SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A+' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF INFORMATION TECHNOLOGY

WEB TECHNOLOGY

III YEAR - V SEM

UNIT 1 – Web Site Basics And HTML

TOPIC 2 - The Internet-Basic Internet Protocols,The world wide web

The Internet

Internet Protocol (IP)

What is Internet Protocol (IP)?

Internet Protocol (IP) is the method or protocol by which data is sent from one computer to another on the internet. Each computer -- known as a host -- on the internet has at least one IP address that uniquely identifies it from all other computers on the internet.

The Internet

- Internet: the network of networks connected via the public backbone and communicating using TCP/IP communication protocol
  - Backbone initially supplied by NSFNET(**National Science Foundation Network**), privately funded (ISP fees) beginning in 1995

Internet Protocols

- Communication protocol: how computers talk
  - Cf. telephone “protocol”: how you answer and end call, what language you speak, etc.
- Internet protocols developed as part of ARPANET research
  - ARPANET began using TCP/IP in 1982
- Designed for use both within local area networks (LAN’s) and between networks

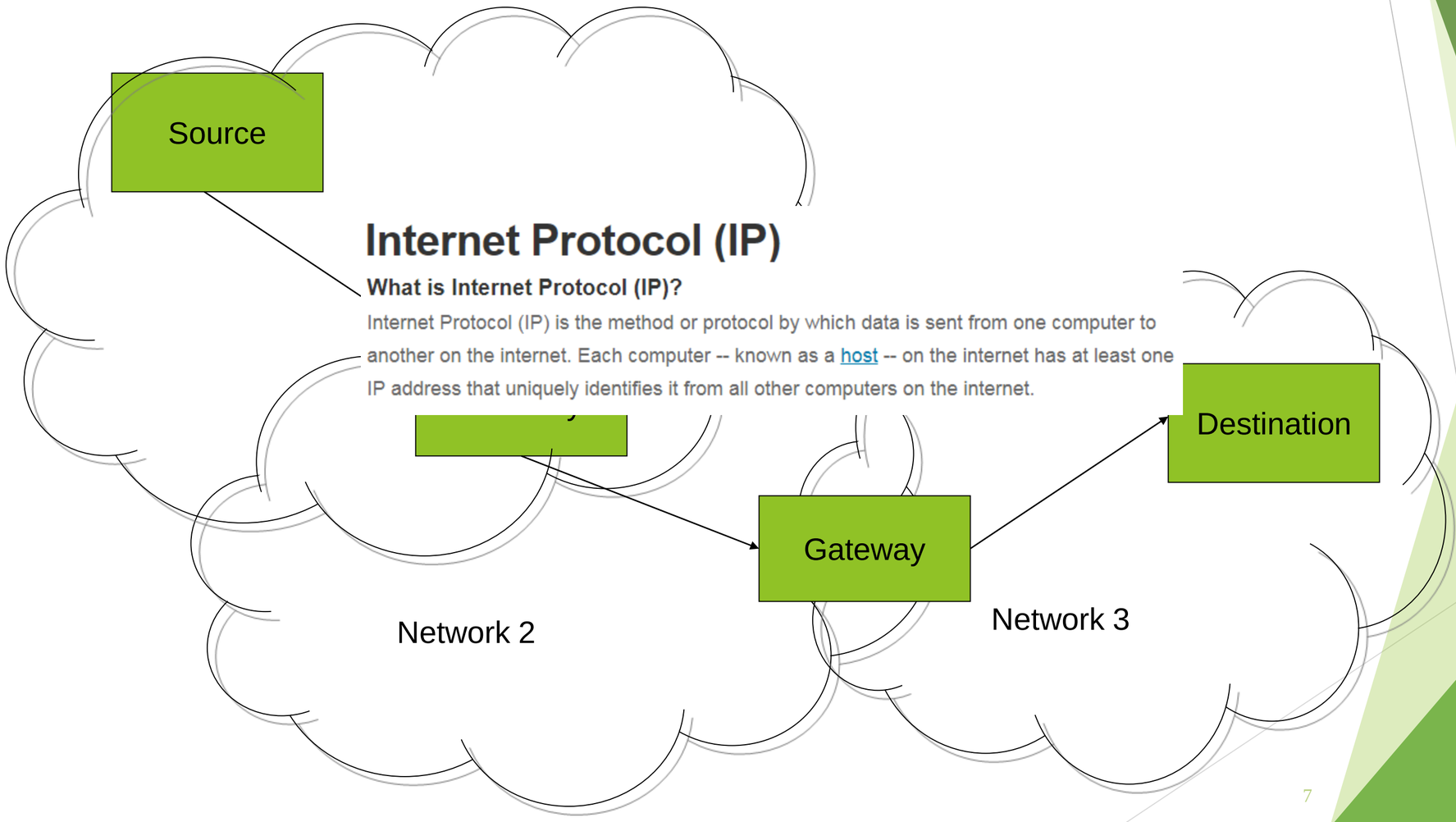
Internet Protocol (IP)

- IP is the fundamental protocol defining the Internet (as the name implies!)
- IP address:
  - 32-bit number (in IPv4)
  - Associated with at most one device at a time (although device may have more than one)
  - Written as four dot-separated bytes, e.g. 192.0.34.166

Internet Protocol (IP)

- IP function: transfer data from source device to destination device
- IP source software creates a packet representing the data
  - Header: source and destination IP addresses, length of data, etc.
  - Data itself
- If destination is on another LAN, packet is sent to a gateway that connects to more than one network

IP


Source
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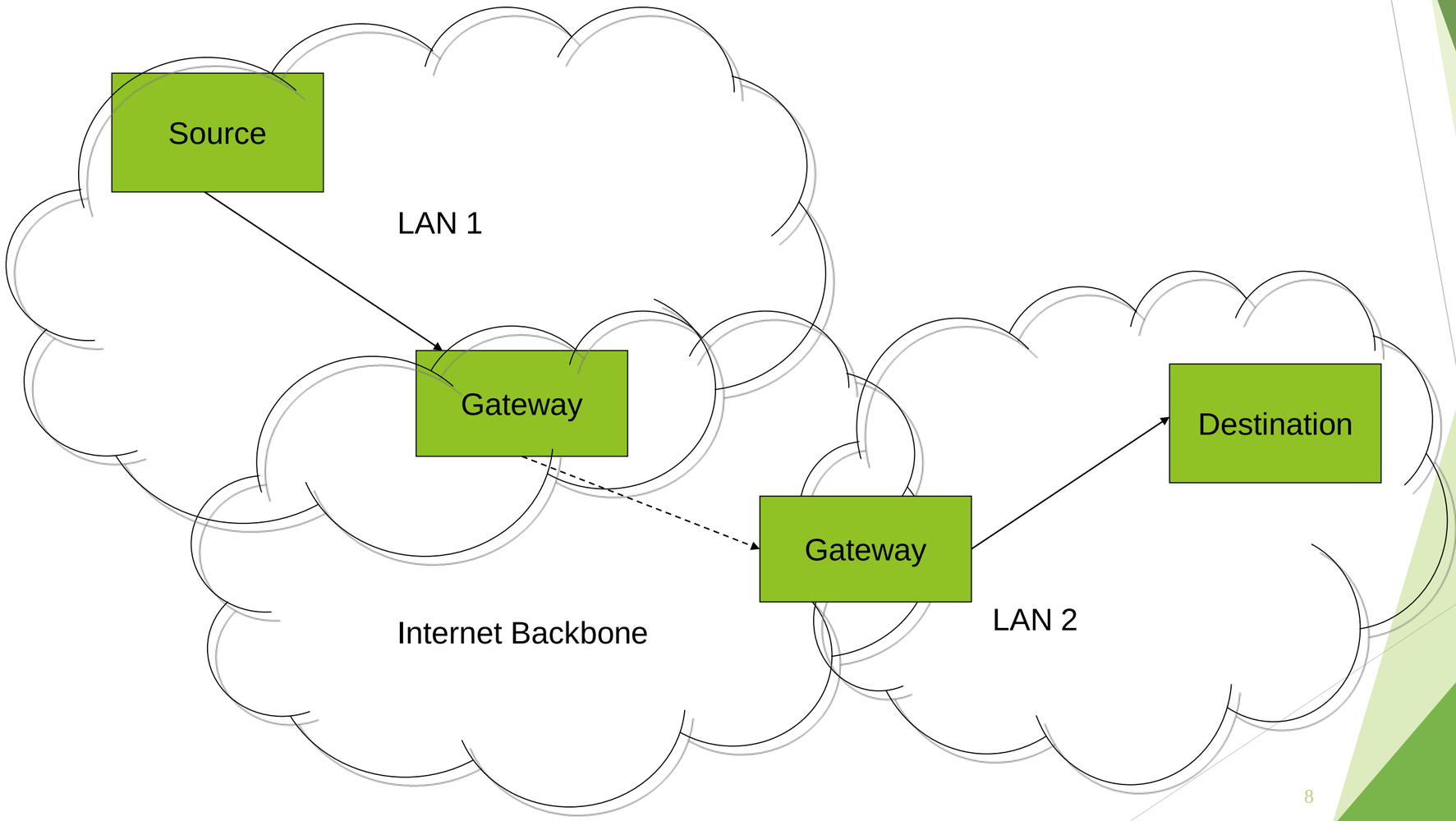
Destination
Gateway
Network 2
Network 3

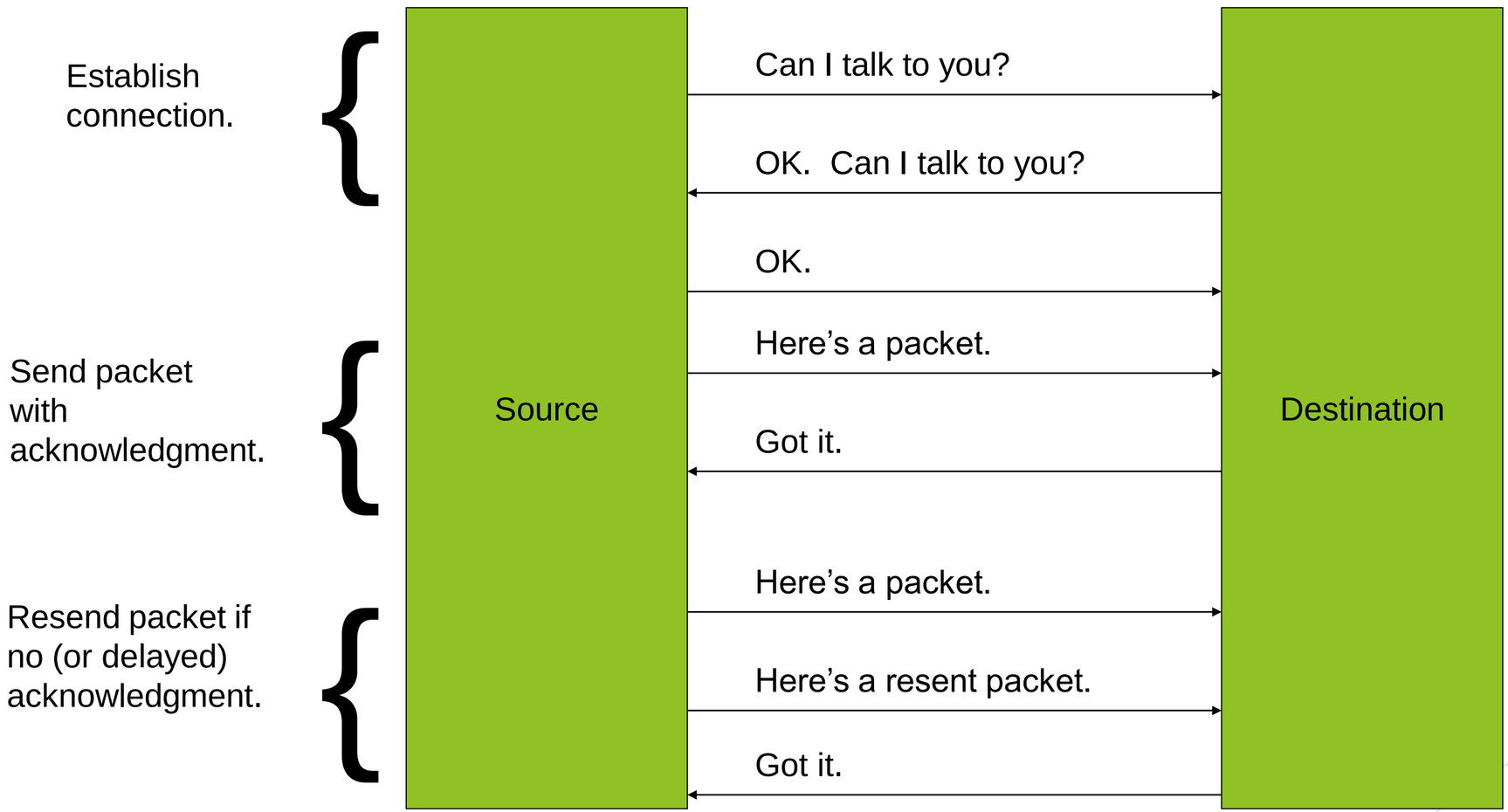
IP


Source
LAN 1
Gateway
Destination
Gateway
LAN 2
Internet Backbone

Transmission Control Protocol (TCP)

- Limitations of IP:
  - No guarantee of packet delivery (packets can be dropped)
  - Communication is one-way (source to destination)
- TCP adds concept of a connection on top of IP
  - Provides guarantee that packets delivered
  - Provide two-way (full duplex) communication

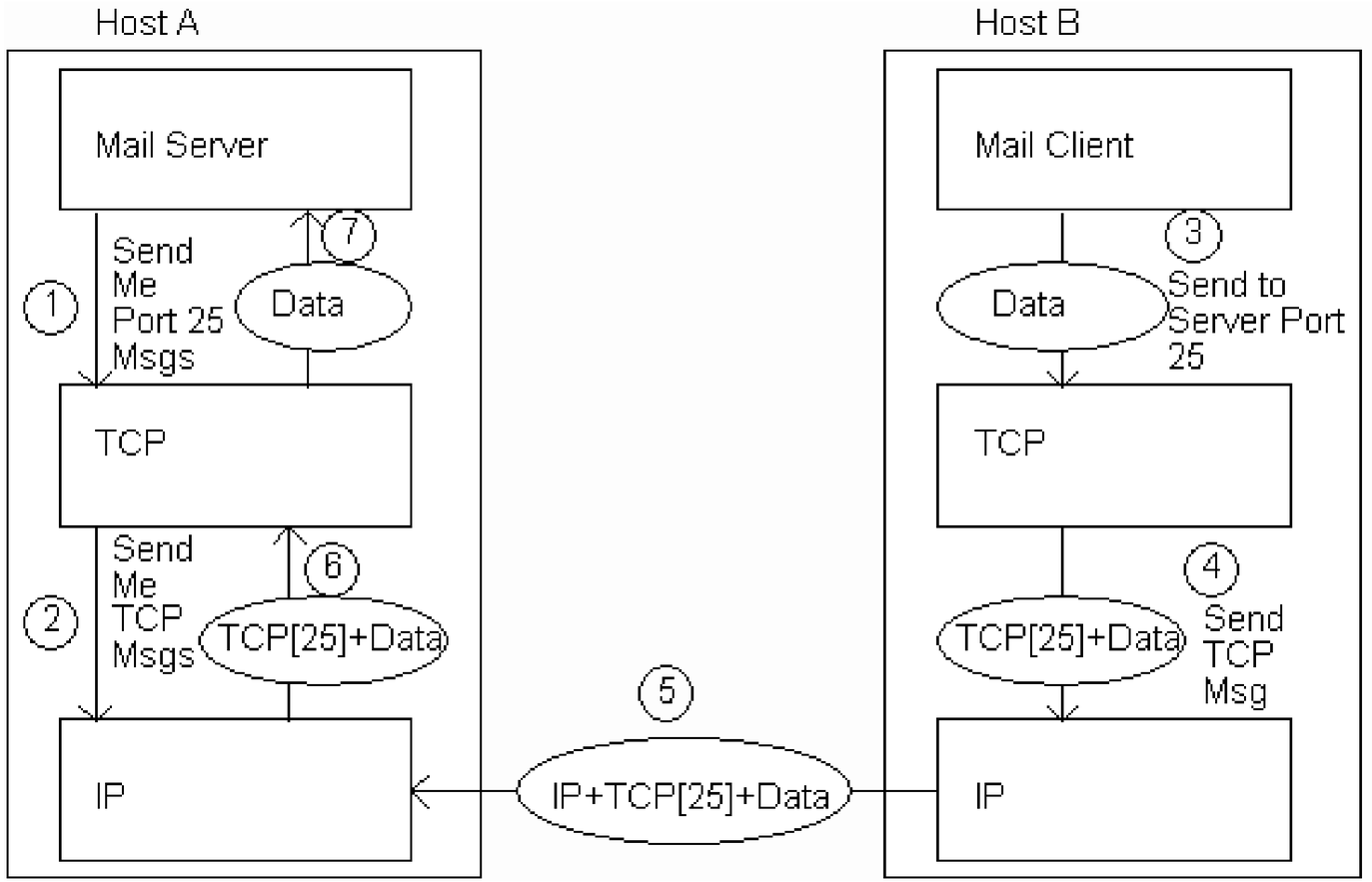
TCP


Establish connection.
Send packet with acknowledgment.
Resend packet if no (or delayed) acknowledgment.
Source
Destination
Can I talk to you?
OK. Can I talk to you?
OK.
Here's a packet.
Got it.
Here's a packet.
Here's a resent packet.
Got it.

TCP

- TCP also adds concept of a port
  - TCP header contains port number representing an application program on the destination computer
  - Some port numbers have standard meanings
    - Example: port 25 is normally used for email transmitted using the Simple Mail Transfer Protocol (SMTP)
  - Other port numbers are available first-come-first served to any application

TCP


Host A
Mail Server
Send Me Port 25 Msgs
1
7
Data
TCP
Send Me TCP Msgs
2
6
TCP[25]+Data
IP
5
IP+TCP[25]+Data
Host B
Mail Client
3
Data
Send to Server Port 25
TCP
4
TCP[25]+Data
Send TCP Msg
IP

User Datagram Protocol (UDP)

- Like TCP in that:
  - Builds on IP
  - Provides port concept
- Unlike TCP in that:
  - No connection concept
  - No transmission guarantee
- Advantage of UDP vs. TCP:
  - Lightweight, so faster for one-time messages

THE WORLD WIDE WEB

Domain Name Service (DNS)

- DNS is the “phone book” for the Internet
  - Map between host names and IP addresses
  - DNS often uses UDP for communication
- Host names
  - Labels separated by dots, e.g., www.example.org
  - Final label is *top-level domain*
    - Generic: .com, .org, etc.
    - Country-code: .us, .il, etc.

DNS

- Domains are divided into second-level domains, which can be further divided into subdomains, etc.
  - E.g., in www.example.com, example is a second-level domain
- A host name plus domain name information is called the fully qualified domain name of the computer
  - Above, www is the host name, www.example.com is the FQDN

DNS

- `nslookup` program provides command-line access to DNS (on most systems)
- looking up a host name given an IP address is known as a reverse lookup
  - Recall that single host may have multiple IP addresses.
  - Address returned is the canonical IP address specified in the DNS system.

DNS

- `ipconfig` (on windows) can be used to find the IP address (addresses) of your machine
- *`ipconfig /displaydns`* displays the contents of the DNS Resolver Cache (*`ipconfig /flushdns`* to flush it)

Analogy to Telephone Network

- IP ~ the telephone network
- TCP ~ calling someone who answers, having a conversation, and hanging up
- UDP ~ calling someone and leaving a message
- DNS ~ directory assistance

Higher-level Protocols

- Many protocols build on TCP
  - Telephone analogy: TCP specifies how we initiate and terminate the phone call, but some other protocol specifies how we carry on the actual conversation
- Some examples:
  - SMTP (email)
  - FTP (file transfer)
  - HTTP (transfer of Web documents)

World Wide Web

- Originally, one of several systems for organizing Internet-based information
  - Competitors: WAIS, Gopher, ARCHIE
- Distinctive feature of Web: support for hypertext (text containing links)
  - Communication via Hypertext Transfer Protocol (HTTP)
  - Document representation using Hypertext Markup Language (HTML)

World Wide Web

- The Web is the collection of machines (Web servers) on the Internet that provide information, particularly HTML documents, via HTTP.
- Machines that access information on the Web are known as Web clients.
- A Web browser is software used by an end user to access the Web.