Task 5 – Design of enterprise network addressing scheme using subnetworks with fixed mask length

Points: 1

Objectives:

→ Creation of FLSM address design for an enterprise network.

→ Expert adjustment of the mask length to create the right number of subnets.

→ Expert matching of mask length to create subnets with the right number of host addresses.

Practical task

The company has changed in the distribution and number of employees in individual departments. Another three-story building with an underground garage was attached to the company. The number of addresses and the division into subnets does not meet current needs.
The administrator was tasked with creating a new network addressing scheme. Due to the large address pool, the division is to be relatively simple and should to base on a fixed length subnet mask (FLSM).

Exercise scenario

1. Save the text document into the user's home directory, then open it to edit.
2. Following the requirements given below, design the enterprise network subnetting scheme using a fixed mask length method.

   Use the address 193.17.130.0/24.

   The network administrator reviewed the enterprise demand and wrote down the following requirements for the number of subnets and the number of IP addresses in each subnet.
   The requirements are presented in the table below:

No	Group name	Demand for IP addresses
1	Designers	13
2	Accounting	14
3	Marketing	7
4	Security	9
5	Secretariat	6
6	Managemnt	12
7	Public wi-fi network	8
8	Point to point connections between routers – 8	2 per connection

Table 1 – Table of requirements for a computer network with a fixed mask length subnets.

3. Complete the appropriate document.

No	Name	Network details
1	Group name	Designers
	Network address	193.17.130.0/27
	Subnet bits number	3
	Required IP address count	13

	First host address	193.17.130.1/27
	Last host address	193.17.130.30/27
	Broadcast address	193.17.130.31/27
2	Group name	Accounting
	Network address	193.17.130.32/27
	Subnet bits number	3
	Required IP address count	14
	First host address	193.17.130.33/27
	Last host address	193.17.130.62/27
	Broadcast address	193.17.130.63/27
3	Group name	Marketing
	Network address	193.17.130.64/27
	Subnet bits number	3
	Required IP address count	7
	First host address	193.17.130.65/27
	Last host address	193.17.130.94/27
	Broadcast address	193.17.130.95/27
4	Group name	Security
	Network address	193.17.130.96/27
	Subnet bits number	3
	Required IP address count	9
	First host address	193.17.130.97/27
	Last host address	193.17.130.126/27
	Broadcast address	193.17.130.127/27
5	Group name	Secretariat
	Network address	193.17.130.128/27
	Subnet bits number	3
	Required IP address count	6
	First host address	193.17.130.129/27
	Last host address	193.17.130.158/27
	Broadcast address	193.17.130.159/27
6	Group name	Management
	Network address	193.17.130.160/27
	Subnet bits number	3
	Required IP address count	12
	First host address	193.17.130.161/27
	Last host address	193.17.130.190/27
	Broadcast address	193.17.130.191/27
7	Group name	Public wi-fi network
	Network address	193.17.130.192/27
	Subnet bits number	3
	Required IP address count	8
	First host address	193.17.130.193/27
	Last host address	193.17.130.222/27
	Broadcast address	193.17.130.223/27

8	Group name	Point to point connections between routers
	Network address	193.17.130.224/27
	Subnet bits number	3
	Required IP address count	2per(16)
	First host address	193.17.130.225/27
	Last host address	193.17.130.254/27
	Broadcast address	193.17.130.255/27

Table 2 - Addressing table for a computer network with a fixed mask length subnets.

Task 6 – Design of enterprise network addressing scheme using subnetworks with variable length masks (VLSM)

Points: 1

Objectives:

→ Creation of an enterprise network addressing scheme using a variable length mask method (VLSM).

→ Expert adjustment of the mask length to the quantitative requirements in individual subnets.

→ Economical management of the available IP address pool.

Practical task

Due to the signing of an attractive contract, the company hired a large number of new employees. The existing network addressing model cannot allow everyone free access to resources. Service servers and computers of some employees lacked public IP addresses. The available company address pool theoretically allows to connect all network devices, but many addresses are wasted. Particularly high address losses occur in point-to-point connections.
The administrator was tasked with reworking the addressing scheme in order to increase the number of available addresses. The technique VLSM should be used.

Exercise scenario

1. Save the text document into the user's home directory, then open it to edit.
2. Following the requirements given below, design the enterprise network subnetting scheme using a variable length subnet mask.

   Use the address 193.17.130.0/24.

   The network administrator reviewed the enterprise demand and wrote down the following requirements for the number of subnets and the number of IP addresses in each subnet.
   The requirements are presented in the table below:

No	Group name	Demand for IP addresses
1	Designers	33
2	Accounting	16
3	Marketing	7
4	Security	9
5	Secretariat	6
6	Managemnt	12
7	Public wi-fi network	40
8	Point to point connections between routers – 8	2 per connection

Table 3 - Table of requirements for a computer network configured with variable length mask method.

3. Complete the appropriate document.

No	Name	Network details
1	Group name	Designers
	Network address	193.17.130.0/26
	Subnet bits number	2
	Required IP address count	33
	First host address	193.17.130.1/26
	Last host address	193.17.130.62/26
	Broadcast address	193.17.130.63/26
2	Group name	Accounting
	Network address	193.17.130.64/27
	Subnet bits number	3
	Required IP address count	16
	First host address	193.17.130.65/27
	Last host address	193.17.130.94/27
	Broadcast address	193.17.130.95/27
3	Group name	Marketing
	Network address	193.17.130.96/28
	Subnet bits number	4
	Required IP address count	7
	First host address	193.17.130.97/28
	Last host address	193.17.130.110/28
	Broadcast address	193.17.130.111/28
4	Group name	Security
	Network address	193.17.130.112/28
	Subnet bits number	4
	Required IP address count	9
	First host address	193.17.130.113/28
	Last host address	193.17.130.126/28
	Broadcast address	193.17.130.127/28
5	Group name	Secretariat
	Network address	193.17.130.128/29
	Subnet bits number	5
	Required IP address count	6

	First host address	193.17.130.129/29
	Last host address	193.17.130.134/29
	Broadcast address	193.17.130.135/29
6	Group name	Management
	Network address	193.17.130.136/28
	Subnet bits number	4
	Required IP address count	12
	First host address	193.17.130.137/28
	Last host address	193.17.130.150/28
	Broadcast address	193.17.130.151/28
7	Group name	Public wi-fi network
	Network address	193.17.130.152/26
	Subnet bits number	2
	Required IP address count	40
	First host address	193.17.130.153/26
	Last host address	193.17.130.214/26
	Broadcast address	193.17.130.215/26
8	Group name	Point to point connections between routers
	Network address	193.17.130.215/27
	Subnet bits number	3
	Required IP address count	2per(16)
	First host address	193.17.130.216/27
	Last host address	193.17.130.245/27
	Broadcast address	193.17.130.246/27

Table 4 - Addressing table for a computer network configured with variable mask lengths method.