CSMC 417

Computer Networks

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Set 1

Spring 2003

Announcements

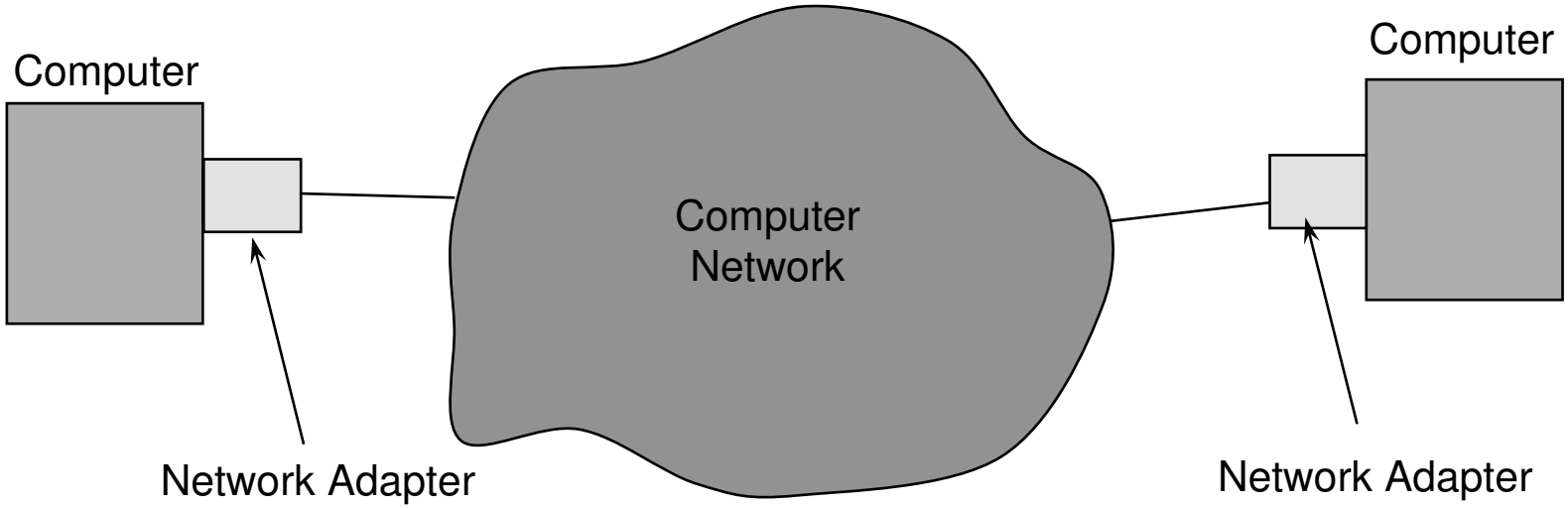
- **Handouts**
  - **class syllabus**
  - **programming assignment #1 (includes computer account)**
  - **department newsletter**
- **Required Background**
  - **must have 311, 251 and 330 (412 or 430 would be helpful)**
  - **strong working knowledge of Java**
  - **willingness to work hard**

Announcements (cont.)

- **Required Work**
  - **will require about the same amount of effort as 412**
    - » **412 a (slightly) harder project to debug**
    - » **417 project is (by design) more ambiguous**
- **Materials**
  - **Tanenbaum, "Computer Networks", 4th Edition**
- **Reading (for this week)**
  - **Chapter 1**

Networks

- **Communication between semi-autonomous computers**
- **Attached to host system by an adapter**



Many Types of Networks

- **Physical Media**
  - copper wires (Ethernet, RS232-C, V.32, etc.)
  - fiber optics (ATM, FDDI)
  - air (IR, Radio, micro-wave)
- **Speeds (link not aggregate)**
  - low
    - » modems (few k bits/sec)
    - » pagers
  - medium
    - » Ethernet (10-100 Mbps)
    - » Token Ring (16 Mbps)
  - high
    - » ATM (155-655 Mbps)
    - » Myrinet (600-1200 Mbps)
    - » SONET (OC-48 - 2488 Mbps)

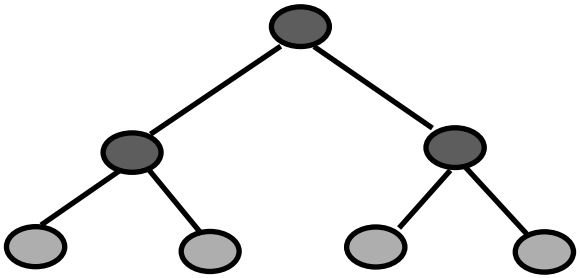
Network Topologies

- How are the communicating objects connected
- Fully connected - link between all sites
- Partially connected
  - links between subset of sites
  - can be an arbitrary graph
- Hierarchical networks
  - network topology looks like a tree
  - internal nodes route messages between different sub-trees
  - if an internal node fails, children can not communicate with each other
  - star network - hierarchical network with single internal node

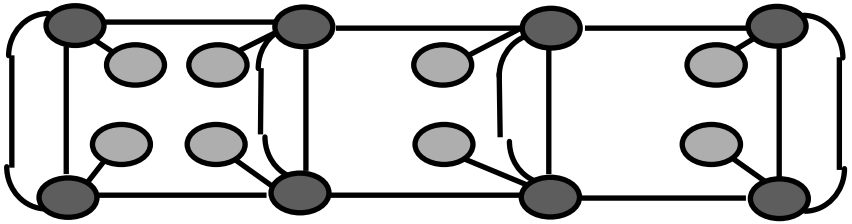
Network Topologies

Network device Processor

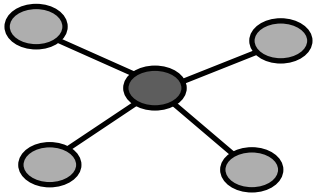
- **Tree**



- **Mesh**



- **Star (Ethernet 10Base-, physical only)**



A Network is not an Island

- Reason for networks is to share information
  - must be able to communicate in a common language
  - called protocols
    - » The nice thing about protocols is that there are so many of them!
- Protocols
  - must be unambiguous and followed exactly
    - » rule of thumb for good protocol implementations
      - be rigorous is what you generate
      - be liberal in what you accept
  - there are many different aspects to protocols
    - » electrical through web services