Why Computer Networks?

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Network vs Computer Network

- **Network:** A system that carries a commodity or information between 2 or more entities
  - Examples: Transportation network, postal, telephone

- **Computer Network**: A system that carries information between 2 or more entities, in the form of electric signals

Computer Network

Transportation vs. Computer Networks

Transportation Network

- Vehicles/People
- Street address
- Intersection
- Traffic jam
- Stop and go traffic light
- Taking alternative path
- Accident
- Following a route to destination

Computer Network

- Packets/Payload
- IP address
- Bridge/router
- Network congestion
- Flow control
- Alternative route
- Collision of packets
- Routing algorithm

Why Study Computer Networks?

Will it be a stairway to wealth?

Will it help me achieve Nirvana?

Can get a good-paying job?

Usage: User Level

- Wake-Up: Email
- Breakfast: Web Browsing, Social Networks

- During Day: More browsing, chatting

- Night: Video-on-demand, Online banking/shopping

Before bed: Online gaming

Usage: Business Level

- Make data, programs and equipment available irrespective of physical location
- – Customer/Employee records,inventory, financial statements etc
- – Custom software, Security software etc
- – Share printers, scanners
- E-commerce based companies
- (Amazon, EBay, Flipkart etc)

amazon.com®   **ebay**™   ⇄*flipkart*.com

Out of ordinary/Futuristic Usage

- Sensor Networks: Instrument the physical world
- – environment/habitat monitoring (e.g. air pollution, wildlife); equipment/structure/health monitoring (e.g. motors, bridges, patient ECG)
- Interplanetary Internet

Impact

- As of 2010
- 2B (billion) Internet users
- 294B emails sent per day
- 255M (million) websites
- 2B videos watched per day at YouTube
- 600M Facebook users

- As of 2013: 1B YouTube users (15% earth population)

[Ref: http://mashable.com/2011/01/25/internet-size-infographic/]

Job Opportunities

Deploy, maintain and debug
– Network administrators, network technicians, field engineers, network analysts
Design better networking technology, protocols and applications
– Network programmers, research scientists, professors

Benefits of Networking

- "The whole is greater than the sum of its parts"

- Connectivity & Communication
- Data Sharing
- Hardware Sharing
- Internet Access
- Data Security and Management
- Performance Enhancement
- Entertainment

Disadvantages of Networking

"There is no such thing as a free lunch"

- Hardware, Software, and Setup Costs
- Hardware and Software Management Costs
- Undesirable Sharing
- Data Security Concerns