Subnetting in Computer Network

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Overview

- Subnetting is a part of Network Layer.
- The duty of the network layer is to divide the received message into separate components and activities.
- The Network layer can be called as the heart of Computer Networks.
- Finding a network and delivering data to it was simpler when the IP (Internet Protocol) system was initially implemented since there were fewer individuals online.
- Sending a data packet to the desired machine in a network is getting more and more challenging these days due to the rise in internet users.
- In order to divide larger networks logically or physically, an organization can employ IP subnets

Introduction to Subnetting

- Subnetting is a combination of two words i.e. Sub and Netting.
- The Substitute Network created for a function to happen is known as Subnetting.
- A full piece of network is broken into small pieces and each piece a different is assigned.
- Subnetting should be done in such a way that network does not gets affected. This means that we can divide the network into different parts but all when put together should perform the same task when done before splitting in to small parts.
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- Subnetting is a technique for creating logical sub-networks from a single physical network (subnets).
- A company can grow its network via subnetting without asking for a new network number from its ISP.
- Subnetting hides network complexity while assisting in the reduction of network traffic.
- Here, a network which is unique has to provide its services to many Local Area Networks i.e. (LAN). So, for this reason Subnetting is extensively used.

- A rapid, effective, and reliable computer network is what subnetting is meant to create.
- Network traffic must find more effective routes as they become larger and more complicated.
- If all network traffic used the same path and moved through the system at once, bottlenecks and congestion would form, creating sluggish and inefficient backlogs.
- You may reduce the number of routers that network traffic must transit through by setting up a subnet.
- In order to make traffic go the shortest distance feasible inside a bigger network, an engineer will effectively create smaller mini routes.

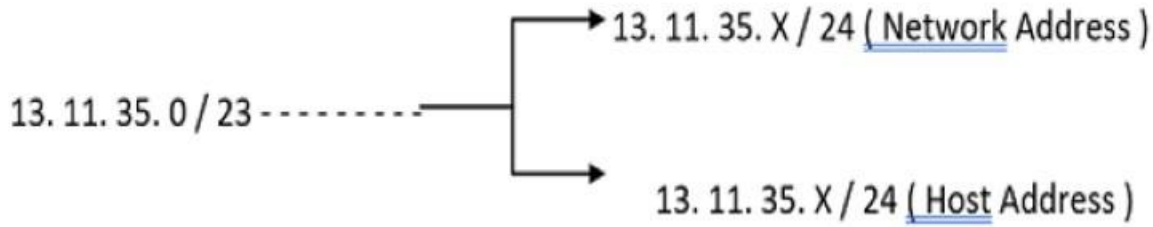
Purpose of Subnetting in Computer Networks

- **Efficiency of the Network**
- By removing the need for extra routers, subnetting makes network traffic simpler. This makes sure the data being transmitted can get to its destination as fast as possible, eliminating or avoiding any potential diversions that may slow it down.
- **Provides Network Security**
- By isolating or removing vulnerable network regions and making it harder for intruders to move through a company's network, subnetting helps the network managers in reducing network-wide risks.

- **Internet Protocol (IP) Addressing Relocation**
- Each class has a finite amount of possible host allocations; for instance, networks with more than 254 devices require a Class B allocation.
- Assume that you are a network administrator. Now, you have a task of allocating 150 hosts among three physical networks in three distinct cities for a Class B or C network.
- If so, we must either ask for additional address blocks for each network or split the single big network into small parts named subnets so that we could utilize a single address block across a number of physical networks.

- **Reduction of Network Traffic**
- Placing all of the computers on the same subnet can assist minimize network traffic if a significant amount of an organization's traffic is intended to be shared routinely among a number of devices. Without a subnet, all computers and servers on the network would be able to see data packets from every other machine.
- **Network Speed Improvement**
- The main network is divided into smaller subnets through the process of subnetting, and the goal of these smaller, linked networks is to split the large network into a collection of smaller, less-busy networks. Subnets reduce the need for traffic to use unnecessary routes, which speeds up the network

- **Division of IP Addresses**
- An IP address is split into its network address and host address via subnetting.
- The split address may then be further divided into units using the subnet mask approach, and those units can be assigned to different network devices.



Here, X refers to the Host ID. This is the only thing which gets changed in the Internet Protocol Address

Understand the working of the Subnet.

The IPv4 Addressing has five different classes. They are:

- Class A Network
- Class B Network
- Class C Network
- Class D Network
- Class E Network