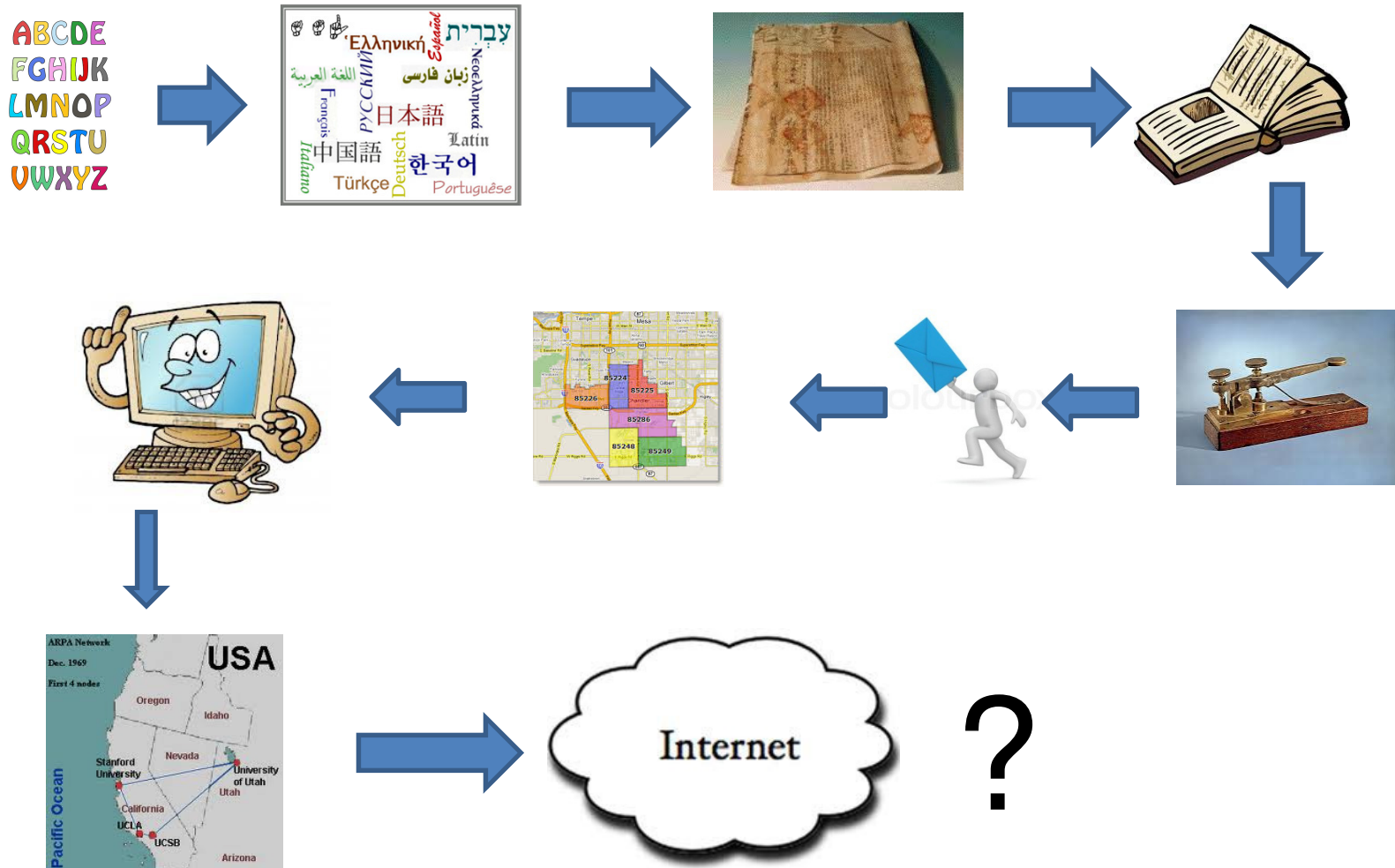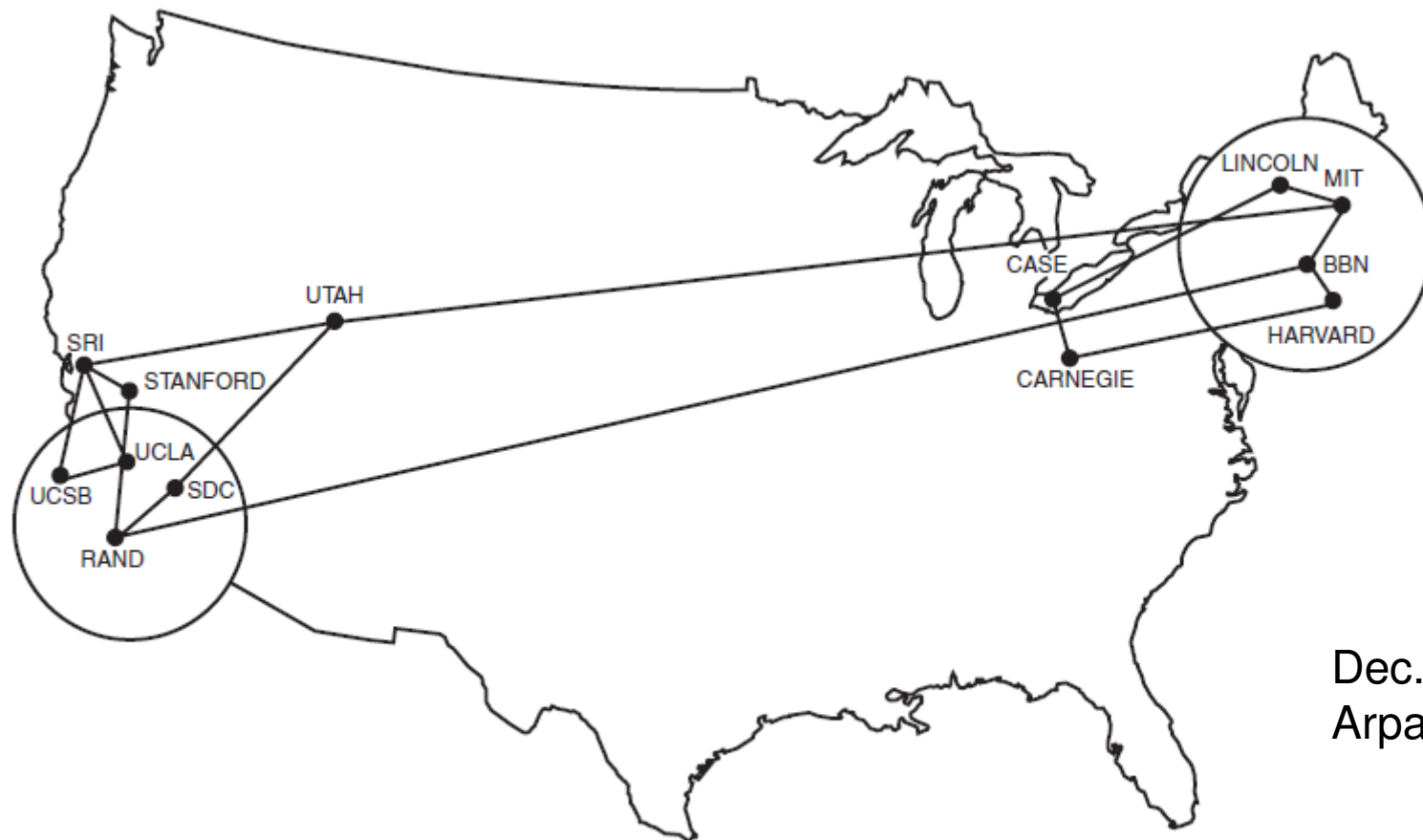# UNIT 11A
The Internet: Fundamentals
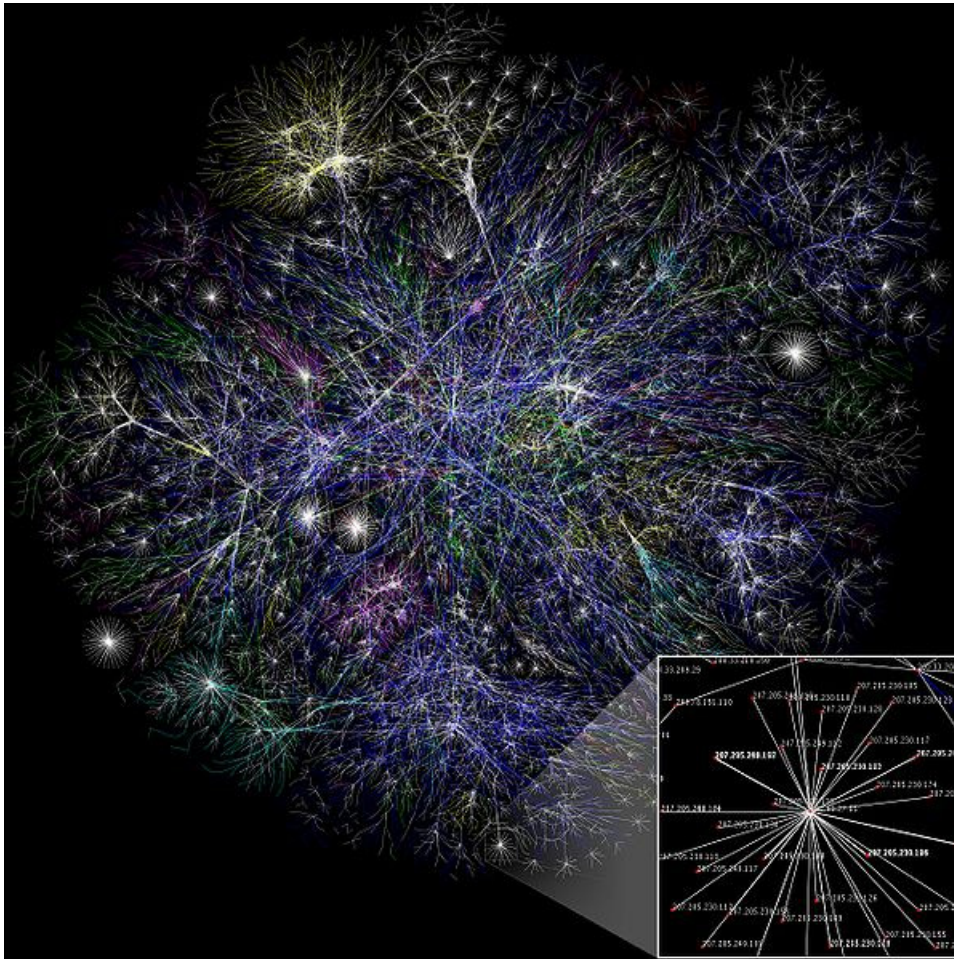
Communication technologies

ARPANET

Dec. 1970
Arpanet

Source: Heart, F., McKenzie, A., McQuillian, J., and Walden, D., ARPANET Completion Report, Bolt, Beranek and Newman, Burlington, MA, January 4, 1978.
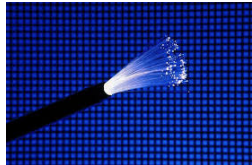
ARPANET to Internet

2000's
Internet Map
(small section)

The wires that connects internet

Copper

Towers

fiber
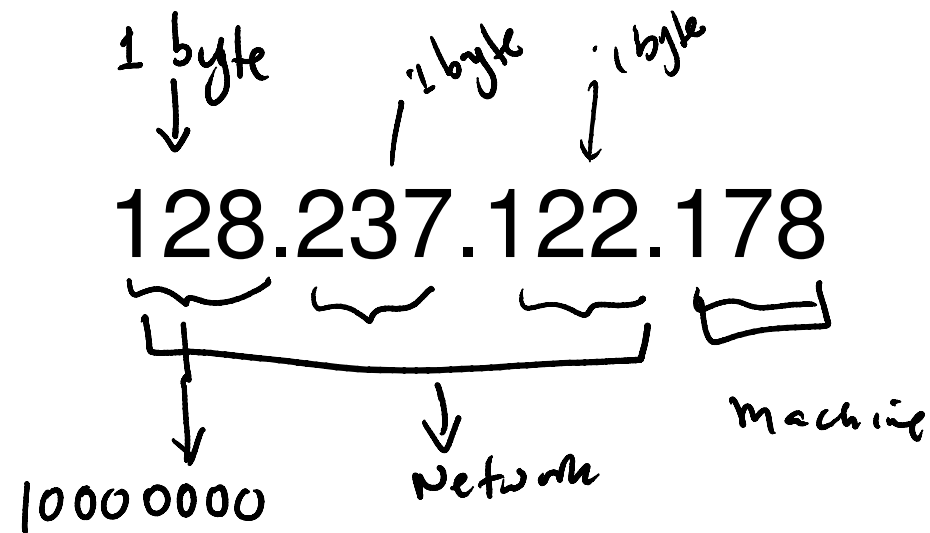
Satellites

Servers

Google.com

IP Address

Facebook.com

IP Address

A computer that runs <u>services..</u>
What kind of services?

- mail server
- applicatn server
- Netflix server

IP4 Addresses

1 byte   1 byte   1 byte

128.237.122.178

1000 0000   Network   Machine

QUIZ: How many different IP4 addresses can we have? 2^{32} if 32-bit

Components of an IP address

- Each device that is connected to a network has an IP address
  - 192.168.66.5 ← *global IP*

  - 127.0.0.1 ← *local IP*

Your home network

PC

gaming device

PC

laptop

router

the internet

cable modem

Simplehelp.net

Adhoc networks

How emails work

AOL

Mail server

ISP

ISP

Gmail.com

Iti

How data is sent

P

P1

P2

P3

P4
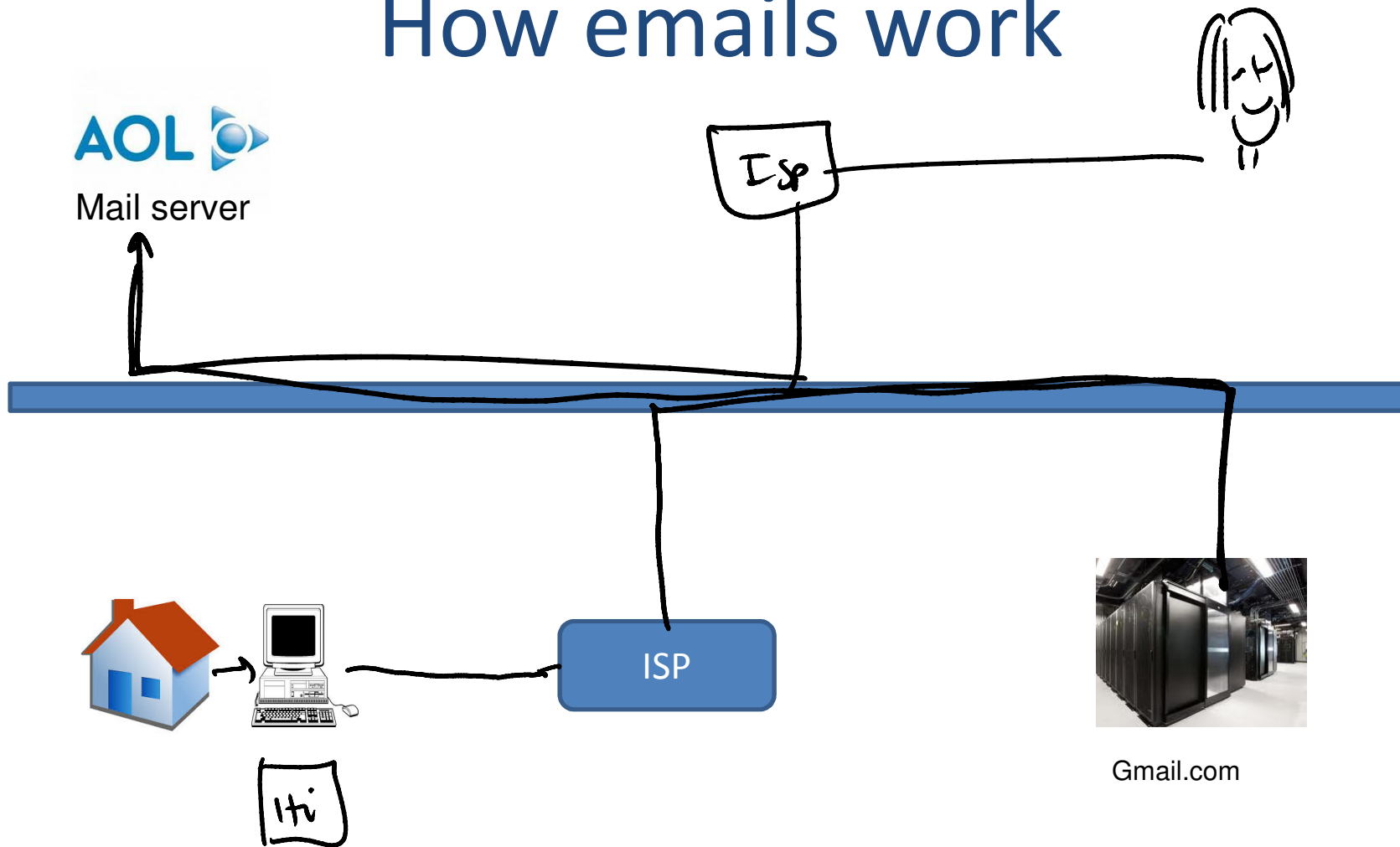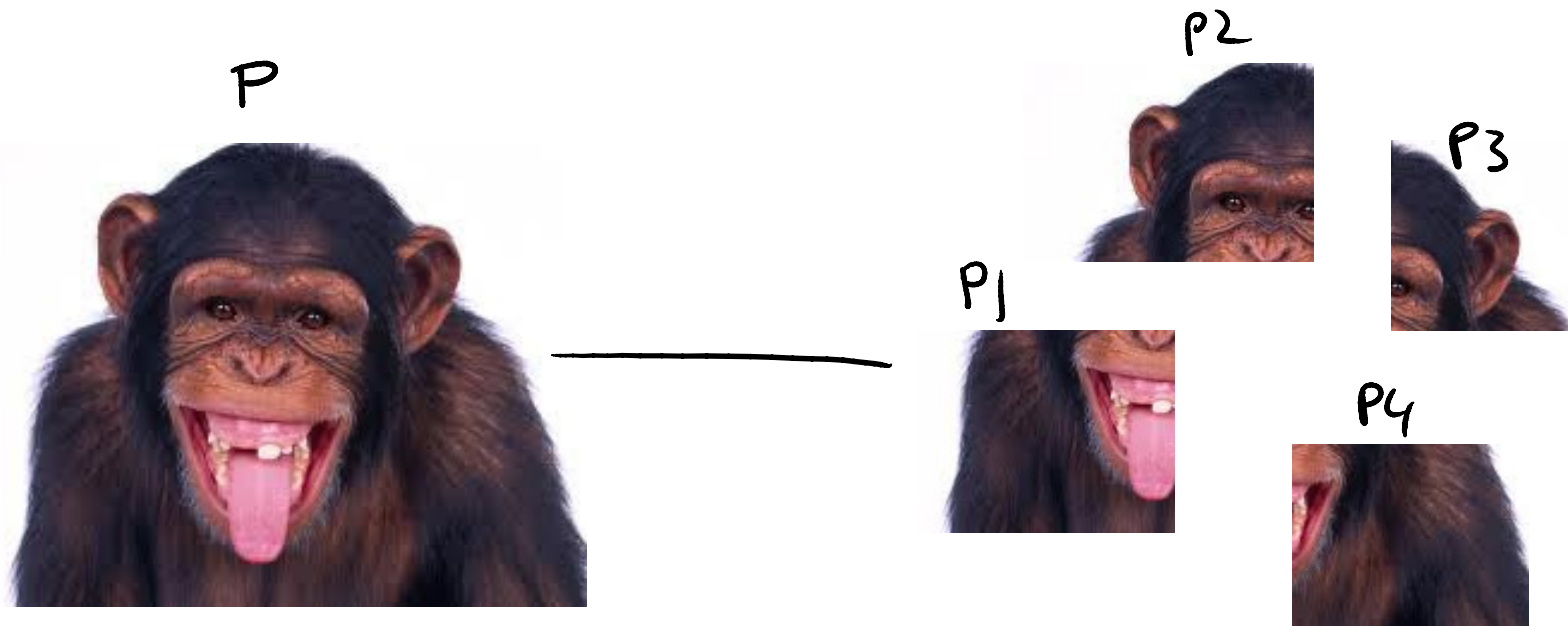
Formatted, encoded

Packets

How packets work

FB

Research

P1-R2-R1

P1-R2

R1

R2

R3

you

P1

boss

ISP

Packet Framing

Control Data

User data

Communication protocols

Error detection

Bit , byte, header, delimiters
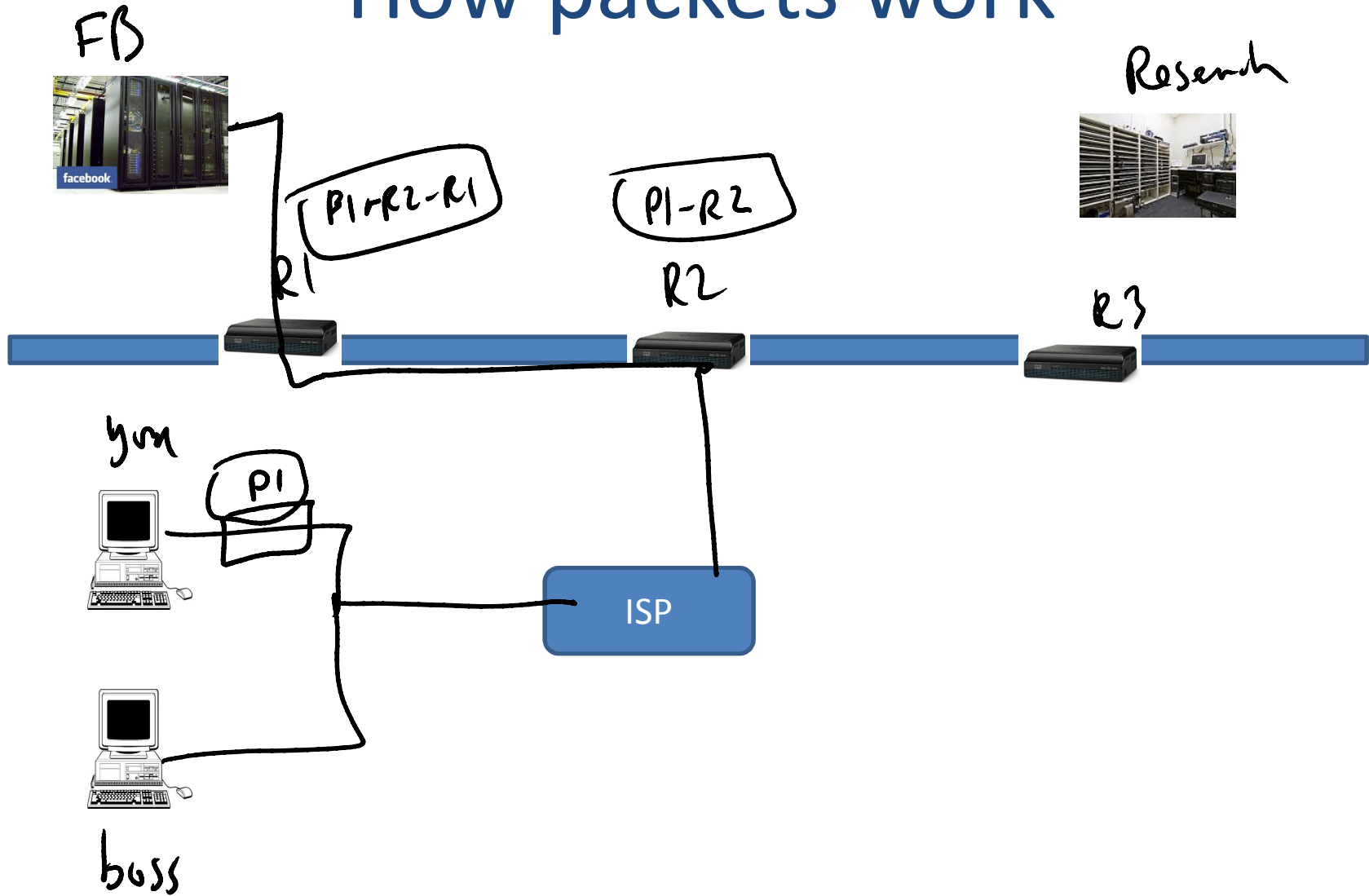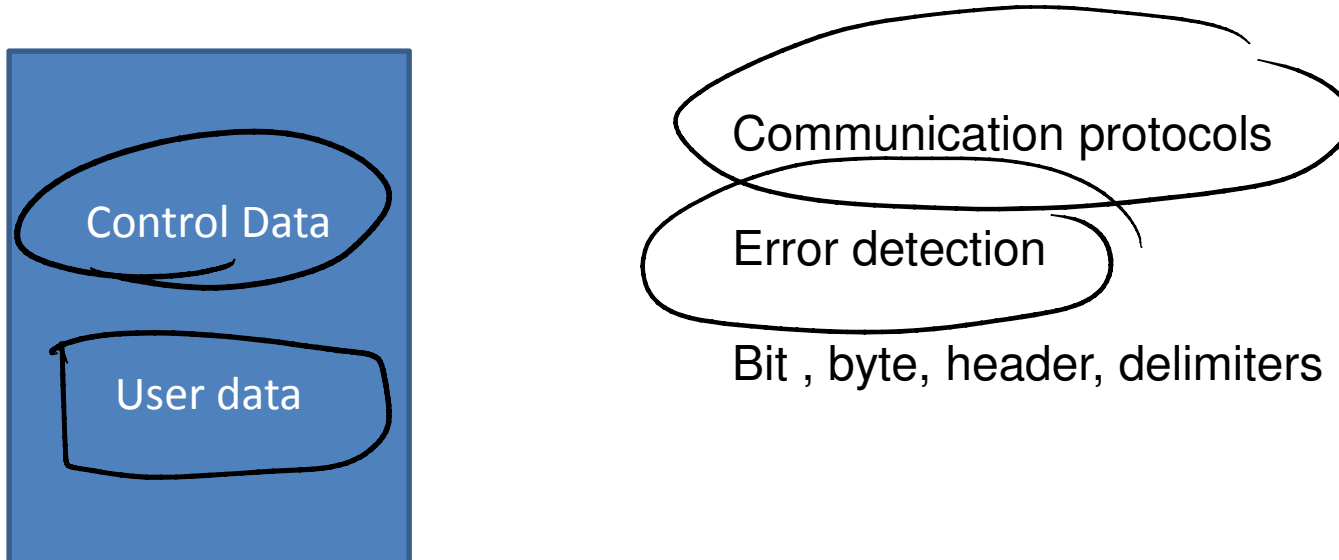
Communication

Communication Protocols

- Digital message formats and rules for exchanging those messages
  - signaling, authentication, error detection and correction capabilities.
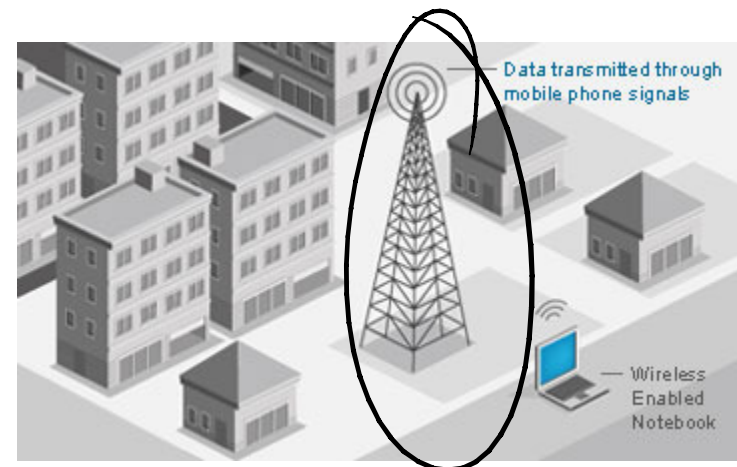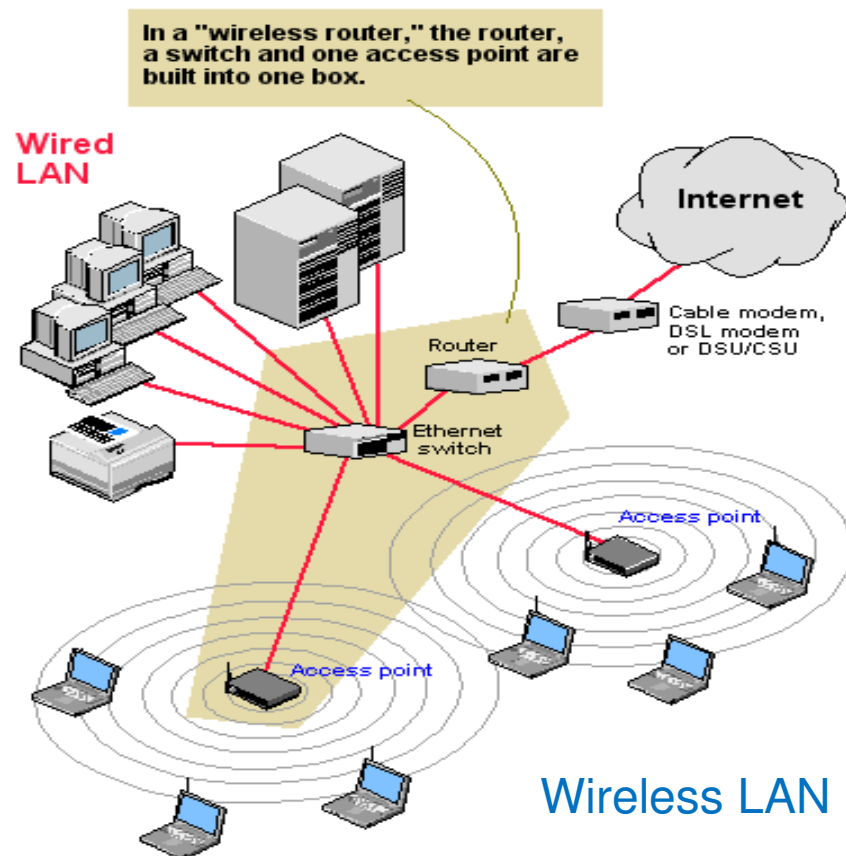
- Protocols have to be agreed upon by the parties involved. To reach agreement a protocol may be developed into a technical standard.

- Standards Bodies
  - International Standards Organization (ISO), Internet Society, W3C

Wireless Data Communication

- Wireless data communication using radio, microwave, and infrared signals
  - Wireless local access network: user transmits messages to a local wireless base station referred to as a wireless router. Typically used in homes, coffee shops.

  - Wireless wide area access network: user transmits messages to a remote base station provided by a telecommunications company.

Examples

From Computer Desktop Encyclopedia
© 2007 The Computer Language Co. Inc.

In a "wireless router," the router, a switch and one access point are built into one box.

Wired LAN

Internet

Router

Cable modem, DSL modem or DSU/CSU

Ethernet switch

Access point

Access point

Wireless LAN

Data transmitted through mobile phone signals

Wireless Enabled Notebook

Wireless WAN

Wireless Local Access Standards

- Wi-Fi (Wireless Fidelity). Officially IEEE 802.11 wireless network standards.
  - Wireless version of a wired local area network

- Bluetooth
  - Low-power wireless standard for communication between devices close to each other

WWW

world wide web

The **World Wide Web** (abbreviated as **WWW** or **W3**,[2] commonly known as **the Web**), is a system of interlinked hypertext documents accessed via the Internet. With a web browser, one can view web pages that may contain text, images, videos, and other multimedia, and navigate between them via hyperlinks.

source: wikipedia

IE
Firefox
Chrome
Safari

Webpages

`<HTML)`

`<body>`

`<|body>`

`</HTML>`

Rest of the Week

- Closer look at the Internet protocol stack, web applications

- Security over the Internet

- Recommended reading: Blown to Bits Chapter 5 and the Appendix