

# 6.033 Lecture 8

## Networking I

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A computer network is some kind of a connection that make some computers communicates between each others. They allow us among a lot of thing to access remote data, and separate client/server. In the end they are a complex and interesting computer system.

### 1 Universal communication

The goal is the universal communication between differents machine, the network system that we are gonna to describe is entailed into the cloud that is between all the computers.

#### 1.1 Interesting issues

$d(\text{tech})/dt$  (physical medium, percetuge message get lost), there are also some kind of limits that are just physical like the speed of light. Another issue is that they are a shared infrastructure, they are multi user usage.

#### 1.2 tecnology

They are heterogeneous  $10^7$  difference, this means that there are a lot of differents protocols, or different performance systems like routers, smartphones network modules for computers etc...

In general we want to define some kind of formula which is like  $\text{length}/\text{spdl} + \text{bits}/\text{secb}$  The first term is called the bit rate and the second term is the propagation delay.

#### 1.3 sharing

**Multiplexing or switching** This is a way of sharing nodes in order to access some kind other computer and is good for avoid to have all connected to everyone, which would cause a awful amout of wires. The idea behind this is to have swiches a various location around the internet. In this way we are gonna

have some kind of different destination but same data stuff. For this reason we are gonna introduce the notion of **routing**.

### 1.3.1 Routing

How to get to everybody location onto the network? This is decision made by the switch based on their own table (we are gonna see this further in the future).

## 1.4 circuit switching

The idea for this is that we want to setup some reserved channel between 2 end points. Of course we don't use this technology anymore, but the idea is in some way preserved. Let's say we have some operators A, B, C that want to communicate on the same wire. What our new technology does is something called TDM (time division multiplexing), exclusively divided traffic for some kind of evenly slices time. Furthermore we have to know the number of intervals so that we can have some kind of idea of the max number of data per second. If we want to know the capacity of the circuit, we want to look at the max number of data that can traffic in one interval.

**The problem with it** The real issue is the continue nature of the circuit switching, we do not know the rates of trafficking on our network.

## 1.5 packet switching

Is simply not possible to know rate of traffic through the network. The idea is that every node can talk at any moment. The complexity is that we cannot predict the data amount, but we have to know it cause we cannot exceed the network capacity. For this reason we are gonna have some kind of queue, when the queue overfill we have some kind of **congestion**. If a queue overfill almost ever we have to reject data or drop some.

**Best effort networking** They don't guarantee that the data will be delivered, but the system will the best that he can for having the data delivered. What we are gonna do in the next session is to look of how we are gonna create software in order to have the best effort principle work as hard as he can.