Subnetting

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* 1. A. What is the first valid host on the subnetwork that the node 172.17.4.114/23 belongs to? 172.17.4.1

|  |  |
| --- | --- |
| 172.17.4.114 | 10101100.00010001.00000100.01110010 |
| 255.255.254.0 | 11111111.11111111.11111110.00000000 |
| 172.17.4.0/23 | 10101100.00010001.00000100.00000000 |
| First Host | 172.17.4.1/23 |

|  |  |
| --- | --- |
| 172.25.28.250 | 10101100.00011001.00011100.11111010 |
| 255.255.254.0 | 11111111.11111111.11111110.00000000 |
| 172.25.28.0/23 | 10101100.00011001.00011100.00000000 |

* 1. What valid host range is the IP address 172.25.28.250/23 a part of? 172.25.28.1 through to 172.25.29.254

|  |  |
| --- | --- |
| Network Address | 172.25.28.0/23 |
| First Host | 172.25.28.1/23 |
| Last Host | 172.25.29.254/23 |
| Broadcast Address | 172.25.29.255/23 |

1. Starting from:

|  |  |
| --- | --- |
| IP Address | 251.100.8.6/22 |

|  |  |
| --- | --- |
| 251.100.8.6 | 11111011.01100100.00001000.00000110 |
| 255.255.252.0 | 11111111.11111111.11111100.00000000 |
| 251.100.8.0/22 | 11111011.01100100.00001000.00000000 |

1st network: 90 hosts => 92 addresses < 128 => 7 bits => 22 (original) + 2 + 1 (loaned)

2nd Network: 32 hosts => 34 addresses < 64 => 6 bits => 23 (network) + 2 + 1 (loaned)

3rd Network: 7 hosts => 9 addresses < 16 => 4 bits => 24 (network) + 3 + 1 (loaned)

4th Network: 7 hosts => 9 addresses < 16 => 4 bits => 25 (network) + 2 + 1 (loaned)

26 bits loaned => 6 bits left

2 hosts => 4 addresses <= 4 => 2 bits needed => 6-2 = 4 networks

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| --- | --- | --- | --- | --- | --- |
| 1st Network | | | | | |
| Network Address | 251.100.8.0/25 | 11111011.01100100.00001000.00000000 | | | |
| First Host | 251.100.8.1/25 | 11111011.01100100.00001000.00000001 | | | |
| Last Host | 251.100.8.126/25 | 11111011.01100100.00001000.01111110 | | | |
| Broadcast Address | 251.100.8.127/25 | 11111011.01100100.00001000.01111111 | | | a |
| 2nd Network | | | | | |
| Network Address | 251.100.8.128/26 | 11111011.01100100.00001000.10000000 | | | |
| First Host | 251.100.8.129/26 | 11111011.01100100.00001000.10000001 | | | |
| Third Host | 251.100.8.129/26 | 11111011.01100100.00001000.10000001 | | b | |
| Last Host | 251.100.8.190/26 | 11111011.01100100.00001000.10111110 | | | |
| Broadcast Address | 251.100.8.191/26 | 11111011.01100100.00001000.10111111 | | | |
| 3rd Network | | | | | |
| Network Address | 251.100.8.192/28 | 11111011.01100100.00001000.11000000 | | | |
| First Host | 251.100.8.193/28 | 11111011.01100100.00001000.11000001 | c | | |
| Last Host | 251.100.8.206/28 | 11111011.01100100.00001000.11001110 | | | |
| Broadcast Address | 251.100.8.207/28 | 11111011.01100100.00001000.11001111 | | | |
| 4th Network | | | | | |
| Network Address | 251.100.8.208/28 | 11111011.01100100.00001000.11010000 | | | |
| First Host | 251.100.8.209/28 | 11111011.01100100.00001000.11010001 | | | |
| Last Host | 251.100.8.222/28 | 11111011.01100100.00001000.11011110 | | | |
| Broadcast Address | 251.100.8.223/28 | 11111011.01100100.00001000.11011111 | | | |
|  |  | 11111011.01100100.00001000.11100000 | | | |