

CSC 402 – Internet Technology

Recap

- Subnet Addressing
- Subnet Design

VLSM

- The main weakness of regular subnetting is that the subnet ID represents only 1 additional hierarchical level in how IP addresses are interpreted and used for routing.
- To overcome this limitation, the original subnetting was enhanced through the technique known as **Variable Length Subnet Masking** (VLSM) , defined in RFC 1009.
- VLSM is a technique where subnetting is performed multiple times in iteration, to allow a network to be divided into a hierarchy of subnets that vary in size.
- In order to use it, routers that support VLSM-capable routing protocols must be employed.

VLSM

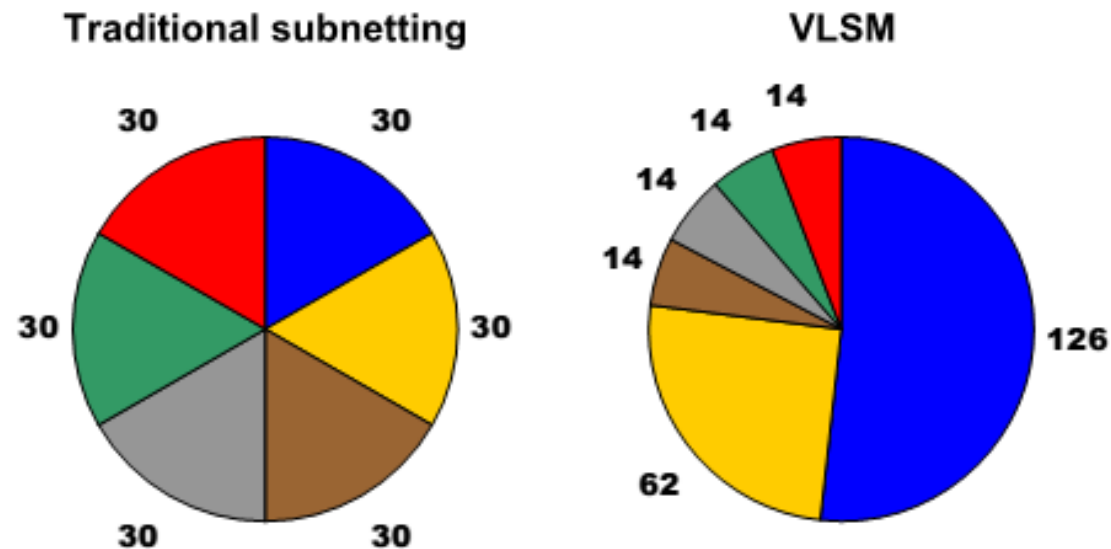
- Consider a company with a Class C network, 201.45.222.0/24.
- There are 6 subnets in the network and the total number of hosts is 190.
- The first 4 subnets (S1, S2, S3, S4) are very small, containing only 10 hosts each. The last 2 subnets (S5 and S6) contain 50 and 100 hosts respectively i.e. a total of 190 hosts.
- Without subnetting, we have enough host IDs in Class C (total of 254) network to handle them all.
- In order to have 6 subnets, we need to use 3 bits for the subnet ID.
- This leaves only 5 bits for the host ID ($8 - 3 = 5$), which means that every subnet has the equal capacity of 30 hosts ($2^5 - 2 = 30$).
- The only solution with the original subnetting is to get another Class C block for the 2 big subnets and use the original one for the 4 small subnets.
- This is expensive and means wasting hundreds of IP addresses.
- The solution: variable length subnet masking
- Allows to apply multi-level splitting to only some of the subnets

VLSM

Class C	1	1	0	Net ID (21 bits)																					Host ID (8 bits)							
Original network	201							45							222							Host ID (8 bits)										
	1	1	0	0	1	0	0	1	0	0	1	0	1	1	0	1	1	1	0	1	1	1	1	0	Host ID (8 bits)							
Subnet mask (/27)	255							255							255							224										
	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	1	1	0	0	0	0	0
Sub-netted	201							45							222							8 sub-nets				30 hosts per subnet						

VLSM

- With traditional subnetting, all subnets must be the same size, which creates problems when there are some subnets that are much larger than others.
- Using VLSM, an organization can divide its network multiple times, creating subnets that much better meet the size requirements of its physical networks.



VLSM

