CNT 125 Online – Subnet Planning Lab

**Background:** A subnetwork, or subnet, is a logically visible subdivision of an IP network. The practice of creating subnetworks is called subnetting. All computers that belong to a subnet are addressed with a common, identical, most-significant bit-group in their IP address. This part of the address is known as the routing prefix or network number. The size of the routing prefix may be indicated using CIDR notation or through specification of a subnet mask. In order to achieve the correct number of subnets when subnetting, some planning is necessary to correctly manipulate the “borrowed bits” to achieve the correct number of usable subnets.

**Learning Outcomes**: Upon successful completion of the course the student will be able to:

* Implement a subnetted TCP/IP network using routers and switches

**Directions:**

1. Download a copy of this lab to your PC
2. Either …. Print out a copy so you write on the page … or … Type into the copy of the lab (feel free to use a colored font or highlighting to help your work to stand out) to complete the lab
3. Use the Podcasts available on D2L with this lab to aid in completing the lab.

*Part A: Using the given network # and subnet mask – correctly calculate the number of borrowed bits, the number of subnets and the number of usable hosts/subnet created for the given network. (Use the Podcasts available on D2L to assist with completing this Lab)*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | IP Address from Network | What Class | SNM Bit Count | SNM – Dotted Decimal | # Bits Borrowed | # of SN Created  (2# of Borrowed Bits ) | # of Addresses/SN  ( 2# of Remaining Bits ) | # of Usable  ( 2# of Remaining Bits – 2 ) |
| Ex | 195.60.123.23 | **C** | /28 | **255.255.255.240** | **4** | 24 = **16 Subnets** | 24 = **16** Addresses/SN | 24 = 16 – 2 = **14** Usable Hosts/SN |
| 1 | 210.34.27.2 | c | /30 | 255.255.255.252 | 6 | 64 | 2 bits | 2 |
| 2 | 220.53.230.25 | c | /29 | 255.255.255.248 | 5 | 32 | 3 bits | 6 |
| 3 | 199.52.1.25 | c | /27 | 255.255.255.224 | 3 | 8 | 5 bits | 30 |
| 4 | 191.82.167.3 | b | /24 | 255.255.255.0 | 8 | 256 | 8 bits | 254 |
| 5 | 131.200.25.73 | b | /20 | 255.255.240.0 | 4 | 16 | 12 bits | 4094 |
| 6 | 10.50.24.32 | a | /12 | 255.240.0.0 | 4 | 16 | 20 bits | 1048576 |
| 7 | 120.50.32.120 | a | /16 | 255.255.0.0 | 8 | 256 | 16 bits | 65536 |

*Part B: Using the given network # and details of required # of Subnets or Hosts per Subnet – correctly create the subnet mask to accommodate this networks need. (Use the Podcasts available on D2L to assist with completing this Lab)*

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | IP Address from Network | What Class | SNM Bit Count | SNM – Dotted Decimal | # Bits Borrowed | # of SN Created  (2# of Borrowed Bits ) | # of Addresses/SN  ( 2# of Remaining Bits ) | # of Usable  ( 2# of Remaining Bits – 2 ) |
| Ex | 198.50.127.129 | **C** | **/27** | **255.255.255.224** | **3** | 8 Subnets Needed | 25 = **32** Addresses/SN | 25 = 32 – 2 = **30** Usable Hosts/SN |
| 1 | 220.49.217.29 | C | 24  28 | 255.255.255.240 | 4 | 16 Subnets Needed | 2^4=16 | 14 |
| 2 | 222.59.210.83 | C | 26 |  | 2 | 3 Subnets Needed |  |  |
| 3 | 223.200.99.183 | C |  |  |  |  |  | 30 Usable Hosts/SN Needed |
| 4 | 191.27.176.39 | B | 23 | 255.255.254.0 | 7 | 100 Subnets Needed | 2^9= 512 | 510 |
| 5 | 132.207.226.37 | B | 24 | 255.255.255.0 | 8 | 200 Subnets Needed |  |  |
| 6 | 128.18.2.10 | B |  |  |  |  |  | 1000 Usable Hosts/SN Needed |
| 7 | 100.70.240.42 | A | 18 | 255.0.0.0 | 10 | 1000 Subnets Needed |  |  |
| 8 | 125.55.35.125 | A |  |  |  |  |  | 4000 Usable Hosts/SN Needed |

|  |  |  |  |
| --- | --- | --- | --- |
| Class of Network | First Octet | Network & Host Octets | Default Subnet Mask |
| A | 0 - 126 | N H H H | 255.0.0.0 |
| B | 128 - 191 | N N H H | 255.255.0.0 |
| C | 192 - 223 | N N N H | 255.255.255.0 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 220 | 219 | 218 | 217 | 216 | 215 | 214 | 213 | 212 | 211 | 210 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 |
| 1048576 | 524288 | 262144 | 131072 | 65536 | 32768 | 16384 | 8192 | 4096 | 2048 | 1024 | 512 | 256 | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |

***Lab Submission***

*To receive credit for completing this lab complete the following:*

*1 - Scan the 2 completed pages …. OR … Take Pictures of the 2 completed pages … OR …. Save the file you typed on.*

*2 - Submit this Scan … or … Pictures … or … Saved File of the 2 completed pages to the Dropbox on D2L for the Subnet Planning Lab.*

*3 - After the lab is submitted … Mr. Brown will check the submission - He will be checking for completeness. If the 2 pages have been attempted/completed you will receive full points for the lab submission.*

*4 - After the lab has been graded an Answer Sheet will become visible in D2L with answers to all of the questions. This will appear in the folder where this lab was originally located on D2L.*