Hello Everyone! In this video, you will learn about various types of network addresses, being used to identify the machines, during a network communication.

Communication among computing devices, worldwide is possible due to the four types of addresses, defined at various layers of the TCP/IP protocol suite. Physical address, Logical Address, Port Address and Specific address. These addresses identify the networking devices during the communication process.

Let's understand the relationship of the addresses to the layers of TCP/IP protocol suite. The physical **address**, also known as the link address, is defined on data link layer. This address has a scope of local area network, i.e., no two machines can have same physical address inside a LAN.,

The **IP address**, also known as logical address, is defined on Network layer. Its scope is worldwide which means that no two machines in the world can have same IP address.

The **port address** or a network identifier of a process is defined on Transport layer. This address identifies a process on a machine, and no two processes on a machine can have same port number. A port address in TCP/IP is 16 bits in length.

A **specific address** is a user-friendly address, which is defined on Application layer. Universal Resource Locator (URL) is an example of specific address. As the application layer is the closest layer to the user, these addresses have been designed in a human readable and understandable form.

When one machine sends data to another machine, the physical addresses of the sender and receiver are placed in a frame header. In the figure, a machine with physical address 10 sends a frame to a machine with physical address 87 in the same network. The data frame carries the sender and receiver's physical address. When the data moves from one network to other, the physical address changes hop to hop throughout the communication path.

In TCP /IP networks, the machines use a 48-bit physical address also known as MAC address. These addresses are represented in a colon hexadecimal notation for easy management and remembrance.

The logical address or IP address in TCP/IP protocol suite is defined in the network layer packets during the communication. These addresses remain, same throughout the path and identify the sender and receiver machines in a multinetwork path. The figure demonstrates the concept of the physical address and logical address.

The figure shows an internet with two routers connecting three LANs. The sender machine with IP address A and physical address 10 is willing to send data to the destination machine with IP address P and physical address 95.

In this case, each computer is connected to only one network, therefore has only one pair of addresses (physical and network). Each router, however, is connected to three networks (only two are shown in the figure). Therefore, each router has three pairs of addresses, one for each connection.

The sender machine creates a frame (with the packet encapsulated) and sends it on the link. However, as the destination machine belongs to a different network, the destination physical address of the packet will be marked with the address of router 1(i.e. 20). The router will send it to the next router in the path, by changing the sender's physical address as its own and receiver's address as of router 2(99 and 33 respectively).

In the last, router 2 will again change the physical addresses in the frame, with its own as the sender and destination machines address as the receiver.

In the complete flow of the data, we can see that the logical address of the machine does not change during the path, while the physical address changes on each hop (intermediate router).

The Machines in TCP/IP networks have a logical address, known as IP address defined on the Internet or Network layer. This address is a 32bit address, which is represented in a dotted decimal notation as shown. we will learn about this address in detail in the upcoming videos.

The port addresses identify the communicating processes on the endpoints. In this figure, two computers are communicating via the Internet. Three processes are running on the sending computer with port addresses a, b, and c while two processes with port addresses j and k are running on the receiving computer Process an on sending machine is communicating with process j on the receiving computer. It can easily be seen here, that the port numbers

of the communicating processes do not change during the path and remain fixed.

In TCP/IP, a process is identified with a 16-bit number, represented as a single decimal number on the transport layer. This is called a port number, as shown in figure.

Specific addresses identify the machines on the application layer. These addresses are represented as Uniform resource locator(URL), while accessing any web site. These addresses are defined for humans to remember easily. During the communication, these addresses are converted into a combination of IP address and port number. ***https://www. Facebook.com is an example.***

Thank You.