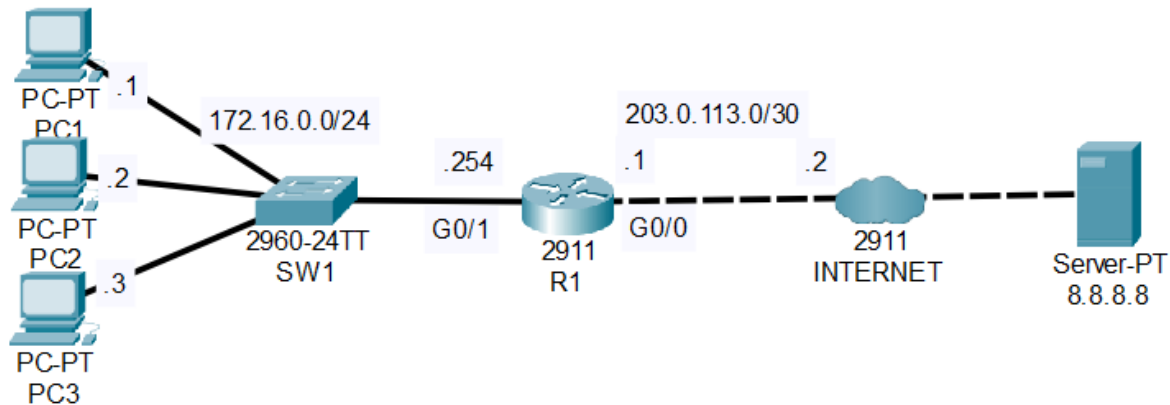Network Topology:

Instructions and actions:

1. Configure dynamic NAT on R1
   >Translate all traffic from 172.16.0.0/24
   >Create a pool of 100.0.0.1 to 100.0.0.2 from the subnet 100.0.0.0/24

```
R1>en
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#int g0/1
R1(config-if)#ip nat inside
R1(config-if)#int g0/0
R1(config-if)#ip nat outside
R1(config-if)#exit
R1(config)#access-list 1 permit 172.16.0.0 0.0.0.255
R1(config)#ip nat pool POOL1 100.0.0.1 100.0.0.2 255.255.255.0
                                                          ^
% Invalid input detected at '^' marker.

R1(config)#ip nat pool POOL1 100.0.0.1 100.0.0.2 prefix-length 24
                                                          ^
% Invalid input detected at '^' marker.

R1(config)#ip nat pool POOL1 ?
  A.B.C.D  Start IP address
R1(config)#ip nat pool POOL1 100.0.0.1 ?
  A.B.C.D  End IP address
R1(config)#ip nat pool POOL1 100.0.0.1 100.0.0.2 ?
  netmask  Specify the network mask
R1(config)#ip nat pool POOL1 100.0.0.1 100.0.0.2 255.255.255.0
                                                          ^
% Invalid input detected at '^' marker.

R1(config)#ip nat pool POOL1 100.0.0.1 100.0.0.2 netmask 255.255.255.0
R1(config)#ip nat inside source list 1 pool POOL1
R1(config)#exit
R1#
```

Since only two inside global IP addresses were assigned in the pool, both PC1 and PC2 can ping across the network, but not PC3 at the same time.

PC1 and PC2:

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping google.com

Pinging 172.217.175.238 with 32 bytes of data:

Reply from 172.217.175.238: bytes=32 time<1ms TTL=254
Reply from 172.217.175.238: bytes=32 time<1ms TTL=254
Reply from 172.217.175.238: bytes=32 time<1ms TTL=254
Reply from 172.217.175.238: bytes=32 time<1ms TTL=254

Ping statistics for 172.217.175.238:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```
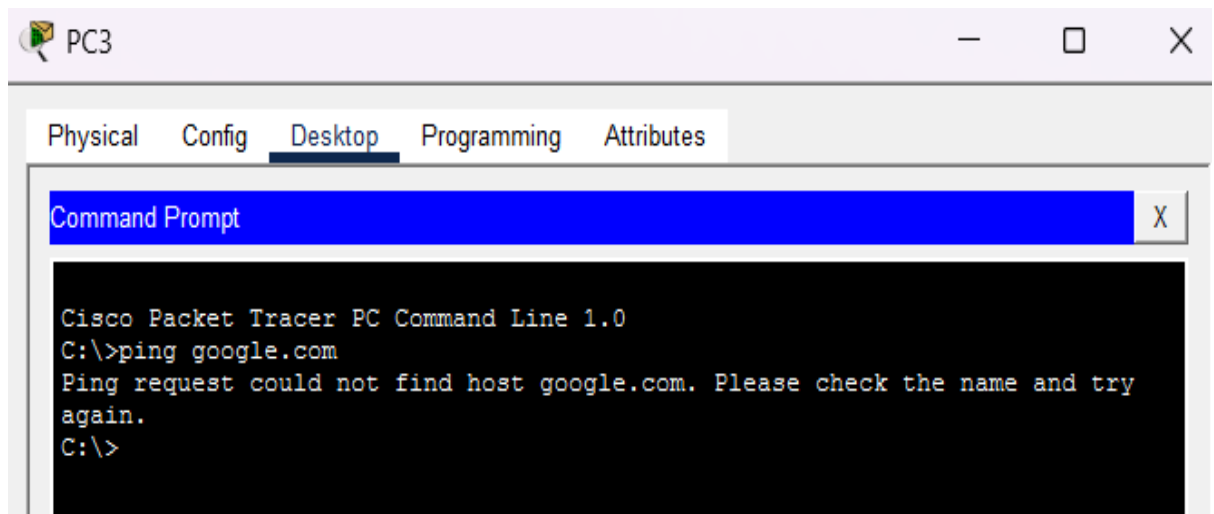
PC3:

```
PC3                                                    —    □    X

 Physical   Config   Desktop   Programming   Attributes

 Command Prompt                                                X

  Cisco Packet Tracer PC Command Line 1.0
  C:\>ping google.com
  Ping request could not find host google.com. Please check the name and try
  again.
  C:\>
```

2. Clear the NAT translations and remove the current NAT configuration. Switch the configuration to PAT using R1's public IP address. (at interface g0/0 – 203.0.113.1)

```
R1>en
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#exit
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#clear ip nat translation *
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#do sh ip nat translations
R1(config)#do sh run
```

To remove the previous configuration and switch to PAT –

```
R1(config)#do sh run | include ip nat
 ip nat outside
 ip nat inside
ip nat pool POOL1 100.0.0.1 100.0.0.2 netmask 255.255.255.0
ip nat inside source list 1 pool POOL1
R1(config)#ip nat inside source list 1 pool POOL1 overload
R1(config)#do sh run | include ip nat
 ip nat outside
 ip nat inside
ip nat pool POOL1 100.0.0.1 100.0.0.2 netmask 255.255.255.0
ip nat inside source list 1 pool POOL1 overload
R1(config)#no ip nat pool POOL1 100.0.0.1 100.0.0.2 netmask 255.255.255.0
%Pool POOL1 in use, cannot destroy
R1(config)#ip nat inside source list 1 interface g0/0 overload
R1(config)#do sh ip nat translations
R1(config)#do sh run | include ip nat
 ip nat outside
 ip nat inside
ip nat pool POOL1 100.0.0.1 100.0.0.2 netmask 255.255.255.0
ip nat inside source list 1 interface GigabitEthernet0/0 overload
R1(config)#no ip nat pool POOL1 100.0.0.1 100.0.0.2 netmask 255.255.255.0
R1(config)#do sh run | include ip nat
 ip nat outside
 ip nat inside
ip nat inside source list 1 interface GigabitEthernet0/0 overload
R1(config)#
```
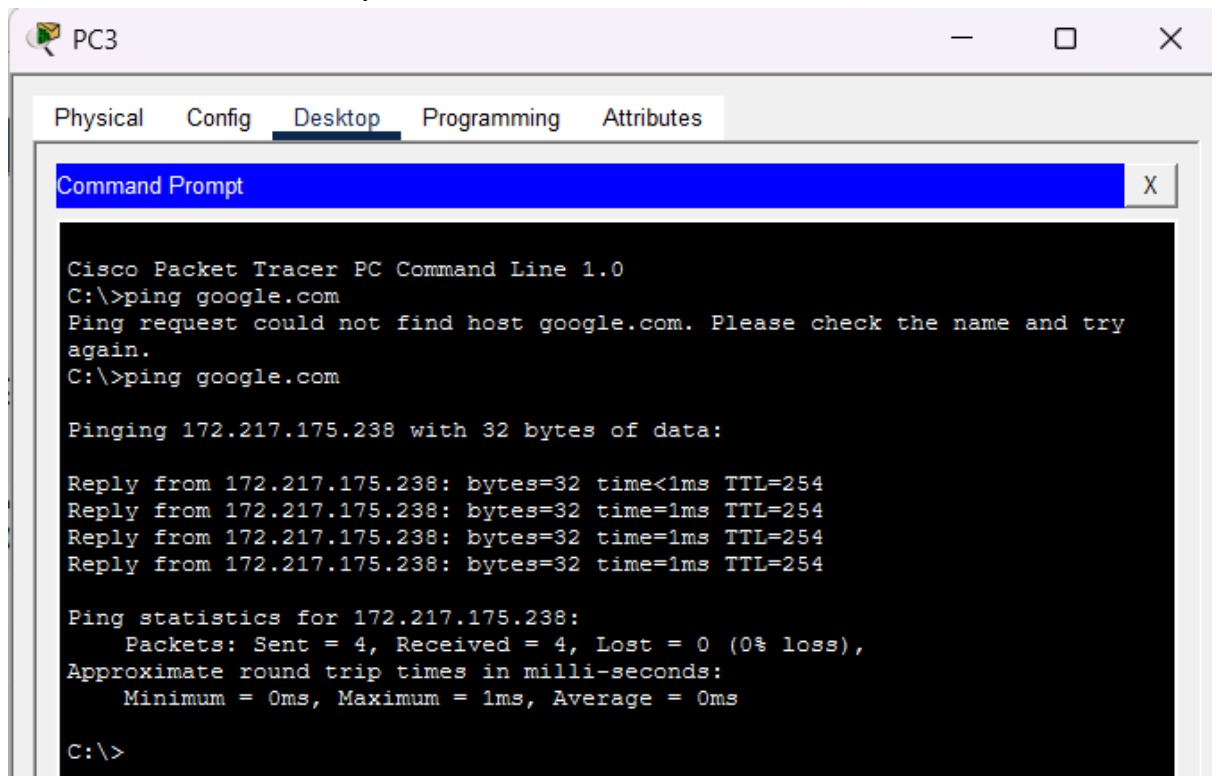
3. Now, ping google.com from each PC
   All the PCs are able to ping google.com simultaneously now;
   they are being assigned a single inside global address (the IP
   address of interface g0/0 of R1), and only the port numbers are
   changed because of the "overload" in the command.

   R1 NAT translations:

```
R1(config)#do sh ip nat translations
Pro  Inside global     Inside local      Outside local     Outside global
icmp 203.0.113.1:1024  172.16.0.2:5      172.217.175.238:5
172.217.175.238:1024
icmp 203.0.113.1:1025  172.16.0.2:6      172.217.175.238:6
172.217.175.238:1025
icmp 203.0.113.1:1026  172.16.0.2:7      172.217.175.238:7
172.217.175.238:1026
icmp 203.0.113.1:1027  172.16.0.2:8      172.217.175.238:8
172.217.175.238:1027
icmp 203.0.113.1:1      172.16.0.3:1      172.217.175.238:1
172.217.175.238:1
icmp 203.0.113.1:2      172.16.0.3:2      172.217.175.238:2
172.217.175.238:2
icmp 203.0.113.1:3      172.16.0.3:3      172.217.175.238:3
172.217.175.238:3
icmp 203.0.113.1:4      172.16.0.3:4      172.217.175.238:4
172.217.175.238:4
icmp 203.0.113.1:5      172.16.0.1:5      172.217.175.238:5
172.217.175.238:5
icmp 203.0.113.1:6      172.16.0.1:6      172.217.175.238:6
172.217.175.238:6
icmp 203.0.113.1:7      172.16.0.1:7      172.217.175.238:7
172.217.175.238:7
icmp 203.0.113.1:8      172.16.0.1:8      172.217.175.238:8
172.217.175.238:8
udp  203.0.113.1:1024  172.16.0.2:1026   8.8.8.8:53        8.8.8.8:53
udp  203.0.113.1:1025  172.16.0.3:1026   8.8.8.8:53        8.8.8.8:53
udp  203.0.113.1:1026  172.16.0.1:1026   8.8.8.8:53        8.8.8.8:53
```

PCs Command Prompts:

PC3 — □ ✕

Physical   Config   Desktop   Programming   Attributes

Command Prompt   X

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping google.com
Ping request could not find host google.com. Please check the name and try
again.
C:\>ping google.com

Pinging 172.217.175.238 with 32 bytes of data:

Reply from 172.217.175.238: bytes=32 time<1ms TTL=254
Reply from 172.217.175.238: bytes=32 time=1ms TTL=254
Reply from 172.217.175.238: bytes=32 time=1ms TTL=254
Reply from 172.217.175.238: bytes=32 time=1ms TTL=254

Ping statistics for 172.217.175.238:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```