

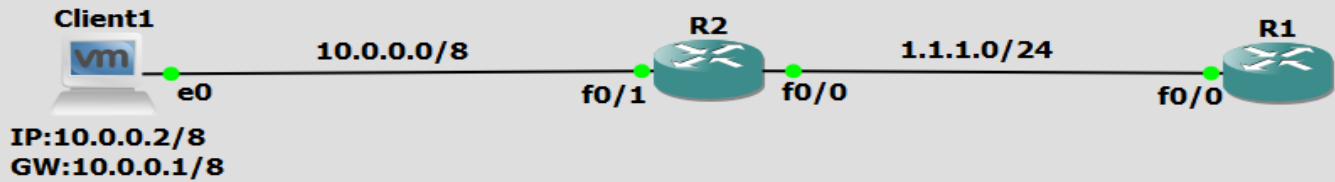
## NAT (Network Address Translation)

- Static NAT with static routing
- Dynamic NAT with static routing
- PAT

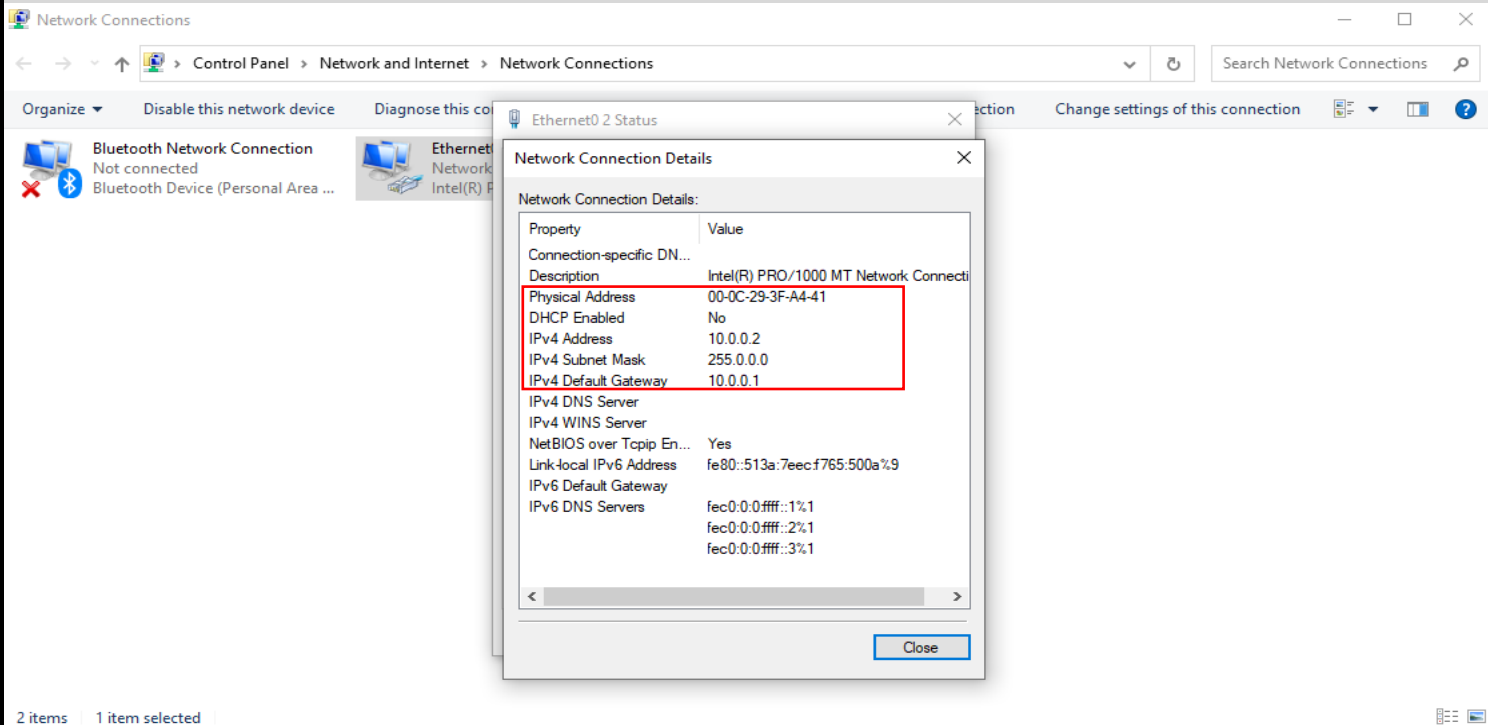
By: Ahmed Abou\_ELmaged Shallan Allam

## Lab1: Static NAT with static routing

### ■ Network Topology



### ■ Assign IP and Gateway Static to Client1



▪ **Assing IPS in Two Routers and create Telnet two and Static Routing Routers.**

<b>R2</b>	<b>R1</b>
R2(config)#int f0/1 R2(config-if)#ip add 10.0.0.1 255.0.0.0 R2(config-if)#no sh R2(config-if)#int f0/0 R2(config-if)#ip add 1.1.1.1 255.255.255.0 R2(config-if)#no sh R2(config-if)#exit  R2(config)#line console 0 R2(config-line)#pass 1234 R2(config-line)#login R2(config-line)#exit  R2(config)#enable secret 1234 R2(config)#exit  R2(config)#line vty 0 4 R2(config-line)#pass 1234 R2(config-line)#login R2(config-line)#exit	R1(config-if)#int f0/0 R1(config-if)#ip add 1.1.1.2 255.255.255.0 R1(config-if)#no sh R1(config-if)#exit  <b>R1(config)#ip route 2.0.0.0 255.0.0.0 1.1.1.1</b>  R1(config)#line console 0 R1(config-line)#pass 1234 R1(config-line)#login R1(config-line)#exit  R1(config)#enable secret 1234 R1(config)#exit  R1(config)#line vty 0 4 R1(config-line)#pass 1234 R1(config-line)#login R1(config-line)#exit

**Static NAT on R2**

```

R1(config)#ip nat inside source static 10.0.0.2 2.0.0.1
R1(config)#int f0/1
R1(config-if)#ip nat inside
R1(config-if)#int f0/0
R1(config-if)#ip nat outside

```

## ■ Testing Telnet from Client1 to Two Routers R1, R2.

```
Telnet 1.1.1.2

Password: s Verification
Password:
R1>
R1>
R1>
R1>en
Password:
R1#
R1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#
R1(config)#do sh ip int br
Interface      IP-Address      OK? Method Status          Protocol
FastEthernet0/0 1.1.1.2         YES NVRAM   up              up
FastEthernet0/1 unassigned      YES NVRAM   administratively down down
R1(config)#
```

```
Telnet 10.0.0.1

User Access Verification

Password:
R2>
R2>
R2>en
Password:
R2#
R2#
R2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#
R2(config)#do sh ip int br
Interface      IP-Address      OK? Method Status          Protocol
FastEthernet0/0 1.1.1.1         YES NVRAM   up              up
FastEthernet0/1 10.0.0.1        YES manual up              up
R2(config)#
R2(config)#
R2(config)#
```

## ■ Testing NAT in Client1.

```
C:\Windows\system32\cmd.exe
Ping statistics for 1.1.1.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Users\Ahmed Allam>ping 1.1.1.1

Pinging 1.1.1.1 with 32 bytes of data:
Reply from 1.1.1.1: bytes=32 time=29ms TTL=255
Reply from 1.1.1.1: bytes=32 time=16ms TTL=255
Reply from 1.1.1.1: bytes=32 time=15ms TTL=255
Reply from 1.1.1.1: bytes=32 time=16ms TTL=255

Ping statistics for 1.1.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 15ms, Maximum = 29ms, Average = 19ms

C:\Users\Ahmed Allam>ping 1.1.1.2

Pinging 1.1.1.2 with 32 bytes of data:
Reply from 1.1.1.2: bytes=32 time=56ms TTL=254
Reply from 1.1.1.2: bytes=32 time=45ms TTL=254
Reply from 1.1.1.2: bytes=32 time=46ms TTL=254
Reply from 1.1.1.2: bytes=32 time=47ms TTL=254

Ping statistics for 1.1.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 45ms, Maximum = 56ms, Average = 48ms

C:\Users\Ahmed Allam>
```

R2#s

\*Mar 1 00:40:29.283: %SYS-5-CONFIG\_I: Configured from console by console

R2#sh ip nat tr

Pro	Inside global	Inside local	Outside local	Outside global
icmp	2.0.0.1:1	10.0.0.2:1	1.1.1.2:1	1.1.1.2:1
---	2.0.0.1	10.0.0.2	---	---

R2#

R2#

R2#

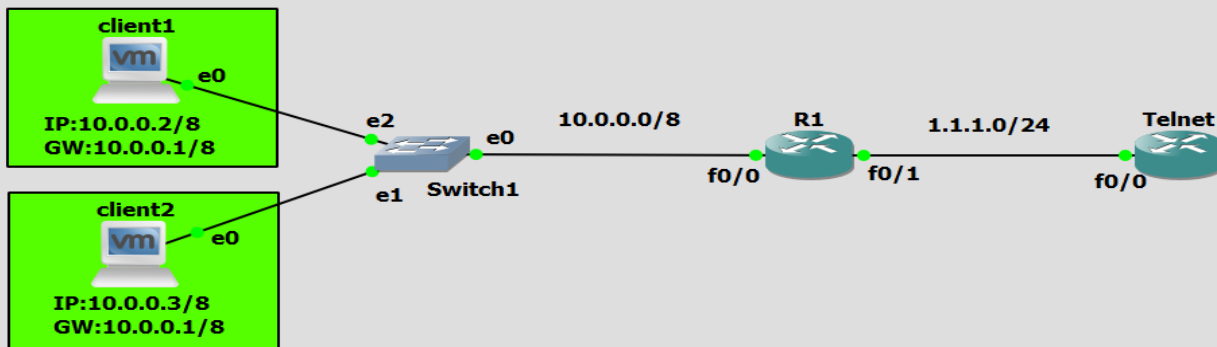
R2#

R2#

## Thanks

## Lab2: Dynamic NAT with static routing

### Network Topology



#### R1

```
R1(config)#int f0/1
R1(config-if)#ip add 10.0.0.1 255.0.0.0
R1(config-if)#no sh
R1(config-if)#int f0/0
R1(config-if)#ip add 1.1.1.1 255.255.255.0
R1(config-if)#no sh
R1(config-if)#exit
R1(config)#access-list 1 permit 10.0.0.0
0.255.255.255
R1(config)#ip nat pool LAN 50.0.0.1 50.0.0.3
netmask 255.255.255.0
R1(config)#ip nat inside source list 1 pool LAN
R1(config)#int f0/0
R1(config-if)#ip nat inside
R1(config-if)#int f0/1
R1(config-if)#ip nat outside
```

#### Telnet

```
R2(config-if)#int f0/0
R2(config-if)#ip add 1.1.1.2 255.255.255.0
R2(config-if)#no sh
R2(config-if)#exit
R2(config)#line console 0
R2(config-line)#pass 1234
R2(config-line)#login
R2(config-line)#exit
R2(config)#enable secret 1234
R2(config)#exit
R2(config)#line vty 0 4
R2(config-line)#pass 1234
R2(config-line)#login
R2(config-line)#exit
R2(config)# ip route 50.0.0.0 255.255.255.0 f0/0
```

## ■ Testing

```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 10.0.19044.1288]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Ahmed Allam>ping 1.1.1.2

Pinging 1.1.1.2 with 32 bytes of data:
Reply from 1.1.1.2: bytes=32 time=46ms TTL=254
Reply from 1.1.1.2: bytes=32 time=46ms TTL=254
Reply from 1.1.1.2: bytes=32 time=44ms TTL=254
Reply from 1.1.1.2: bytes=32 time=46ms TTL=254

Ping statistics for 1.1.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 44ms, Maximum = 46ms, Average = 45ms

C:\Users\Ahmed Allam>
```

```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 10.0.19044.1288]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Ahmed Allam>ping 1.1.1.2

Pinging 1.1.1.2 with 32 bytes of data:
Reply from 1.1.1.2: bytes=32 time=33ms TTL=254
Reply from 1.1.1.2: bytes=32 time=45ms TTL=254
Reply from 1.1.1.2: bytes=32 time=45ms TTL=254
Reply from 1.1.1.2: bytes=32 time=45ms TTL=254

Ping statistics for 1.1.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 33ms, Maximum = 45ms, Average = 42ms

C:\Users\Ahmed Allam>
```

```
R1#sh ip nat tr
Pro Inside global      Inside local      Outside local      Outside global
--- 50.0.0.1           10.0.0.2          ---               ---
icmp 50.0.0.2:1        10.0.0.3:1        1.1.1.2:1         1.1.1.2:1
--- 50.0.0.2           10.0.0.3          ---               ---
R1#
```

```
PC1 PC2
Telnet 1.1.1.2
Username: s Verification
Username: ahmed
Password:
R2>
R2>
R2>en
Password:
R2#
R2#
R2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#
```

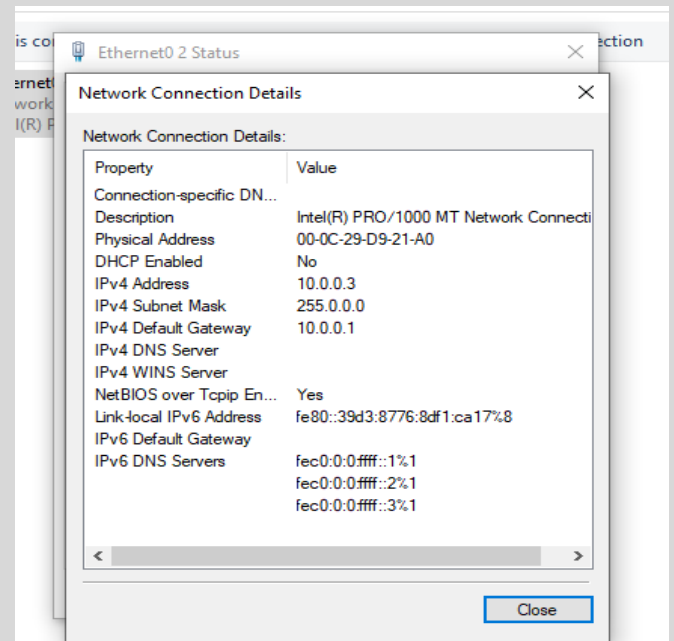
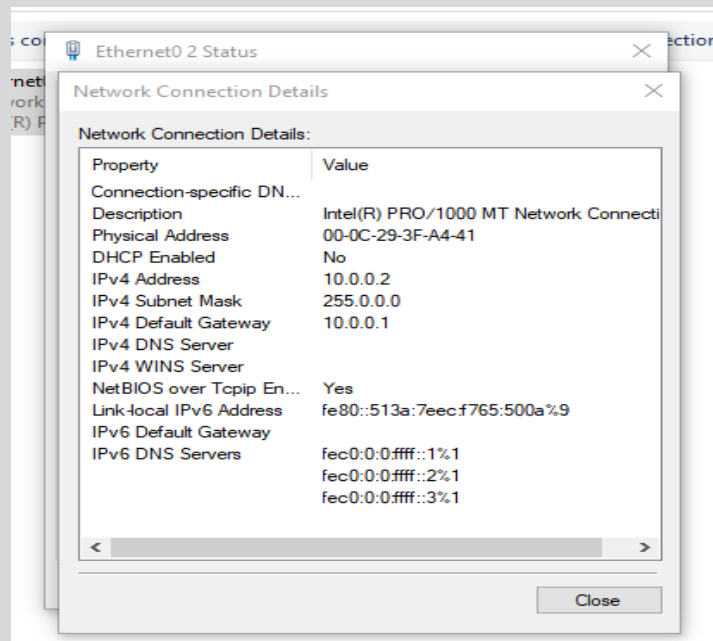
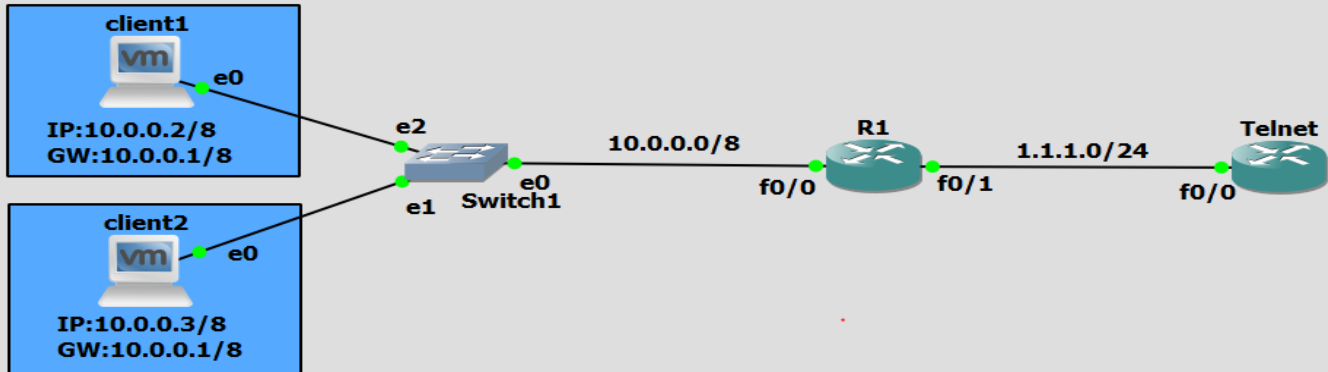
```
PC1 PC2
Telnet 1.1.1.2
Username: s Verification
Username: ahmed
Password:
R2>
R2>
R2>en
Password:
Password:
Password:
R2#
R2#
R2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#
R2(config)#
R2(config)#
R2(config)#
```

Thanks



## Lab3: PAT [Port Address Translation]

### ■ Network Topology



## R1

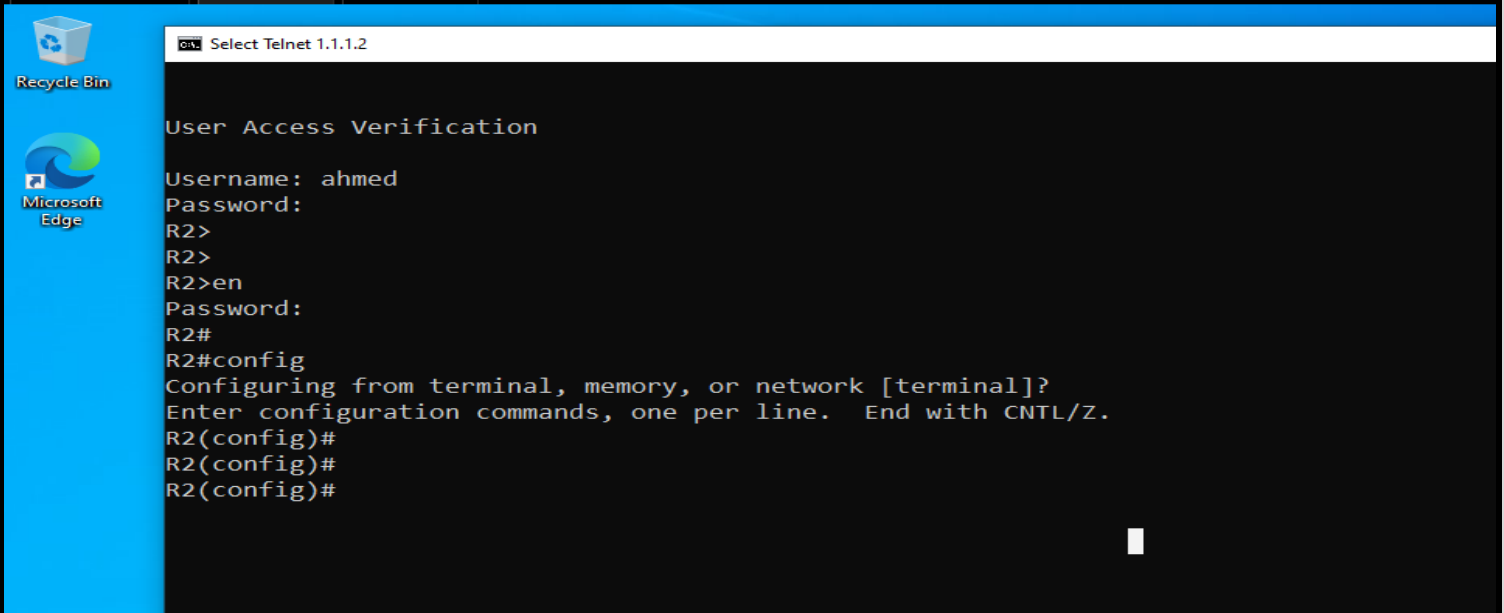
```
R1(config)#int f0/1
R1(config-if)#ip add 10.0.0.1 255.0.0.0
R1(config-if)#no sh
R1(config-if)#int f0/0
R1(config-if)#ip add 1.1.1.1 255.255.255.0
R1(config-if)#no sh
R1(config-if)#exit
R1(config)#access-list 1 permit 10.0.0.0
0.255.255.255
R1(config)# ip nat inside source list 1 interface
f0/1 overload
R1(config)#int f0/0
R1(config-if)#ip nat inside
R1(config-if)#int f0/1
R1(config-if)#ip nat outside
```

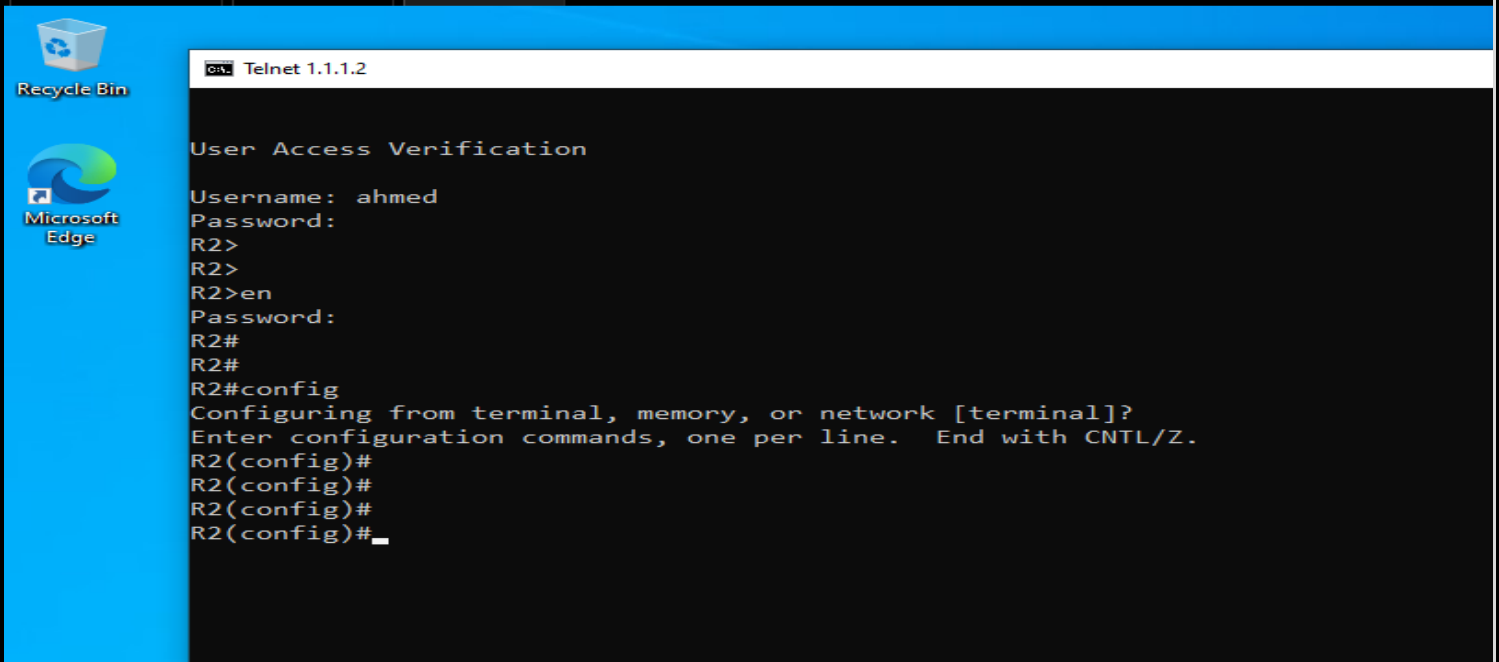
## Telnet

```
R2(config-if)#int f0/0
R2(config-if)#ip add 1.1.1.2 255.255.255.0
R2(config-if)#no sh
R2(config-if)#exit
R2(config)#line console 0
R2(config-line)#pass 1234
R2(config-line)#login
R2(config-line)#exit
R2(config)#enable secret 1234
R2(config)#exit
R2(config)#line vty 0 4
R2(config-line)#pass 1234
R2(config-line)#login
R2(config-line)#exit
R2(config)# ip route 10.0.0.0 255.255.255.0 f0/0
```

## ■ Testing

GNS3VM x PC1 x PC2 x





```

R2#
R2#
R2#s
*Mar  1 00:28:13.303: %SYS-5-CONFIG_I: Configured from console by console
R2#show users

```

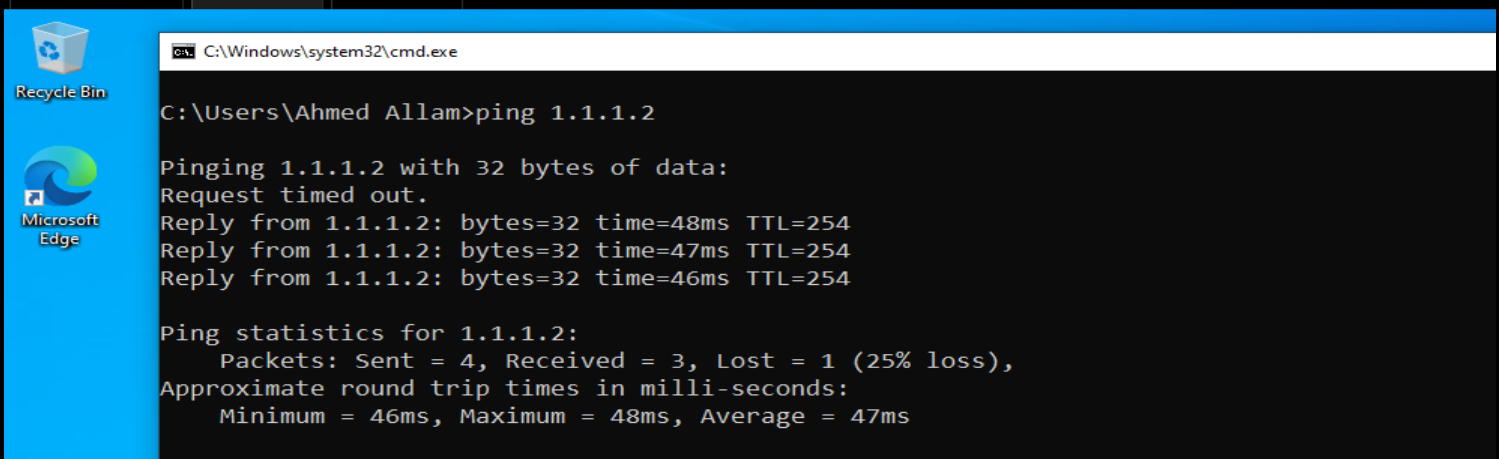
Line	User	Host(s)	Idle	Location
* 0 con 0		idle	00:00:00	
98 vty 0	ahmed	idle	00:02:17	1.1.1.1
99 vty 1	ahmed	idle	00:00:48	1.1.1.1

Interface	User	Mode	Idle	Peer Address
-----------	------	------	------	--------------

```

R2#
  
```





C:\Windows\system32\cmd.exe

Connection to host lost.

C:\Users\Ahmed Allam>

C:\Users\Ahmed Allam>ping 1.1.1.2

Pinging 1.1.1.2 with 32 bytes of data:

Request timed out.

Reply from 1.1.1.2: bytes=32 time=46ms TTL=254

Reply from 1.1.1.2: bytes=32 time=46ms TTL=254

Reply from 1.1.1.2: bytes=32 time=46ms TTL=254

Ping statistics for 1.1.1.2:

Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),

Approximate round trip times in milli-seconds:

Minimum = 46ms, Maximum = 46ms, Average = 46ms

C:\Users\Ahmed Allam>\_

```
R1#
R1#
R1#
R1#
R1#
R1#
R1#show ip nat tr
Pro Inside global      Inside local      Outside local      Outside global
icmp 1.1.1.1:0          10.0.0.3:1        1.1.1.2:1          1.1.1.2:0
tcp 1.1.1.1:59191       10.0.0.3:59191    1.1.1.2:23         1.1.1.2:23
R1#
```

# Thanks