Demystifying Networking
Prof. Sridhar Iyer
Department of Computer Science and Engineering
Indian Institute of Technology, Bombay

Lecture – 39
From Dabbawalas to Routers and Switches

So, what is this Dabbawala Network have to do with routing in a computer network? Actually there are several analogical ideas in the two networks. For example, just as every home cannot be connected to every office. If we have to do that, you need a dedicated dabbawala to go from each home to each office. In a similar way, every computer in the world cannot be directly connected to every other computer. So hence, there is a need for some sort of hierarchy through which the packets can reach from the source computer to the destination computer.

This hierarchy, it turns out, is fairly similar to what happens in the dabbawala network. So, there is a source dabbawala who actually carries the dabba from the home to the nearest routing station or the train station. Then there is the dabbawala in the train who actually sorts it and make sure that it reaches the correct destination station and there is the third dabbawala, who takes it from the destination station to the office.

Now, in a network there are two entities which perform this function. The source and the destination actions are very similar, hence both these functions are carried out by an entity called the switch. The job of the switch is to know the locality, that is, it knows how to go from the source computer to the nearest router or the nearest point on the internet.Then the router, which is the analogy of the train dabbawala, knows how to take the packet along the internet to the nearest point to the destination. So, we have a switch and the router these are two devices, which are useful for routing your packet from the source to the destination.

So, do both routers and switches work in the same way? While conceptually they are similar, what we saw in the last week was that, there are different types of addresses. Switches actually work with MAC addresses whereas, routers work with IP addresses. Why do we have these two types of addresses? This is required so that routers can form a table of addresses in the internet, so that they can reach the packet from the source point on the internet to the destination point on the internet.

The switches work with MAC addresses because within a local area network there is no need to worry about internet level addresses. So, the switch, all it has to do is to find out for a given IP address, what is the MAC address and deliver the packet to the corresponding computer. Thus, routers work with IP addresses and switches work with MAC addresses.