Setup your virtual machines. Add a network rule that blocks all traffic from internal network 1 to internal network 2 except for one port. Use traceroute to show this port is open and that there are no other hosts between your target and PFSense. You should submit the following.

1. A screen shot showing what happens when you use traceroute to the target when the port is open vs when it is closed.

# Sub Task 1

TraceRoute command with port 80 open

```
Shell No.1 _ _ _ x

File Actions Edit View Help

root@kali:~# traceroute -T -p 80 192.168.1.112

traceroute to 192.168.1.112 (192.168.1.112), 30 hops max, 60 byte packets
1 192.168.1.112 (192.168.1.112) 0.573 ms 0.596 ms 0.580 ms

root@kali:~#
```

TraceRoute command with port 80 closed

### Sub Task 2

Place your two Kali Machines on the same virtual network. Perform the following scans with nmap, while performing a packet capture between the two. Submit the following.

- 1. A short explanation of each of the following scans, explaining the differences, when you would use them, and referencing the packet capture to illustrate your point.
  - a) Full Connect
  - b) Syn Scan
  - c) Xmas Scan

### **Full Connect:**

Running a Full Connect scan "nmap -sT 192.168.2.1/24" will broadcast an "ARP Broadcast Packet" asking who has every IP Address in the given range, if a response is received for a given IP Address the scan will then attempt a 3way TCP handshake the results of this will depend on firewall configuration

Block – will drop the packet and Wireshark will only show a SYN packet

Reject – will respond to the SYN packet with a RST, ACK packet (Reset, ACK)

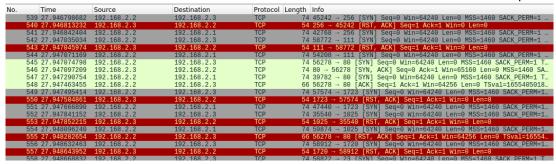
Accept – will perform the complete [SYN] [SYN ACK] [ACK]

No.	Time	Source	Destination	Protocol	Length Into				
74	0.515290478	PcsCompu_17:39:82	Broadcast	ARP	60 Who	has	192.168.2.59?	Tell	192.168.2.2
75	0.515648897	PcsCompu_17:39:82	Broadcast	ARP	60 Who	has	192.168.2.60?	Tell	192.168.2.2
76	0.515666836	PcsCompu_17:39:82	Broadcast	ARP	60 Who	has	192.168.2.61?	Tell	192.168.2.2
77	0.606458012	PcsCompu_17:39:82	Broadcast	ARP	60 Who	has	192.168.2.70?	Tell	192.168.2.2
78	0.606478832	PcsCompu_17:39:82	Broadcast	ARP	60 Who	has	192.168.2.71?	Tell	192.168.2.2
79	0.608737680	PcsCompu_17:39:82	Broadcast	ARP	60 Who	has	192.168.2.74?	Tell	192.168.2.2
80	0.608745008	PcsCompu_17:39:82	Broadcast	ARP	60 Who	has	192.168.2.75?	Tell	192.168.2.2
81	0.608807758	PcsCompu_17:39:82	Broadcast	ARP	60 Who	has	192.168.2.76?	Tell	192.168.2.2
82	0.611357506	PcsCompu_17:39:82	Broadcast	ARP	60 Who	has	192.168.2.79?	Tell	192.168.2.2
83	0.611376551	PcsCompu_17:39:82	Broadcast	ARP	60 Who	has	192.168.2.80?	Tell	192.168.2.2
84	0.615250276	PcsCompu_17:39:82	Broadcast	ARP	60 Who	has	192.168.2.83?	Tell	192.168.2.2

**ARP Broadcasts** 

).	Time	Source	Destination	Protocol		
		PcsCompu_17:39:82	Broadcast	ARP	60	Who has 192.168.2.42? Tell 192.168.2.2
51	1 1.826826645	PcsCompu_17:39:82	Broadcast	ARP	60	Who has 192.168.2.81? Tell 192.168.2.2
51	2 1.826960480	PcsCompu_17:39:82	Broadcast	ARP	60	Who has 192.168.2.178? Tell 192.168.2.2
51	3 1.932922543	192.168.2.2	192.168.2.1	DNS	84	Standard query 0x6ca6 PTR 1.2.168.192.in-addr.arpa
51	4 1.932928136	192.168.2.2	192.168.2.1	DNS	84	Standard query 0x6ca7 PTR 3.2.168.192.in-addr.arpa
51	5 5.934758446	192.168.2.2	192.168.2.1	DNS	84	Standard query 0x6ca8 PTR 3.2.168.192.in-addr.arpa
51	6 5.934769489	192.168.2.2	192.168.2.1	DNS	84	Standard query 0x6ca9 PTR 1.2.168.192.in-addr.arpa

**ARP Broadcast Response** 



TCP 3-Way Handshake

# SYN Scan:

Running a Full Connect scan "nmap -sS 192.168.2.1/24" for the most part will be the same as the Full Connect Scan, with the exception that during the TCP 3-Way Handshake the connection is never formed, rather Nmap analyses the [SYN ACK] response to produce the results of the scan.

No.	Time	Source	Destination	Protoc	ol Length Info
	518 9.931767807	192.168.2.2	192.168.2.1	DNS	84 Standard query 0x529a PTR 3.2.168.192.in-addr.arpa
	519 14.935163328	192.168.2.2	192.168.2.1	DNS	84 Standard query 0x529b PTR 2.2.168.192.in-addr.arpa
	520 18.936529761	192.168.2.2	192.168.2.1	DNS	84 Standard query 0x529c PTR 2.2.168.192.in-addr.arpa
	521 22.938273444	192.168.2.2	192.168.2.1	DNS	84 Standard query 0x529d PTR 2.2.168.192.in-addr.arpa
	522 27.939418585	192.168.2.2	192.168.2.3	TCP	60 51095 → 554 [SYN] Seq=0 Win=1024 Len=0 MSS=1460
	523 27.939445619	192.168.2.3	192.168.2.2	TCP	54 554 → 51095 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0
	524 27.939464521	192.168.2.2	192.168.2.1	TCP	60 51095 → 554 [SYN] Seq=0 Win=1024 Len=0 MSS=1460
	525 27.939466357	192.168.2.2	192.168.2.3	TCP	60 51095 → 25 [SYN] Seq=0 Win=1024 Len=0 MSS=1460
	526 27.939471479	192.168.2.3	192.168.2.2	TCP	54 25 → 51095 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0
	527 27.939481327	192.168.2.2	192.168.2.1	TCP	60 51095 → 25 [SYN] Seq=0 Win=1024 Len=0 MSS=1460
	528 27.939482847	192.168.2.2	192.168.2.3	TCP	60 51095 → 1723 [SŸN] Seq=0 Win=1024 Len=0 MSS=1460
	529 27.939486972	192.168.2.3	192.168.2.2	TCP	54 1723 → 51095 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0
	530 27.939497858	192.168.2.2	192.168.2.1	TCP	60 51095 → 1723 [SYN] Seq=0 Win=1024 Len=0 MSS=1460
	531 27.939577720	192.168.2.2	192.168.2.3	TCP	60 51095 → 113 [SYN] Seq=0 Win=1024 Len=0 MSS=1460
	532 27.939582315	192.168.2.3	192.168.2.2	TCP	54 113 → 51095 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0
	533 27.939592755	192.168.2.2	192.168.2.1	TCP	60 51095 → 113 [SYN] Seq=0 Win=1024 Len=0 MSS=1460
	534 27.939687002	192.168.2.2	192.168.2.3	TCP	60 51095 → 110 [SYN] Seq=0 Win=1024 Len=0 MSS=1460
	535 27.939691499	192.168.2.3	192.168.2.2	TCP	54 110 → 51095 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0
	536 27.939946538	192.168.2.2	192.168.2.1	TCP	60 51095 → 110 [SYN] Seq=0 Win=1024 Len=0 MSS=1460
	537 27.942539549	192.168.2.2	192.168.2.3	TCP	60 51095 → 443 [SYN] Seq=0 Win=1024 Len=0 MSS=1460
	538 27.942550090	192.168.2.3	192.168.2.2	TCP	54 443 → 51095 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0
	539 27.942561898	192.168.2.2	192.168.2.1	TCP	60 51095 → 443 [SYN] Seq=0 Win=1024 Len=0 MSS=1460
	540 27.942636904	192.168.2.2	192.168.2.3	TCP	60 51095 → 5900 [SYN] Seq=0 Win=1024 Len=0 MSS=1460
	541 27.942641476	192.168.2.3	192.168.2.2	TCP	54 5900 → 51095 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0
	542 27.942652199	192.168.2.2	192.168.2.1	TCP	60 51095 → 5900 [SYN] Seq=0 Win=1024 Len=0 MSS=1460
	543 27.942730997	192.168.2.2	192.168.2.3	TCP	60 51095 → 135 [SYN] Seq=0 Win=1024 Len=0 MSS=1460
	544 27.942736464	192.168.2.3	192.168.2.2	TCP	54 135 → 51095 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0
	545 27.942748361	192.168.2.2	192.168.2.1	TCP	60 51095 → 135 [SYN] Seg=0 Win=1024 Len=0 MSS=1460
	546 27.942828641	192.168.2.2	192.168.2.3	TCP	60 51095 → 3389 [SYN] Seq=0 Win=1024 Len=0 MSS=1460
	547 27.942833495	192.168.2.3	192.168.2.2	TCP	54 3389 → 51095 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0
	548 27.942855044	192.168.2.2	192.168.2.1	TCP	60 51095 → 3389 [SYN] Seq=0 Win=1024 Len=0 MSS=1460
_	549 27.942915161	192.168.2.2	192.168.2.3	TCP	60 51095 → 80 [SYN] Seg=0 Win=1024 Len=0 MSS=1460
	550 27.942925393	192.168.2.3	192.168.2.2	TCP	58 80 → 51095 [SYN, ACK] Seg=0 Ack=1 Win=64240 Len=0 MSS=1460
	551 27.943006504	192.168.2.2	192.168.2.1	TCP	60 51095 → 80 [SYN] Seg=0 Win=1024 Len=0 MSS=1460
L	552 27.943118582		192.168.2.3	TCP	60 51095 → 80 [RST] Seg=1 Win=0 Len=0
	553 27.945486969	192.168.2.2	192.168.2.3	TCP	60 51095 → 8888 [SYN] Seq=0 Win=1024 Len=0 MSS=1460
		400 400 0 0	400 400 0 0	TOD	54 0000

# **SYN Scan:**

Running a Full Connect scan "nmap -sX 192.168.2.1/24" starts with an ARP broadcast just as the previous scans then probes the ports of the found IP-Addresses with an unusual packet where the [PSH], [URG], [FIN] flags in the header manipulated, in general due to the way the TCP stack is implemented in the Windows Operating System it is unlikely that this scan will produce usable results on a Windows system.

lo.	Time	Source	Destination	Protocol	Length Info
	507 1.821935897	PcsCompu 17:39:82	Broadcast	ARP	60 Who has 192.168.2.240? Tell 192.168.2.2
	508 1.822087108	PcsCompu 17:39:82	Broadcast	ARP	60 Who has 192.168.2.247? Tell 192.168.2.2
	509 1.822091944	PcsCompu 17:39:82	Broadcast	ARP	60 Who has 192.168.2.251? Tell 192.168.2.2
	510 1.827567296	PcsCompu 17:39:82	Broadcast	ARP	60 Who has 192.168.2.43? Tell 192.168.2.2
	511 1.827572349	PcsCompu 17:39:82	Broadcast	ARP	60 Who has 192.168.2.167? Tell 192.168.2.2
	512 1.827574742	PcsCompu 17:39:82	Broadcast	ARP	60 Who has 192.168.2.168? Tell 192.168.2.2
	513 1.934294440	192.168.2.2	192.168.2.1	DNS	84 Standard guery 0xd2c7 PTR 1.2.168.192.in-addr.arpa
	514 1.934310965	192.168.2.2	192.168.2.1	DNS	84 Standard guery 0xd2c8 PTR 3.2.168.192.in-addr.arpa
	515 5.935400739	192.168.2.2	192.168.2.1	DNS	84 Standard guery 0xd2c9 PTR 3.2.168.192.in-addr.arpa
	516 5.935406143	192.168.2.2	192.168.2.1	DNS	84 Standard query 0xd2ca PTR 1.2.168.192.in-addr.arpa
	517 9.937660378	192.168.2.2	192.168.2.1	DNS	84 Standard query 0xd2cb PTR 1.2.168.192.in-addr.arpa
	518 9.937668440	192.168.2.2	192.168.2.1	DNS	84 Standard query 0xd2cc PTR 3.2.168.192.in-addr.arpa
	519 14.941045062	192.168.2.2	192.168.2.1	DNS	84 Standard query 0xd2cd PTR 2.2.168.192.in-addr.arpa
	520 18.942836372	192.168.2.2	192.168.2.1	DNS	84 Standard guery Oxd2ce PTR 2.2.168.192.in-addr.arpa
	521 22.943445574	192.168.2.2	192.168.2.1	DNS	84 Standard guery 0xd2cf PTR 2.2.168.192.in-addr.arpa
	522 27.945978010	192.168.2.2	192.168.2.3	TCP	60 49504 → 1025 [FIN, PSH, URG] Seg=1 Win=1024 Urg=0 Len=0
	523 27.945999441	192.168.2.3	192.168.2.2	TCP	54 1025 → 49504 [RST, ACK] Seg=1 Ack=2 Win=0 Len=0
	524 27.946022065	192.168.2.2	192.168.2.1	TCP	60 49504 → 1025 [FIN, PSH, URG] Seg=1 Win=1024 Urg=0 Len=0
	525 27.946024497	192.168.2.2	192.168.2.3	TCP	60 49504 → 8080 [FIN, PSH, URG] Seq=1 Win=1024 Urg=0 Len=0
	526 27.946031193	192.168.2.3	192.168.2.2	TCP	54 8080 → 49504 [RST, ACK] Seq=1 Ack=2 Win=0 Len=0
	527 27.946053794	192.168.2.2	192.168.2.1	TCP	60 49504 → 8080 [FIN, PSH, URG] Seq=1 Win=1024 Urg=0 Len=0
	528 27.946056091	192.168.2.2	192.168.2.3	TCP	60 49504 → 139 [FIN, PSH, URG] Seq=1 Win=1024 Urg=0 Len=0
	529 27.946062278	192.168.2.3	192.168.2.2	TCP	54 139 → 49504 [RST, ACK] Seq=1 Ack=2 Win=0 Len=0
	530 27.946081474	192.168.2.2	192.168.2.1	TCP	60 49504 → 139 [FIN, PSH, URG] Seq=1 Win=1024 Urg=0 Len=0
	531 27.946083893	192.168.2.2	192.168.2.3	TCP	60 49504 → 22 [FIN, PSH, URG] Seq=1 Win=1024 Urg=0 Len=0
	532 27.946090164	192.168.2.3	192.168.2.2	TCP	54 22 → 49504 [RST, ACK] Seq=1 Ack=2 Win=0 Len=0
	533 27.946190727	192.168.2.2	192.168.2.1	TCP	60 49504 → 22 [FIN, PSH, URG] Seq=1 Win=1024 Urg=0 Len=0
	534 27.946346091	192.168.2.2	192.168.2.3	TCP	60 49504 → 135 [FIN, PSH, URG] Seq=1 Win=1024 Urg=0 Len=0
		192.168.2.3	192.168.2.2	TCP	54 135 → 49504 [RST, ACK] Seq=1 Ack=2 Win=0 Len=0
	536 27.946365321	192.168.2.2	192.168.2.1	TCP	60 49504 → 135 [FIN, PSH, URG] Seq=1 Win=1024 Urg=0 Len=0
	537 27.948946652	192.168.2.2	192.168.2.3	TCP	60 49504 → 80 [FIN, PSH, URG] Seq=1 Win=1024 Urg=0 Len=0
	538 27.948952430	192.168.2.2	192.168.2.1	TCP	60 49504 → 80 [FIN, PSH, URG] Seq=1 Win=1024 Urg=0 Len=0
	539 27.949065747	192.168.2.2	192.168.2.3	TCP	60 49504 → 443 [FIN, PSH, URG] Seq=1 Win=1024 Urg=0 Len=0
	540 27.949071701	192.168.2.3	192.168.2.2	TCP	54 443 → 49504 [RST, ACK] Seq=1 Ack=2 Win=0 Len=0
	541 27.949085318	192.168.2.2	192.168.2.1	TCP	60 49504 → 443 [FIN, PSH, URG] Seq=1 Win=1024 Urg=0 Len=0
	542 27.949087021	192.168.2.2	192.168.2.3	TCP	60 49504 → 21 [FIN, PSH, URG] Seq=1 Win=1024 Urg=0 Len=0

