Computer Networks

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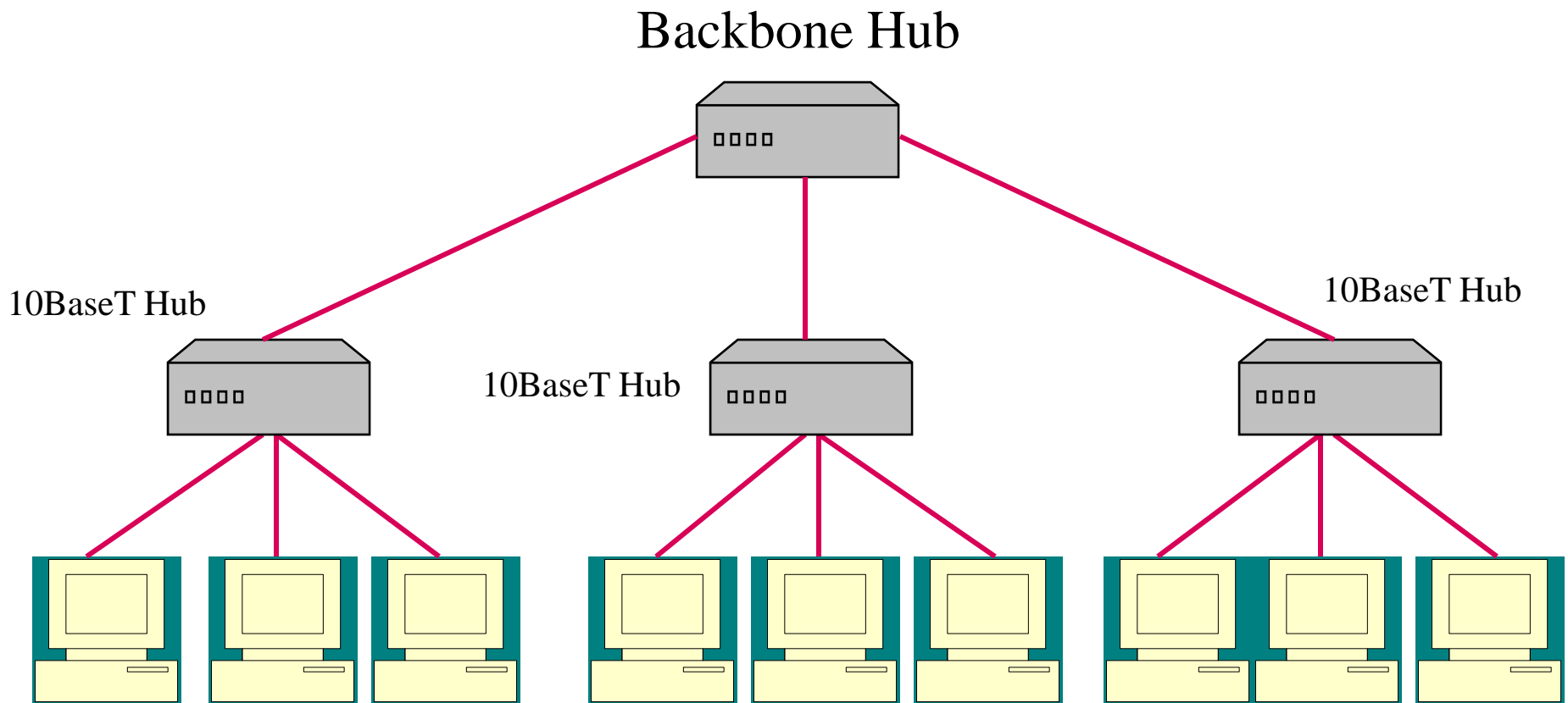
Kutztown University

Connecting Networks

- Hubs

- Bridges (outdated)

- Routers

- Switches

Connecting Networks – Hubs

Backbone Hub

10BaseT Hub
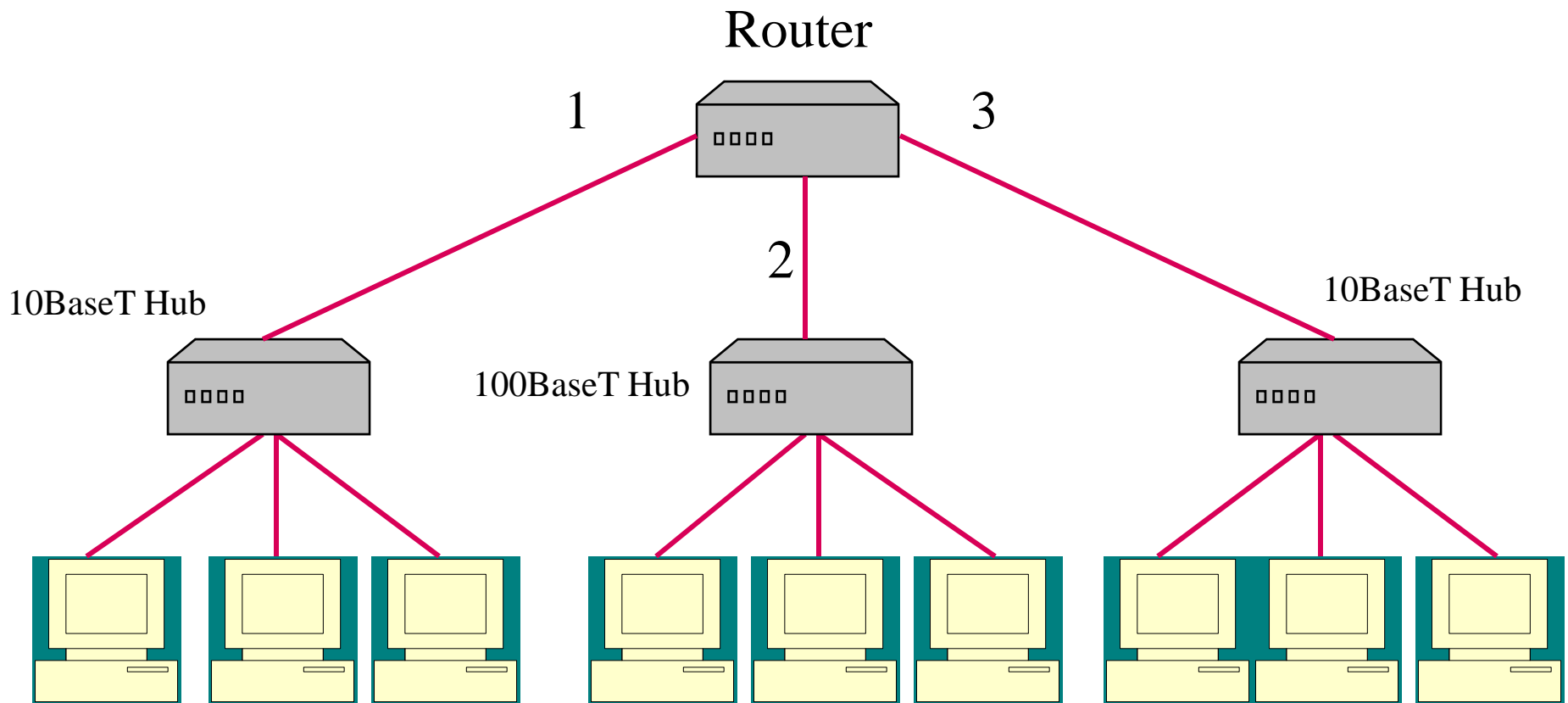
10BaseT Hub

10BaseT Hub

10BaseT Hub

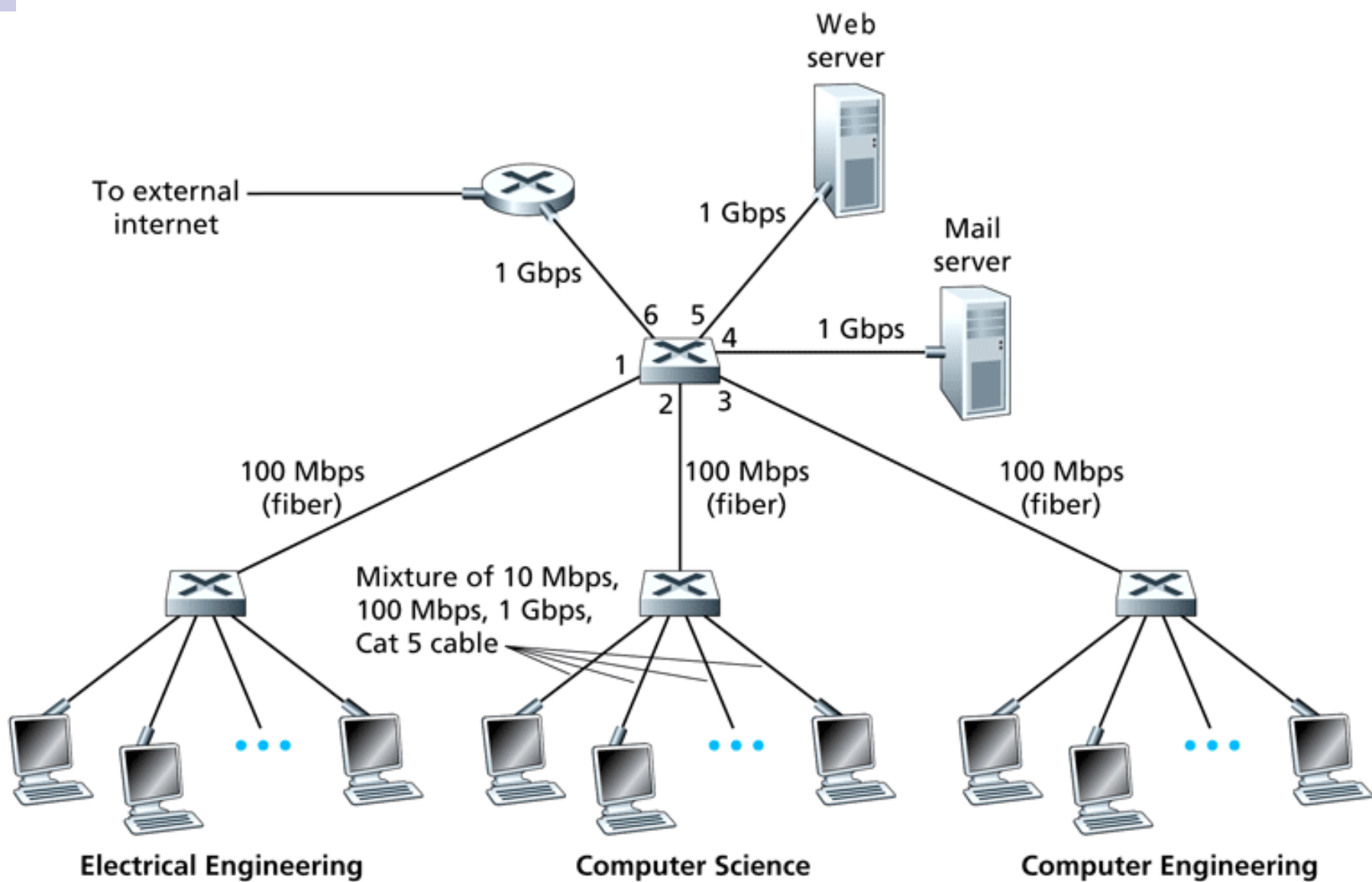# Hubs: Benefits & Drawbacks

- **Benefits**
  - ☐ Provides communication
  - ☐ Increases distance
  - ☐ Graceful degradation
- **Drawbacks**
  - ☐ Collision domain extended
  - ☐ Incompatible hardware
  - ☐ Node limitations

Connecting Networks – Switches/Routers

Router

1   3

2

10BaseT Hub   10BaseT Hub

100BaseT Hub

Figure 5.26 ♦ An institutional network using a combination of hubs, Ethernet switches, and a router

Routers: Benefits & Drawbacks

- **Benefits**
  - □ Isolation of traffic
  - □ More intelligent routing
  - □ Prevention of broadcast storms
- **Drawbacks**
  - □ Not plug and play
  - □ Longer per-message processing time

Switches

- Forwarding
  - Switch table
    - MAC Address
    - Interface
    - Timestamp (TTL)

- Filtering

Switch Table

Address	Interface	Time
62-FE-F7-11-89-A3	1	9:32
7C-BA-B2-B4-91-10	3	9:36
....	....	....

Figure 5.27 ♦ Portion of a switch table for the uppermost switch in Figure 5.26

Switches: Self-learning

- Switch table it initially empty

- When a frame arrives on one of the interfaces and the frame's destination address is not in the table, then the switch forwards the frame to the output buffers of all the other interfaces.

- For each frame received, the switch adds an entry to the switch table. This entry contains the LAN address of the frame's source address field, the interface the frame arrived from, and the current time. So the switch table is built from the sending nodes.

- When a frame arrives and the destination address entry is in the switch table, then the switch forwards the frame to the appropriate interface.

- The switch will delete entries in the switch table if no frame has been received from a source node after a specified time frame.

- Which network device allows a user to capture traffic from a device other than their own?
    1. Hub
    2. Bridge
    3. Layer-2 switch
    4. Router
    5. Layer-3 switch

- You have configured a 100Mbps network connection between your computer and the switch as half-duplex. What will be the maximum speed of the connection?

1. 50Mbps
2. 100Mbps
3. 100MBps
4. 200Mbps

■ You are configuring a home network. What device would you recommend to connect up to four computers?

1. Hub
2. Layer-2 Switch
3. Router
4. Layer-3 Switch

- Suppose that a group of 10 stations is serviced by an Ethernet LAN. How much bandwidth is available to each station if the 10 stations are connected to a 10Mbps Ethernet hub?

  1. 1 Mbps
  2. 5 Mbps
  3. 10 Mbps
  4. 100 Mbps

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CSC311

■ Suppose that a group of 10 stations is serviced by an Ethernet LAN. How much bandwidth is available to each station if the 10 stations are connected to a 100Mbps Ethernet switch?

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