1. Question

1.1. 120.156.21.95/12 – Class A

172.18.54.141/19 – Class B

192.167.43.58/27 – Class C

1.2. 120.156.21.95/12 – public

172.18.54.141/19 – private

192.167.43.58/27 – public

1.3.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **1st octet** | **2nd octet** | **3rd octet** | **4th octet** |
| **Host Address (decimal)** | 120 | 156 | 21 | 95 |
| **Mask (decimal)** | 255 | 240 | 0 | 0 |
| **Network Address (decimal)** | 120 | 144 | 0 | 0 |
| **First available host address (decimal)** | 120 | 144 | 0 | 1 |
| **Last available host address (decimal)** | 120 | 159 | 255 | 254 |
| **Broadcast address (decimal)** | 120 | 159 | 255 | 255 |
| **Host Address (binary)** | 01111000 | 10011100 | 00010101 | 01011111 |
| **Mask (binary)** | 11111111 | 11110000 | 00000000 | 00000000 |
| **Network Address (binary)** | 01111000 | 10010000 | 00000000 | 00000000 |
| **First available host address (binary)** | 01111000 | 10010000 | 00000000 | 00000001 |
| **Last available host address (binary)** | 01111000 | 10011111 | 11111111 | 11111110 |
| **Broadcast address (binary)** | 01111000 | 10011111 | 11111111 | 11111111 |
| **Available number of addresses for hosts** | 32-12=20, 2^20 - 2 = 1048574 | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **1st octet** | **2nd octet** | **3rd octet** | **4th octet** |
| **Host Address (decimal)** | 172 | 18 | 54 | 141 |
| **Mask (decimal)** | 255 | 255 | 224 | 0 |
| **Network Address (decimal)** | 172 | 18 | 32 | 0 |
| **First available host address (decimal)** | 172 | 18 | 32 | 1 |
| **Last available host address (decimal)** | 172 | 18 | 63 | 254 |
| **Broadcast address (decimal)** | 172 | 18 | 63 | 255 |
| **Host Address (binary)** | 10101100 | 00010010 | 00110110 | 10001101 |
| **Mask (binary)** | 11111111 | 11111111 | 11100000 | 00000000 |
| **Network Address (binary)** | 10101100 | 00010010 | 00100000 | 00000000 |
| **First available host address (binary)** | 10101100 | 00010010 | 00100000 | 00000001 |
| **Last available host address (binary)** | 10101100 | 00010010 | 00111111 | 11111110 |
| **Broadcast address (binary)** | 10101100 | 00010010 | 00111111 | 11111111 |
| **Available number of addresses for hosts** | 32-19=13, 2^13 - 2 = 8190 | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **1st octet** | **2nd octet** | **3rd octet** | **4th octet** |
| **Host Address (decimal)** | 192 | 167 | 43 | 58 |
| **Mask (decimal)** | 255 | 255 | 255 | 224 |
| **Network Address (decimal)** | 192 | 167 | 43 | 32 |
| **First available host address (decimal)** | 192 | 167 | 43 | 33 |
| **Last available host address (decimal)** | 192 | 167 | 43 | 63 |
| **Broadcast address (decimal)** | 192 | 167 | 43 | 64 |
| **Host Address (binary)** | 11000000 | 10100111 | 00101011 | 00111010 |
| **Mask (binary)** | 11111111 | 11111111 | 11111111 | 11100000 |
| **Network Address (binary)** | 11000000 | 10100111 | 00101011 | 00100000 |
| **First available host address (binary)** | 11000000 | 10100111 | 00101011 | 00100001 |
| **Last available host address (binary)** | 11000000 | 10100111 | 00101011 | 00111111 |
| **Broadcast address (binary)** | 11000000 | 10100111 | 00101011 | 01000000 |
| **Available number of addresses for hosts** | 32-27=5, 2^5 - 2 = 30 | | | |

2. Question

2.1. FLSM

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Hosts** | **Subnet/mask** | **Unused addresses** | **% of unused addresses** |
| **Net 1** | 120 | 172.16.0.0/25 | 6 | 5% |
| **Net 2** | 35 | 172.16.0.128/25 | 91 | 72% |
| **Net 3** | 50 | 172.16.1.0/25 | 76 | 60% |
| **Net 4** | 80 | 172.16.1.128/25 | 46 | 37% |
| **Net 5** | 75 | 172.16.2.0/25 | 51 | 40% |
| **Net 6** | 40 | 172.16.2.128/25 | 86 | 68% |
| **Net 7** | 60 | 172.16.3.0/25 | 66 | 52% |
| **Net 8** | 25 | 172.16.3.128/25 | 101 | 80% |
| **Net 9** | 2 | 172.16.4.0/25 | 124 | 98% |
| **Net 10** | 2 | 172.16.4.128/25 | 124 | 98% |
| **Net 11** | 2 | 172.16.5.0/25 | 124 | 98% |
| **Unused** | 0 | 172.16.5.128/25 | 126 | 100% |

2.3 VLSM

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Network** | **Hosts** | **Subnet/mask** | **Unused addresses** | **% of unused addresses** |
| **Net 1** | 120 | 172.16.0.0/25 | 6 | 5% |
| **Net 4** | 80 | 172.16.0.128/25 | 46 | 37% |
| **Net 5** | 75 | 172.16.1.0/25 | 51 | 40% |
| **Net 7** | 60 | 172.16.1.128/26 | 2 | 3% |
| **Net 3** | 50 | 172.16.1.192/26 | 12 | 19% |
| **Net 6** | 40 | 172.16.2.0/26 | 22 | 35% |
| **Net 2** | 35 | 172.16.2.64/26 | 27 | 44% |
| **Net 8** | 25 | 172.16.2.128/27 | 5 | 17% |
| **Net 9** | 2 | 172.16.2.160/30 | 0 | 0% |
| **Net 10** | 2 | 172.16.2.164/30 | 0 | 0% |
| **Net 11** | 2 | 172.16.2.168/30 | 0 | 0% |
| **Unused** | 0 |  |  |  |