Networking

Group Project

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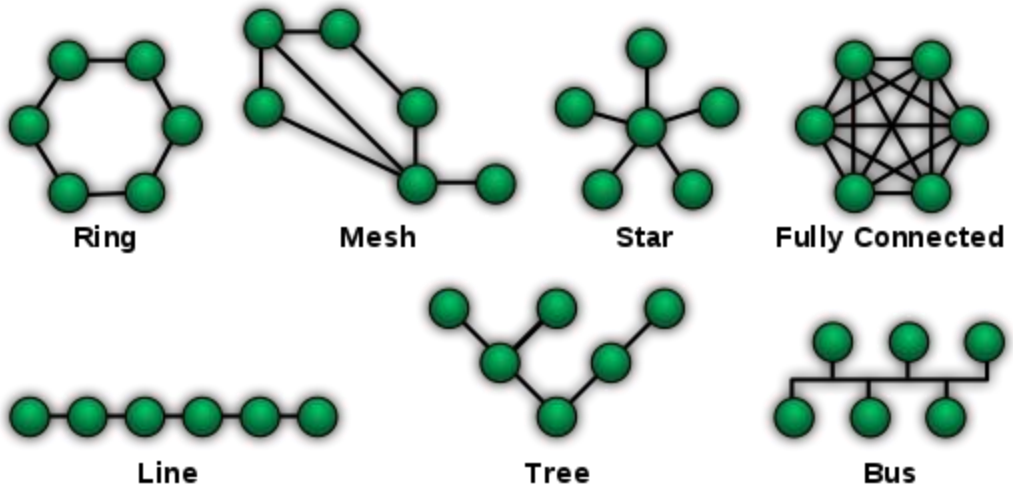
What is a Network?

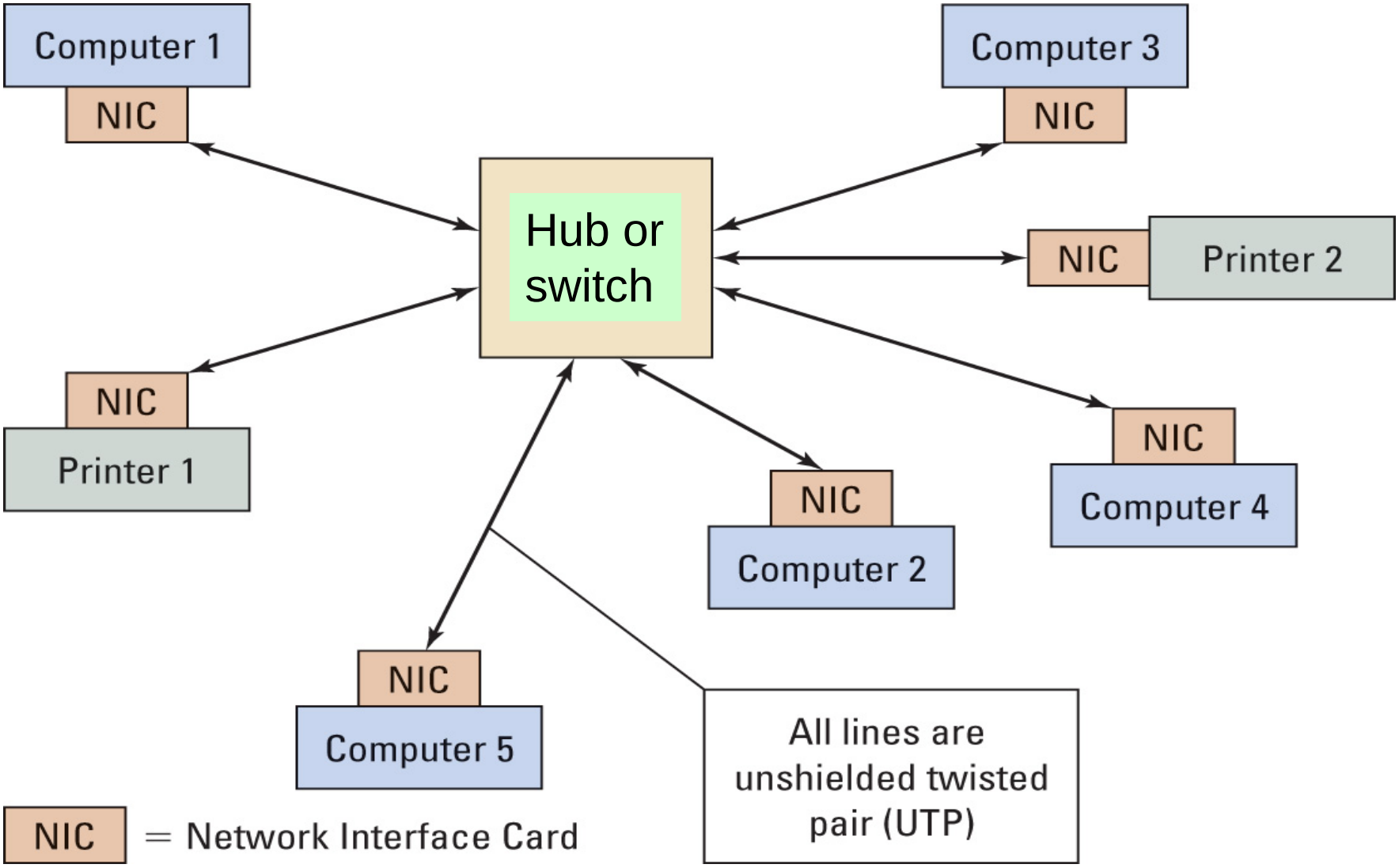
A network consists of two or more computers that are linked in order to share resources (such as printers and CDs), exchange files, or allow electronic communications. The computers on a network may be linked through cables, telephone lines, radio waves, satellites, or infrared light beams.



Networking: Computers on the Internet

- 1969 – 4
- 1971 – 15
- 1984 – 1000
- 1987 – 10,000
- 1989 – 100,000
- 1992 – 1,000,000
- 1996 – 10,000,000
- 2001 – 100,000,000
- By 2005… billions

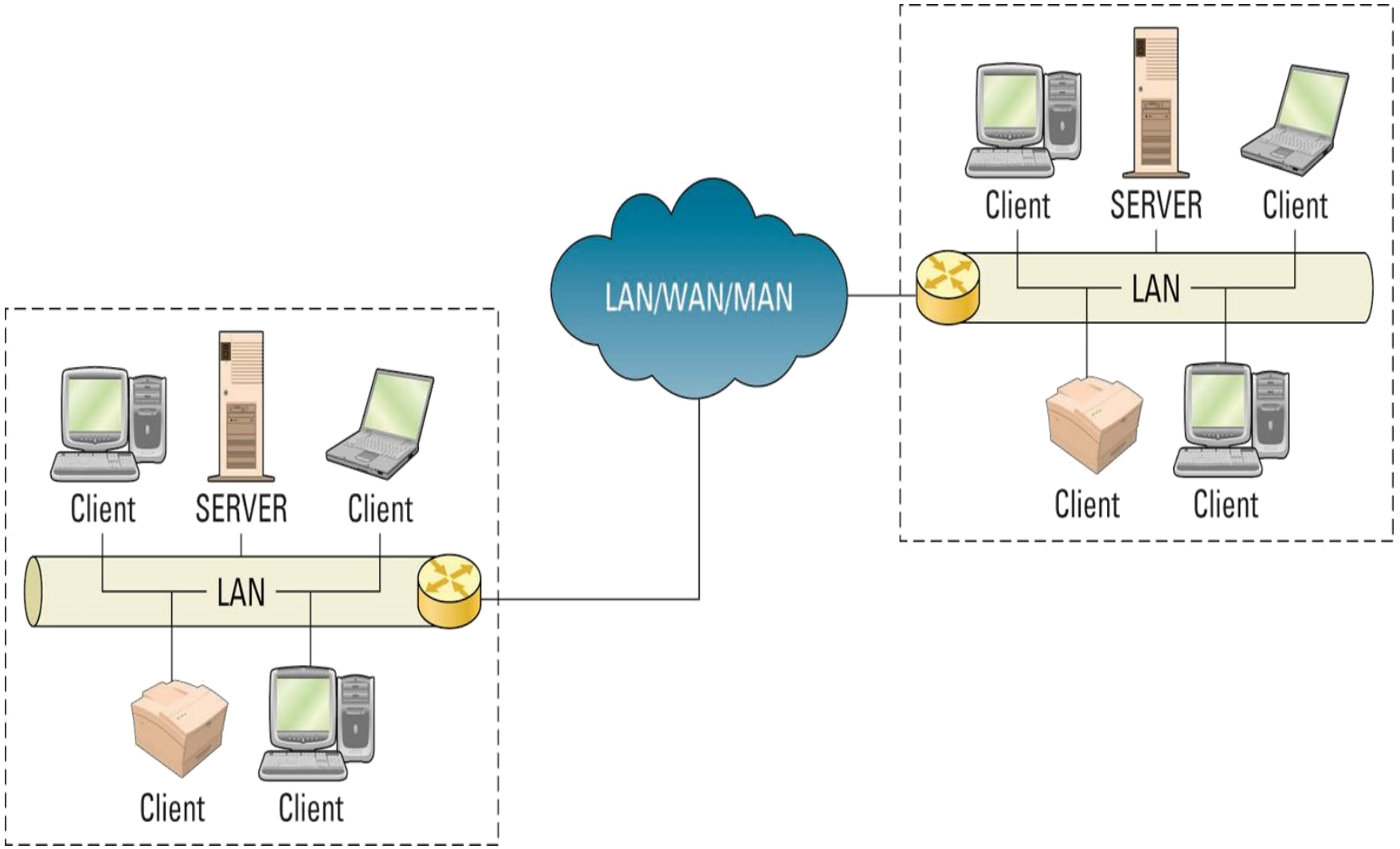
LAN "Local Area Network"



NIC – a "Network Interface Card"

- Every networked device must have a NIC
  - Most laptops today have both a wired NIC and a wireless NIC
- Each NIC has an IP address (it's "logical address") and a physical address called a MAC address.
  - Each NIC is given an address at the factory that is the device's physical address or MAC address.
  - No two NIC devices will ever have the same MAC address.
- MAC Addresses are used within a LAN
  - IP addresses allow routers to route a message across different networks
  - when a message reaches the correct destination network, the correct NIC is identified via its MAC address.

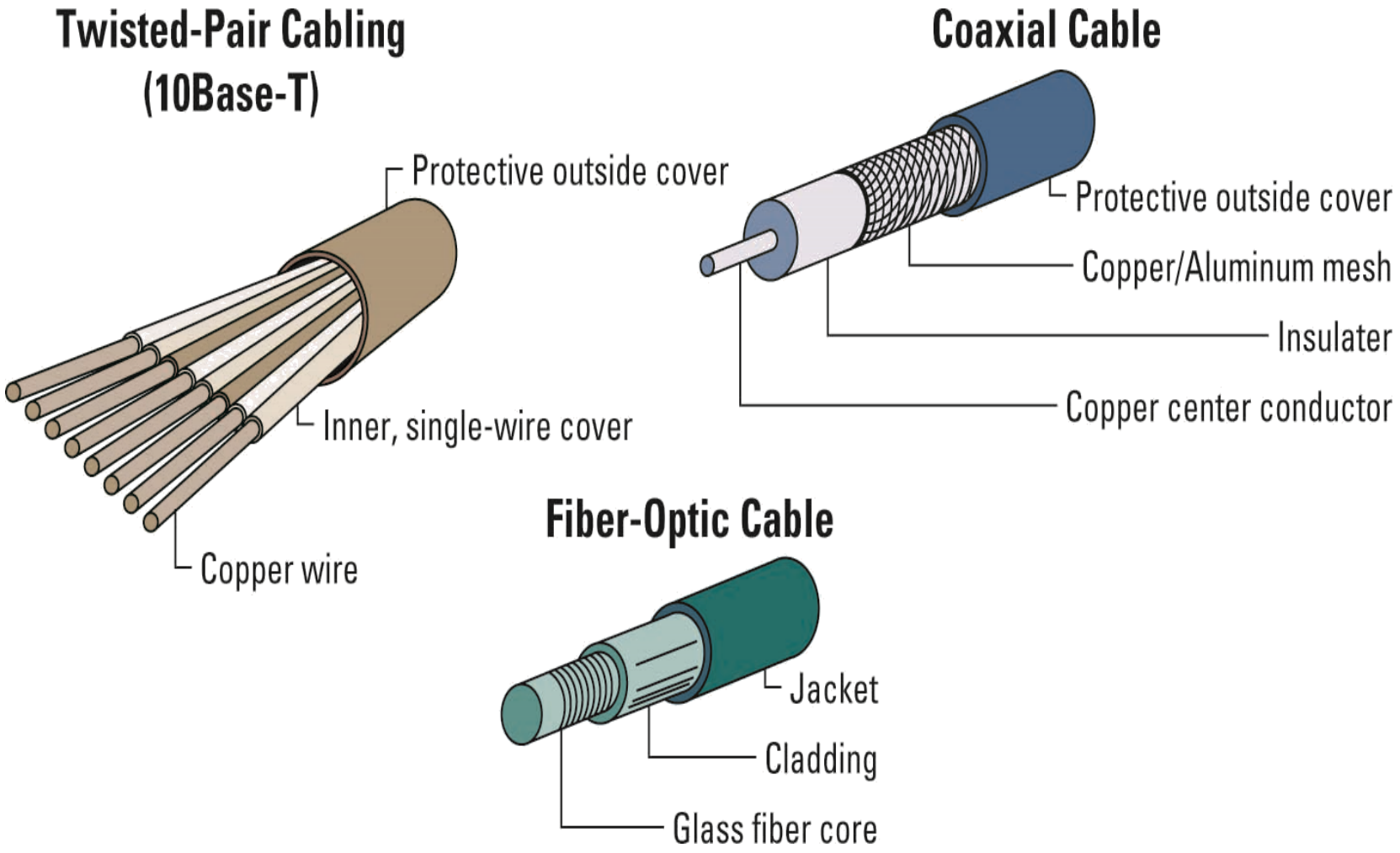
Client/Server Networks



Network Hardware

- The most essential networking hardware devices for us to learn about are:
  - Cables
  - NICs
  - Hubs
  - Switches
  - Routers

Wire Media


Twisted-Pair Cabling
(10Base-T)
Protective outside cover
Inner, single-wire cover
Copper wire
Coaxial Cable
Protective outside cover
Copper/Aluminum mesh
Insulater
Copper center conductor
Fiber-Optic Cable
Jacket
Cladding
Glass fiber core

Hubs

- A "hub" is a networking component that into which you can plug in multiple network devices
  - Connect computers, printers, scanners, etc.
- Anytime a connected device sends a network message, the hub forwards the message to all other connected devices (not just the intended recipient!)
  - Unintended recipients should ignore bogus network traffic (akin to "screening" telephone calls)
  - Creates opportunities for deviant "packet sniffers"
- Hub can only deal with one message at a time, since it is broadcast over all connections

Switches

- A **switch** is a network device which directs traffic only to its intended destination(s) rather than to all devices on the network.
  - sometimes referred to as an "intelligent hub"
- Provide a dedicated connection between individual devices
  - multiple devices can send data at once