

Assignment Information			
Name:	Mario Morales	Assignment:	Project 1
Date Submitted:		Course Section:	
Course:	COSN 215		

The purpose of this project is to set up a working DMZ network within VirtualBox. This network will be used throughout the course and you will continue to expand it.

Phase 0

Download the proper ISO for pfSense, a Linux server OS (Ubuntu Server is recommended), a Linux desktop OS (again Ubuntu is recommended), and Kali Linux. Insert screenshots that show you have downloaded the correct versions and **verified the hash for each.**

The image contains two screenshots. The left screenshot shows the pfSense download page with the 'CD Image (ISO) Installer' selected and the 'Austin, TX USA' mirror chosen. Below this, there's a section for 'Daily Snapshots Available' and a 'Download Guide' table. The right screenshot shows a PowerShell terminal window where the hashes for several downloaded ISOs are being verified using the 'Get-FileHash' command.

Download Guide Table:

OS	Version	Size	SHA256 Hash
Kali Linux 64-Bit	2019.3	2.9G	d9bc23ad1ed2af7f01700c6d15aec580e2f1a0a50e6751ce067654b753ef7020
Ubuntu 19.04 Desktop	2019.3	2.9G	d9bc23ad1ed2af7f01700c6d15aec580e2f1a0a50e6751ce067654b753ef7020
Ubuntu 19.04 Live Server	2019.3	2.9G	d9bc23ad1ed2af7f01700c6d15aec580e2f1a0a50e6751ce067654b753ef7020

PowerShell Hash Verification Output:

```
PS J:\> Get-FileHash C:\Users\cos_user_pcc\Downloads\pfSense-CE-2.4.4-RELEASE-p3-amd64.iso.gz
Algorithm Hash Path
-----
SHA256 A4BAC489CDE968175141666F92840992437303520A1BAD2F288E7F50F775834 C...

PS J:\> Get-FileHash C:\Users\cos_user_pcc\Downloads\ubuntu-19.04-desktop-amd64.iso
Resolve-Path : Cannot find path 'C:\Users\cos_user_pcc\Downloads\ubuntu-19.04-desktop-amd64' because it does not exist.
At C:\Windows\System32\WindowsPowerShell\v1.0\Modules\Microsoft.PowerShell.Utility\Microsoft.PowerShell.Utility.ps1:110 char:16
+ SpatchProcess -> Resolve-Path $Path | Foreach-Object {
+ ~~~~~
+ CategoryInfo          : ObjectNotFound: (C:\Users\cos_us...4-desktop-amd64:String) [Resolve-Path], ItemNotFoundException
+ FullyQualifiedErrorId : PathNotFound,Microsoft.PowerShell.Commands.ResolvePathCommand

PS J:\> Get-FileHash C:\Users\cos_user_pcc\Downloads\ubuntu-19.04-desktop-amd64.iso
Algorithm Hash Path
-----
SHA256 2DA6F8B5C65B71B040C5C10311EAE179654588BA801C963E9E3F3C0457CBE C...

PS J:\> Get-FileHash C:\Users\cos_user_pcc\Downloads\ubuntu-19.04-live-server-amd64.iso
Algorithm Hash Path
-----
SHA256 25D483341CCD00522A6660B000B933787C86C47B42F1845BCF997127F4861E90 C...

PS J:\> Get-FileHash C:\Users\cos_user_pcc\Downloads\kali-linux-2019.3-amd64.iso
Algorithm Hash Path
-----
SHA256 D9BC23AD1ED2AF7F01700C6D15AEC580E2F1A0A50E6751CE067654B753EF7020 C...

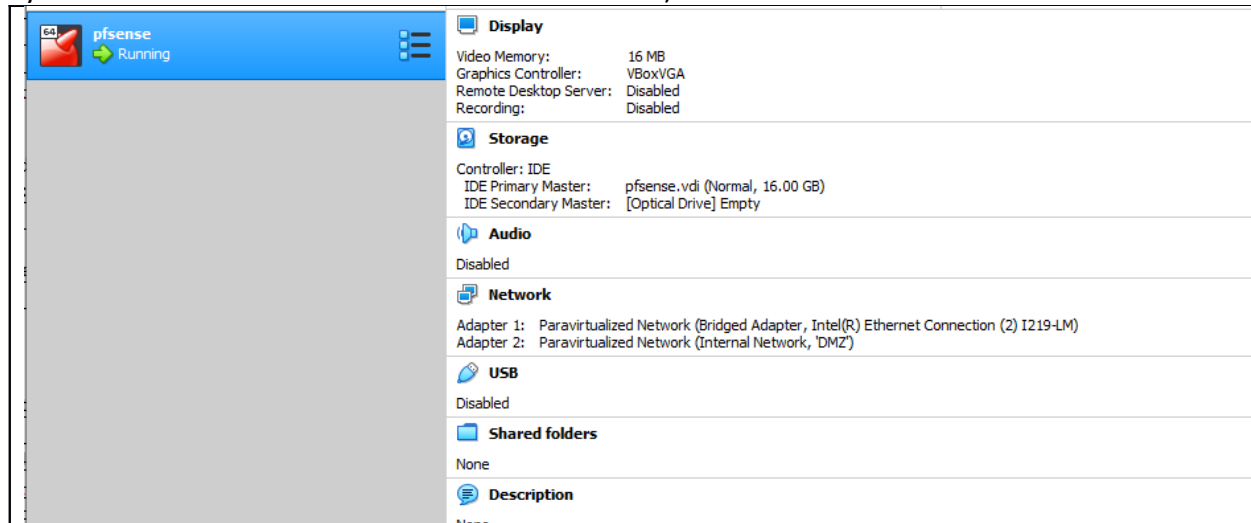
PS J:\> |
```

Phase 1

Install pfSense with the following parameters:

Hostname	myGateway
RAM	1024
Adapter 1	WAN (bridged)
Adapter 2	DMZ (internal network,para-virtualized)

Provide screenshots showing the router is installed with the appropriate parameters (basically you should have two interfaces with IP addresses):



Bring up a shell and ping 8.8.8.8 Screenshot it here:

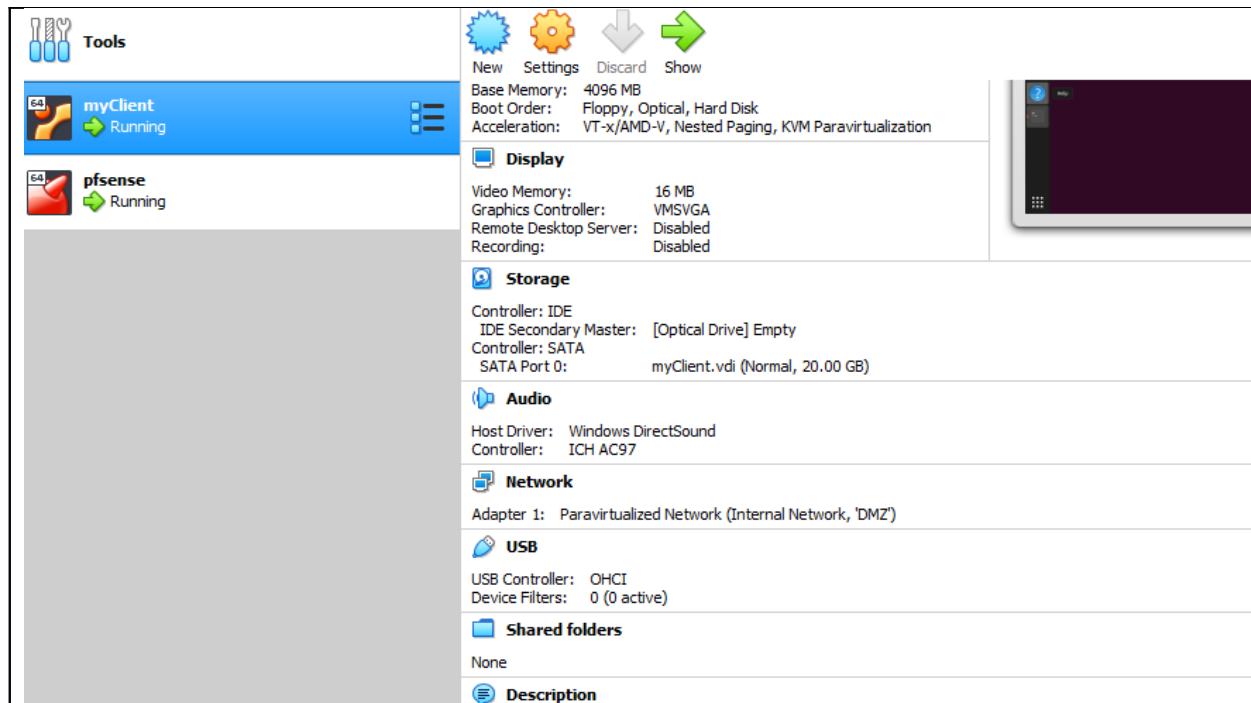
```
[2.4.4-RELEASE][root@pfSense.localdomain]/root: ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8): 56 data bytes
64 bytes from 8.8.8.8: icmp_seq=0 ttl=54 time=3.554 ms
64 bytes from 8.8.8.8: icmp_seq=1 ttl=54 time=3.317 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=54 time=3.362 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=54 time=3.220 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=54 time=3.372 ms
64 bytes from 8.8.8.8: icmp_seq=5 ttl=54 time=3.318 ms
64 bytes from 8.8.8.8: icmp_seq=6 ttl=54 time=3.585 ms
64 bytes from 8.8.8.8: icmp_seq=7 ttl=54 time=3.316 ms
64 bytes from 8.8.8.8: icmp_seq=8 ttl=54 time=3.225 ms
^C
--- 8.8.8.8 ping statistics ---
12 packets transmitted, 9 packets received, 25.0% packet loss
round-trip min/avg/max/stddev = 3.220/3.363/3.585/0.121 ms
[2.4.4-RELEASE][root@pfSense.localdomain]/root: █
```

Phase 2

Install Ubuntu Desktop with the following parameters:

Hostname	myClient
RAM	1024 (it installs faster with 4098)
Adapter 1	DMZ (internal network,para-virtualized)
Install Type	Minimal (web browser and basic utilities) Don't download updates
Username	student
Password	P@ssw0rd

Provide screenshots demonstrating the client has been correctly installed:



From myClient, prove connectivity with myGateway Screenshot it here:

```
student@student-VirtualBox:~$ ping 10.113.112.54
PING 10.113.112.54 (10.113.112.54) 56(84) bytes of data.
64 bytes from 10.113.112.54: icmp_seq=1 ttl=64 time=0.461 ms
64 bytes from 10.113.112.54: icmp_seq=2 ttl=64 time=0.448 ms
64 bytes from 10.113.112.54: icmp_seq=3 ttl=64 time=0.454 ms
64 bytes from 10.113.112.54: icmp_seq=4 ttl=64 time=0.491 ms
64 bytes from 10.113.112.54: icmp_seq=5 ttl=64 time=0.462 ms
^C
--- 10.113.112.54 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 53ms
rtt min/avg/max/mdev = 0.448/0.463/0.491/0.020 ms
```

From myClient, prove connectivity with 8.8.8.8 Screenshot it here:

```

student@student-VirtualBox:~$ ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=53 time=4.02 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=53 time=3.69 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=53 time=3.69 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=53 time=3.75 ms
64 bytes from 8.8.8.8: icmp_seq=5 ttl=53 time=3.74 ms
64 bytes from 8.8.8.8: icmp_seq=6 ttl=53 time=3.79 ms
64 bytes from 8.8.8.8: icmp_seq=7 ttl=53 time=3.68 ms
64 bytes from 8.8.8.8: icmp_seq=8 ttl=53 time=3.70 ms
64 bytes from 8.8.8.8: icmp_seq=9 ttl=53 time=3.69 ms
64 bytes from 8.8.8.8: icmp_seq=10 ttl=53 time=3.79 ms
64 bytes from 8.8.8.8: icmp_seq=11 ttl=53 time=3.73 ms
64 bytes from 8.8.8.8: icmp_seq=12 ttl=53 time=3.74 ms
64 bytes from 8.8.8.8: icmp_seq=13 ttl=53 time=3.72 ms
^C
--- 8.8.8.8 ping statistics ---
13 packets transmitted, 13 received, 0% packet loss, time 874ms
rtt min/avg/max/mdev = 3.679/3.748/4.023/0.107 ms

```

From myClient, prove your traffic goes through myGateway to 8.8.8.8 Screenshot it here:

```

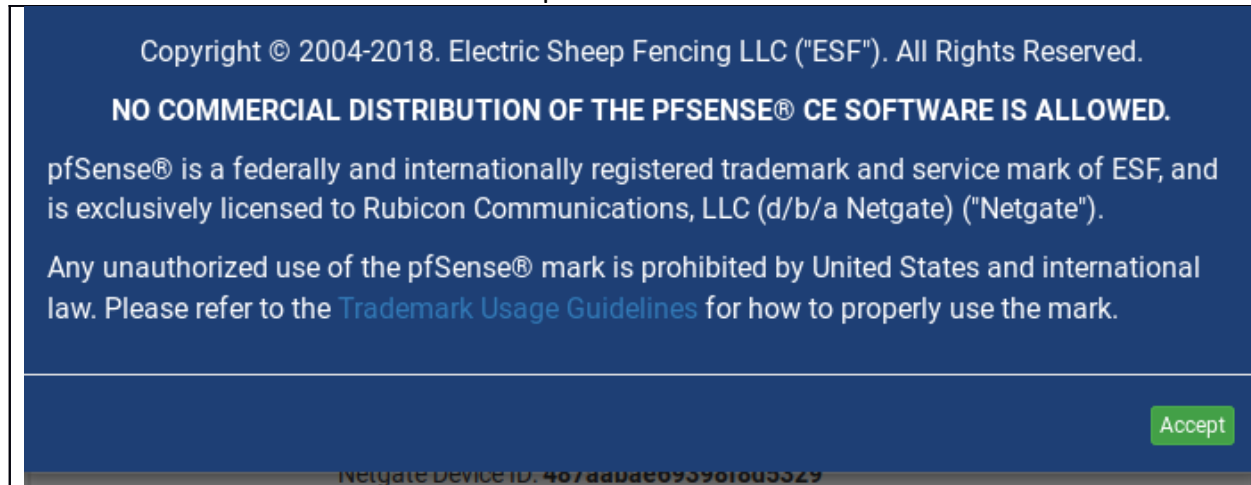
student@student-VirtualBox:~$ tracepath 8.8.8.8
1?: [LOCALHOST] pmtu 1500
1:  pfSense.localdomain 0.567ms
1:  pfSense.localdomain 0.338ms
2:  10.113.112.1 2.156ms
3:  10.1.1.3 1.368ms
4:  no reply
5:  207.233.67.1 2.111ms
6:  tus-agg3--lbc-cc-2-10g.cenic.net 4.131ms
7:  137.164.3.64 4.287ms
8:  no reply
9:  no reply
10: no reply
11: no reply
12: no reply
13: no reply
14: no reply
15: no reply
16: no reply
17: no reply
18: no reply
^C

```

Log into myGateway's web GUI from the client (username: **admin** and password: **pfSense**). Go through the configuration wizard with mostly defaults but for these exceptions:

Hostname	myGateway
Primary DNS	8.8.8.8
Block RFC1918 Private Networks	Uncheck box
Admin Password	P@ssw0rd

Provide a screenshot of the license acceptance box:



BONUS EXTRA CREDIT:

Configure myGateway to allow you to access the web gui from the host machine. Provide screenshots here:

Phase 3

Install Ubuntu Server with the following parameters:

Hostname	myServer
RAM	1024 (it installs faster with 4098)
Adapter 1	DMZ (internal network,para-virtualized)
Install Type	Minimal (web browser and basic utilities) Don't download updates
Username	student
Password	P@ssw0rd
OpenSSH package	Install

From myServer prove connectivity with myGateway Screenshot it here:

```
student@myserver:~$ ping 10.113.112.54
PING 10.113.112.54 (10.113.112.54) 56(84) bytes of data.
64 bytes from 10.113.112.54: icmp_seq=1 ttl=63 time=3.47 ms
64 bytes from 10.113.112.54: icmp_seq=2 ttl=63 time=1.92 ms
64 bytes from 10.113.112.54: icmp_seq=3 ttl=63 time=2.13 ms
64 bytes from 10.113.112.54: icmp_seq=4 ttl=63 time=2.09 ms
64 bytes from 10.113.112.54: icmp_seq=5 ttl=63 time=2.06 ms
64 bytes from 10.113.112.54: icmp_seq=6 ttl=63 time=2.07 ms
64 bytes from 10.113.112.54: icmp_seq=7 ttl=63 time=2.04 ms
^C
--- 10.113.112.54 ping statistics ---
7 packets transmitted, 7 received, 0% packet loss, time 15ms
rtt min/avg/max/mdev = 1.918/2.253/3.466/0.499 ms
student@myserver:~$ _
```

From myServer, prove connectivity with 8.8.8.8 Screenshot it here:

```
student@myserver:~$ ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=53 time=4.57 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=53 time=4.42 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=53 time=4.39 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=53 time=4.46 ms
64 bytes from 8.8.8.8: icmp_seq=5 ttl=53 time=4.41 ms
64 bytes from 8.8.8.8: icmp_seq=6 ttl=53 time=4.24 ms
64 bytes from 8.8.8.8: icmp_seq=7 ttl=53 time=4.37 ms
^C
--- 8.8.8.8 ping statistics ---
7 packets transmitted, 7 received, 0% packet loss, time 18ms
rtt min/avg/max/mdev = 4.244/4.409/4.565/0.119 ms
student@myserver:~$ _
```

From myServer, prove your traffic goes through myGateway to 8.8.8.8 Screenshot it here:

```

student@myserver:~$ tracepath 8.8.8.8
 1?: [LOCALHOST] pmtu 1500
 1:  myGateway.localdomain 0.498ms
 1:  myGateway.localdomain 0.464ms
 2:  10.113.112.1 2.144ms
 3:  10.1.1.2 1.321ms
 4:  no reply
 5:  207.233.67.1 2.059ms
 6:  137.164.35.5 2.417ms
 7:  137.164.3.64 5.052ms
 8:  no reply
 9:  no reply
10:  no reply
11:  no reply
12:  no reply
13:  no reply
14:  no reply
15:  no reply
16:  no reply
^C

```

Phase 4

Install Kali with the following parameters:

Hostname	myPenTestDMZ
RAM	1024 (it installs faster with 4098)
Adapter 1	DMZ (internal network,para-virtualized)
Password	P@ssw0rd

Note: I had to disable the network adapter and then re-enable it afer the install.

Note-note: This install took the longest.

From myPenTestDMZ prove connectivity with myGateway Screenshot it here:


```
root@myPenTestDMZ:~# ping 10.113.112.54
PING 10.113.112.54 (10.113.112.54) 56(84) bytes of data.
64 bytes from 10.113.112.54: icmp_seq=1 ttl=63 time=3.46 ms
64 bytes from 10.113.112.54: icmp_seq=2 ttl=63 time=2.17 ms
64 bytes from 10.113.112.54: icmp_seq=3 ttl=63 time=2.18 ms
64 bytes from 10.113.112.54: icmp_seq=4 ttl=63 time=2.33 ms
64 bytes from 10.113.112.54: icmp_seq=5 ttl=63 time=2.10 ms
64 bytes from 10.113.112.54: icmp_seq=6 ttl=63 time=2.10 ms
^C
--- 10.113.112.54 ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5007ms
rtt min/avg/max/mdev = 2.095/2.387/3.460/0.485 ms
root@myPenTestDMZ:~#
```

From myPenTestDMZ, prove connectivity with 8.8.8.8 Screenshot it here:

```
root@myPenTestDMZ:~# ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=53 time=4.46 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=53 time=4.41 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=53 time=4.33 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=53 time=4.41 ms
^C
--- 8.8.8.8 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3005ms
rtt min/avg/max/mdev = 4.326/4.402/4.463/0.049 ms
root@myPenTestDMZ:~#
```

From myPenTestDMZ, prove your traffic goes through myGateway to 8.8.8.8 Screenshot it here:


```

traceroute to 8.8.8.8 (8.8.8.8), 30 hops max, 60 byte packets
 1  myGateway.localdomain (192.168.1.1)  0.570 ms  0.520 ms  0.513 ms
 2  10.113.112.1 (10.113.112.1)  2.221 ms  2.825 ms  2.772 ms
 3  10.1.1.2 (10.1.1.2)  1.039 ms  10.1.1.3 (10.1.1.3)  1.018 ms  0.993 ms
 4  * * *
 5  207.233.67.1 (207.233.67.1)  1.808 ms  1.720 ms  1.695 ms
 6  tus-agg3--lbc-cc-2-10g.cenic.net (137.164.13.146)  4.307 ms  4.264 ms  137.164
.35.5 (137.164.35.5)  1.851 ms
 7  dc-lax-agg6--tus-agg3-100ge-2.cenic.net (137.164.11.24)  3.755 ms  5.562 ms  1
37.164.3.64 (137.164.3.64)  5.511 ms
 8  72.14.222.56 (72.14.222.56)  5.494 ms  5.490 ms  74.125.49.165 (74.125.49.165)
 5.476 ms
 9  108.170.247.225 (108.170.247.225)  3.545 ms  108.170.247.193 (108.170.247.193)
 6.496 ms  108.170.247.129 (108.170.247.129)  5.350 ms
10  74.125.251.39 (74.125.251.39)  5.336 ms  209.85.245.229 (209.85.245.229)  5.30
2 ms  108.170.237.113 (108.170.237.113)  5.222 ms
11  * * *
12  * * *
13  * * *
14  * * *
15  * * *
16  * * *
17  * * *
18  * * *

```

Phase 5

Draw what your current network looks like (including IP addresses and host names) and insert it here: