Demystifying Networking
Department of Computer Science and Engineering
Indian Institute of Technology, Bombay

Lecture - 22
Addressing at various layers

Now, when it comes to addressing, what we find are that there are primarily three categories or three levels of addresses which are important.

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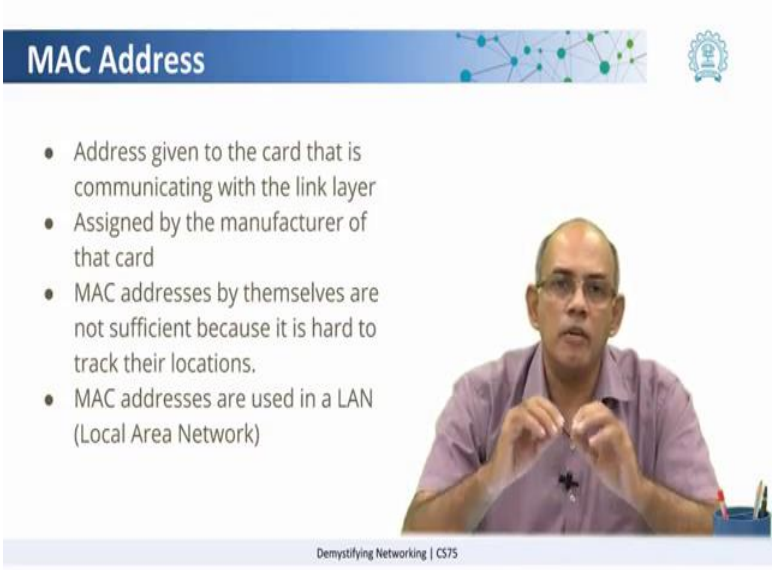

One is called the physical address or the MAC address, which is essentially the address given to the card which is communicating with the link layer. So, in your computer if you have an Ethernet card, there will be a MAC address; if you have a Wi-Fi, there will be some other MAC address.

So, that address is assigned by the manufacturer to identify that card. Is it enough to have only that address? If we have only that address, what might happen is that in order to identify where is a machine, it can get very complicated. Right? I mean different machines will go to different countries and they will be in different locations and in order to send a packet from a client, which has such a MAC address to a server, which is also having only such a MAC address, is going to become very complex in order to make sure to get the packet from the source to the destination.

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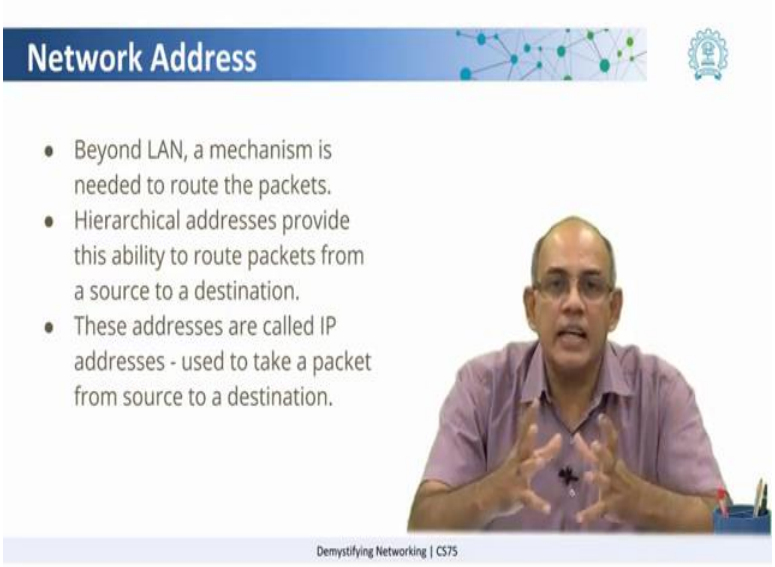

So, the MAC address is useful at the link layer where multiple machines are using the same link to communicate or when machines are on a LAN or a local area network. What happens when we go beyond the local area, when we go beyond a LAN? Some mechanism is needed to categorize these addresses, so that packets can be routed. It is very similar to the postal system, where we have the notion of cities and streets and buildings and flats.

Similarly, we need a notion, a hierarchical notion of addressing. So, that packets can go from a source to a destination. These addresses are called network addresses or IP addresses. IP stands for Internet Protocol. So, these addresses are used to take a packet from the source to the destination.

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On top of it, is it possible that we will always be able to remember the IP addresses of different machines? For example, what is the IP address of your favorite search engine, you do not remember these addresses and since the machines may change IP addresses may change, it is required that for humans to be able to remember what is easy, are the logical addresses. So, that is the third level of addressing which is what we use as 'www.et.iitb.ac.in' or any other address that you are familiar with.