

Calculating VLSMs

Scenario: Your company has been given the network address 172.16.32.0/19.

10101100 . 00010000 . 001 00000 . 00000000

After careful planning, looking at current needs and expansion, you realize you need a maximum of three subnets of 1,000 hosts, three subnets of 250 hosts, and several subnets for serial point-to-point links.

There are several ways to do this, but you have decided that you will variably subnet your network as follows: (We did it this way just for the exercise and to keep it somewhat simple.)

Step 1: The maximum number of hosts any of your subnets will need is 1,000, so you decide to make the initial subnets 172.16.32.0/22. Write out the eight /22 subnets in binary and decimal form:

1.	10101100	.	00010000	.	001	00000	.	00000000	172.16.32.0/22
2.	10101100	.	00010000	.	001	00100	.	00000000	172.16.36.0/22
3.	10101100	.	00010000	.	001	01000	.	00000000	172.16.40.0/22
4.	10101100	.	00010000	.	001	01100	.	00000000	172.16.44.0/22
5.	10101100	.	00010000	.	001	10000	.	00000000	172.16.48.0/22
6.	10101100	.	00010000	.	001	10100	.	00000000	172.16.52.0/22
7.	10101100	.	00010000	.	001	11000	.	00000000	172.16.56.0/22
8.	10101100	.	00010000	.	001	11100	.	00000000	172.16.60.0/22

Step 2: You only need three /22 subnets, so you reserved the first three for those subnets needing 1,000 hosts. Which ones are they?

1.	10101100	.	00010000	.	001	00000	.	00000000	172.16.32.0/22
2.	10101100	.	00010000	.	001	00100	.	00000000	172.16.36.0/22
3.	10101100	.	00010000	.	001	01000	.	00000000	172.16.40.0/22

Step 3: You decide to sub-subnet the fourth subnet (172.16.44.0/22) for the three subnets each needing 250 hosts. A /24 will work well for this. What are the three /24 sub-subnets you will use?

4.	10101100	.	00010000	.	001	01100	.	00000000	172.16.44.0/22
4a.	10101100	.	00010000	.	001	01100	.	00000000	172.16.44.0/24
4b.	10101100	.	00010000	.	001	01101	.	00000000	172.16.45.0/24
4c.	10101100	.	00010000	.	001	01110	.	00000000	172.16.46.0/24
4d.	10101100	.	00010000	.	001	01111	.	00000000	172.16.47.0/24

Step 4: The last (fourth) of the /24 sub-subnets (172.16.47.0/24), you decide to use for you serial point-to-point links. List the first five /30 sub-sub-subnets (if there is such a term):

4d.	10101100	.	00010000	.	001	01111	.	00000000	172.16.47.0/24
4d1.	10101100	.	00010000	.	001	01111	.	<u>00000000</u>	172.16.47.0/30
4d2.	10101100	.	00010000	.	001	01111	.	<u>00000100</u>	172.16.47.4/30
4d3.	10101100	.	00010000	.	001	01111	.	<u>00001000</u>	172.16.47.8/30
4d4.	10101100	.	00010000	.	001	01111	.	<u>00001100</u>	172.16.47.12/30
4d5.	10101100	.	00010000	.	001	01111	.	<u>00010000</u>	172.16.47.16/30
etc.									
4d5.	10101100	.	00010000	.	001	01111	.	<u>11111100</u>	172.16.47.252/30