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Assignment 2 – GNS3Single Switch LAN

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1. PC-1 and PC-2 and PC-3 are now in the same broadcast domain. In your own words, explain the concept of a broadcast domain.

   A broadcast domain is the list of IP addresses that will receive a broadcast message when one is sent to all devices within the network.

2. What was the result of the arp command on your PCs? Explain this result.

   The result shown was “arp is empty” for all 3 PCs. This is because the Ethernet Switch has not been communicating with any of the PCs.

3. What are the MAC addresses assigned to PC-1 and PC-2 and PC-3?

   PC-1 MAC address is 00:50:79:66:68:00

   PC-2 MAC address is 00:50:79:66:68:01

   PC-3 MAC address is 00:50:79:66:68:02

4. Are PC-1 and PC-2 and PC-3 in the same layer 3 network? Explain your answer.

   Yes, PC-1, PC-2, and PC-3 are all are in the same layer 3 network because their network address which is the first 3 numbers (each number separated by a period) of the IP address are the exact same.

5. Are PC-1 and PC-2 and PC-3 in the same broadcast domain? Explain your answe

   Yes, PC-1, PC-2, and PC-3 are all within the same broadcast domain because they are all have the same subnet.

6. Include the contents of the arp tables from all PCs in your lab report.

PC-1	00:50:79:66:68:01 192.168.1.2 expires in 5 seconds 00:50:79:66:68:02 192.168.1.3 expires in 46 seconds
PC-2	00:50:79:66:68:00 192.168.1.1 expires in 8 seconds 00:50:79:66:68:02 192.168.1.3 expires in 82 seconds
PC-3	00:50:79:66:68:00 192.168.1.1 expires in 52 seconds 00:50:79:66:68:01 192.168.1.2 expires in 85 seconds

7. Explain the purpose of ARP and how it works. Use appropriate terminology for things like OSI or TCP layer names or numbers, protocols, addresses, and datagram names (i.e. packet, segment, frame, etc.). Be specific and discuss how caching improves performance.

   ARP works between Layers 2 and 3 of the OSI model. Its purpose is to find the MAC address of the destination host on an network, given an IP address. The ARP

broadcasts a request packet to all machines on the network. The packet contains the source source MAC address and the source IP address and the destination IP address. If a machine recognizes the destination IP address as its own, it sends a ARP reply with its MAC address. Now the ARP can update the cache table with the IP address and its corresponding MAC address for future reference and faster access.

8. Did the MAC address on the PCs change when you changed the IP address on PC2? Why?

   The MAC address did not changed after changing the IP address because the MAC address is OSI Layer 2 and is unique to the machine while the IP address is OSI Layer 3 and refers to the network the machine is apart of.

9. Is PC-2 in the same layer 3 network as it was when it had an IP address of 192.168.1.2? Explain.

   No, PC-2 is no longer in the same layer 3 network because the new IP address changed the network address portion of the IP address. All computer on the same network share the same netweork address so now that network address in PC-2's IP address is different it is no longer apart of the same network.

10. Is PC-2 in the same broadcast domain as it was when it had an IP address of 192.168.1.2? Explain.

    No, PC-2 in the same broadcast domain because the new IP address changes the subnet and by proxy changes the broadcast domain.

11. Why does the ping from PC-1 to PC-2 (and PC-3 to PC-2)fail? Explain this in terms of layer 3 networks and broadcast domains

    The ping from PC-1 to PC-2 (and PC-3 to PC-2) failed because the new IP address assigned to PC-2 has a different network address. Since the network address is different PC-2 no longer shares the same layer 3 network or subnet which means it is also outside of the range of IP addresses that can receive a broadcast message (not within broadcast domain that PC-1 and PC-3 share).

Reflection

The most valuable feature of the lab was the visual representation of the network and the console, where the command outputs were concise labeled information, which made it very easy to understand what information I was looking at. I did not do much to prepare for this lab prior to starting, which led to me having a hole in my understanding of the terms and processes being used in the lab. In future labs I would look through the questions prior to starting to check if there are any terms that I don't recognize or understand and research them, so I have some foundational knowledge going into the assignment. For someone preparing for this lab for the first time, I would suggest they have a simple overview of the OSI layers, especially layer 2 and 3, and understand the relationship and information exchange between them.