Network

- By: Qazaqbayev Sultanbek

Networking

- **Computer network** A collection of computing devices that are connected in various ways in order to communicate and share resources

  Usually, the connections between computers in a network are made using physical wires or cables

  However, some connections are **wireless**, using radio waves or infrared signals

Networking

- The generic term **node** or **host** refers to any device on a network

- **Data transfer rate**   The speed with which data is moved from one place on a network to another

- Data transfer rate is a key issue in computer networks

Networking

- Computer networks have opened up an entire frontier in the world of computing called the **client/server model**
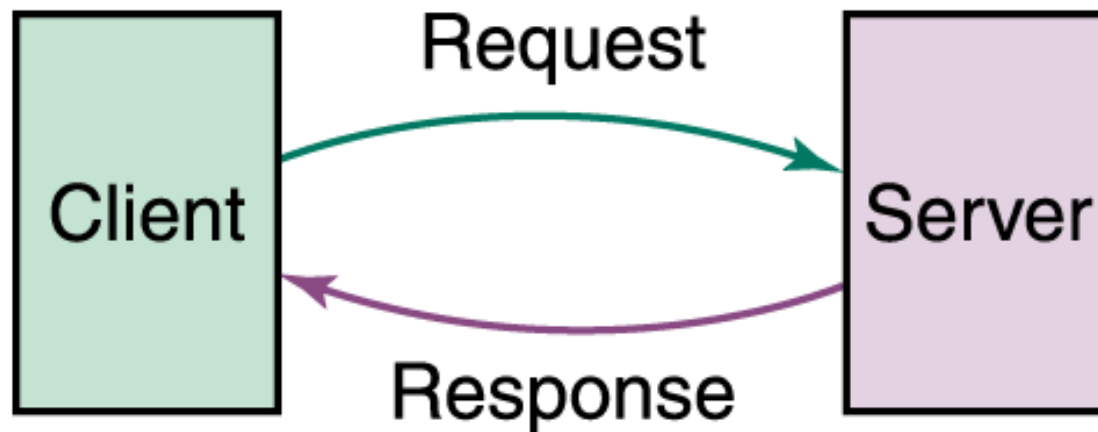

Figure 15.1 Client/Server interaction

Networking

- **File server** A computer that stores and manages files for multiple users on a network

- **Web server** A computer dedicated to responding to requests (from the browser client) for web pages

Types of Networks

- **Local-area network** **(LAN)**   A network that connects a relatively small number of machines in a relatively close geographical area

Types of Networks

- Various configurations, called topologies, have been used to administer LANs

  – **Ring topology**   A configuration that connects all nodes in a closed loop on which messages travel in one direction

  – **Star topology**   A configuration that centers around one node to which all others are connected and through which all messages are sent

  – **Bus topology**   All nodes are connected to a single communication line that carries messages in both directions

So, who owns the Internet?

Well, nobody does. No single person or company owns the Internet or even controls it entirely. As a wide-area network, it is made up of many smaller networks. These smaller networks are often owned and managed by a person or organization. The Internet, then, is really defined by how connections can be made between these networks.

Internet Connections

- There are various technologies available that you can use to connect a home computer to the Internet

  – A **phone modem** converts computer data into an analog audio signal for transfer over a telephone line, and then a modem at the destination converts it back again into data

  – A **digital subscriber line** **(DSL)** uses regular copper phone lines to transfer digital data to and from the phone company's central office

  – A **cable modem** uses the same line that your cable TV signals come in on to transfer the data back and forth

Network Addresses

- **Hostname** A unique identification that specifies a particular computer on the Internet

  For example

  matisse.csc.villanova.edu
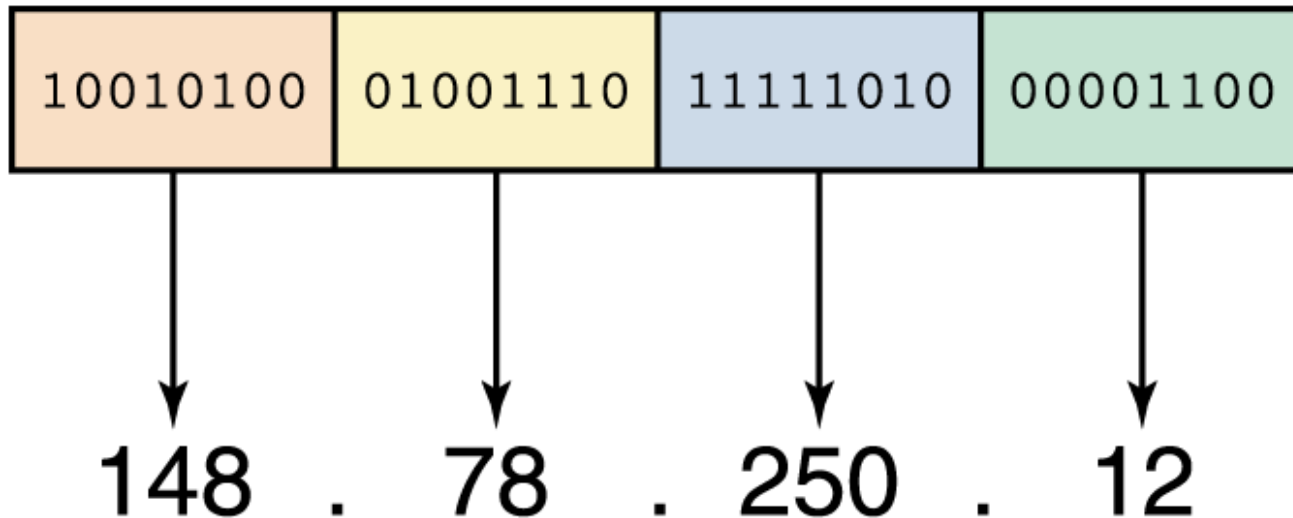
  condor.develocorp.com

Network Addresses

- Network software translates a hostname into its corresponding IP address

  For example

  205.39.145.18

Network Addresses

- An **IP address** can be split into
  - **network address**, which specifies a specific network
  - **host number**, which specifies a particular machine in that network

10010100	01001110	11111010	00001100

148 . 78 . 250 . 12

Figure 15.9
An IP address is stored in four bytes

Domain Name System

- The very last section of the domain is called its **top-level domain (TLD)** name

Top-Level Domain	General Purpose	New TLDs	General Purpose
.com	U.S. Commercial	.biz	Business
.net	Network	.info	Information
.org	Nonprofit organization	.pro	Professional
.edu	U.S. Educational	.museum	Museums
.int	International	.aero	Aerospace industry
.mil	U.S. Military	.coop	Cooperative
.gov	U.S. Government		

Figure 15.10 Top-level domains, including some relatively new ones

Domain Name System

- Organizations based in countries other than the United States use a top-level domain that corresponds to their two-letter country codes

Country Code TLD	Country
.au	Australia
.br	Brazil
.ca	Canada
.gr	Greece
.in	India
.ru	Russian Federation
.uk	United Kingdom

Figure 15.11
Some of the top-level domain names based on country codes

Domain Name System

- The **domain name system** (DNS) is chiefly used to translate hostnames into numeric IP addresses

  - DNS is an example of a distributed database

  - If that server can resolve the hostname, it does so

  - If not, that server asks another domain name server