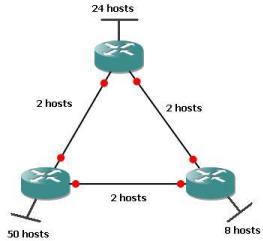
**Vlsm Example 1**

**Available subnet - 192.168.2.0/24**

**Lan1**

**WAN link 1 WAN link 2** 

**WAN link 3**

**Lan2 Lan3**

**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 -> 26-2 = 62 hosts**

**S = 2 bits -> 22 = 4 subnets**

**/mask = N + S = 24+2 = /26 =(255.255.255.192)**

**LAN2 will take the subnet ID: 192.168.2.0 /26**

1

**N = 24 S=2 H=6**

**11000000.10101000.00000010.00000000**

**192 . 168 . 2 . 0**

| **No of**  **Network**  **Subnet**  **no.Subnet ID in binary Subnet ID in**  **Subnet**  **hosts per**  **decimal**  **mask**  **subnet** |
| --- |
| **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 -> 25-2 = 30 hosts**

**S = 3 bits -> 23 = 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**

| **No of**  **Network**  **Subnet**  **no.Subnet ID in binary Subnet ID in**  **Subnet**  **hosts per**  **decimal**  **mask**  **subnet** |
| --- |
| **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 -> 24-2 = 14 hosts**

**S = 4 bits -> 24 = 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**

| **No of**  **Network**  **Subnet**  **no.Subnet ID in binary Subnet ID in**  **Subnet**  **hosts per**  **decimal**  **mask**  **subnet** |
| --- |
| **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** |

2

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

**H = 2 bits -> 22-2 = 2 hosts**

**S = 6 bits -> 26 = 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**

| **No of**  **Network**  **Subnet**  **no.Subnet ID in binary Subnet ID in**  **Subnet**  **hosts per**  **decimal**  **mask**  **subnet** |
| --- |
| **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** |

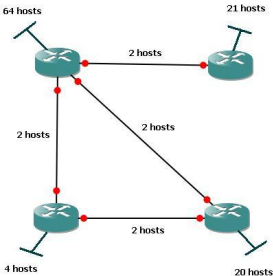
**Vlsm Example 2**

**Available subnet 10.23.22.0/24**

**Lan3**

**Lan2**

**WAN link 1**

**WAN link 2WAN link 4** 

**WAN link 3**

**Lan1**

**Lan4**

3

**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 -> 27-2 = 126 hosts**

**S = 1 bits -> 21 = 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**

| **No of**  **Network**  **Subnet**  **no.Subnet ID in binary Subnet ID in**  **Subnet**  **hosts per**  **decimal**  **mask**  **subnet** |
| --- |
| **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 -> 25-2 = 30 hosts**

**S = 3 bits -> 23 = 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**

**00001010.00010111.00010110.00000000**

| **No of**  **Network**  **Subnet**  **no.Subnet ID in binary Subnet ID in**  **Subnet**  **hosts per**  **decimal**  **mask**  **subnet** |
| --- |
| **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** |

4

**3) LAN 4 (20 hosts):**

**H = 5 bits -> 25-2 = 30 hosts**

**S = 3 bits -> 23 = 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**

| **No of**  **Network**  **Subnet**  **no.Subnet ID in binary Subnet ID in**  **Subnet**  **hosts per**  **decimal**  **mask**  **subnet** |
| --- |
| **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 -> 23-2 = 6 hosts**

**S = 5 bits -> 25 = 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**

**00001010.00010111.00010110.00000000**

| **No of**  **Network**  **Subnet**  **no.Subnet ID in binary Subnet ID in**  **Subnet**  **hosts per**  **decimal**  **mask**  **subnet** |
| --- |
| **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

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

**H = 2 bits -> 22-2 = 4 hosts**

**S = 6 bits -> 26 = 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**  **Subnet**  **No of hosts**  **Network**  **decimal**  **mask**  **per subnet** |
| --- |
| **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** |

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