

Variable Length Subnet Masks VLSM

- Early routing protocols only supported Fixed Length Subnet Masking (FLSM) where all subnets had to be the same size. You couldn't have a subnet with 14 hosts and another subnet with 64 hosts in the same network.
- All modern routing protocols support Variable Length Subnet Masking. This allows us to size subnets differently according to how many hosts they have.

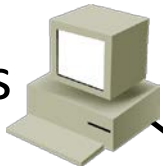
Subnetting Considerations



- How many locations do we have in the network?
- How many hosts are in each location?
- What are the IP addressing requirements for each location? (Should different departments or types of host be in different subnets?)
- What size is appropriate for each subnet? (Don't waste addresses, but leave room for growth.)

Network Topology Diagram

Sales:
14 Hosts



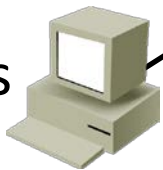
New York

Boston

Sales:
7 Hosts

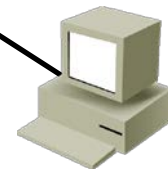


Eng:
28 Hosts



Point to point link:
2 Hosts

Eng:
28 Hosts



The router interfaces
need IP addresses so
count as hosts.
The router interface
+ 13 PCs = 14 hosts

We've been allocated the Class C network 200.15.10.0/24

Subnetting Design Steps



- Find the largest segment and allocate a suitable subnet size for it.
- Allocate this subnet at the start of the address space.
- Continue going down the list.

- In the real world you want a scalable design – you will likely allocate spare subnets for future growth, and leave space in the subnets for additional hosts.
- In the CCNA exam do **exactly** what the question asks, don't worry about whether it's best practice or not.

Engineering Departments



- The Engineering departments in both sites have 28 hosts.
- For our example we've been told that the departments will not grow and we need to use the smallest subnets possible to maximise our address space.
- Pause the video here and calculate the optimal subnet mask for the Engineering departments.
- Also determine the network and broadcast addresses that will be allocated to both Engineering departments, and the range of host addresses.

Engineering Departments



- We've been allocated 200.15.10.0/24

128	64	32	16	8	4	2	1	128	64	32	16	8	4	2	1	128	64	32	16	8	4	2	1	128	64	32	16	8	4	2	1
1	1	0	0	1	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	
128	64	32	16	8	4	2	1	128	64	32	16	8	4	2	1	128	64	32	16	8	4	2	1	128	64	32	16	8	4	2	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	

- /27 (or 255.255.255.224) supports 30 hosts
- New York Engineering subnet
- Network Address: 200.15.10.0/27
- Broadcast Address: 200.15.10.31
- Hosts: 200.15.10.1 to 30
- Boston Engineering subnet
- Network Address: 200.15.10.32/27
- Broadcast Address: 200.15.10.63
- Hosts: 200.15.10.33 to 62