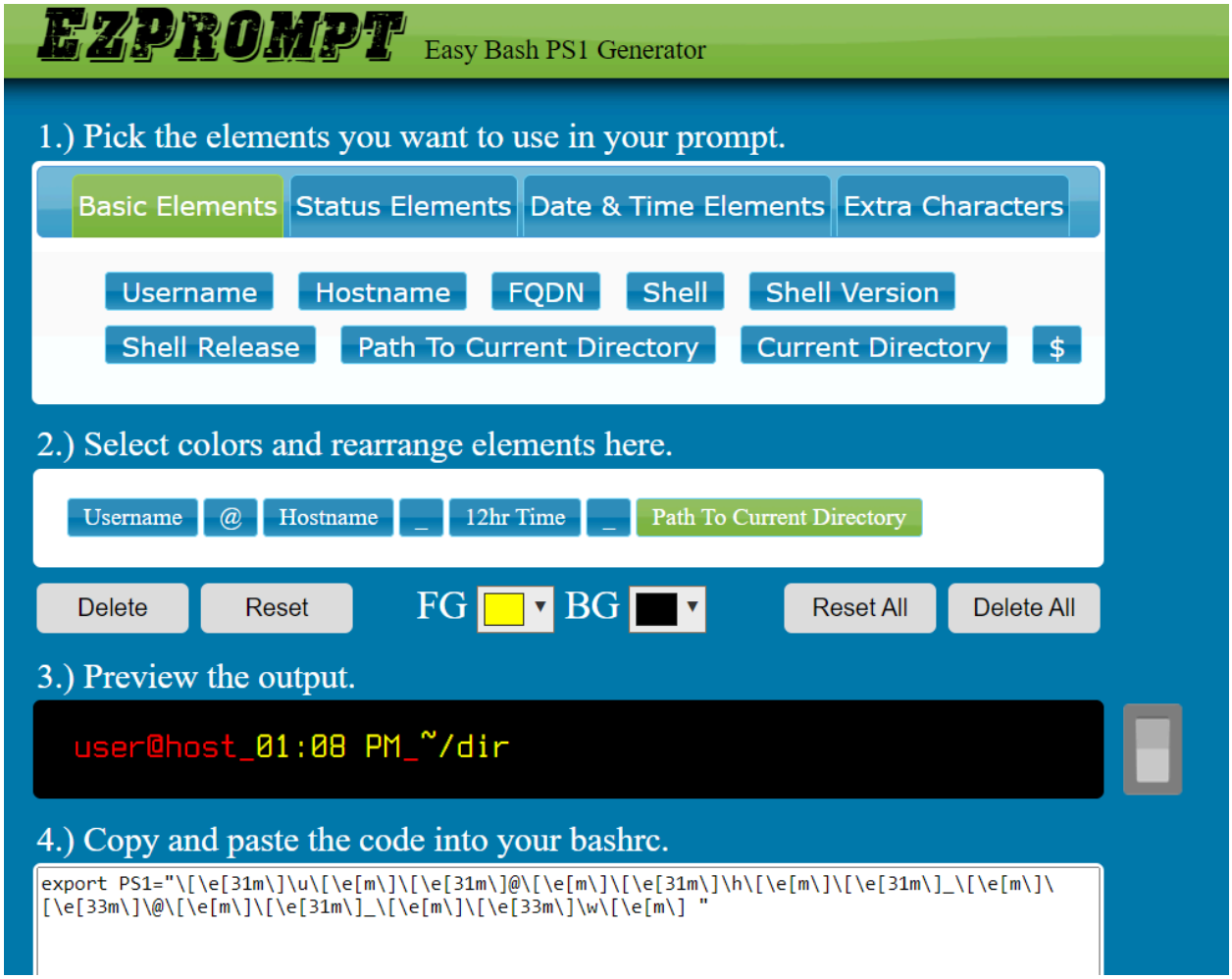
3. I then rebooted my RHEL vm and retried using SSH to test the banner. At first it didn't appear, but then I checked the path, and if you look at it it was /etc/ssd/sshwarning.txt when it should have been /etc/ssh/sshwarning.txt. Now it works since I corrected the spelling of the path.



Section #4 System Customization:

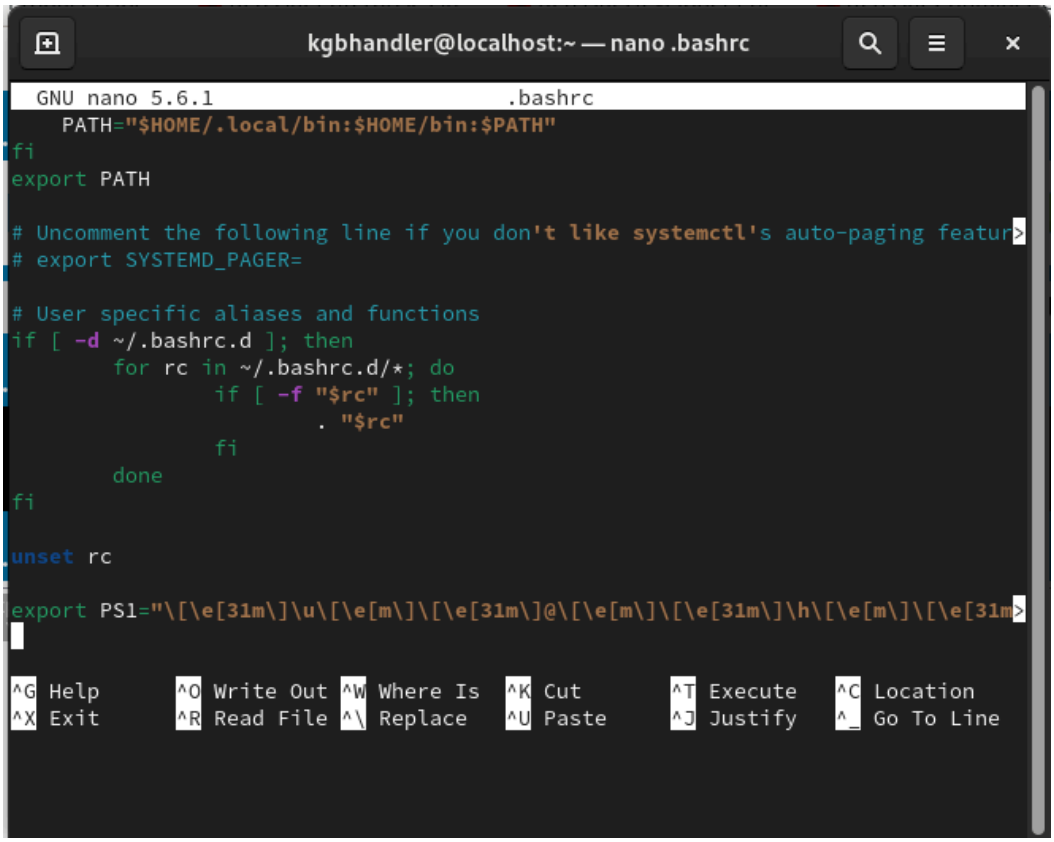
1. Customize KGBHandler's bash shell
   -Since KGBHandler is a sudo privileged user I will be using this user for a lot of tasks. Thus, having a customized terminal and bash shell will be beneficial. Also it would be nice to have a custom aesthetic for the terminal.

   Step 1. Use an online bash prompt generator. I will use https://ezprompt.net/ to customize my PS1 prompt. As you can see the PS1 prompt can be quite difficult to create manually so using a free prompt generator is more effective. I want KGBHandler's Bash prompt to display his username, hostname of the device, time in 12 hour format, and path of current directory.



Step 2. On KGBHandler's bashrc file I will change the PS1 value provided by the generator I used. The bashrc file is a hidden file so I have to use ls -a to find it in KGBHandler's home directory.

I will use nano to edit the .bashrc file to add the new prompt. I simply pasted the new PS1 prompt to the bottom of the .bashrc file.



To make the changes apply right away I used source ~/.bashrc.

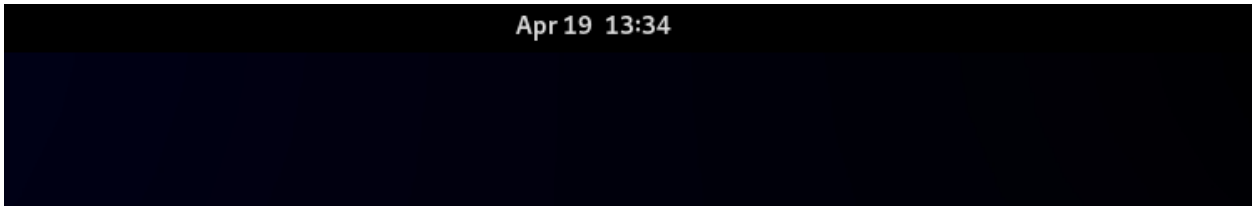
```
kgbhandler@localhost:~
[kgbhandler@localhost ~]$ ls -a
.  ..  .bash_logout  .bash_profile  .bashrc  .mozilla  .xauthcZ9FWZ
[kgbhandler@localhost ~]$ nano .bashrc
[kgbhandler@localhost ~]$ nano .bashrc
[kgbhandler@localhost ~]$ source ~/.bashrc
kgbhandler@localhost_01:29 PM_~ S
```

2. Change the time format on the system

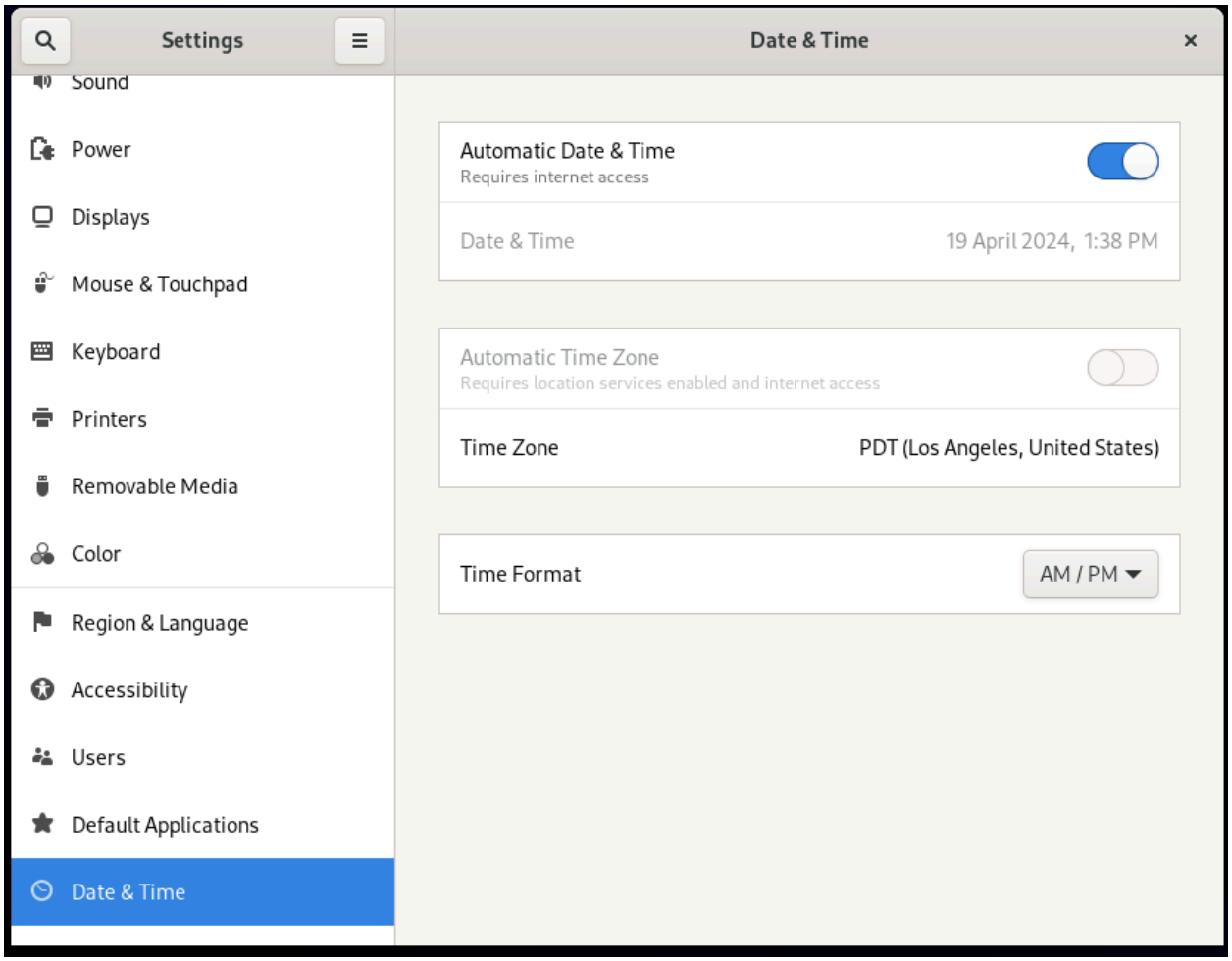
   Step 1. Use the locale command to determine the current time settings.

```
kgbhandler@localhost:~
kgbhandler@localhost_01:31 PM_~ locale
LANG=en_US.UTF-8
LC_CTYPE="en_US.UTF-8"
LC_NUMERIC="en_US.UTF-8"
LC_TIME="en_US.UTF-8"
LC_COLLATE="en_US.UTF-8"
LC_MONETARY="en_US.UTF-8"
LC_MESSAGES="en_US.UTF-8"
LC_PAPER="en_US.UTF-8"
LC_NAME="en_US.UTF-8"
LC_ADDRESS="en_US.UTF-8"
LC_TELEPHONE="en_US.UTF-8"
LC_MEASUREMENT="en_US.UTF-8"
LC_IDENTIFICATION="en_US.UTF-8"
LC_ALL=
kgbhandler@localhost_01:33 PM_~
```

   Step 2. The time is correct on the bash terminal, but on my GNOME desktop it is in military time, but I want it to be in 12 hour time format.



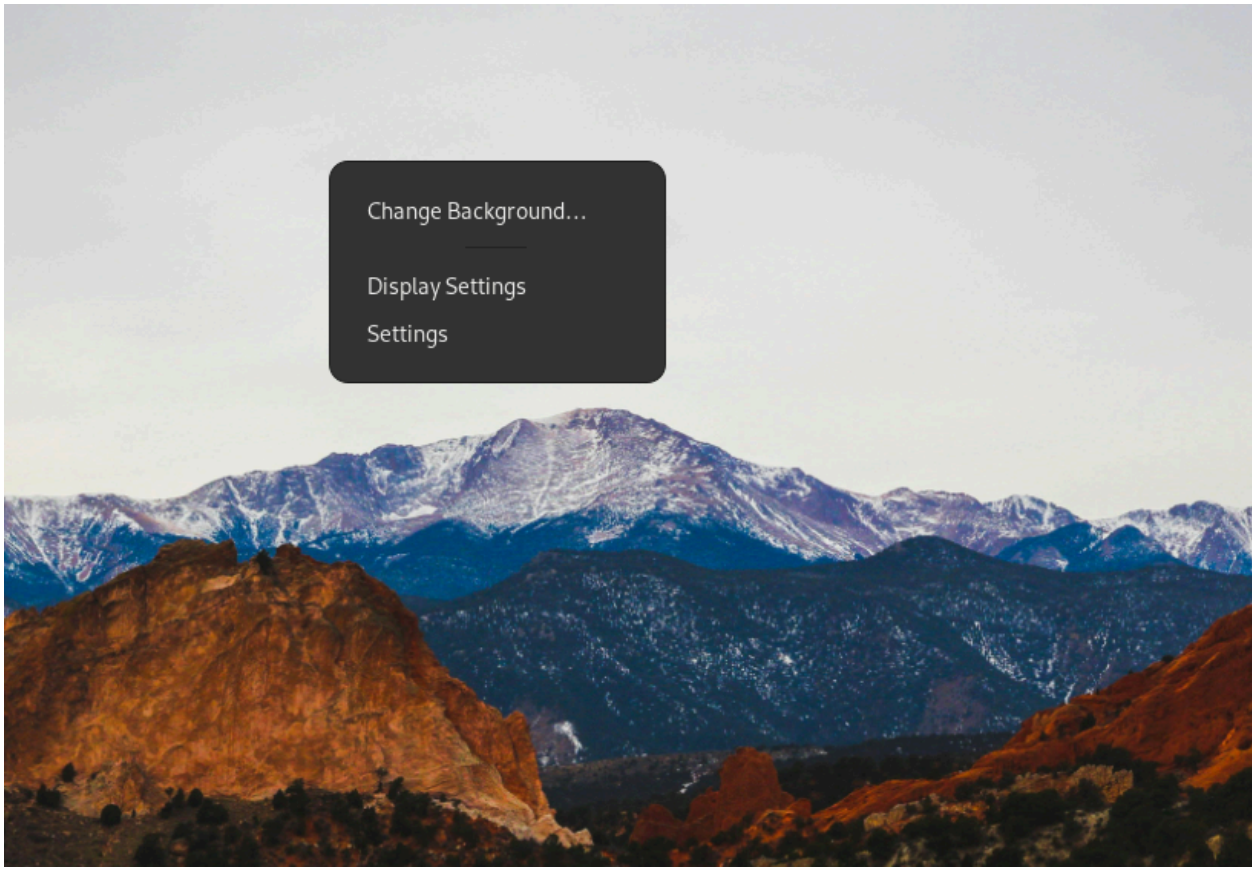
Step 3. To change this setting I will go to the settings for my GNOME desktop. I went to settings, Date & Time, and then changed the Time Format from 24 hour to AM/PM.



3. Change wallpaper

   I will change my wallpaper for my RHEL system. Simply right click on the background in use and click on change background. I changed my background already in the following screenshot.


Activities
Apr 19 1:59 PM
Type to search

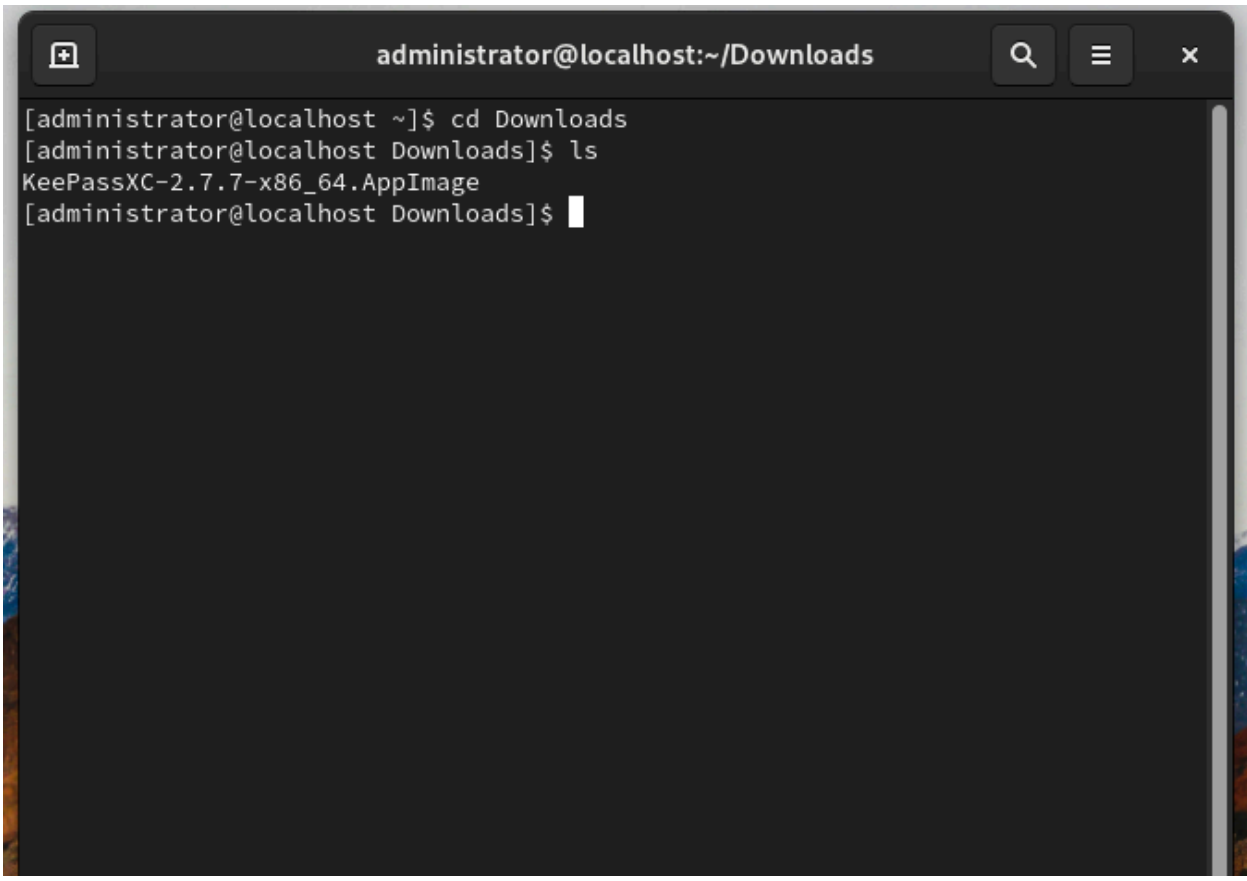

Change Background...
Display Settings
Settings

Section #5 Installing key services and applications

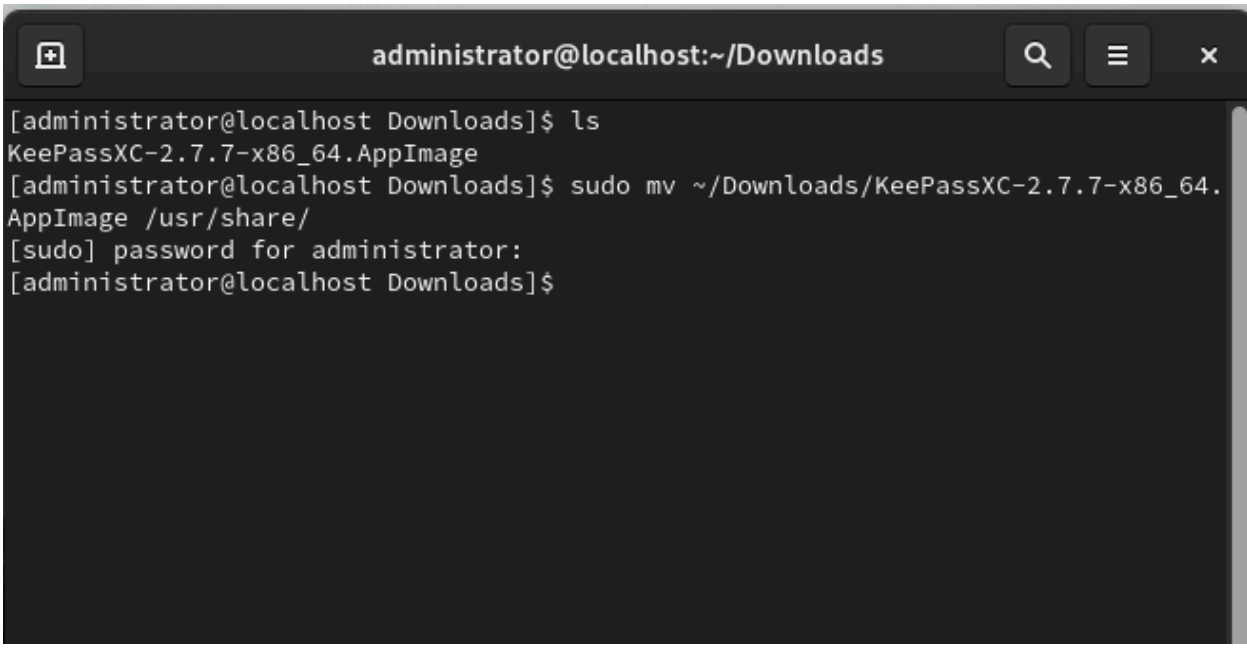
1. Install a password manager
   Reasoning: Having a password manager will ensure that I can safely and efficiently manage passwords on my Linux VM. I will be installing Keepassxc.

   Step 1. Install Keepassxc on my Linux system. I will be installing Keepassxc by downloading the latest version's software onto my VM, then installing it manually.

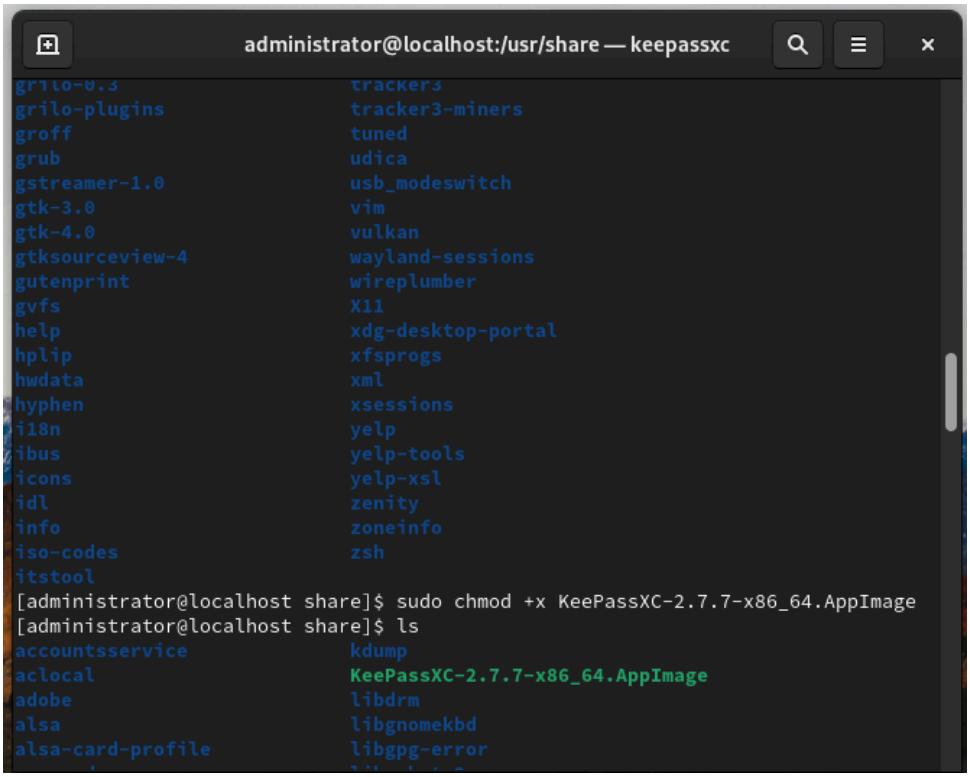
   - Here is the downloaded app image file:



   - Now I will move the app image file to /usr/share so that any user can access this executable and use it.



- Since it is now located in /usr/share/ I will use chmod +x so that all users can execute the app image and use Keepassxc.



- The app can be execute by typing in ./name of the app

administrator@localhost:/usr/share — keepassxc

```
groff                       tuned
grub                        udica
gstreamer-1.0               usb_modeswitch
gtk-3.0                     vim
gtk-4.0                     vulkan
gtksourceview-4             wayland-sessions
gutenprint                  wireplumber
gvfs                        X11
help                        xdg-desktop-portal
hplip                       xfsprogs
hwdata                      xml
hyphen                      xsessions
i18n                        yelp
ibus                        yelp-tools
icons                       yelp-xsl
idl                         zenity
info                        zoneinfo
iso-codes                   zsh
itstool
[administrator@localhost share]$ ./KeePassXC-2.7.7-x86_64.AppImage
Warning: Ignoring XDG_SESSION_TYPE=wayland on Gnome. Use QT_QPA_PLATFORM=wayland
 to run on Wayland anyway.
QObject::startTimer: Timers cannot have negative intervals
qt.network.ssl: QSslSocket: cannot resolve EVP_PKEY_base_id
qt.network.ssl: QSslSocket: cannot resolve SSL_get_peer_certificate
qt.network.ssl: QSslSocket: cannot call unresolved function SSL_get_peer_certifi
cate
```