

CYSE-270- Linux System For Cybersecurity

Assignment –10

Networking Basics - Subnetting (100 points)

Understanding subnetting takes time and practice. Using the methods covered during the class, fill in the following tables for **Network, broadcast, first IP, Last IP** and **Max. Hosts in the network**.

The column for IP address should be in Decimal format for each, except number of hosts. (Refer to the examples in the slide for week 10-Networking Basics)

Task-A: (50 Points)

Category	IP Address	Binary Format
Address	192.168.100.4	11000000.10101000.01100100.00000100
Netmask	28 (255.255.255.240)	11111111.11111111.11111111.11110000
Network address	192.168.100.0	11000000.10101000.01100100.00000000
Broadcast address	192.168.100.15	11000000.10101000.01100100.00010001
First IP	192.168.100.1	11000000.10101000.01100100.00000001
Last IP	192.168.100.14	11000000.10101000.01100100.00001110
Maximum host in the network	14 hosts	

Task-B: (50 points)

Category	IP Address	Binary Format
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Address	170.1.0.0	10101010.00000001.00000000.00000000
Netmask	26 (255.255.255.192)	11111111.11111111.11111111.11000000
Network address	170.1.0.0	10101010.00000001.00000000.00000000
Broadcast address	170.1.0.63	10101010.00000001.00000000.01000001
First IP	170.1.0.1	10101010. 00000001.00000000.00000001
Last IP	170.1.0.62	10101010. 00000001.00000000.00116110
Maximum host in the network	62 hosts	

Masks					Networks	Addresses
/1	/9	/17	/25	128	2	128
/2	/10	/18	/26	192	4	64
/3	/11	/19	/27	224	8	32
/4	/12	/20	/28	240	16	16
/5	/13	/21	/29	248	32	8
/6	/14	/22	/30	252	64	4
/7	/15	/23	/31	254	128	2
/8	/16	/24	/32	255	256	1

Addresses																																																
128	0																																															
64	0																64																															
32	0																32												64																			
16	0								16								32								48								64								8							
8	0				8				16				24				32				40				48				56				64				72				8							
4	0		4		8		12		16		20		24		28		32		36		40		44		48		52		56		60		64		68		72		76		8							

1. First, I began by translating each address from decimal format to binary format. Next, I chose the address "192.168.100.4" while setting below the numbers "128/64/32/16/8/4/2/1" (these numbers represent the place values of each bit). To begin translating, I chose the number "192" and subtracted with the highest bit first. After subtracting 192 from 128, we are left with 64 in which I continue to subtract with the next bit (64). Once I run out of numbers to subtract, I then placed "1"s to the first two bits and then "0" for the rest. At the end, we are left with "11000000" for 192. The rest of the addresses follow the same sequence in translating to binary. However, if the place value number is larger than the bit, then a "0" is in place until it could be subtracted (ex. The bit 1 for 128/64/32/16/8/4/2/1 would translate to 00000001).
2. For the netmask, I was given the number 28 alone, so I had to figure out what the decimal number of the address could be. Following this table chart for 28, the row with that netmask will have the decimal value 240. To figure out where to place that value, the placement of the netmasks in the chart corresponds to the placement (which there are 4) of the address. For example, in the row of "/4 /12 /20 /28", the netmask of 28 is in the fourth octet. So the decimal value 240 would be placed to the furthest of the right. Everything on the left of 240 would be 255 and any number after the 240 would be zero (as for now there aren't any in this example). Once we have the decimal value of the netmask (255.255.255.240), it then follows the 1st step.
3. To calculate the network address: if the mask was 255, I would have to bring down the address. If the mask is 0, then I would have to use 255 in its place. For any other number (the 240), it is referred to in the chart. In the row of /28 and 240, the address on the far right is 16. I would then correspond it to the blue chart in the row that starts off with 16. Looking back to the address, since the 240 spot corresponds with the spot of 4, I used it to see where 4 would fall under (which would be 0). So, the network address would be: 192.168.100.0
4. For the broadcast address, the same rules from #3 is followed. This time, however, we take the placement of 0 and 16 and subtract 1 for the 16 to get 15. The broadcast address would be 192.168.100.15.
5. To get both the first and last IP address, I would add 1 using the network address and subtract 1 using the broadcast address. This would be: 192.168.100.1 (first) and 192.168.100.14 (last).
6. To find the maximum number of hosts, I subtracted 2 from 16 to get 14 maximum hosts in the network.

Reflection

In this lab, I had to learn how to subnet with the addresses on the list. I did have trouble understanding how to find the addresses on the list. For this I had to use outside sources to remember. I had watched a tutorial video ([Professor Messer's Seven Second Subnetting video](#)), which gave me the layout on how I could start. As for the binary conversion, I had also watched [this](#) video, which explains it quickly. Understanding these concepts would be useful in making IP address management more efficient.