Assignment

Theme:

Subnetting I Supernetting

Course: Computer Networks

Module: Logical Concepts and Segmentation of Networks

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This document presents a step-by-step approach to solving a specific task, outlining the methodology, execution, and expected outcomes. By following the instructions, the reader will gain hands-on experience in applying technical concepts to practical situations, reinforcing both theoretical knowledge and problem-solving abilities.

The structured approach ensures that each step is clearly defined, making the process easy to follow and implement in professional environments.

"a. *You work as a network administrator and your task is to segment the* ***10.20.6.0/24*** *network, that is, to divide it into multiple networks, but so that there are at least 7 computers in each subnet. Specify:*

1. *The possible number of hosts in each subnet.*
2. *The possible number of subnets.*

b. *Your second task is to assign a common Network ID to the subnets given to you. The given subnets are:* ***111.17.0.0/24***

- *111.17.1.0/24*
- *111.17.2.0/24*
- *111.17.3.0/24*
- *111.17.4.0/24*
- .....
- *111.17.9.0/24"*

In the first task, it is necessary to segment the network according to the decimal notation 10.20.6.0/24, more precisely divide it into several networks, which implies:

- The possible number of hosts in each subnet.
- The possible number of subnets.

10.20.6.0/24

00001010.00010100.00000110.00000000

- Required number of hosts mrh=7
- Possible number of hosts mh=?0
- The number 0 in the mask n0=?
- Number of units added nd1=?
- Brooj subbnetova ns=?

Mh=2n0-2

2n0≥9

mh= 2n4-2=16-2

mh=14

nd1=32-n0-no1

nd1=32-4-24

nd1=4

ns=2nd1-2

ns=2na4-2

ns=14

The number of addresses in each subnet with the addition of 4 bits for hosts can have 14 addresses as can be formulated Mh **=2n0-2**.

The possible number of subnets, by adding 4 bits for the subnets, we get the number 16 from which the first and last subnets are subtracted to arrive at a solution that is 14. As can be shown by the formulation :

Ns=2nd1-2.

This task involves network segmentation based on the **10.20.6.0/24** subnet. The goal is to divide the network into multiple subnets while determining key parameters such as the number of available hosts per subnet and the total number of subnets.

By applying subnetting principles, it is established that each subnet can accommodate **14 usable hosts** (calculated as $\mathbf{2^4 - 2}$). Additionally, by allocating **4 bits** for subnet identification, a total of **16 subnets** can be created. However, after excluding the first and last subnets, the final number of usable subnets is **14**.

This process ensures efficient IP address allocation, optimizing network structure while meeting the required number of hosts per segment.

In the second task, the task is to determine the common Network ID. The given subnet is 111.17.0.0/24

- 111.17.1.0/24
- 111.17.2.0/24
- 111.17.3.0/24
- 111.17.4.0/24
- ……..
- 111.17.9.0/24

From the offered subnets, we can deduce a common ID, through their binary notation.

Ordinal	Subnet	Binary form	Common Network ID
1	111.17.1.0/24	01101111.00010001.00000001.00000000	111.17.3.0/24 111.17.4.0/24 On the basis of these two addresses, we can find a common ID: 111.17.0.0
2	111.17.2.0/24	01101111.00010001.00000010.00000000	
3	111.17.3.0/24	01101111.00010001.**00000011.00000000**	
4	111.17.4.0/24	01101111.00010001.**00000100.00000000**	
9	111.17.9.0/24	01101111.00010001.00001001.00000000	

111.17.3.0/24= 01101111.00010001.00000011.00000000

111.17.4.0/24= 01101111.00010001.00000100.00000000

111 . 17 . 0 . 0

In this task, the goal is to determine the **common Network ID** for a given set of subnets within the **111.17.0.0/24** range. By analyzing the binary representation of each subnet, it becomes possible to identify shared bits and derive a **common network identifier**.

By comparing the binary notation of **111.17.3.0/24** and **111.17.4.0/24**, we observe that their common bits lead to the **111.17.0.0** Network ID. This process helps in identifying hierarchical structures in subnetting, ensuring efficient IP address management and routing optimization.