

Computer Networks

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Agenda

- Networks and Cloud
 - The physical and virtual
- Connected Devices
- Network Types
 - *AN
- Network Protocols
 - Wired/Wireless
- Let's connect!!!



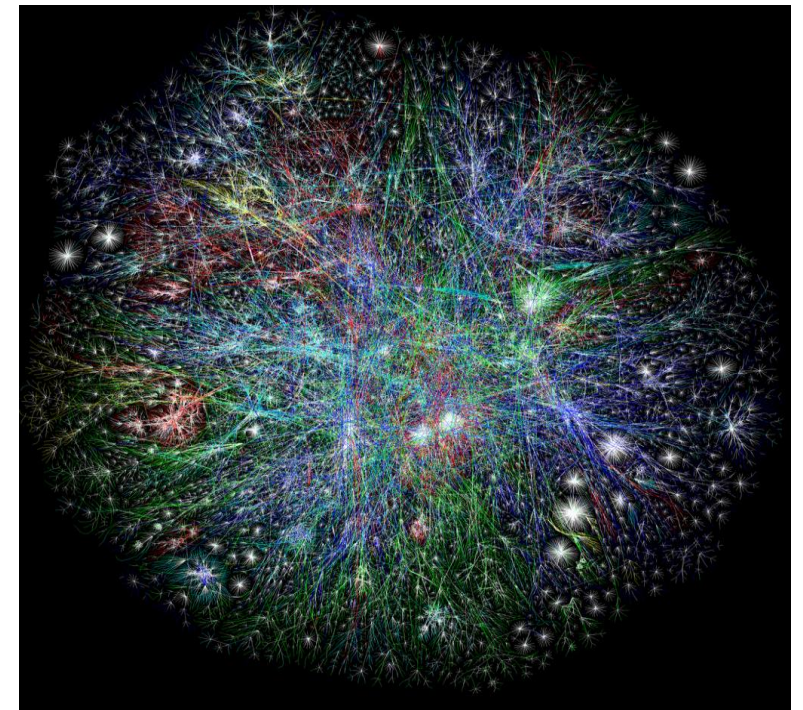
Networks

- Machines/Devices can be pretty cool in isolation...
- However, much more interesting when connected...
- Key point:
 - Networks are no longer only used to connect computers.
 - Part of many aspects of everyday life



Networks - Under the bonnet

- Inherently Physical:
 - Devices need a some form of physical channel to communicate
 - Devices need specific hardware to use that channel (eg. Antenna and associated electronics)



Elements of a Network

- Devices
 - Communicate with one another
- Physical Medium
 - Used to connect devices
- Messages
 - Information travelling over the medium
- Rules
 - Governs how messages flow through a network

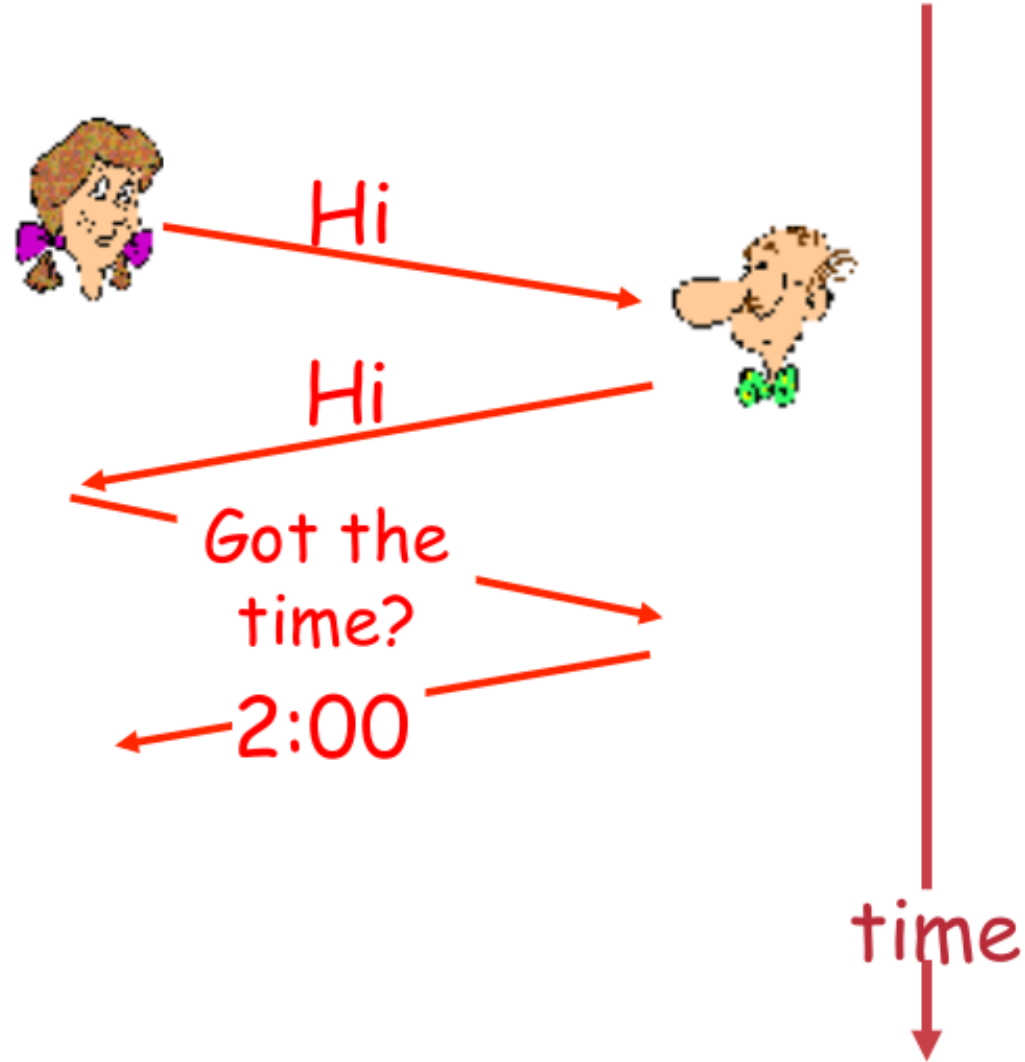
Get the message

- Data is divided into smaller parts during transmission
 - Segmentation
- The benefits of doing so:
 - Many different conversations can be interleaved on the network(multiplexing)
 - Increases reliability of network communications.
 - The separate pieces of each message need not travel the same pathway across the network from source to destination
- Adds complexity however:
 - Addressing, labeling, sending, receiving.
 - Reassembling
- NEED RULES FOR THIS...

Protocols

- Humans have generally accepted protocols for interaction:
 - Identified sender and receiver
 - Agreed upon method of communicating (face-to-face, telephone...)
 - Common language and grammar
 - Speed and timing of delivery
 - Confirmation or acknowledgement requirements
- All communication activity on Internet governed by protocols





Learning about Networks

- Can't create complex networks at home however you can create "virtual networks"
 - Virtualbox hypervisor
 - Vagrant
- Can use programmable, multi-channel, prototyping device to investigate different mediums, protocols
 - Raspberry Pi has bluetooth, Wifi, Ethernet, SPI, I2C...

