PfSense Firewall Router Network Configuration

By Brennen Tse

Purpose:

Install PfSense to use as a firewall/router for two Linux desktops.

Background:

PfSense is a version of the FreeBSD OS. The version we're using today is open source and designed to be installed on a virtual machine to make a firewall and router for the network. Setting up PfSense is really easy with low hardware requirements. PfSense can follow either default or custom rules when it filters traffic separately. Whether it's from the internal LAN or the Internet, you can use PfSense to set different rules and policies for each. It's also flexible enough to be added upon with additional code to make it more useable. For example, you can include intrusion detection and prevention with PfSense (IPS/IDS).

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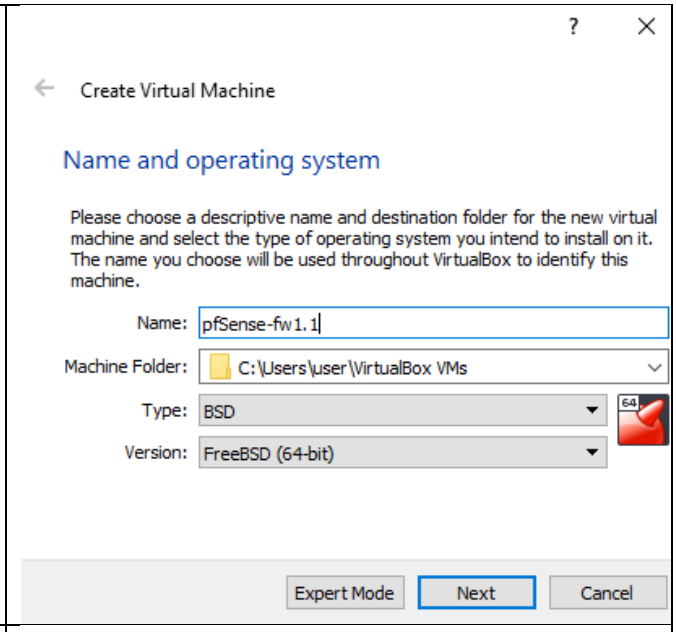
Prerequisites:

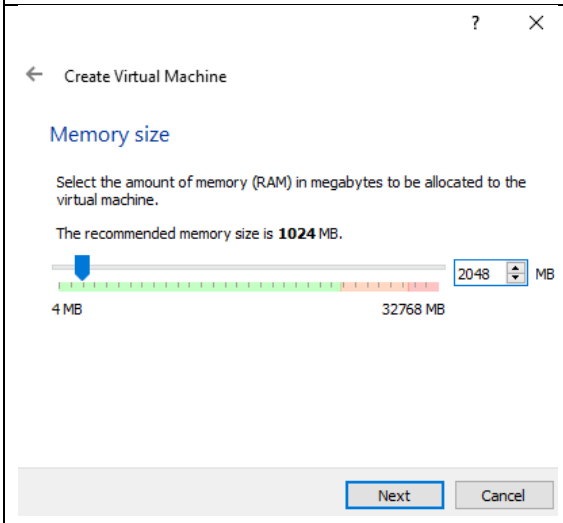
Download Pfsense

Install Linux Mint or Ubuntu or Other Linux VM

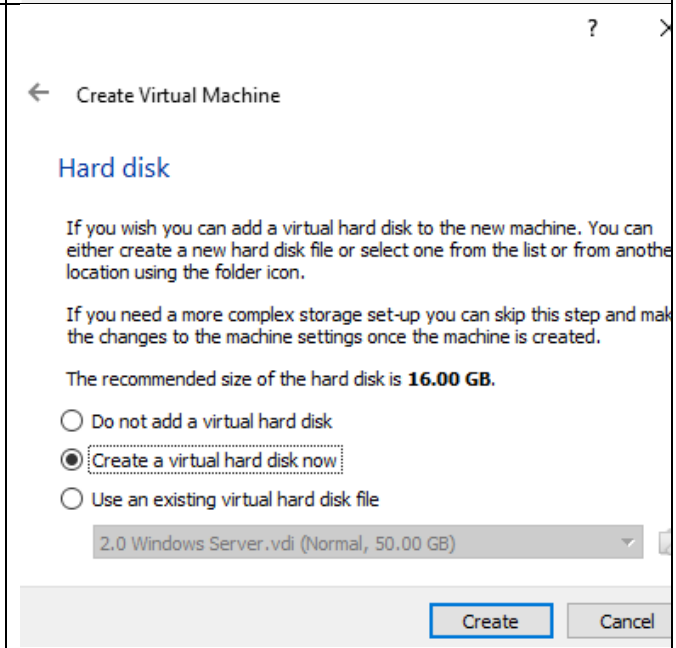
Installing PfSense:

Name the pfSense VM and select BSD.

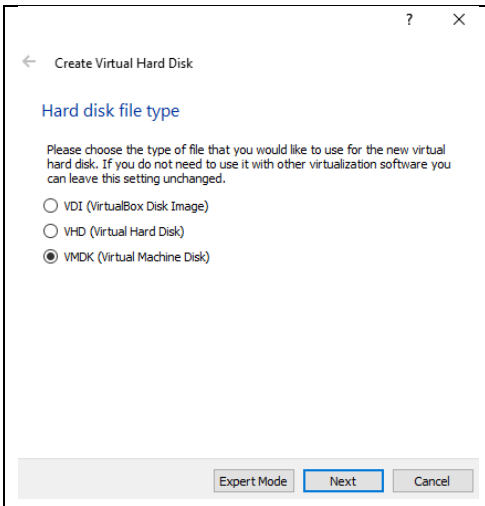




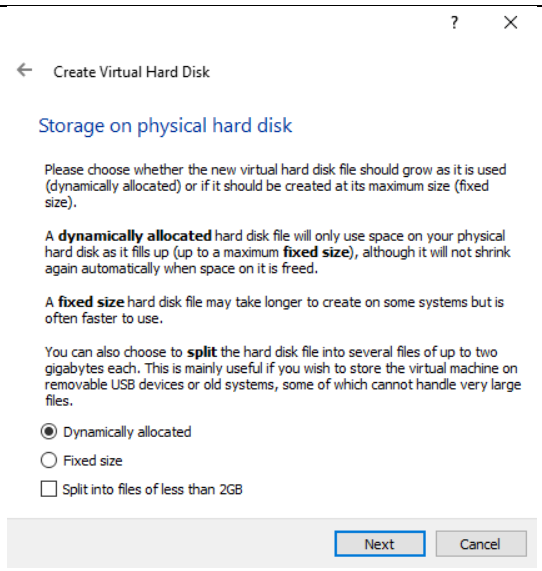
Assign 2048MB of memory



Create a virtual hard disk

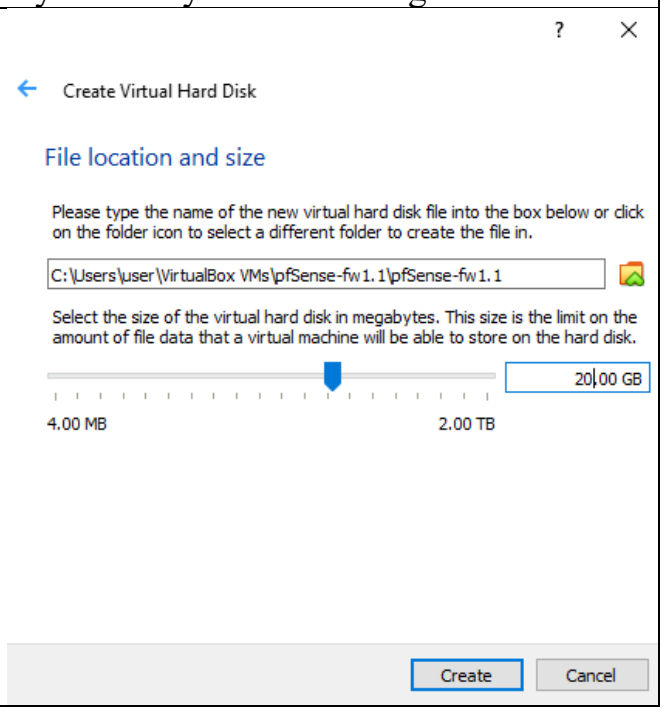


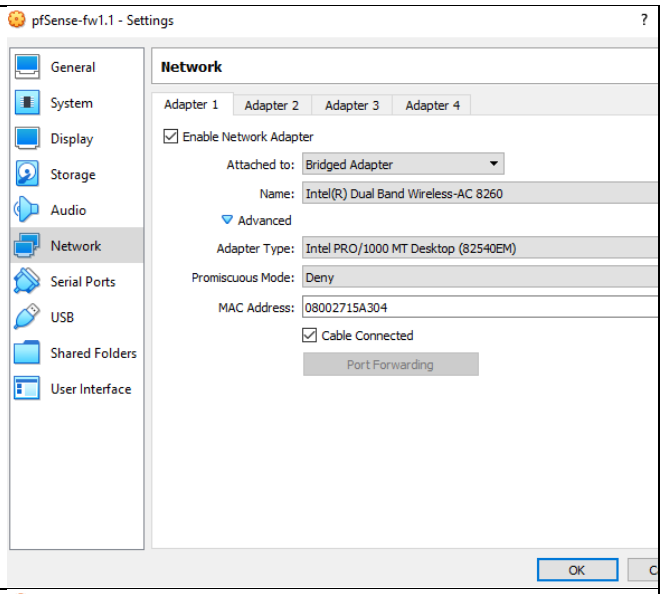
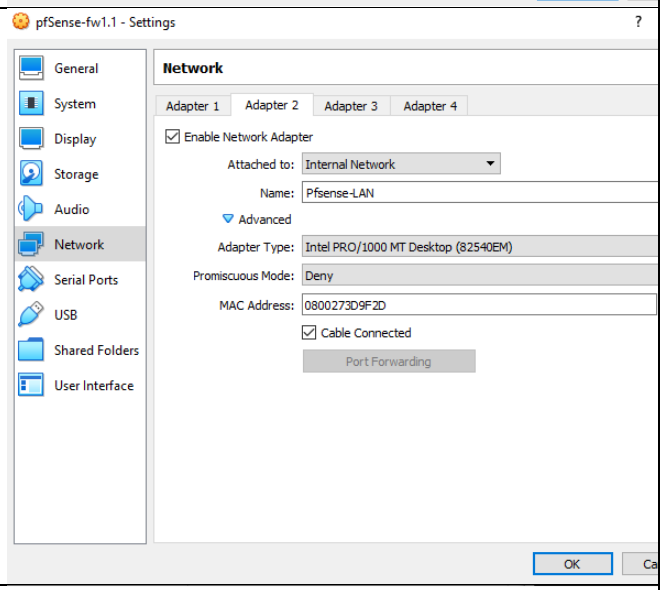
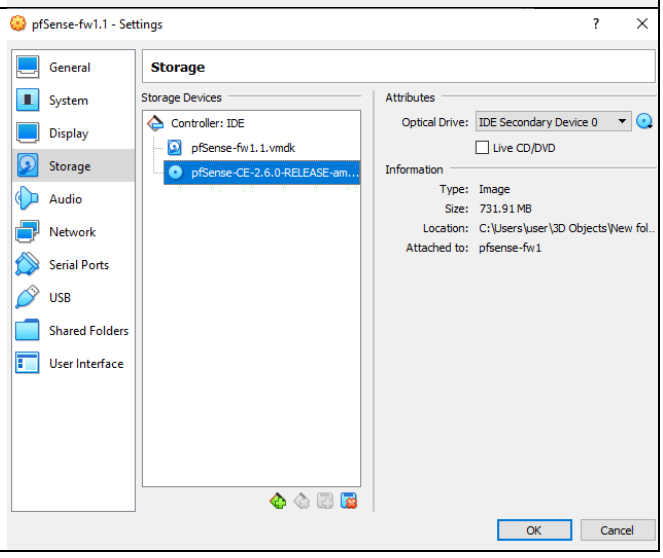
Choose a hard disk file type, anyone works.

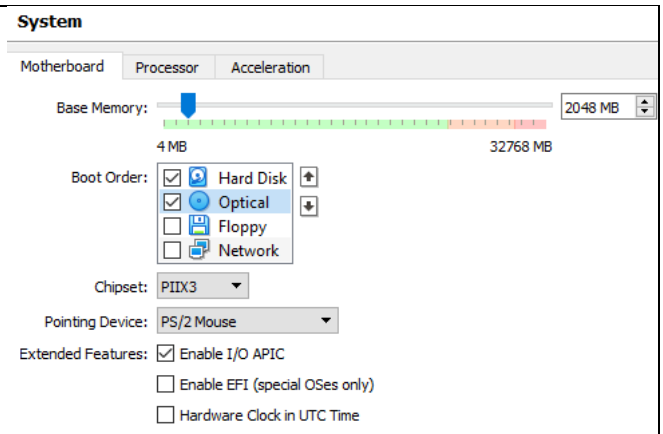
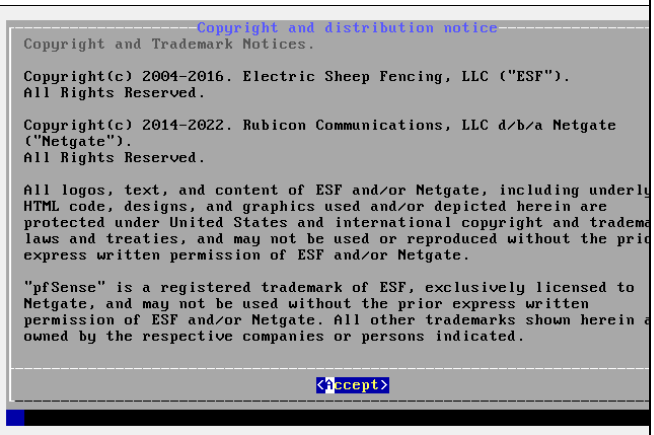
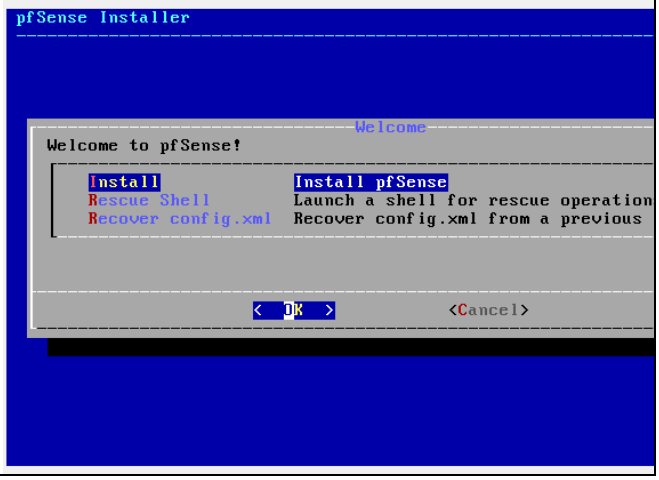


Dynamically allocate storage

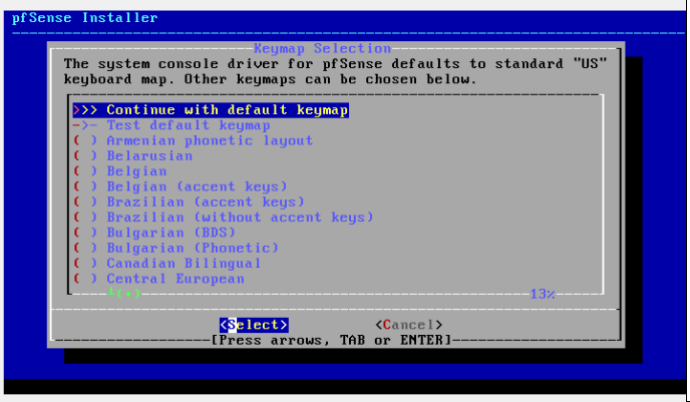
Limit the data size to 20GB.



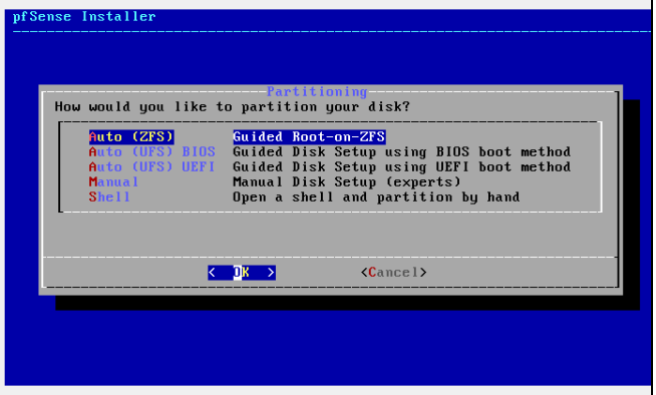
Set adapter 1 of the VM's network to bridged adapter for wireless.	
Set adapter 2 of the VM's network to the internal PfSense-LAN. This is where the VM's will connect to and be routed through PfSense.	
Add the Pfsense ISO Image you downloaded earlier to the storage optical drive.	

Rearrange the boot order so that hard disk is on top and floppy is not selected.	
Once all these settings have been configured, click the green start arrow to start the VM. You will be greeted by this screen. Read and click accept.	
Click Install to Install Pfsense.	

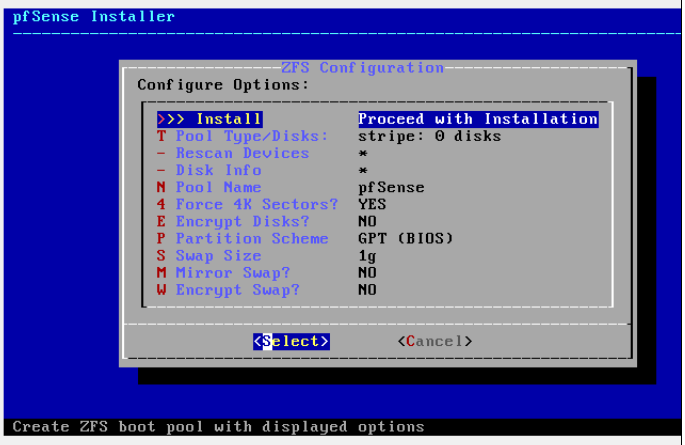
Click Continue with default keymap.



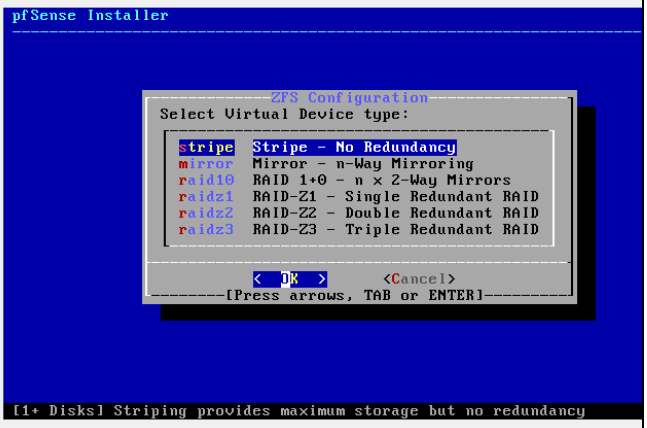
Select the Auto ZFS partition.

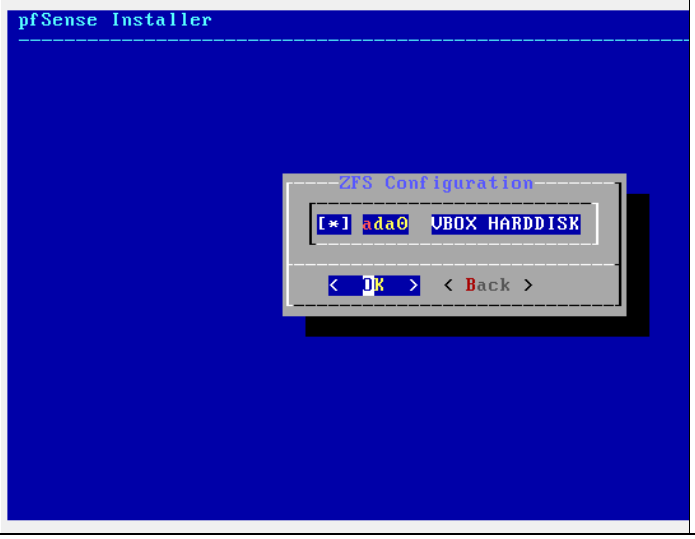


Install.

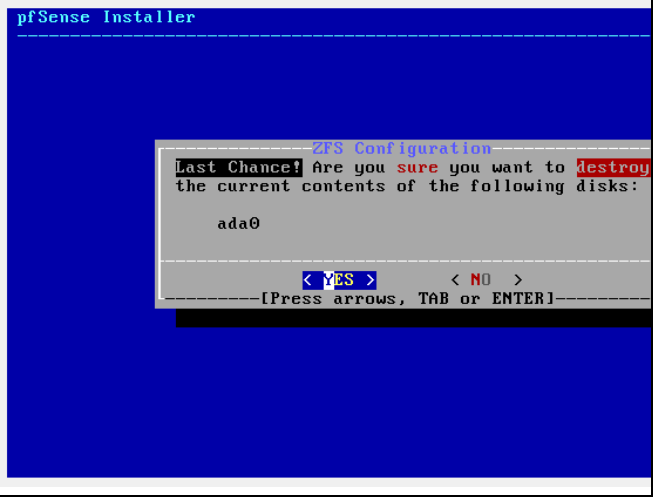


Select the stripe as the Virtual Device.

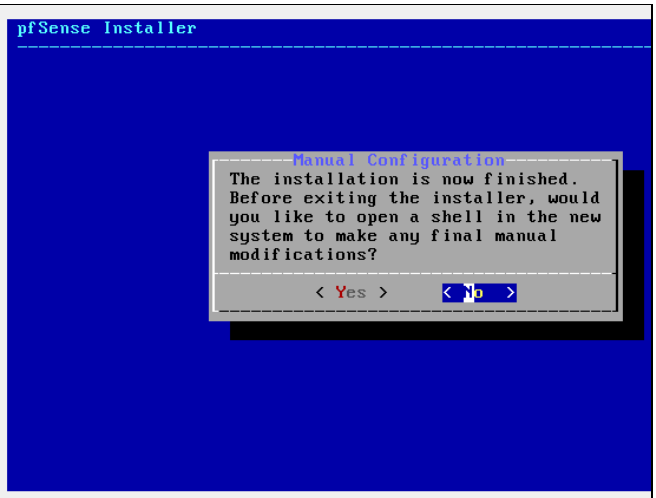




Click yes to wipe the disk.

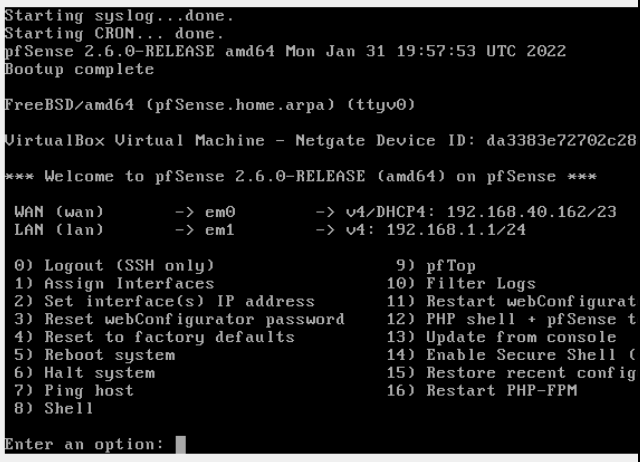


Click No, then reboot.

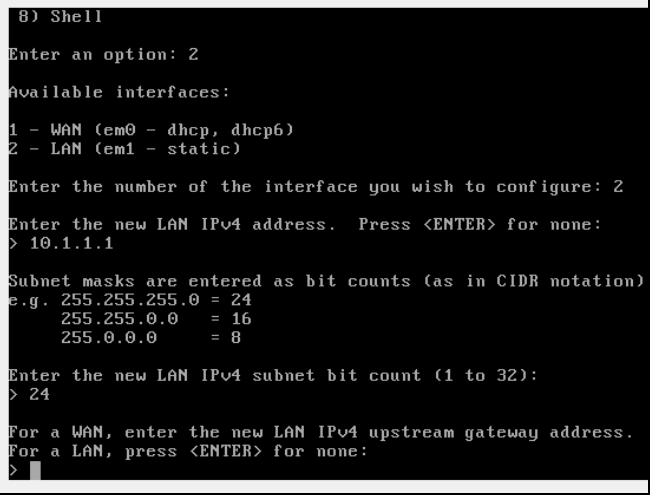


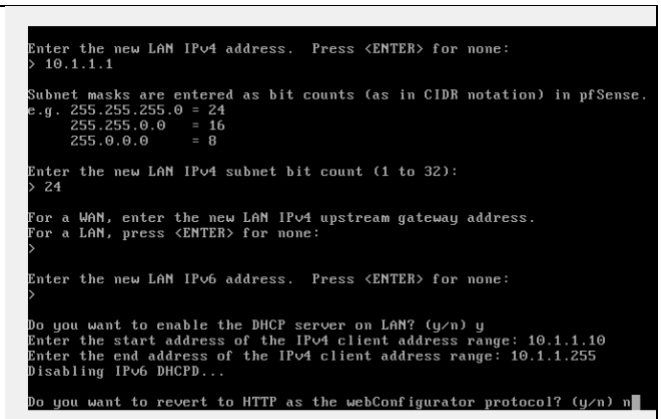
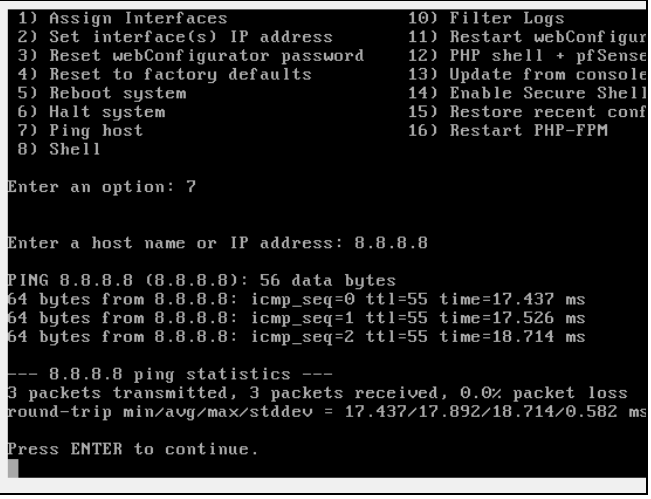
Configuration Validation:

Once the Pfsense firewall has been rebooted, it should automatically get an IP address. However this leads to both the WAN and the LAN being in the same network. To change that press 2.

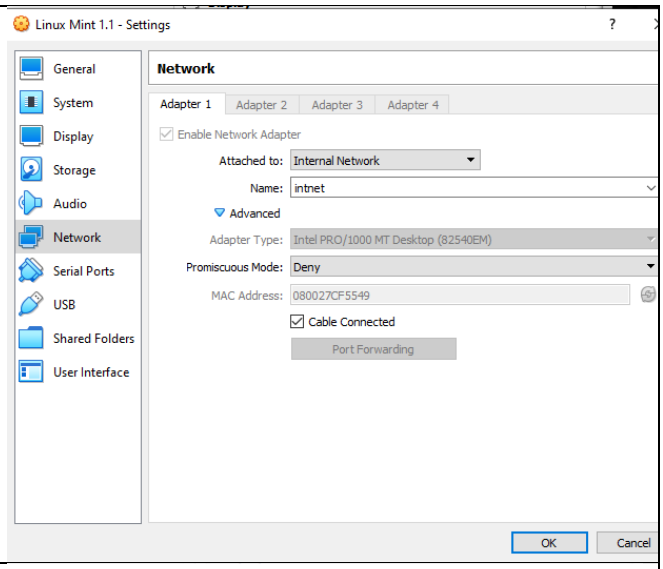


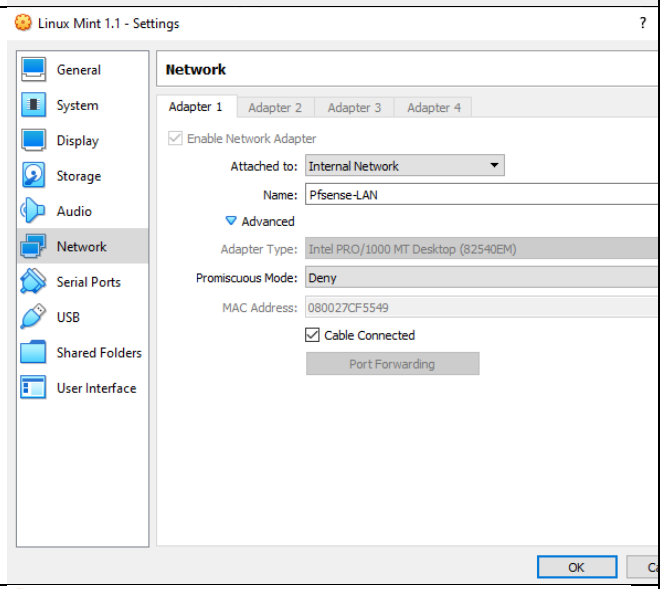
After choosing 2, select the interface and press 2 again. Enter in the default gateway you want to use and press enter after you've chosen the subnet mask (/24)



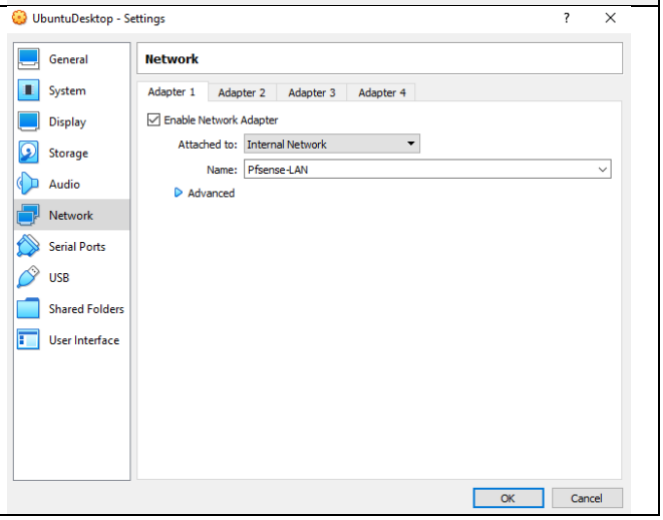
Since this lab is not using IPV6, just ignore the following prompts. We will also need to configure a DHCP address, so press y, and enter the range of the client DHCP will use for addresses.	
Now we can see that the LAN and WAN are in different networks which is what we want.	
Can we reach the Internet though? To run a test I selected 7 and the general IP address of the internet (0.0.0.0) and you should be able to successfully reach and ping.	

Now we go back to our Linux VM's that we configured in the last lab. Change Linux mint's network from intent to Pfsense-Lan to be inside the Pfsense LAN.



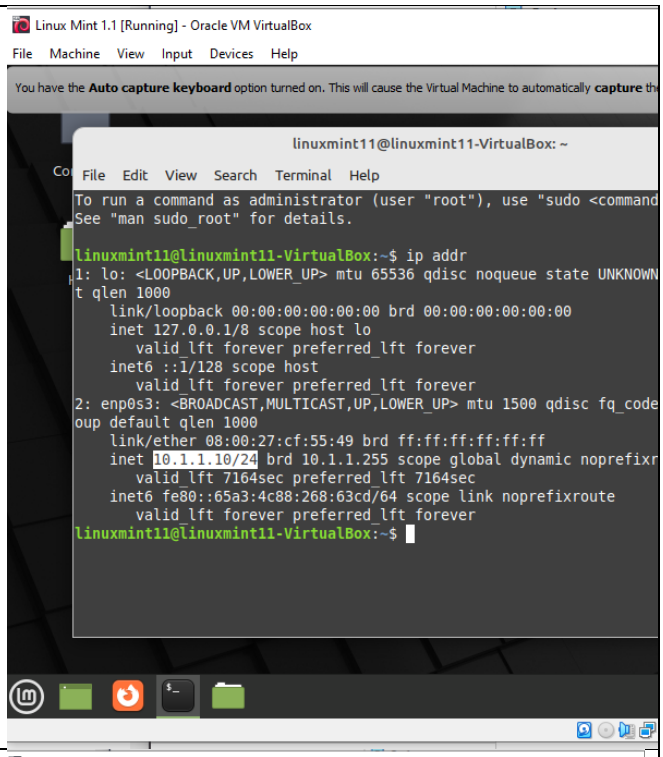


Do the same for the Ubuntu Desktop.

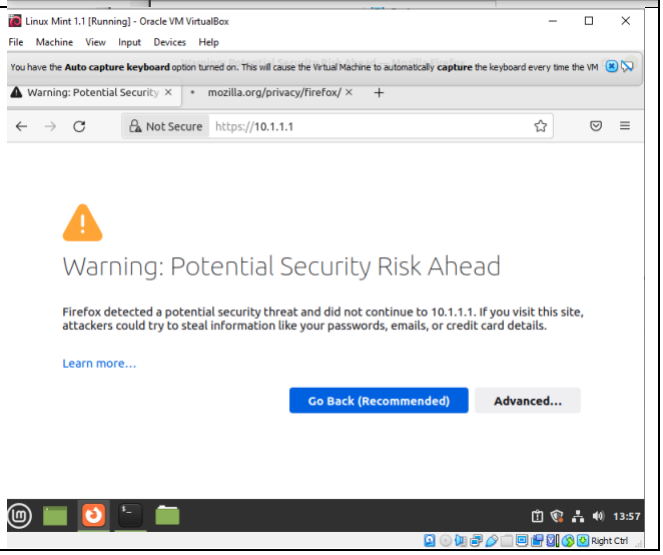


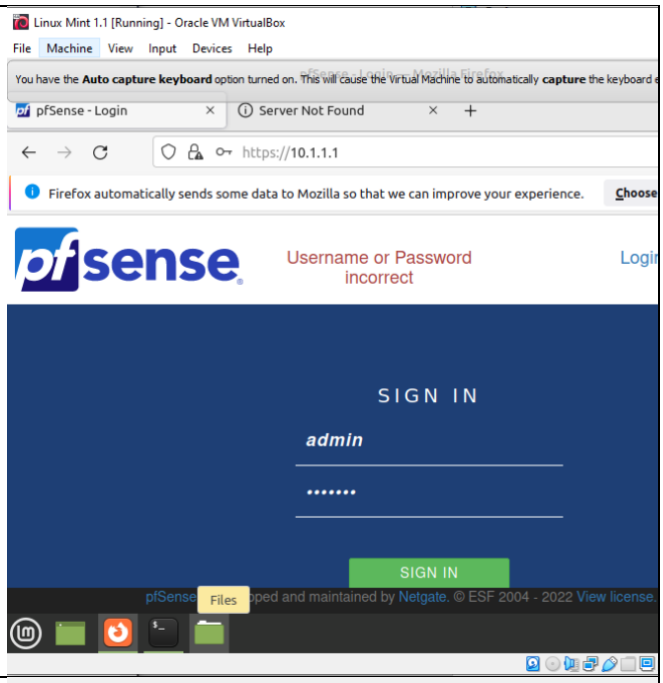
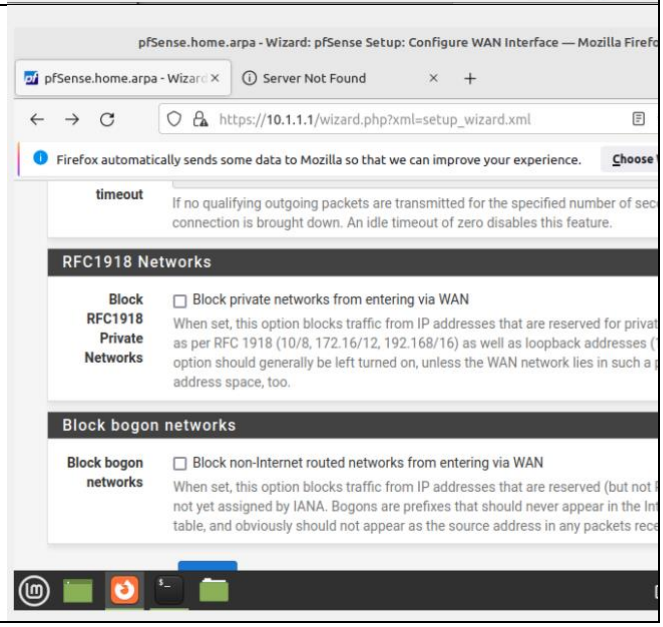
Verify IP Address:

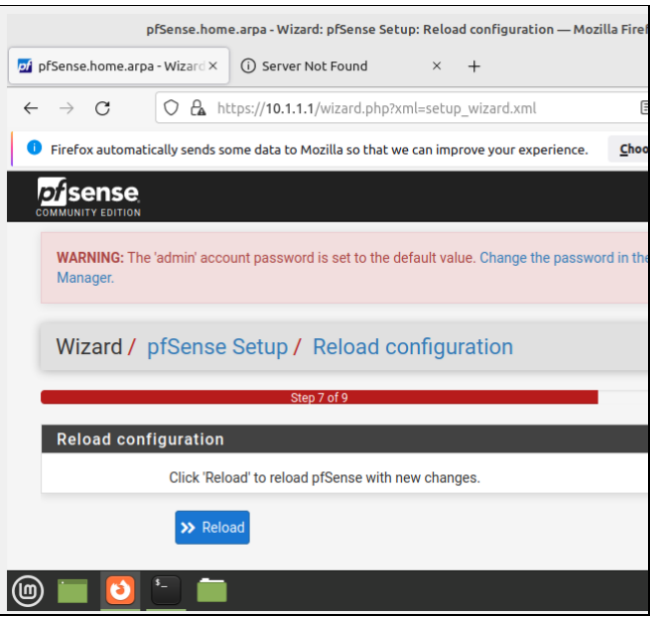
To verify the IP address, type in ip addr, which should display a DHCP assigned ip address within the selected range.



Access the pfSense GUI through https://10.1.1.1

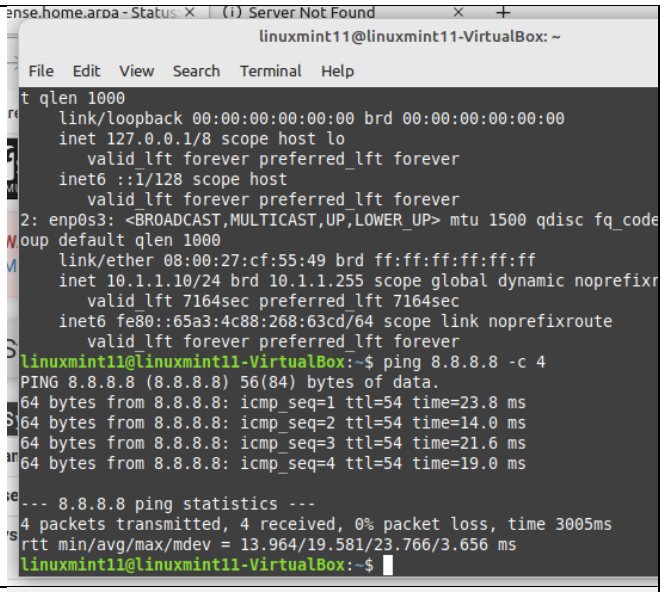


Use the general username and password of admin and admin to login to pfsense and start configuring.	
Configure the default commands for Pfsense except for page 4, where you must ensure that the Block Private Networks remains unchecked to allow for network traffic and Internet connectivity on the local LAN.	

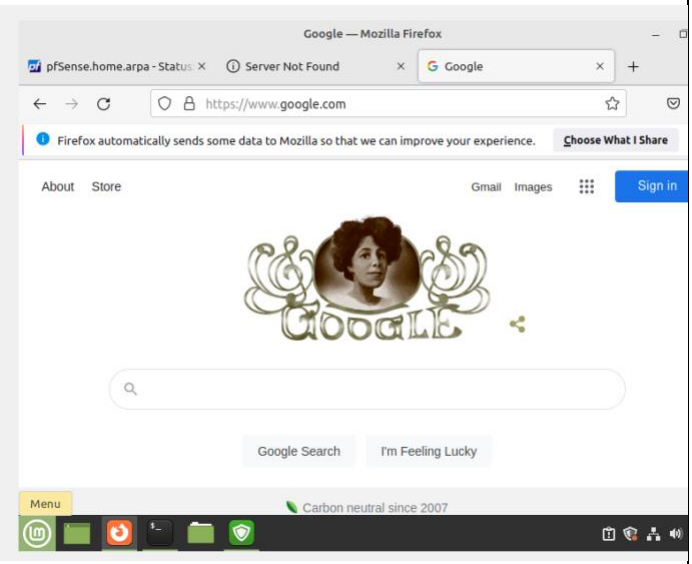
Once you have finished setting up, reload the configuration to save your changes.	

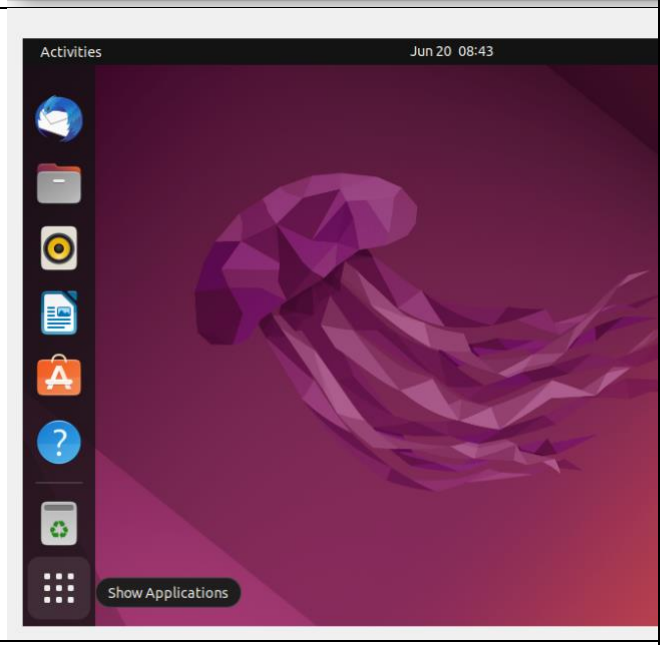
Test connectivity:

The IP addresses should be from the DHCP server, and pinging the public IP address of 8.8.8.8 should work and be successful.



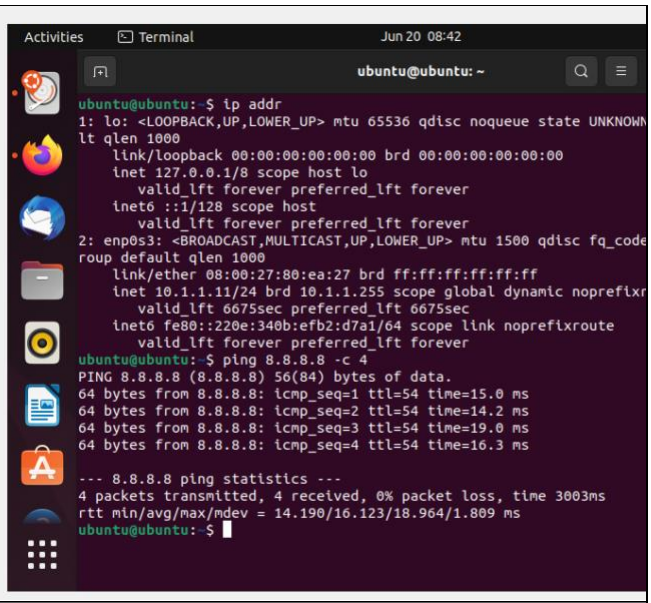
You can also browse the internet.



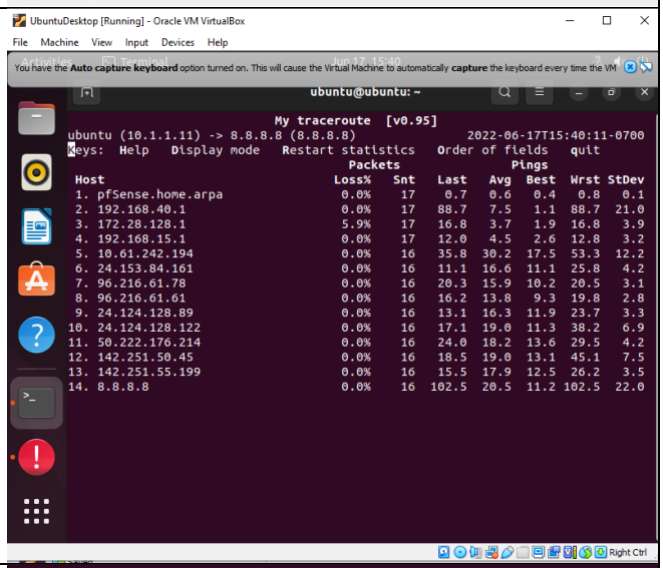


Ubuntu Connectivity Test:

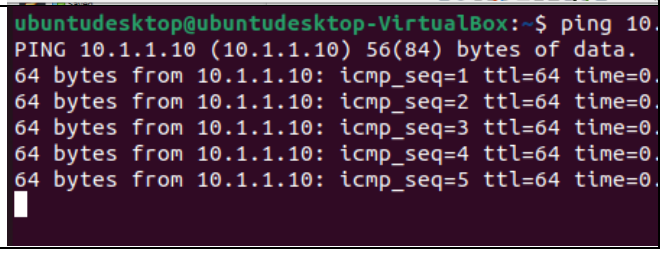
You can also check the Ubuntu Desktop as it too should have a DHCP address. If you ping the public IP it should go through.

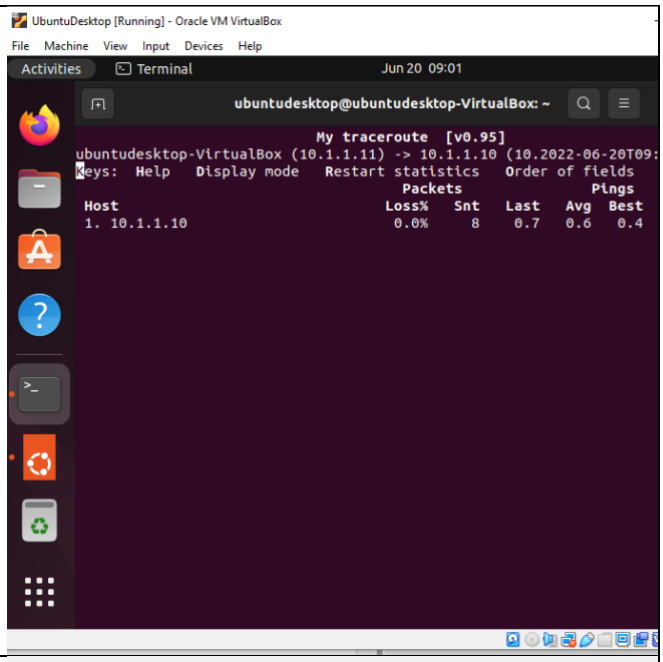
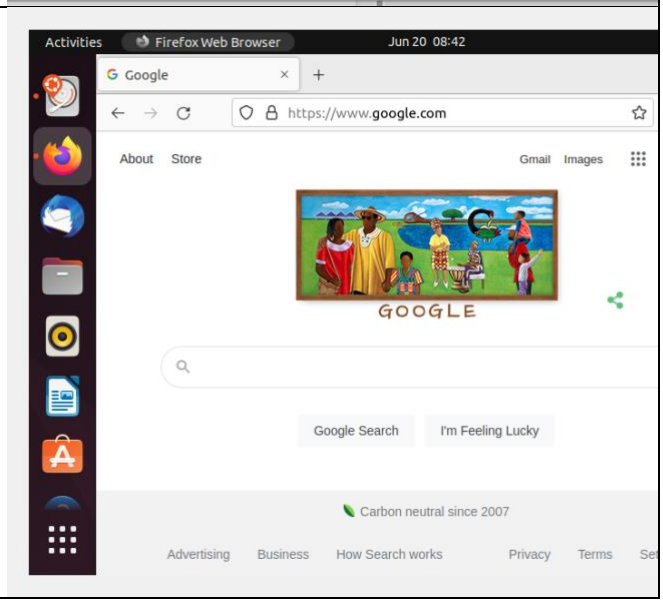


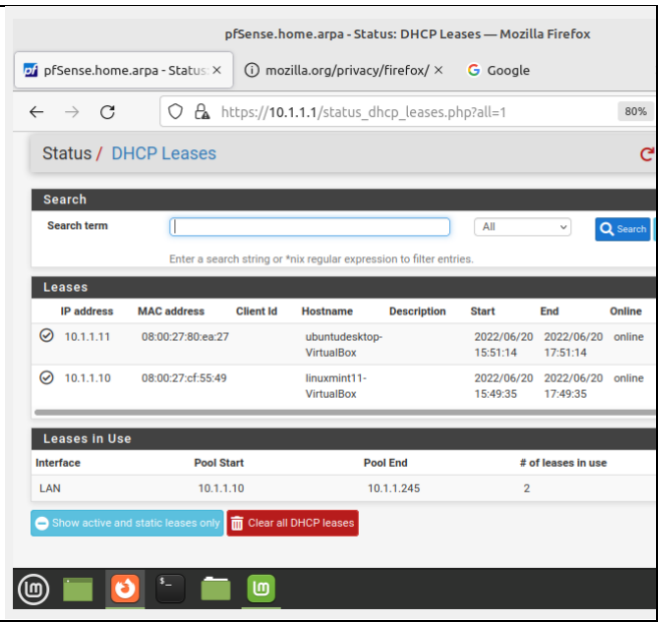
To make doubly sure, you can do a traceroute command to see the path, and we can see that it goes through the PFSense firewall at pfsense.home.arpa.



You can also ping the Linux Mint VM from the Ubuntu Desktop too.



Since both are on the Internal LAN, the traffic is not routed through the Pfsense Internet interface.	
We can also access google through Ubuntu desktop.	

As one final check, we can see through the PFsense DHCP leases that both VM's are online and working.	

Problems:

The main problems I had with PfSense were with the DHCP server and connectivity. The DHCP server was originally not distributing IP addresses and I wasn't sure what the problem was. I then discovered that the range for the IP addresses it was assigned was erroneous and prevented any addresses from being assigned. Second, the Linux Mint machine was using the wrong adapter instead of PfSense_Lan it was using the old one of Intnet which prevented pinging across.

Conclusion:

PfSense is a strong candidate for those looking for a flexible and impressive alternative to physical routers and firewalls. With its ease of use, low hardware requirements and extensive firewall settings, any operator using virtual machines may want to consider using PfSense to strengthen their network.