BITS Pilani
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Introduction

Introduction

- A computer network is a group of two or more computers connected to each electronically.
- The link through which communication takes place is called a network medium.
- Rules and conventions that allow meaningful and unambiguous communication between members of a Computer Network are collectively called Network Protocols.

Definition

- A Computer Network is an interconnected group of autonomous computing nodes and other devices (nodes) that use a common network protocol to share information with each other over network medium.

- Data communication are the exchange of data between two devices via some form of transmission medium such as a wire cable.

Terms: Protocol, Network Edge, Network Core, Internet

Protocol

Human protocols:

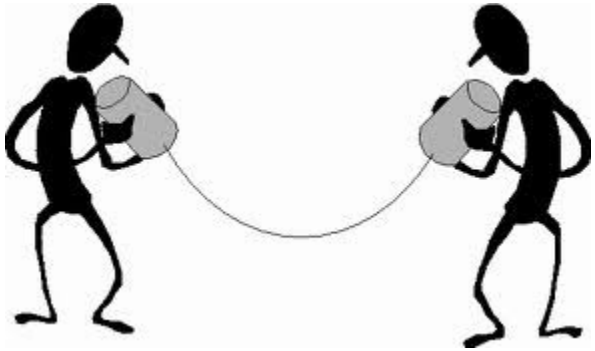
"what's the time?"

"I have a question"

introductions

- ... specific msgs sent
- ... specific actions taken

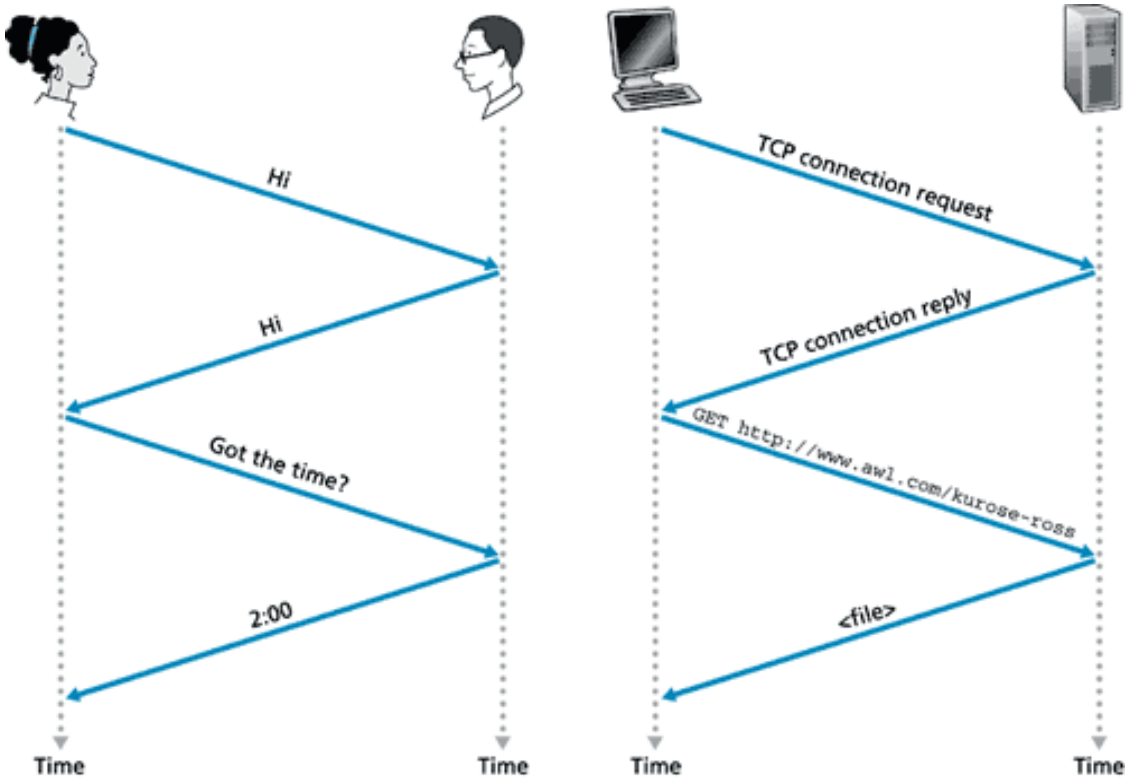
when msgs received, or other events



Network protocols:
machines rather than humans all communication activity is governed by protocols.

protocols define format, order of msgs sent and received among network entities, and actions taken on msg transmission, receipt

Protocol


Hi
Hi
Got the time?
2:00
Time
Time
TCP connection request
TCP connection reply
GET http://www.awl.com/kurose-ross
<file>
Time
Time

A closer look

network edge:

applications and hosts

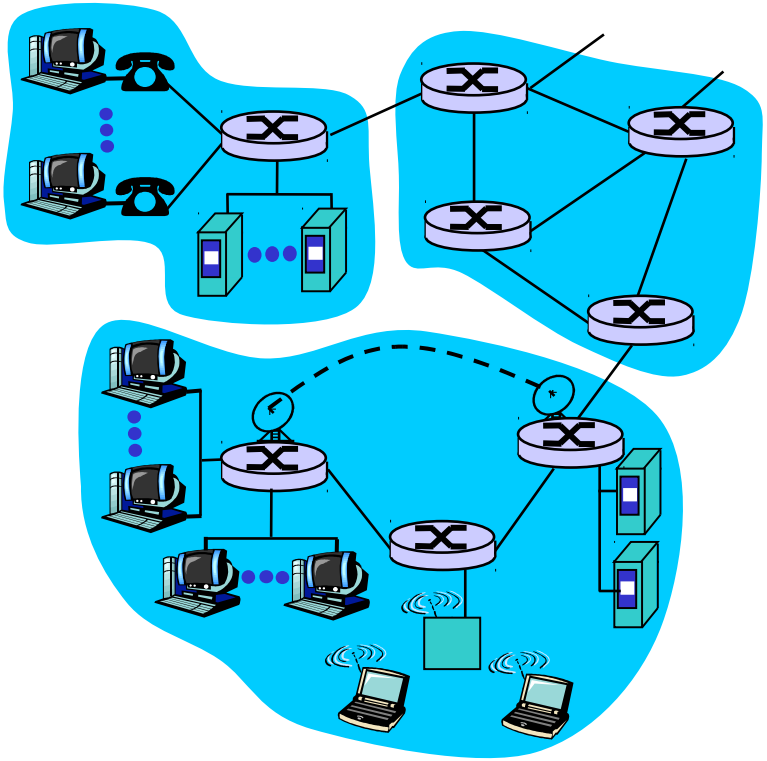
network core:

routers

network of networks

access networks, physical media:

communication links



Network Edge

end systems (hosts):

run application programs

e.g. Web, email

at “edge of network”

client/server model

client host requests, receives service from

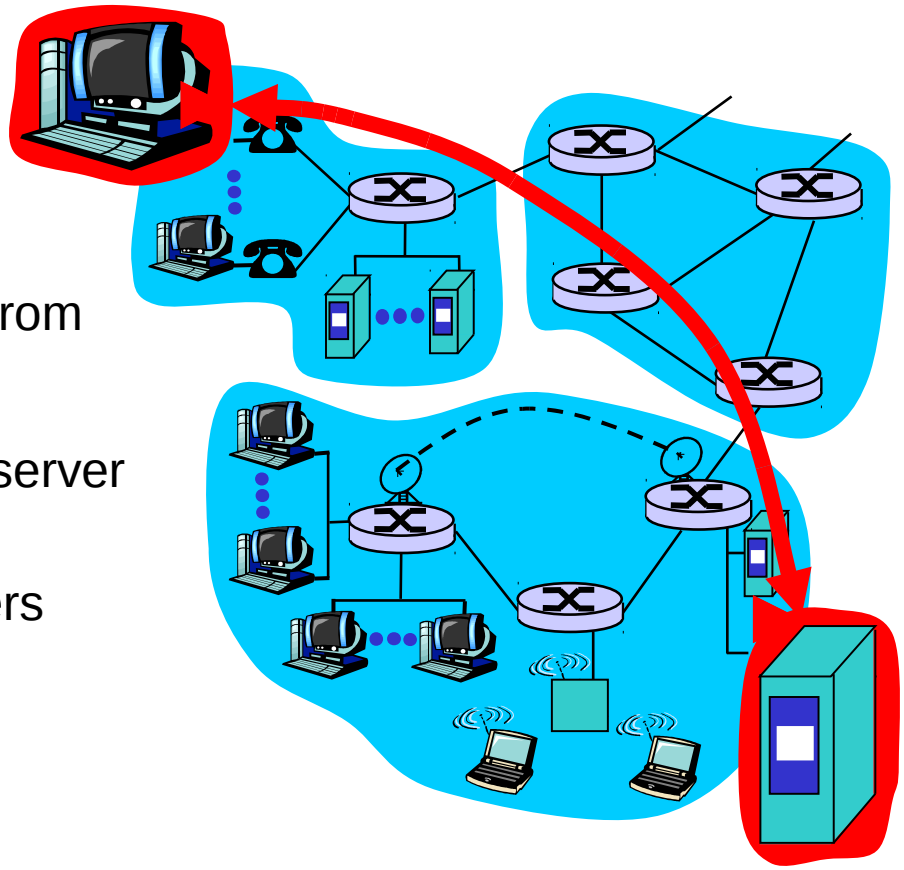
always-on server

e.g. Web browser/server; email client/server

peer-peer model:

minimal (or no) use of dedicated servers

e.g. Skype, BitTorrent



Network edge: connection-oriented service

innovate achieve lead

Goal: data transfer between end systems

- *handshaking:* setup (prepare for) data transfer ahead of time
  - Hello, hello back human protocol
  - *set up "state"* in two communicating hosts
- TCP - Transmission Control Protocol
  - Internet's connection-oriented service

TCP service [RFC 793]

- *reliable, in-order* byte-stream data transfer
  - loss: acknowledgements and retransmissions
- *flow control:*
  - sender won't overwhelm receiver
- *congestion control:*
  - senders "slow down sending rate" when network congested

Network edge: Connectionless service

innovate achieve lead

Goal: data transfer between end systems

- same as before!

- UDP - User Datagram Protocol [RFC 768]:
  - connectionless
  - unreliable data transfer
  - no flow control
  - no congestion control

App's using TCP:

- HTTP (Web), FTP (file transfer), Telnet (remote login), SMTP (email)

App's using UDP:

- streaming media, teleconferencing, DNS, Internet telephony