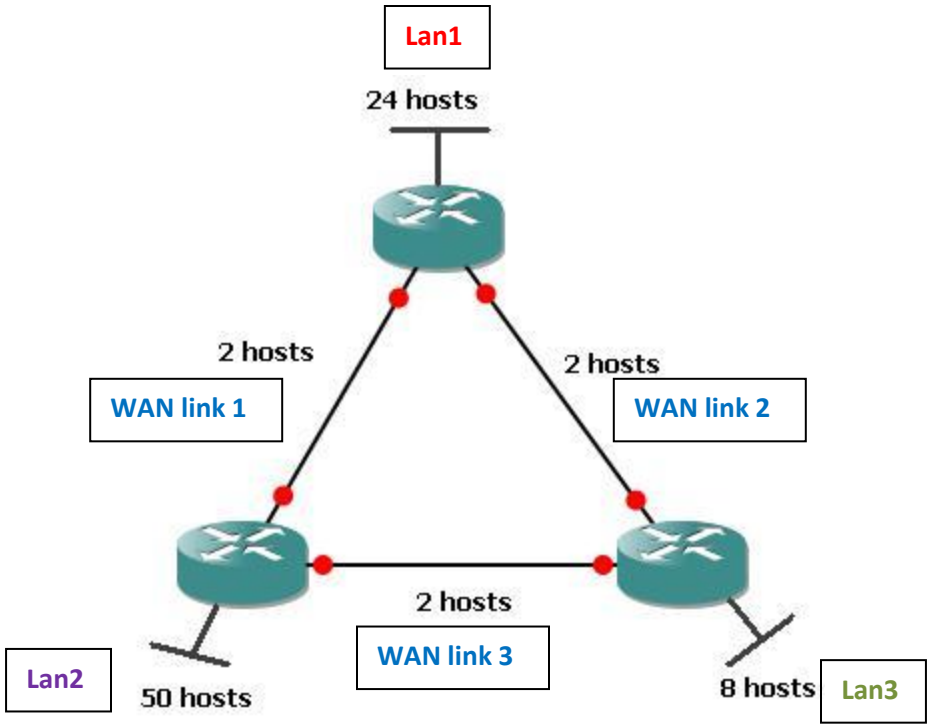
Vlsm Example 1

Available subnet - 192.168.2.0/24



Solution:

In this network we have 6 networks (LAN1 – LAN2 – LAN3 – WAN link1 – WAN link2 – WAN link3)

1- Determine the class of this network 192.168.2.0/24
(Class: C , N = 24bits , H = 8bits, Default Mask = 24)

2- Order the networks from the largest size to the smallest:
1) **LAN 2 (50 hosts)**
2) **LAN1 (24 hosts)**
3) **LAN3 (8 hosts)**
4) **WAN link 1 - WAN link 2 - WAN link 3 (2 hosts)**

3- Start from the biggest network:
1) **LAN 2 (50 hosts):**
H = 6 bits -> 2^6-2 = 62 hosts
S = 2 bits -> 2^2 = 4 subnets
/mask = N + S = 24+2 = /26 =(255.255.255.192)
LAN2 will take the subnet ID: 192.168.2.0 /26

N = 24 S=2 H=6

11000000.10101000.00000010.00000000

192 . 168 . 2 . 0

Subnet no.	Subnet ID in binary	Subnet ID in decimal	Subnet mask	No of hosts per subnet	Network
0	11000000.10101000.00000010.00000000	192.168.2.0	/26	62 hosts	LAN2
1	11000000.10101000.00000010.01000000	192.168.2.64	/26	62 hosts	unused
2	11000000.10101000.00000010.10000000	192.168.2.128	/26	62 hosts	unused
3	11000000.10101000.00000010.11000000	192.168.2.192	/26	62 hosts	unused

2) **LAN 1 (24 hosts):**

H = 5 bits -> 2^5-2 = 30 hosts

S = 3 bits -> 2^3 = 8 subnets

/mask = N + S = 24+3 = /27 =(255.255.255.224)

LAN1 size is smaller than the available networks sizes so we will choose any "unused" subnet and subnet it to smaller size as follows:

Choose 192.168.2.64 and subdivide it into smaller subnets

N = 24 S=3 H=5

11000000.10101000.00000010.01000000

Subnet no.	Subnet ID in binary	Subnet ID in decimal	Subnet mask	No of hosts per subnet	Network
0	11000000.10101000.00000010.00000000	192.168.2.0	/26	62 hosts	LAN2
1	11000000.10101000.00000010.01000000	192.168.2.64	/27	30 hosts	LAN1
2	11000000.10101000.00000010.01100000	192.168.2.96	/27	30 hosts	unused
3	11000000.10101000.00000010.10000000	192.168.2.128	/26	62 hosts	unused
4	11000000.10101000.00000010.11000000	192.168.2.192	/26	62 hosts	unused

3) LAN 3 (8 hosts):

H = 4 bits -> 2^4-2 = 14 hosts

S = 4 bits -> 2^4 = 16 subnets

/mask = N + S = 24+4 = /28 =(255.255.255.240)

LAN3 size is smaller than the available networks sizes so we will choose any "unused" subnet and subnet it to smaller size as follows:

Choose 192.168.2.96 and subdivide it into smaller subnets

N = 24 S=4 H=4

11000000.10101000.00000010.01000000

Subnet no.	Subnet ID in binary	Subnet ID in decimal	Subnet mask	No of hosts per subnet	Network
0	11000000.10101000.00000010.00000000	192.168.2.0	/26	62 hosts	LAN2
1	11000000.10101000.00000010.01000000	192.168.2.64	/27	30 hosts	LAN1
2	11000000.10101000.00000010.01100000	192.168.2.96	/28	14 hosts	LAN3
3	11000000.10101000.00000010.01110000	192.168.2.112	/28	14 hosts	unused
4	11000000.10101000.00000010.10000000	192.168.2.128	/26	62 hosts	unused
5	11000000.10101000.00000010.11000000	192.168.2.192	/26	62 hosts	unused

4) WAN Links 1,2,3 (2 hosts):

H = 2 bits -> 2^2-2 = 2 hosts

S = 6 bits -> 2^6 = 64 subnets

/mask = N + S = 24+6 = /30 =(255.255.255.252)

WAN links 1,2 and 3 sizes are smaller than the available networks sizes so we will choose any "unused" subnet and subnet it to smaller size as follows:

Choose 192.168.2.112 and subdivide it into smaller subnets

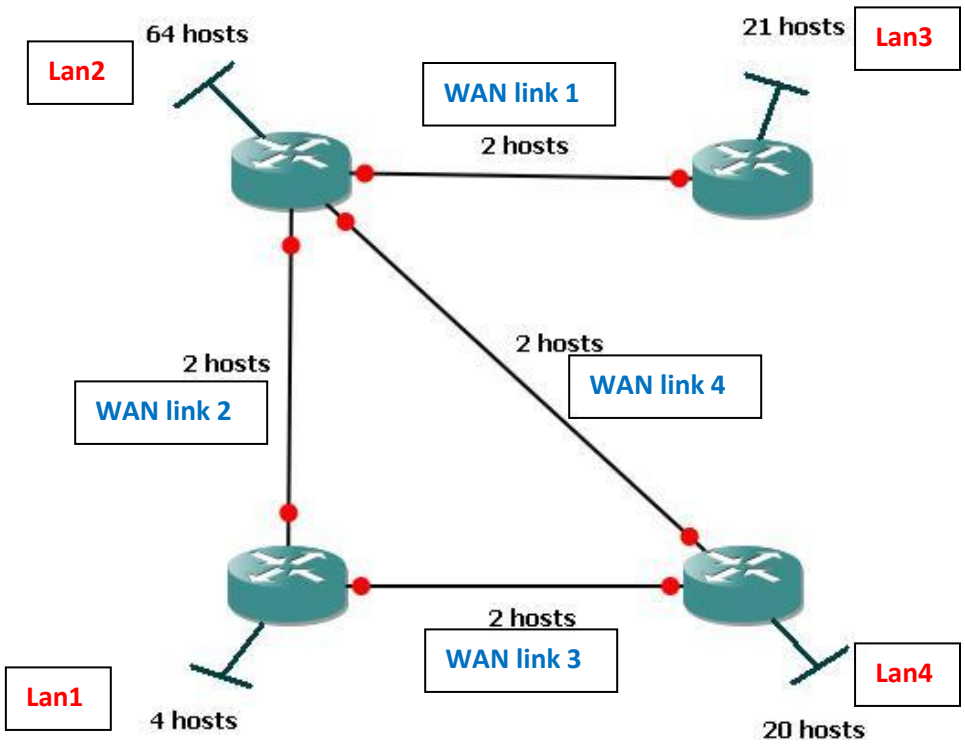
N = 24 S=6 H=2

11000000.10101000.00000010.01000000

Subnet no.	Subnet ID in binary	Subnet ID in decimal	Subnet mask	No of hosts per subnet	Network
0	11000000.10101000.00000010.00000000	192.168.2.0	/26	62 hosts	LAN2
1	11000000.10101000.00000010.01000000	192.168.2.64	/27	30 hosts	LAN1
2	11000000.10101000.00000010.01100000	192.168.2.96	/28	14 hosts	LAN3
3	11000000.10101000.00000010.01110000	192.168.2.112	/30	2 hosts	WAN link1
4	11000000.10101000.00000010.01110100	192.168.2.116	/30	2 hosts	WAN link2
5	11000000.10101000.00000010.01111000	192.168.2.120	/30	2 hosts	WAN link3
6	11000000.10101000.00000010.01111100	192.168.2.124	/30	2 hosts	unused
7	11000000.10101000.00000010.10000000	192.168.2.128	/26	62 hosts	unused
8	11000000.10101000.00000010.11000000	192.168.2.192	/26	62 hosts	unused

Vlsm Example 2

Available subnet 10.23.22.0/24



Solution:

In this network we have 8 networks (LAN1 – LAN2 – LAN3 – LAN4 – WAN link1 – WAN link2 – WAN link3 - WAN link4)

1- **Determine the class of this network 10.23.22.0/24**
(Class: A , N = 8 bits , H = 24 bits, Default mask = 8, Given mask = 24 = N+S = 8 + 16) s=16

2- **Order the networks from the largest size to the smallest:**
   1) **LAN2 (64 hosts)**
   2) **LAN3 (21 hosts)**
   3) **LAN4 (20 hosts)**
   4) **LAN1 (4 hosts)**
   5) **WAN link 1 - WAN link 2 - WAN link 3 - WAN link 4(2 hosts)**

3- **Start from the biggest network:**

1) LAN 2 (64 hosts):

H = 7 bits -> 2^7-2 = 126 hosts
S = 1 bits -> 2^1 = 2 subnets
/mask = N + S = 8+(16+1) = /25 =(255.255.255.128)

Choose 10.23.22.0 and subdivide it into smaller subnets
N = 8 S=17 H=7
00001010.00010111.00010110.00000000

Subnet no.	Subnet ID in binary	Subnet ID in decimal	Subnet mask	No of hosts per subnet	Network
0	00001010.00010111.00010110.00000000	10.23.22.0	/25	126 hosts	LAN2
1	00001010.00010111.00010110.10000000	10.23.22.128	/25	126 hosts	unused

2) LAN 3 (21 hosts):

H = 5 bits -> 2^5-2 = 30 hosts
S = 3 bits -> 2^3 = 8 subnets
/mask = N + S = 8+(16+3) = /27 =(255.255.255.224)

Choose 10.23.22.128 and subdivide it into smaller subnets
N = 8 S=19 H=5
00001010.00010111.00010110.10000000

Subnet no.	Subnet ID in binary	Subnet ID in decimal	Subnet mask	No of hosts per subnet	Network
0	00001010.00010111.00010110.00000000	10.23.22.0	/25	126 hosts	LAN2
1	00001010.00010111.00010110.10000000	10.23.22.128	/27	30 hosts	LAN3
2	00001010.00010111.00010110.10100000	10.23.22.160	/27	30 hosts	unused
3	00001010.00010111.00010110.11000000	10.23.22.192	/27	30 hosts	unused
4	00001010.00010111.00010110.11100000	10.23.22.224	/27	30 hosts	unused

3) LAN 4 (20 hosts):

H = 5 bits -> 2^5-2 = 30 hosts
S = 3 bits -> 2^3 = 8 subnets
/mask = N + S = 8+(16+3) = /27 =(255.255.255.224)
Choose any one of the unused subnets such as 10.23.22.160

Subnet no.	Subnet ID in binary	Subnet ID in decimal	Subnet mask	No of hosts per subnet	Network
0	00001010.00010111.00010110.00000000	10.23.22.0	/25	126 hosts	LAN2
1	00001010.00010111.00010110.10000000	10.23.22.128	/27	30 hosts	LAN3
2	00001010.00010111.00010110.10100000	10.23.22.160	/27	30 hosts	LAN4
3	00001010.00010111.00010110.11000000	10.23.22.192	/27	30 hosts	unused
4	00001010.00010111.00010110.11100000	10.23.22.224	/27	30 hosts	unused

4) LAN 1 (4 hosts):

H = 3 bits -> 2^3-2 = 6 hosts
S = 5 bits -> 2^5 = 32 subnets
/mask = N + S = 8+(16+5) = /29 =(255.255.255.248)
LAN1 size is smaller than the available networks sizes so we will choose any "unused" subnet and subnet it to smaller size as follows:
Choose 10.23.22.192 and subdivide it into smaller subnets

N = 8 S=21 H=3

00001010.00010111.00010110.11000000

Subnet no.	Subnet ID in binary	Subnet ID in decimal	Subnet mask	No of hosts per subnet	Network
0	00001010.00010111.00010110.00000000	10.23.22.0	/25	126 hosts	LAN2
1	00001010.00010111.00010110.10000000	10.23.22.128	/27	30 hosts	LAN3
2	00001010.00010111.00010110.10100000	10.23.22.160	/27	30 hosts	LAN4
3	00001010.00010111.00010110.11000000	10.23.22.192	/29	6 hosts	LAN1
4	00001010.00010111.00010110.11001000	10.23.22.200	/29	6 hosts	unused
5	00001010.00010111.00010110.11010000	10.23.22.208	/29	6 hosts	unused
6	00001010.00010111.00010110.11011000	10.23.22.216	/29	6 hosts	unused
7	00001010.00010111.00010110.11100000	10.23.22.224	/27	30 hosts	unused

5) WAN Links 1,2,3 and 4 (2 hosts):

H = 2 bits -> 2^2-2 = 4 hosts
S = 6 bits -> 2^6 = 64 subnets
/mask = N + S = 8+(16+6) = /30 =(255.255.255.252)
WAN Link sizes are smaller than the available networks sizes so we will choose any "unused" subnet and subnet it to smaller size as follows:
Choose 10.23.22.200 and subdivide it into smaller subnets for WAN link1 and 2
Choose 10.23.22.208 and subdivide it into smaller subnets for WAN link3 and 4

N = 8 **S=22** **H=2**
00001010.00010111.00010110.00000000

Subnet no.	Subnet ID in binary	Subnet ID in decimal	Subnet mask	No of hosts per subnet	Network
0	00001010.00010111.00010110.00000000	10.23.22.0	/25	126 hosts	LAN2
1	00001010.00010111.00010110.10000000	10.23.22.128	/27	30 hosts	LAN3
2	00001010.00010111.00010110.10100000	10.23.22.160	/27	30 hosts	LAN4
3	00001010.00010111.00010110.11000000	10.23.22.192	/29	6 hosts	LAN1
4	00001010.00010111.00010110.11001000	10.23.22.200	/30	2 hosts	WAN link1
5	00001010.00010111.00010110.11001100	10.23.22.204	/30	2 hosts	WAN link2
6	00001010.00010111.00010110.11010000	10.23.22.208	/30	2 hosts	WAN link3
7	00001010.00010111.00010110.11010100	10.23.22.212	/30	2 hosts	WAN link4
8	00001010.00010111.00010110.11011000	10.23.22.216	/29	6 hosts	unused
9	00001010.00010111.00010110.11100000	10.23.22.224	/27	30 hosts	unused