TELECOMMUNICATION NETWORKS (TCN) TC-421

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SECTION : A

ELECTRONICS DEPARTMENT

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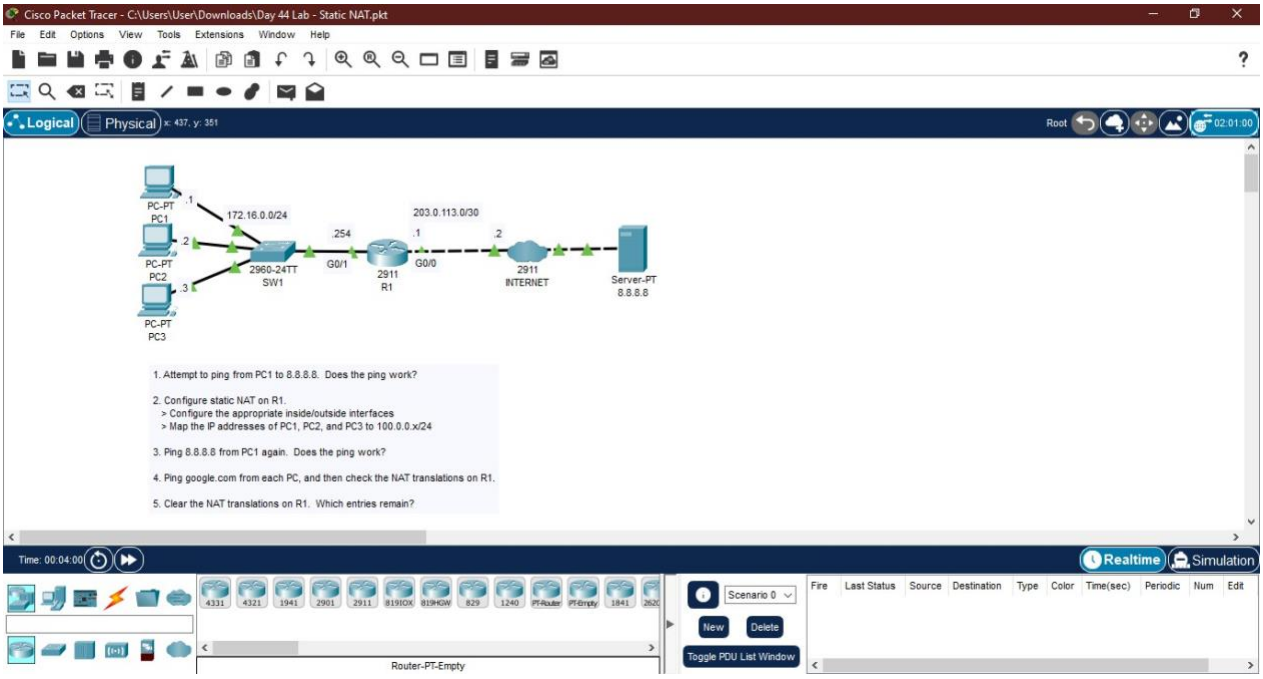
NAT: NETWORK ADDRESS TRANSLATION

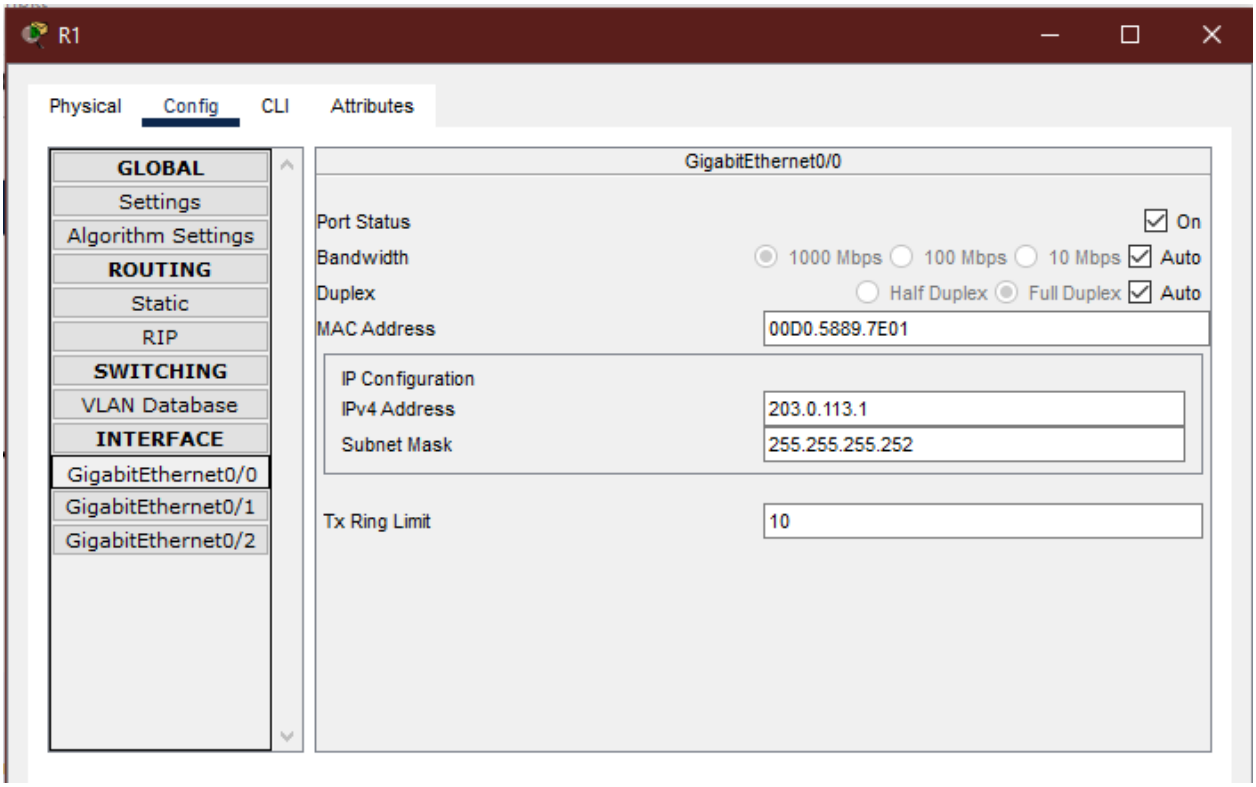
Network Address Translation (NAT) is a service that enables private IP networks to use the internet and cloud. NAT translates private IP addresses in an internal network to a public IP address before packets are sent to an external network

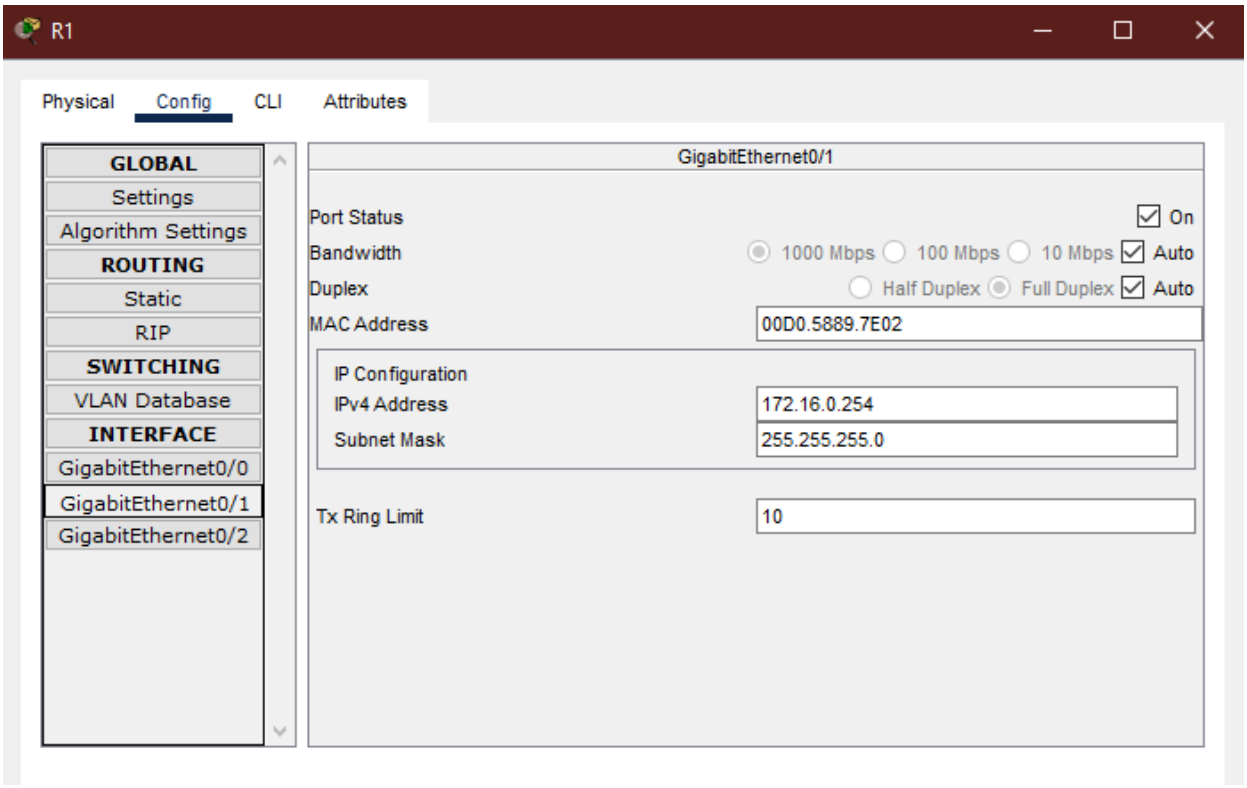
The following network is being created in Packet Tracer. It consists of a router R1, which is connected to 3 PCs by means of a switch.



The router is configured to have a inside local address of 172.16.0.254 which is an example of a private IP address. The inside global address is 203.0.113.1 which is a public IP address for the router to connect it to the internet.

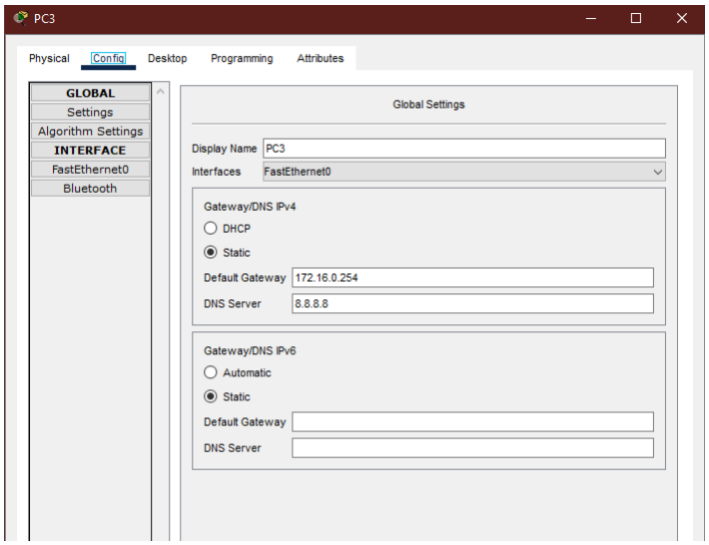
Router Configuration:



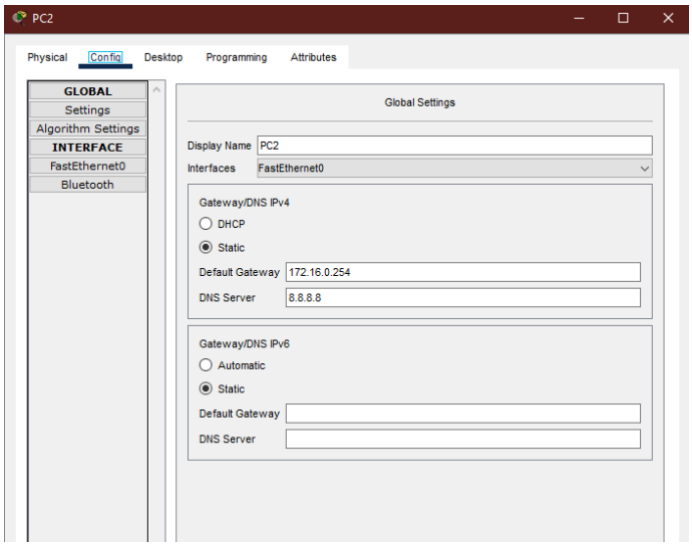


PCs Configuration:

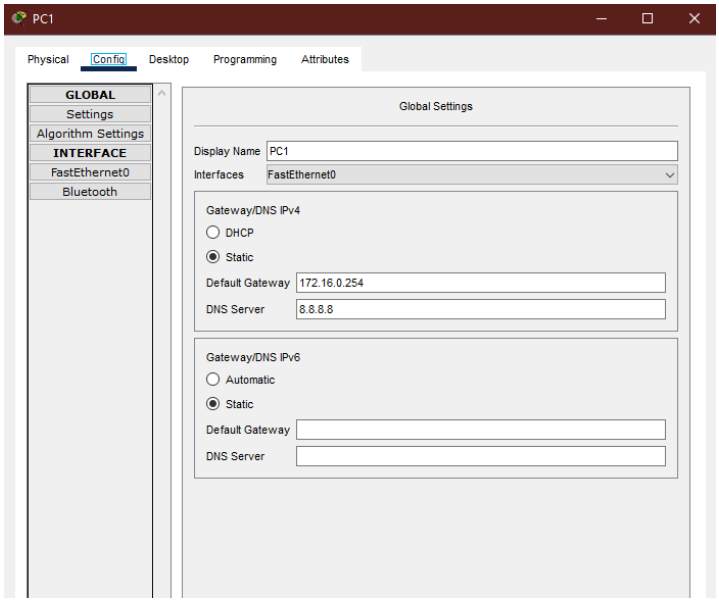
PC1:



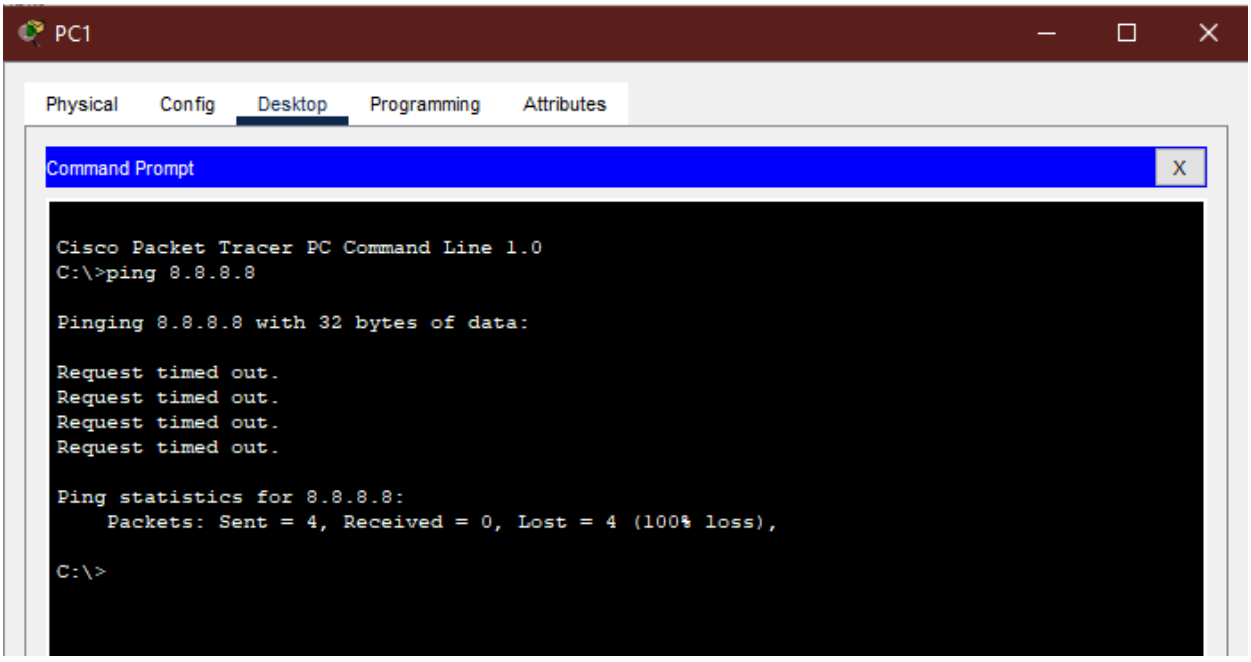
PC 2:



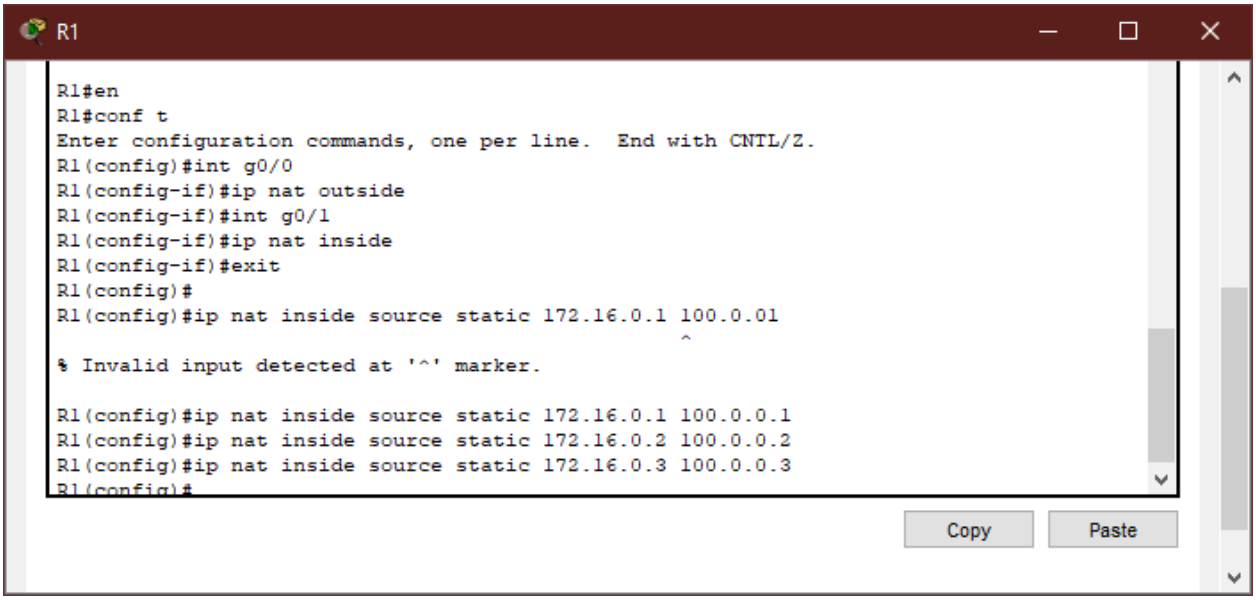
PC 3:



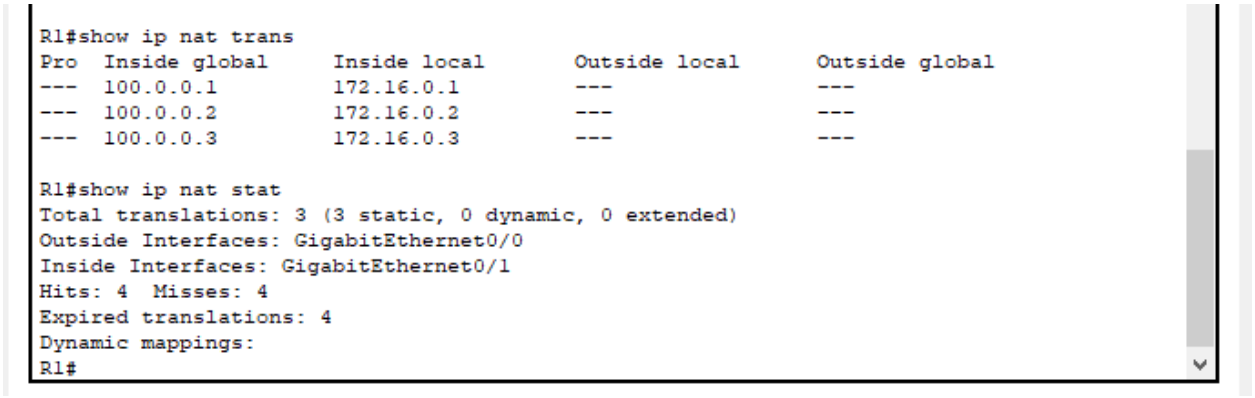
Ping the ip address 8.8.8.8 by PC 1. Since it doesnot have a public ip address of its own, it will not be able to communicate with the internet.



Configure the router to create NATS for the PCs using the IOS commands on the CLI.

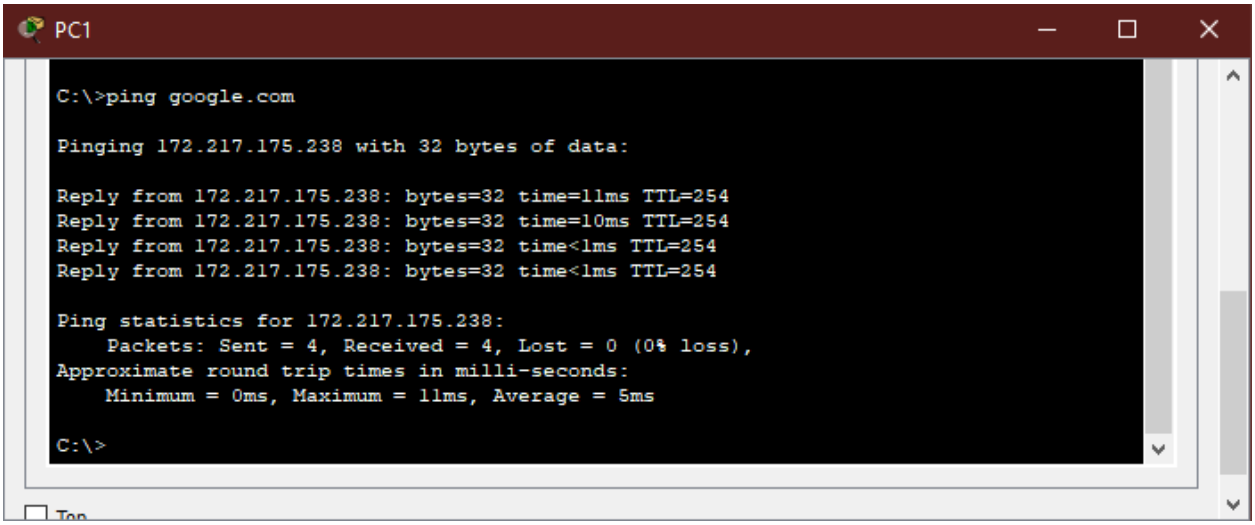


To demonstrate the successful translations, following commands are used to check the static NATs.

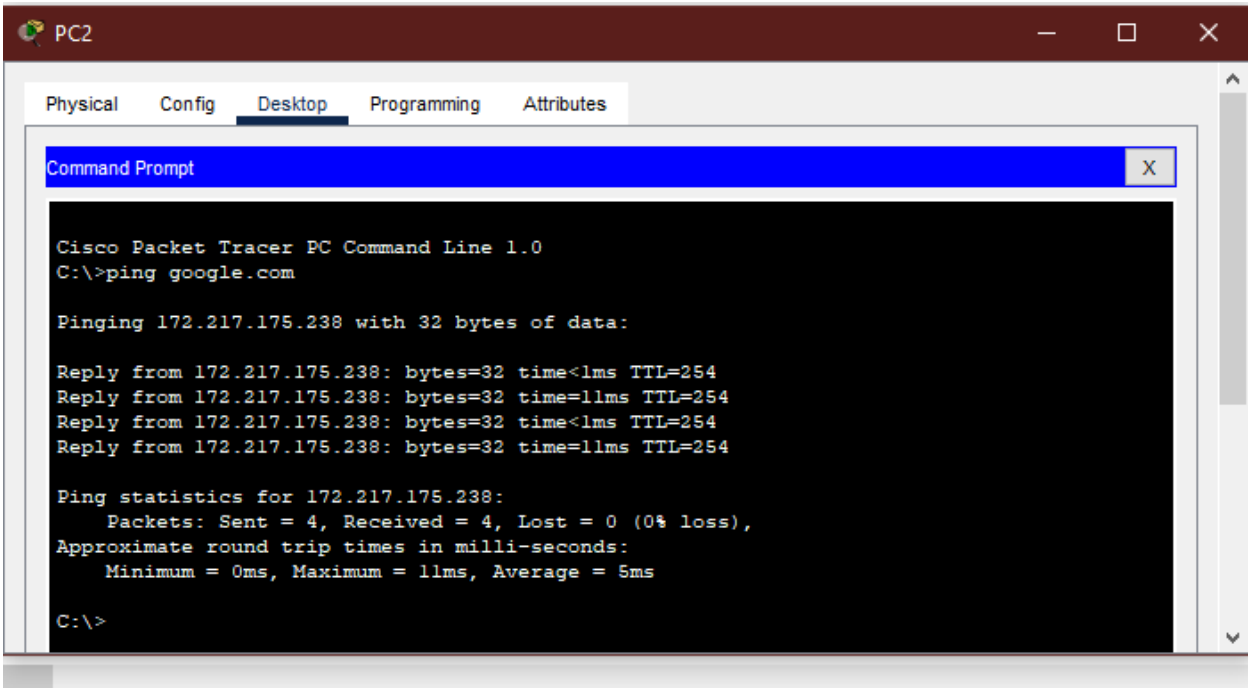


Since the PCs have inside global addresses now, each PC is used to send a ping request to google.com. The successful ping acknowledgment shows that the PCs are now connected to the Internet.

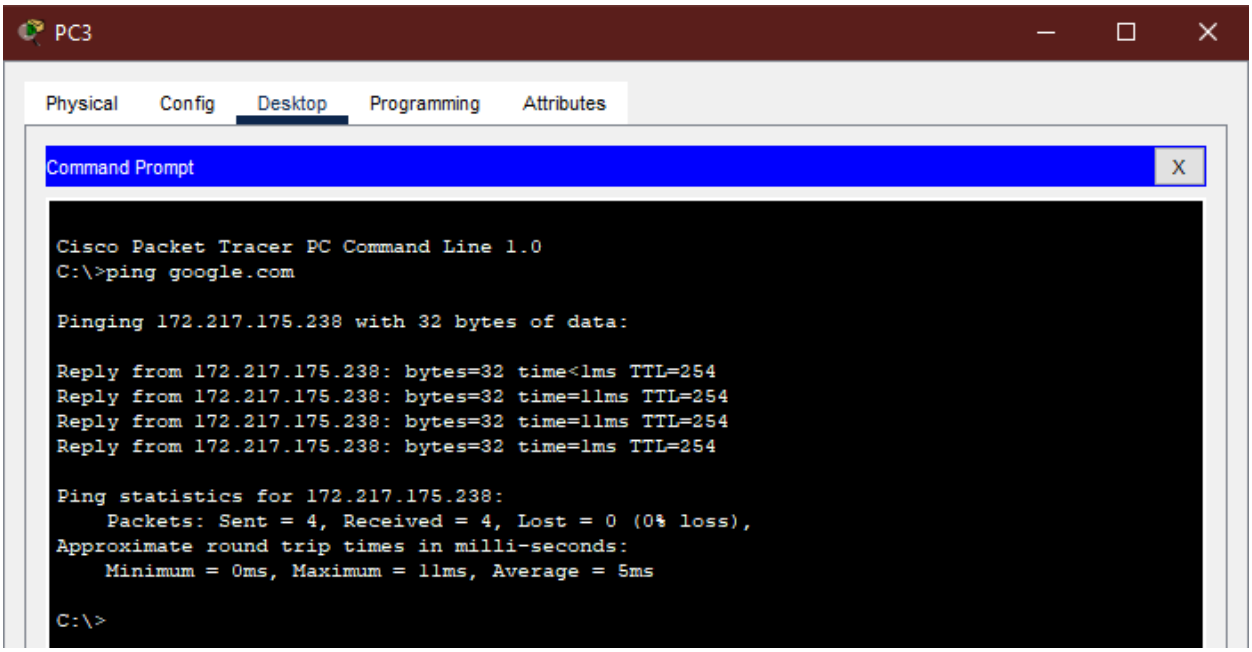
PC 1:


PC1
C:\>ping google.com
Pinging 172.217.175.238 with 32 bytes of data:
Reply from 172.217.175.238: bytes=32 time=11ms TTL=254
Reply from 172.217.175.238: bytes=32 time=10ms 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 = 11ms, Average = 5ms
C:\>

PC 2:


PC2
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
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=11ms TTL=254
Reply from 172.217.175.238: bytes=32 time<1ms TTL=254
Reply from 172.217.175.238: bytes=32 time=11ms 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 = 11ms, Average = 5ms
C:\>

PC 3:



Finally, the "*show ip nat translation*" command is used to display the translations. Notice that the last two translations are udp, because they are using dns to search for the ip of google.com with port number 53.

Lastly, "*clear ip nat translation* * " is used to clear all the dynamic translations.

```
R1#show ip nat trans
Pro  Inside global     Inside local       Outside local      Outside global
---  100.0.0.1         172.16.0.1         ---                ---
---  100.0.0.2         172.16.0.2         ---                ---
---  100.0.0.3         172.16.0.3         ---                ---
udp 100.0.0.2:1025     172.16.0.2:1025    8.8.8.8:53         8.8.8.8:53
udp 100.0.0.3:1025     172.16.0.3:1025    8.8.8.8:53         8.8.8.8:53

R1#clear ip nat translations *
                         ^
% Invalid input detected at '^' marker.

R1#clear ip nat translation *
R1#show ip nat translation
Pro  Inside global     Inside local       Outside local      Outside global
---  100.0.0.1         172.16.0.1         ---                ---
---  100.0.0.2         172.16.0.2         ---                ---
---  100.0.0.3         172.16.0.3         ---                ---

R1#
```