**Fundamentals of TCP/IP Networks**

# Internets

An internet (with a lowercase i), connects different computer networks, allowing hosts on all of the networks to communicate with one another. The term

subnetwork, or subnet, is used to refer to one of the networks composing an internet. A single address format is used to identify all hosts in the internet.

The term Internet (with an uppercase I) is used to refer to the TCP/IP internet that connects millions of computers globally.

The first widespread implementation of TCP/IP appeared with 4.2BSD in 1983. Several implementations of TCP/IP are derived directly from the BSD code; other implementations, including the Linux implementation, are written from scratch, taking the operation of the BSD code as a reference standard defining the operation of TCP/IP.

# Data-Link Layer

Consists of the device driver and the **hardware interface (network card)** to the underlying physical medium

Concerned with transferring data across a physical link in a network

To transfer data, the data-link layer encapsulates datagrams from the network layer into units called frames

Data-link layer transmits the frames across the physical link and may handles acknowledgements from the receiver

Maximum Transmission Unit (MTU). A data-link layer’s MTU is the upper limit that the layer places on the size of a frame

netstat –i

netstat –i displays a list of the system’s network interfaces, along with their MTUs

## Network Interface Card (NIC)

A network interface card (NIC) is a circuit board or card that is installed in a computer so that it can be connected to a network.

The network controller implements the electronic circuitry required to communicate using a specific physical layer and data link layer standard such as Ethernet or Wi-Fi.

The NIC allows computers to communicate over a computer network, either by using cables or wirelessly.

The NIC is both a physical layer and data link layer device, as it provides physical access to a networking medium and, for IEEE 802 and similar networks, provides a low-level addressing system through the use of MAC addresses that are uniquely assigned to network interfaces.

## MAC Address

unique identifier assigned to a NIC

MAC addresses are used as a network address for most IEEE 802 network technologies, including Ethernet and Wi-Fi.

In this context, MAC addresses are used in the medium access control protocol sublayer.

It may also be known as an Ethernet hardware address (EHA), hardware address or physical address (not to be confused with a memory physical address)

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