Lab – Calculating IPv4 Subnets

1. Determine IPv4 Address Subnetting – *(cont)*

Determine the network and broadcast addresses and number of host bits and hosts for the given IPv4 addresses and prefixes in the following table.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IPv4 Address/Prefix | Network Address | Broadcast Address | Total Number of Host Bits | Total Number of Hosts |
| 172.30.10.130/30 | 172.30.10.128 | 172.30.10.31 | 2 | 2 |
| 10.1.113.75/19 | 10.1.96.0 | 10.1.127.255 | 13 | 8190 |
| 198.133.219.250/24 | 198.133.219.0 | 192.133.219.255 | 8 | 254 |
| 128.107.14.191/22 | 128.107.12.0 | 128.107.15.255 | 10 | 1022 |
| 172.16.104.99/27 | 128.16.104.96 | 172.16.104.127 | 5 | 30 |

1. Calculate IPv4 Address Subnetting – *(cont)*
   1. Fill out the tables below with appropriate answers given the IPv4 address, original subnet mask, and new subnet mask.
      1. *(Problem 1 completed in Assign#9A)*
      2. Problem 2:

|  |  |
| --- | --- |
| Given: | |
| **Host IP Address:** | 10.101.99.228 |
| **Original Subnet Mask** | 255.0.0.0 |
| **New Subnet Mask:** | 255.255.128.0 |
| Find: | |
| **Number of Subnet Bits** | 9 |
| **Number of Subnets Created** | 29 = 512 |
| **Number of Host Bits per Subnet** | 15 |
| **Number of Hosts per Subnet** | 215-2 = 32,766 |
| **Network Address of this Subnet** | 10.101.0.0 |
| **IPv4 Address of First Host on this Subnet** | 10.101.0.1 |
| **IPv4 Address of Last Host on this Subnet** | 10.101.127.254 |
| **IPv4 Broadcast Address on this Subnet** | 10.101.127.255 |

* + 1. **Problem 3**:

|  |  |
| --- | --- |
| Given: | |
| **Host IP Address:** | 172.22.32.12 |
| **Original Subnet Mask** | 255.255.0.0 |
| **New Subnet Mask:** | 255.255.224.0 |
| Find: | |
| **Number of Subnet Bits** | 3 |
| **Number of Subnets Created** | 23 = 8 |
| **Number of Host Bits per Subnet** | 13 |
| **Number of Hosts per Subnet** | 213-2 = 8190 |
| **Network Address of this Subnet** | 172.22.32.0 |
| **IPv4 Address of First Host on this Subnet** | 172.22.32.1 |
| **IPv4 Address of Last Host on this Subnet** | 172.22.63.254 |
| **IPv4 Broadcast Address on this Subnet** | 172.22.63.255 |

* + 1. **Problem 4**:

|  |  |
| --- | --- |
| Given: | |
| **Host IP Address:** | 192.168.1.245 |
| **Original Subnet Mask** | 255.255.255.0 |
| **New Subnet Mask:** | 255.255.255.252 |
| Find: | |
| **Number of Subnet Bits** | 6 |
| **Number of Subnets Created** | 26 = 64 |
| **Number of Host Bits per Subnet** | 2 |
| **Number of Hosts per Subnet** | 22-2 = 2 |
| **Network Address of this Subnet** | 192.168.1.244 |
| **IPv4 Address of First Host on this Subnet** | 192.168.1.245 |
| **IPv4 Address of Last Host on this Subnet** | 192.168.1.246 |
| **IPv4 Broadcast Address on this Subnet** | 192.168.1.247 |

* + 1. **Problem 5**:

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| --- | --- |
| Given: | |
| **Host IP Address:** | 128.107.0.55 |
| **Original Subnet Mask** | 255.255.0.0 |
| **New Subnet Mask:** | 255.255.255.0 |
| Find: | |
| **Number of Subnet Bits** | 8 |
| **Number of Subnets Created** | 28 = 256 |
| **Number of Host Bits per Subnet** | 8 |
| **Number of Hosts per Subnet** | 28-2 = 254 |
| **Network Address of this Subnet** | 128.107.0.0 |
| **IPv4 Address of First Host on this Subnet** | 128.107.0.1 |
| **IPv4 Address of Last Host on this Subnet** | 128.107.0.254 |
| **IPv4 Broadcast Address on this Subnet** | 128.107.0.255 |

* + 1. **Problem 6**:

|  |  |
| --- | --- |
| Given: | |
| **Host IP Address:** | 192.135.250.180 |
| **Original Subnet Mask** | 255.255.255.0 |
| **New Subnet Mask:** | 255.255.255.248 |
| Find: | |
| **Number of Subnet Bits** | 5 |
| **Number of Subnets Created** | 25 = 32 |
| **Number of Host Bits per Subnet** | 3 |
| **Number of Hosts per Subnet** | 23-2 = 6 |
| **Network Address of this Subnet** | 192.135.250.176 |
| **IPv4 Address of First Host on this Subnet** | 192.135.250.177 |
| **IPv4 Address of Last Host on this Subnet** | 192.135.250.182 |
| **IPv4 Broadcast Address on this Subnet** | 192.135.250.183 |

Reflection

Why is the subnet mask so important when analyzing an IPv4 address?

\_\_Because the subnet mask can use the simplest and cheapest arithmetic logic AND to distinguish the Internet IP address from the local IP address, and calculate how many hosts can be assigned to the local end devices.\_\_\_\_

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