6.033 Lecture 10
Networking II

Americo De Filippo

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References

[1] Saltzer, Jerome H. and M. Frans Kaashoek. Principles of Computer System Design: An Introduction (2009): **Section: 7.4**

Last time we talked about the three layers: ETE, network, link. We went about how this interact with each other in a connection. Today we are gonna finish the discussion of the link layer, and then we are gonna go about the net layer.

1 The others Issue of link layer: Framing

When you are sending a frame (packet in the link layer) on the link layer the recevier has to know whether the packet is starting or ending. The solution is pretty simple we are gonna to add simply some number at the start and another at the end of the message.

what if the net-layer includes in his message the end code? One solution could be is to make the end symbol reserved only to the link layer. Another idea is called bit-stuffing, suppose we send our end code let's say 1111, the sender is gonna convert 111 to 1110 and the recv will do the inverse. In this way we are gonna ensure that when is encounter the 1111 signal we are sure that is the end symbol.

2 Network layer

The network layer is based on the Ip protocol that has and Ipv4 Header [1]. An important section of the header is the Time-to-live in order to waste time into loops in our network.

[1] you could review this online

2.1 Forwarding

The idea is that given a packet what the next hop ought to be. They are gonna do that by keeping a table, that will map the destination with the next link that he should use. The routing is the one that is in charge of deciding with hop should choose in order to have the shorter path.

2.2 Routing

As we have said before here we are gonna choose the best path in order to have the faster route for our packet to the destination.
The principles of the routing should be:

1. Scalable: We dont want people involved in configuring this millions of routers.
2. Robust: If a node fails the network should handle the fail without interrupting its execution.
3. Distributed: We want that every machine does something, we dont want a machine that does all the job.

Path Vector routing The couting will be devided in 2 steps, Advertisement and the integration step. Of course when the advertisment that comes to a node has in it the node id, it will ignore the adv.

Error handling in path vector Suppose that a link fail, for the 2 principle it wont stop, on the other hand it will just keep going expiring the node after he does not hear adv from the failed node.

"Soft state" You should relie on an information only when it is regulary refreshed.

2.3 The scalability is not achevied with path-vector

The solution is: Hierarchy, throught sub-networks [2]. For example if the MIT sub-network would go down it wont affect all the others sub-networks the internet. The idea is to have autonomous systems inside our enormous network. To the edge of two regions there will be an edge-node that will interconnect them.

[2] read the recitation paper about it