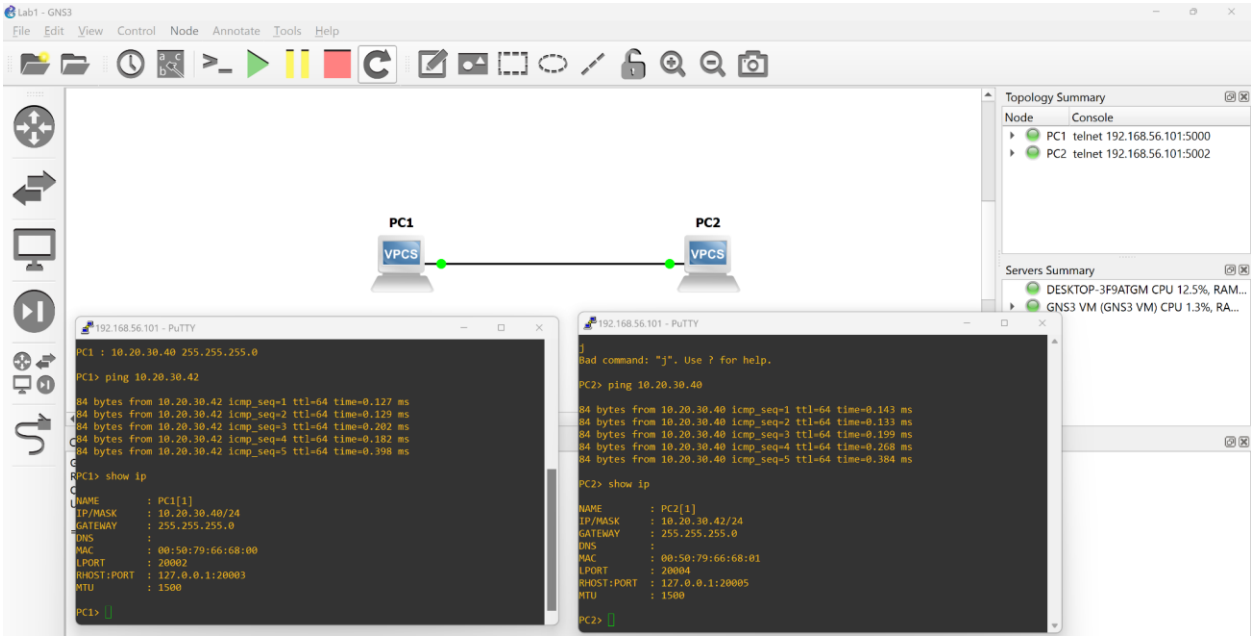
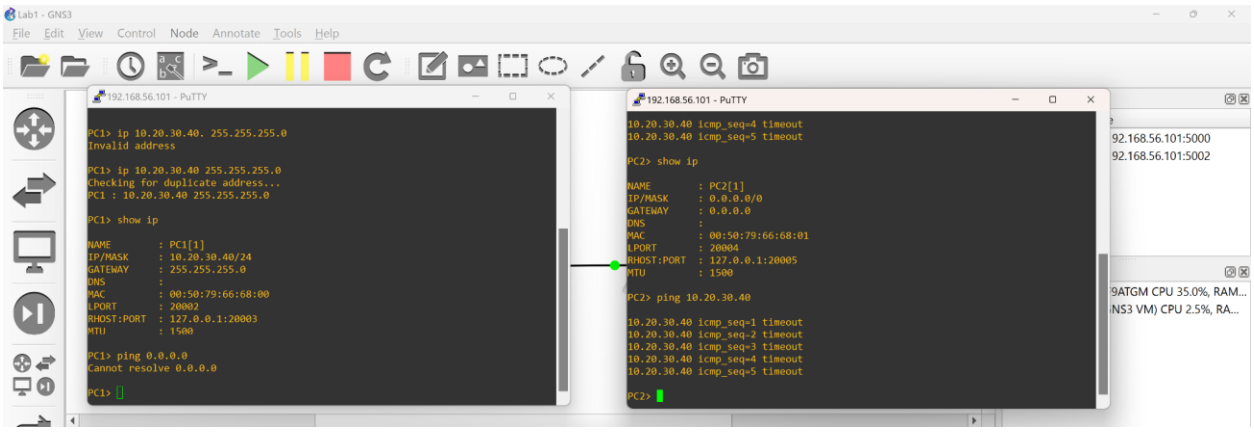
Computer Networks - Lab 1:

In this lab, I experimented with a variety of IP Address and Subnet Mask combinations using two virtual machines in GNS3, as instructed. To begin, I set up the virtual machines, created a link between them, set their IP addresses and subnet masks to the ones that were given, and tested the connection between them- here is a screenshot showcasing a successful connection with the default settings:

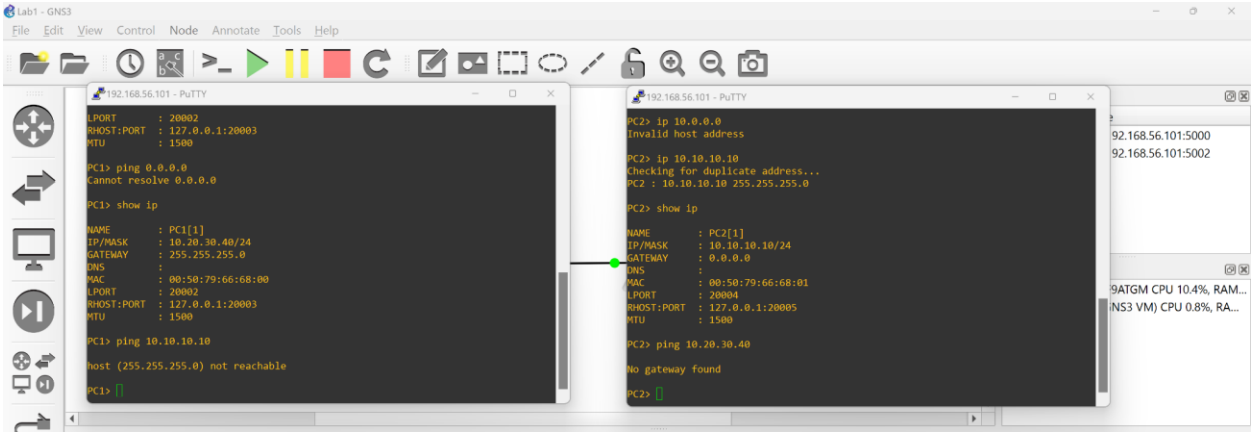


Now, here are screenshots showcasing the various IP address and subnet mask combinations that I tried, and their results:

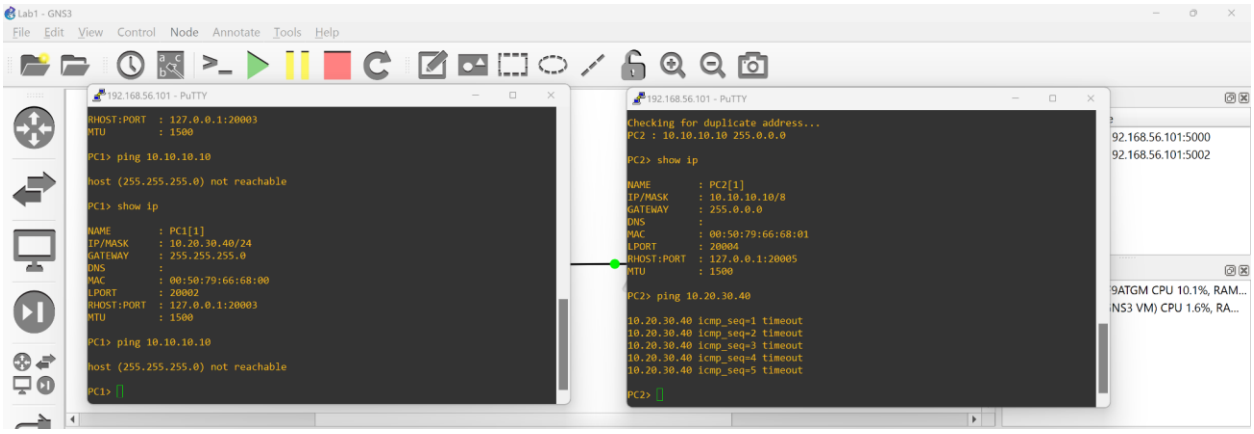
Test 1:



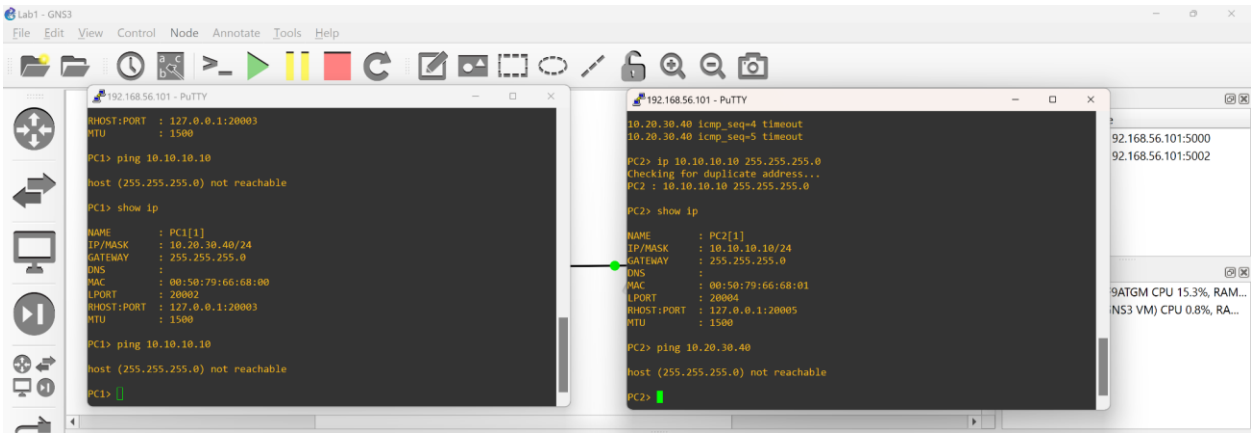
Test 2:



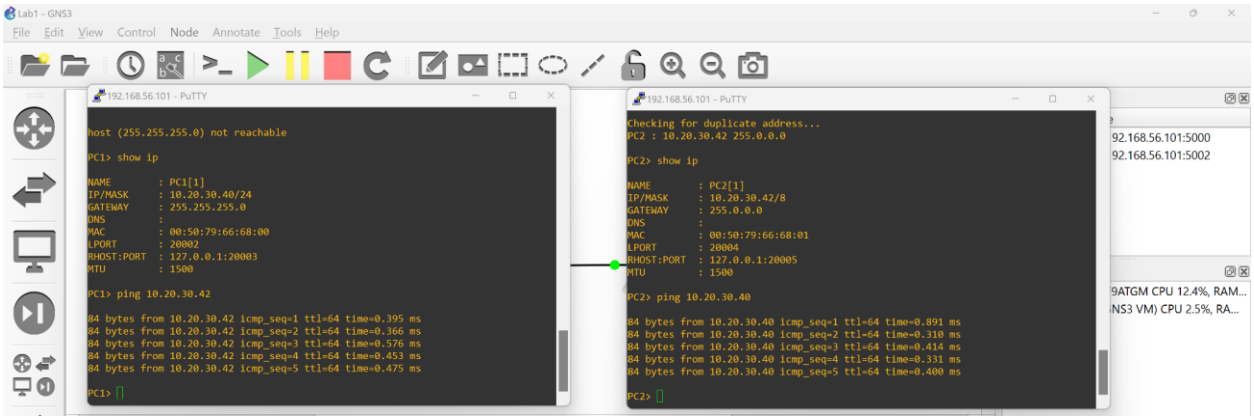
Test 3:



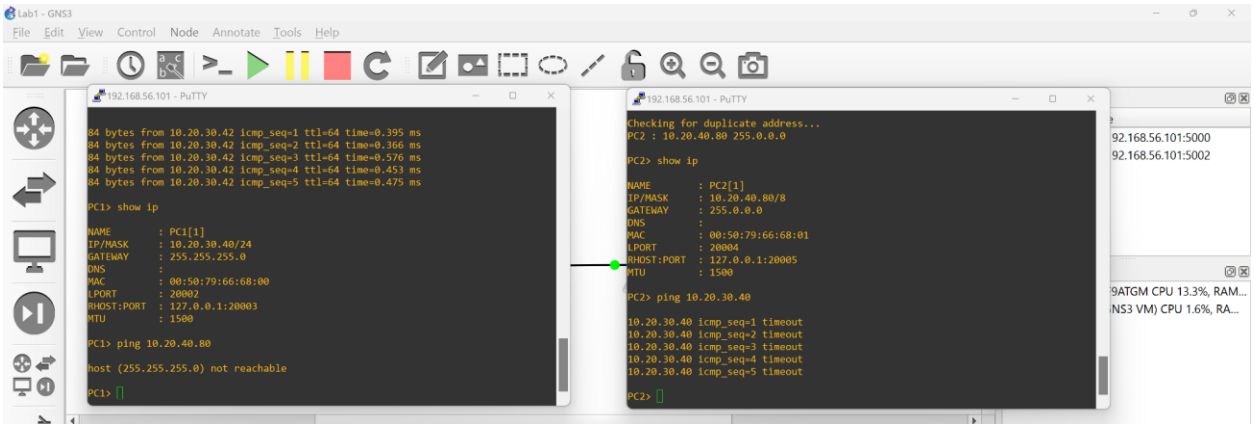
Test 4:



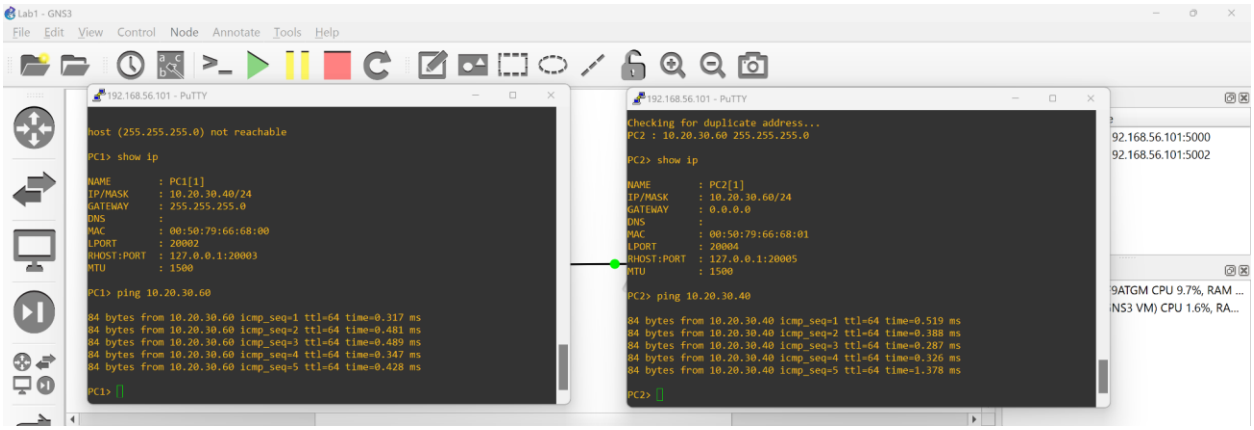
Test 5:



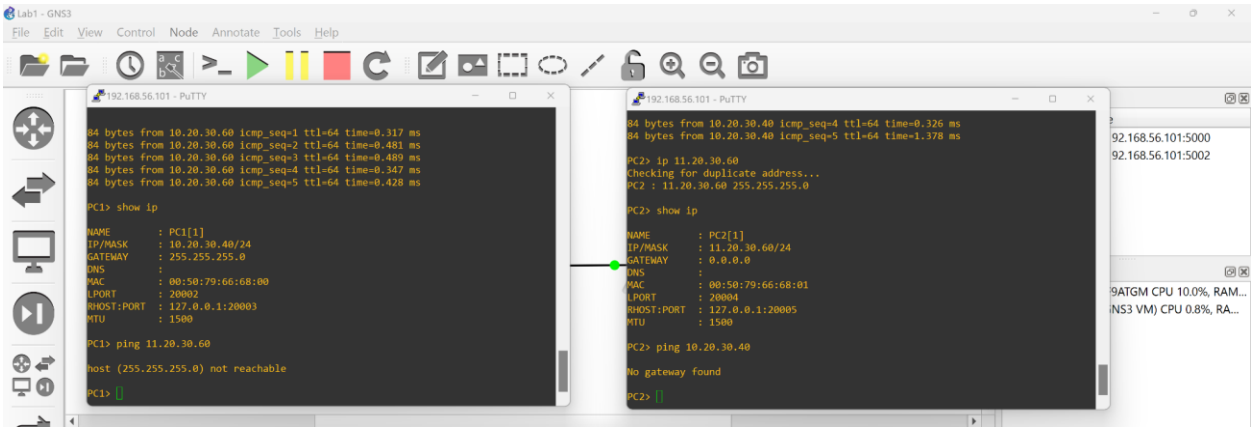
Test 6:



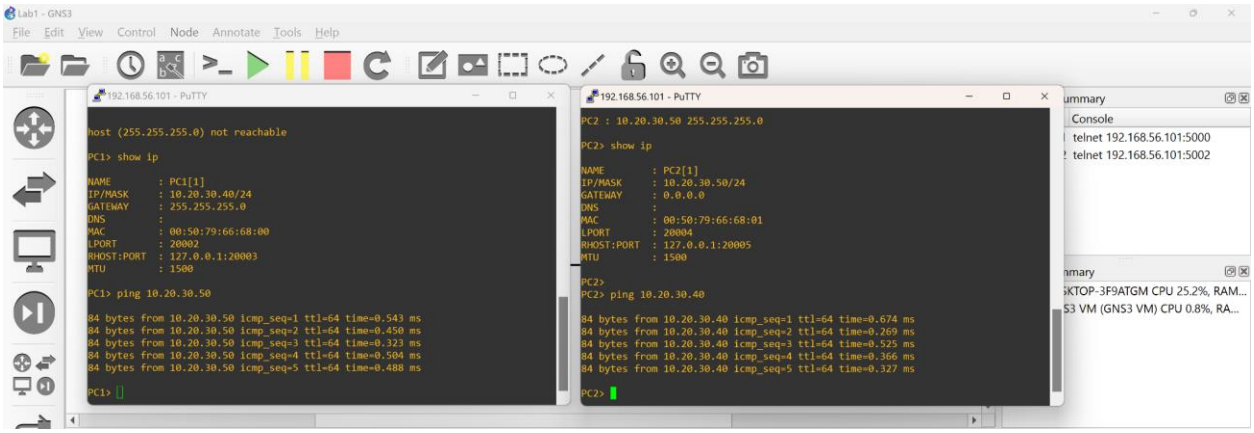
Test 7:



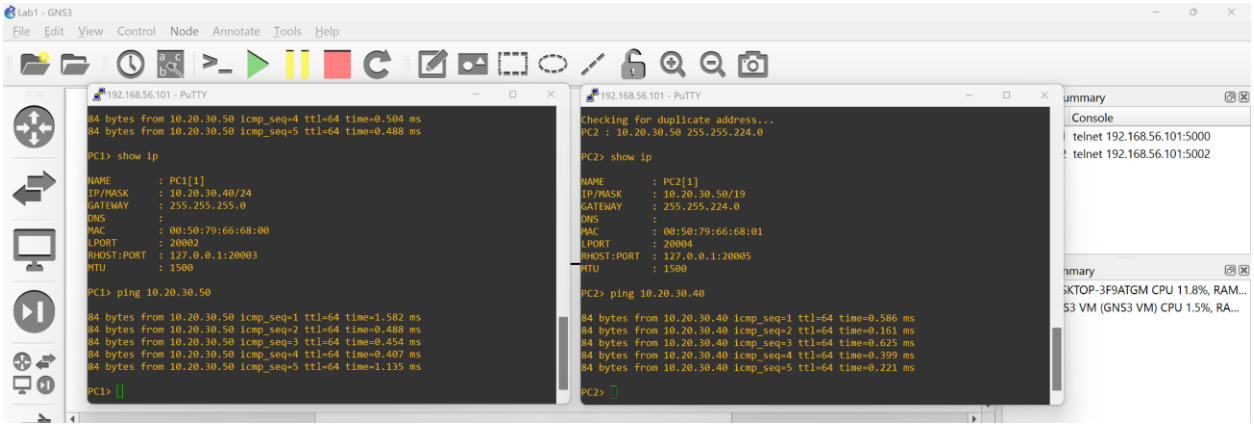
Test 8:



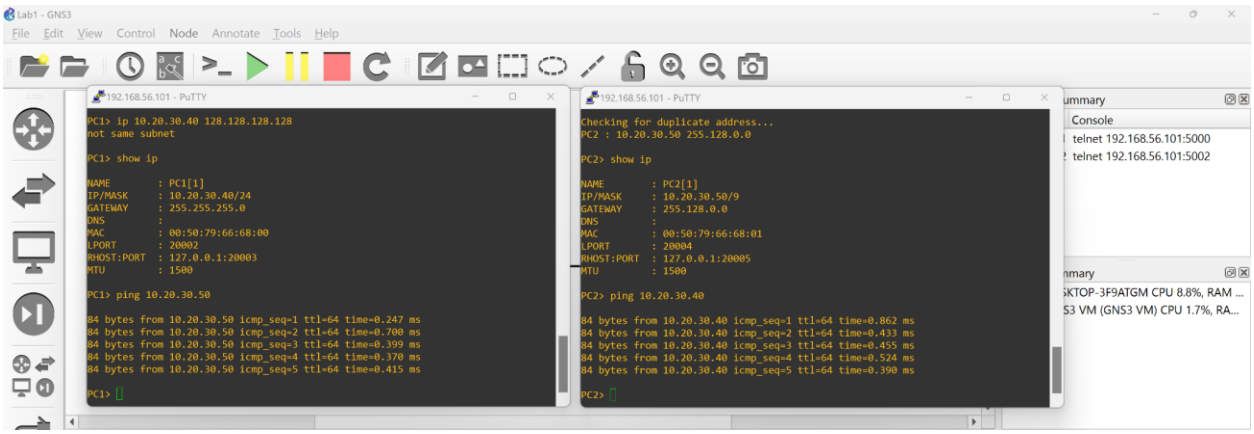
Test 9:



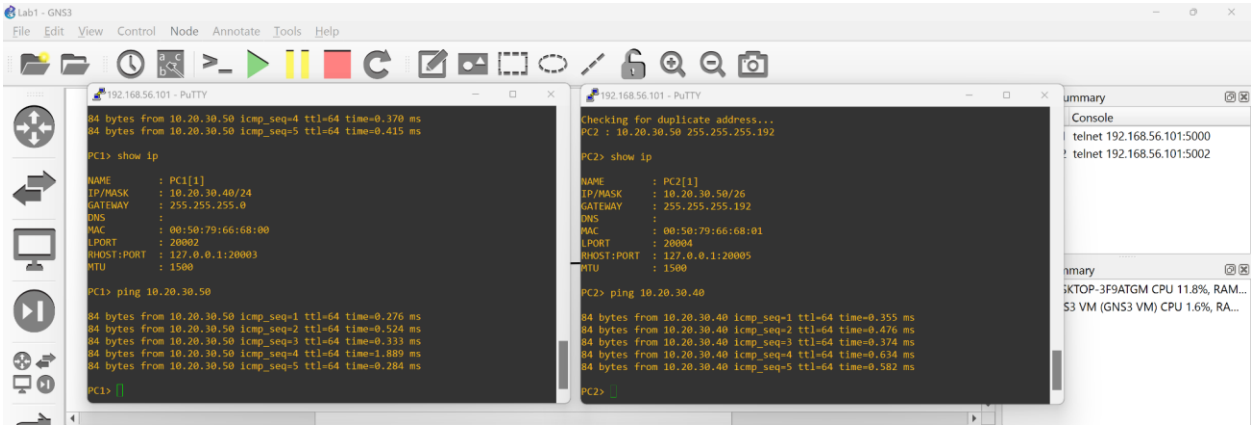
Test 10:



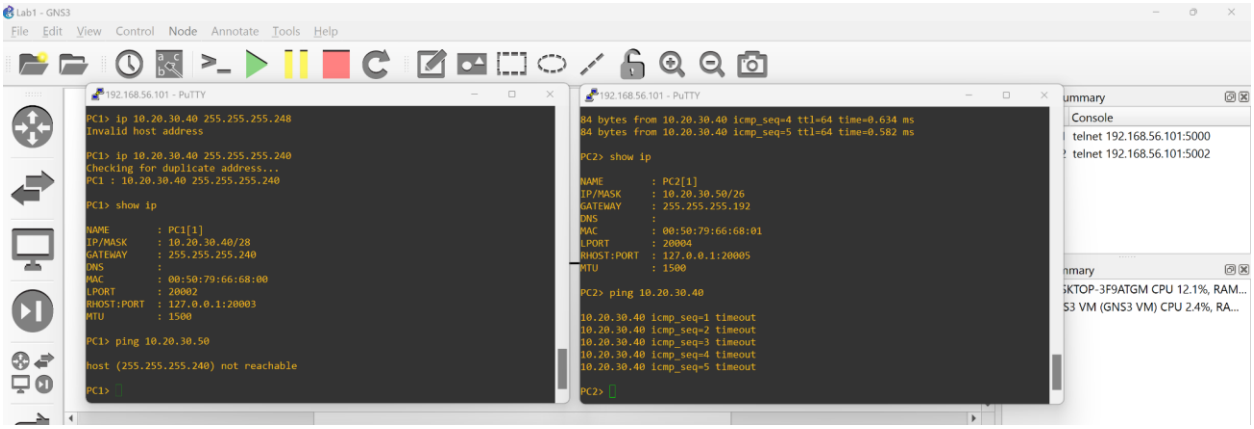
Test 11:



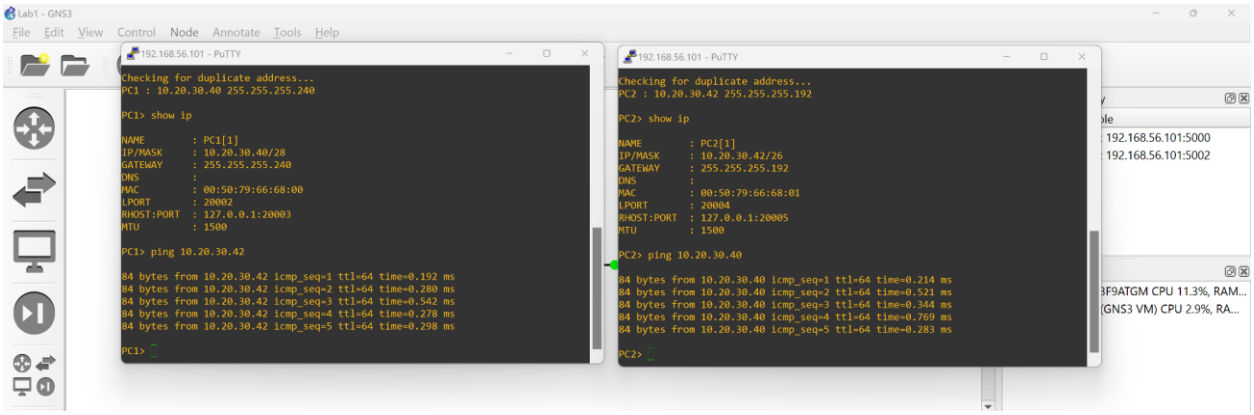
Test 12:



Test 13:



Test 14:



Based on my tests, it appears that if one host has a larger subnet mask and an address outside the range of the other host, that the machines cannot talk to each other. This is evident in the sixth test that I have displayed above, where PC1 has an address of 10.20.30.40 and a subnet mask of 255.255.255.0, and PC2 has an address of 10.20.40.80 and a subnet mask of 255.0.0.0. In this particular case, PC2 has a larger subnet mask, and the address of PC1 is outside of (below) the range of PC2. As can be seen in the test, PC2 was able to reach PC1, but PC1 could not send data back to PC2. This is because the subnet mask of PC2 allows it to communicate with a wider range of addresses, whereas the subnet mask of PC1 gives it a narrower range of addresses to communicate with, which does not include the address of PC2.

The subnet mask seems to determine the range of IP addresses that the machine can communicate with; the bigger the subnet mask, the wider range of addresses that can be reached. In the case of subnet masks, a ‘bigger’ mask is a mask that is closer to 0.0.0.0, which can communicate with every address, and a ‘smaller’ mask is a mask that is closer to 255.255.255.255.

References:

Cloud Access. “Cloud Control PanelTM.” *Joomla & WordPress Managed Hosting, Expert Support and Tutorials*, www.cloudaccess.net/cloud-control-panel-ccp/157-dns-management/322-subnet-masks-reference-table.html. Accessed 10 Sept. 2024.