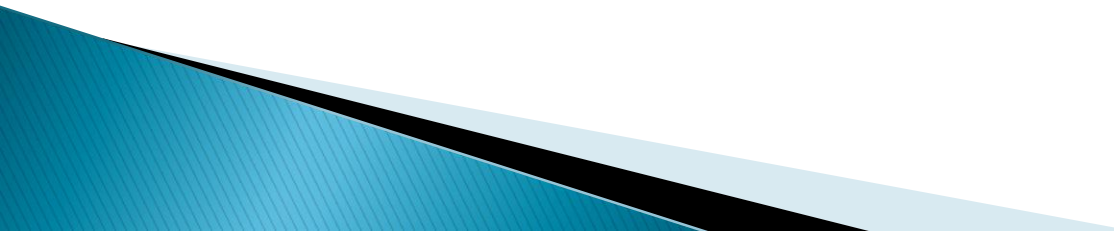
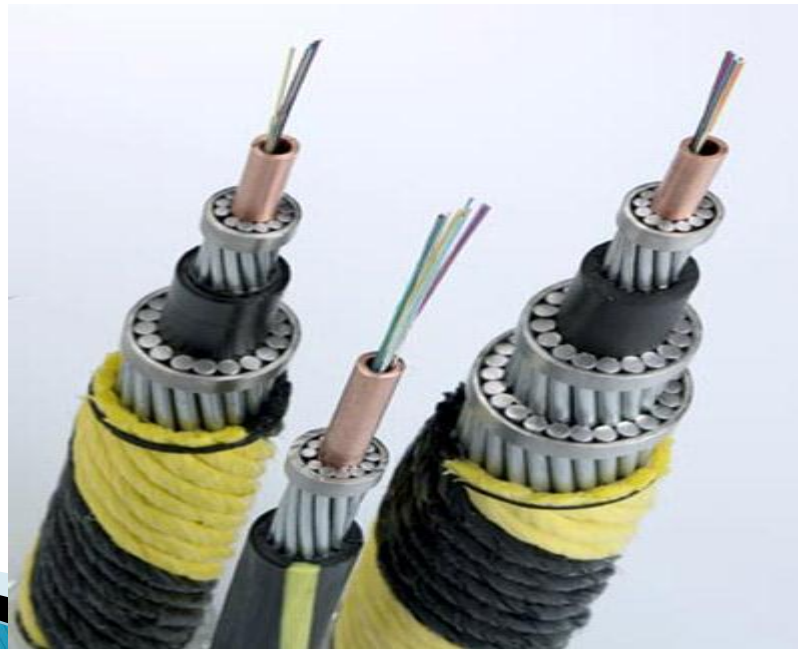
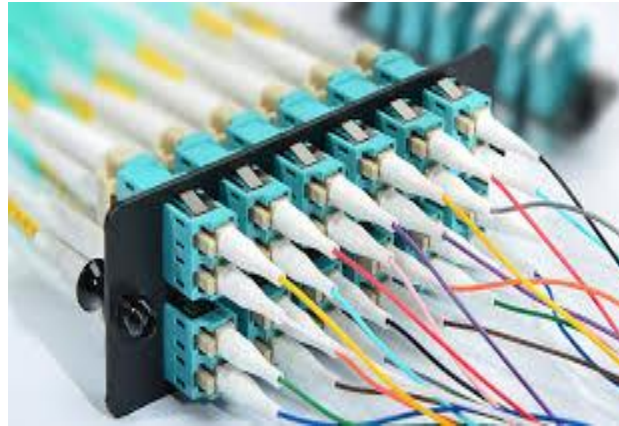
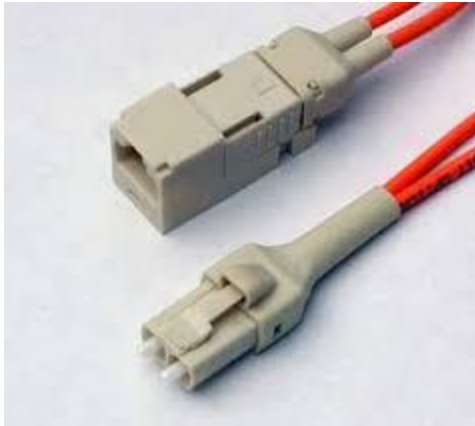


Practical Network
Third Class CS&IT
L.3,2019
Mohamad Ali





Connector of optical fiber cable



Hubs, Switches, and Routers

Introduction

Hubs, switches, bridge, and routers are all devices that let you connect one or more computers to other computers, networked devices, or to other networks. Each has two or more connectors called ports into which you plug in the cables to make the connection.

Hub

A **hub** is typically:

Its job is very simple: anything that comes in one port is sent out to the others.

- Least expensive.
- Least intelligent.
- Least complicated of the other three.
- Every computer connected to the hub "sees" everything that every other computer on the hub sees.

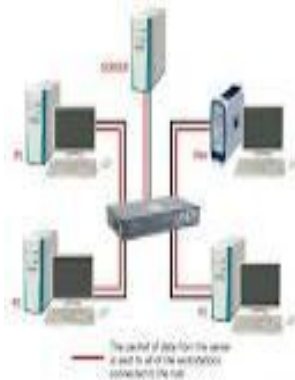
Hubs

Hub is device that pass on anything received on one connection to all other connections, anything that comes in one port is sent out to the others(broadcast by IP address).

There are two types of hubs:

- ❑ *Passive hubs* simply connect all ports together and usually not powered.
- ❑ *Active hubs* use electronics to amplify and clean up the signal before it is broadcast to the other ports.

Shape of Hub

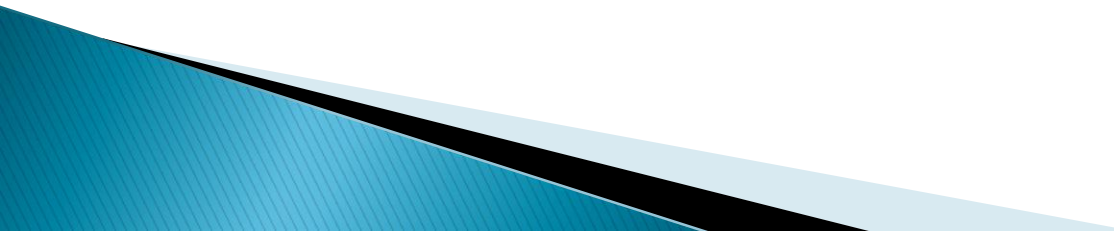


Switch

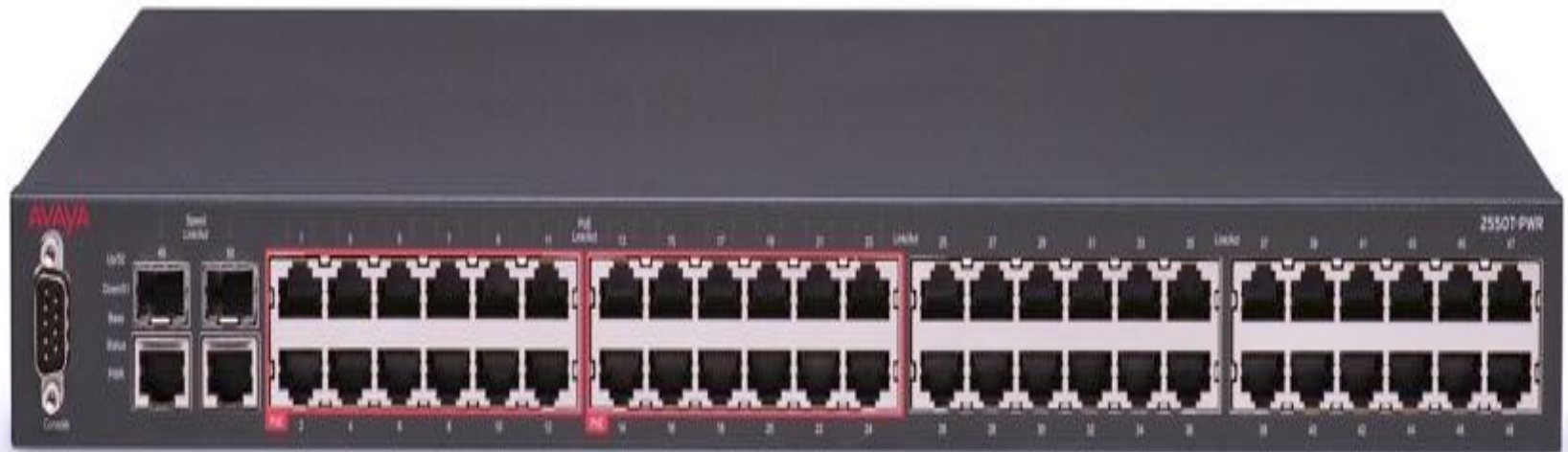
A switch is a device used on a computer network to physically connect devices together. (also called switching hub, bridging hub, officially MAC bridge)

Switches manage the flow of data across a network by only transmitting a received message to the device for which the message was intended.

Each networked device connected to a switch can be identified using a MAC address, allowing the switch to regulate the flow of traffic. This maximizes security and efficiency of the network.

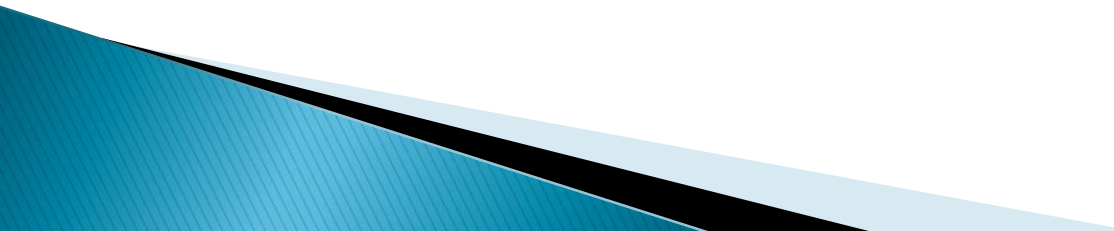


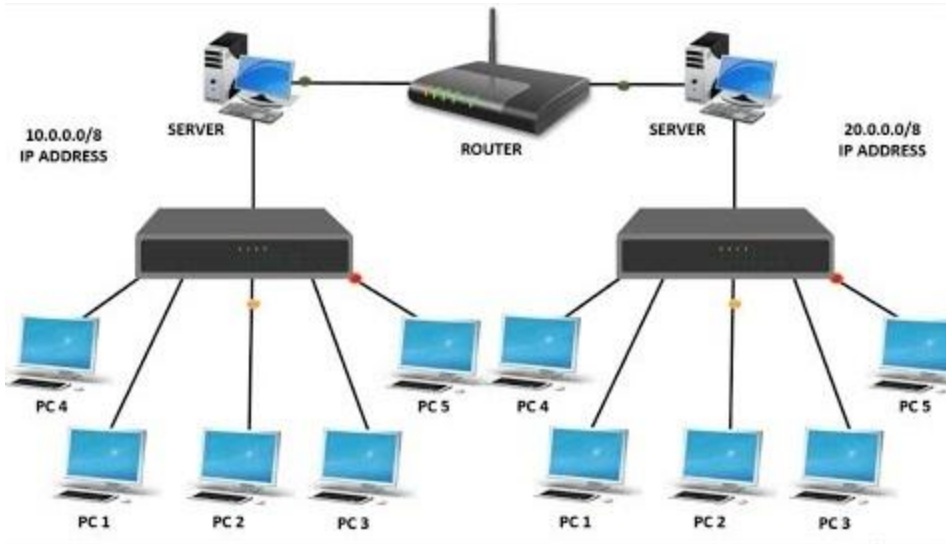
Switch



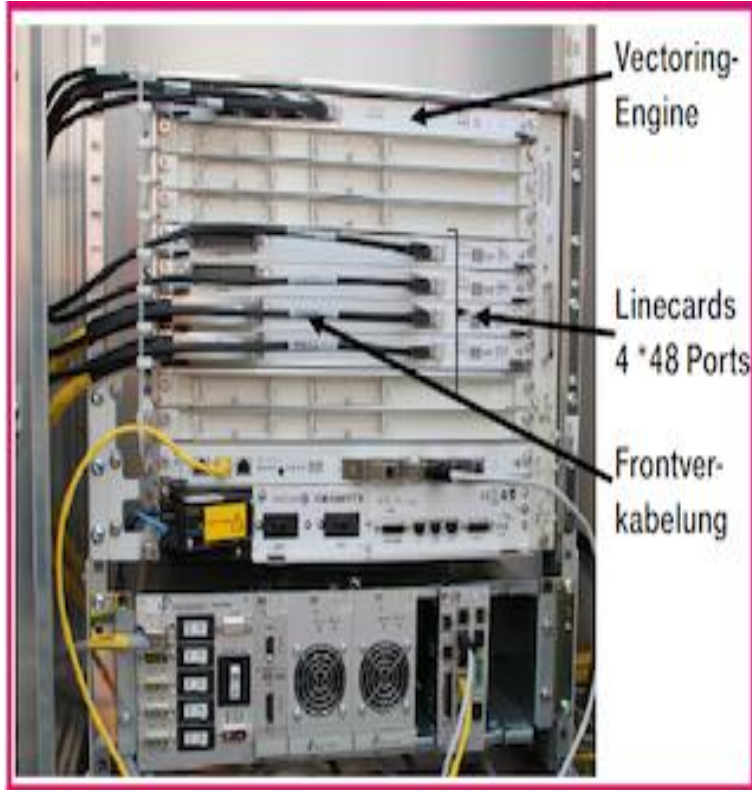


Router

- ❑ Router is a networking device that forwards data packets between two or more data lines from different networks using IP address.
 - ❑ Routers perform the traffic directing functions on the Internet.
 - ❑ Routers are slower than switch because they are more intelligent (a small computing) devices, and analyze every packet, causing packet-forwarding delays.
 - ❑ Typically, when a WAN is set up, there will be at least two routers used.
- 

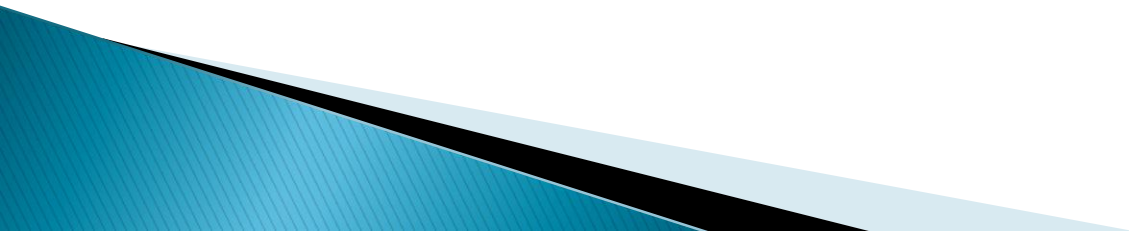


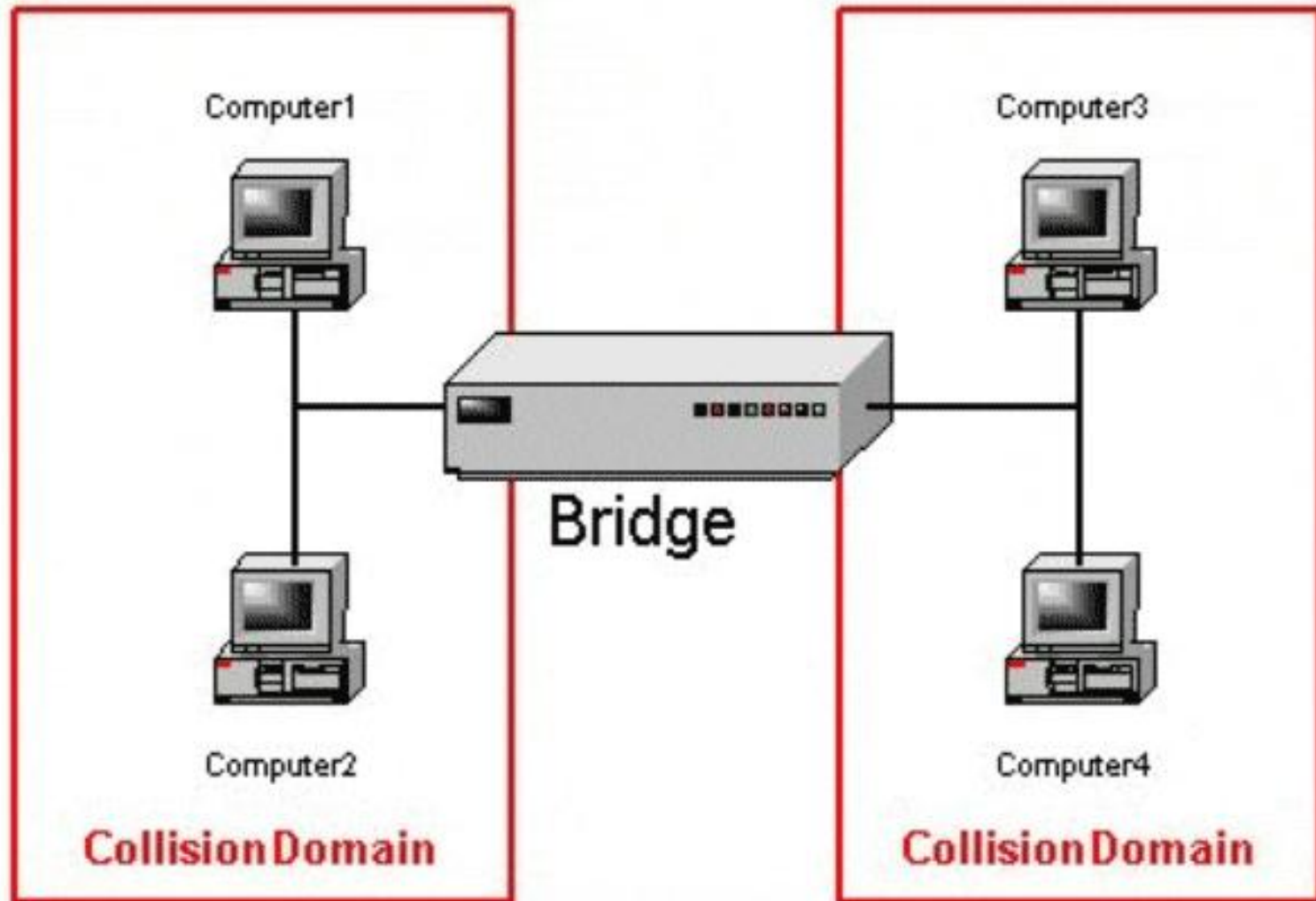
Router



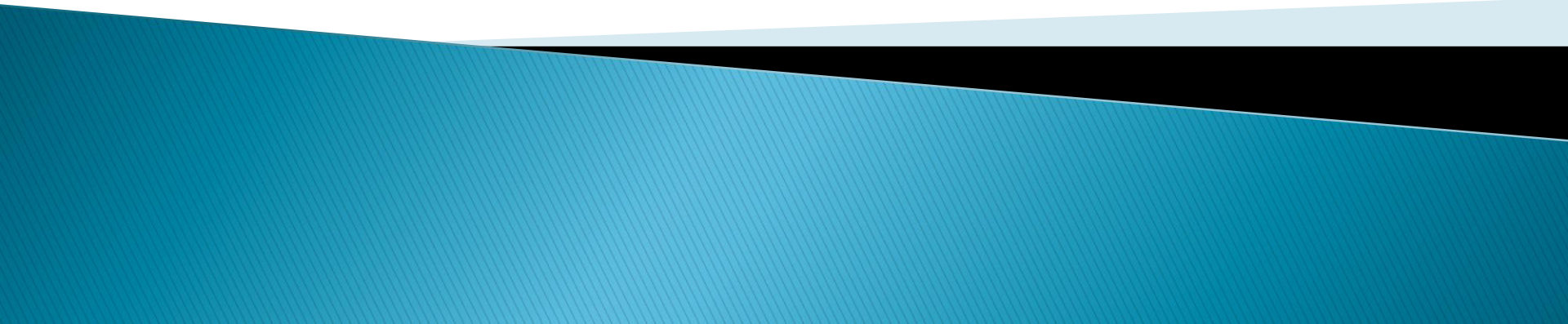
Bridge Network

A network bridge is a computer networking device that creates a single aggregate network from multiple communication networks or network segments. This function is called network bridging



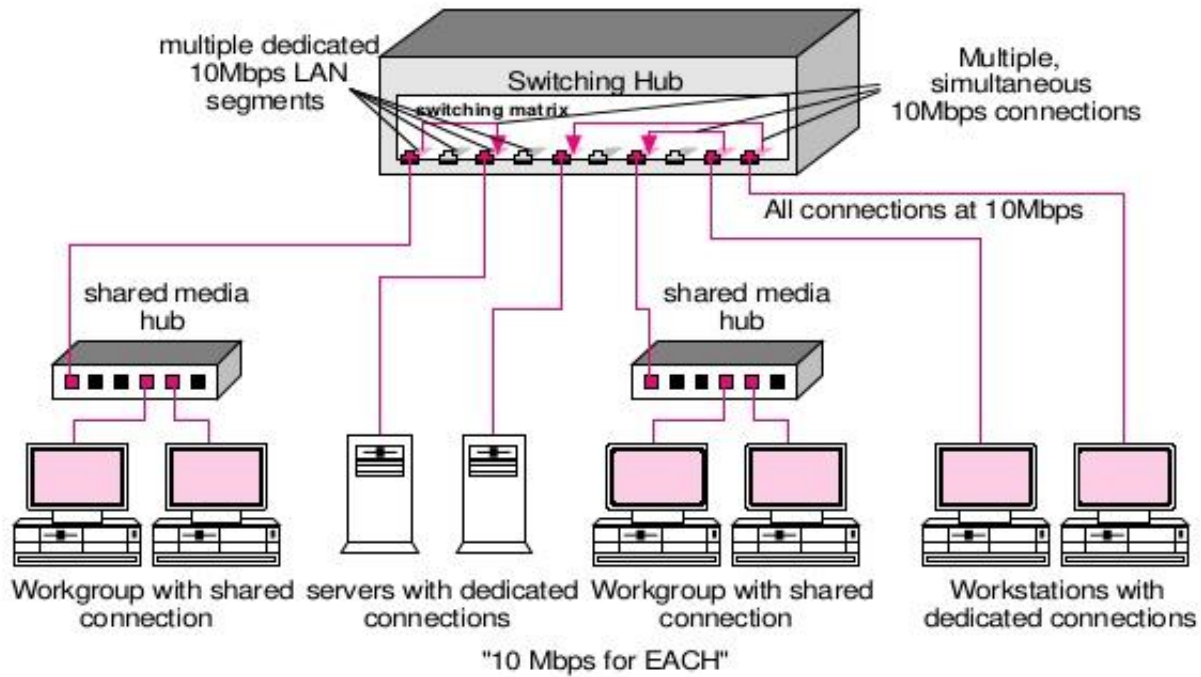


Different design for network types



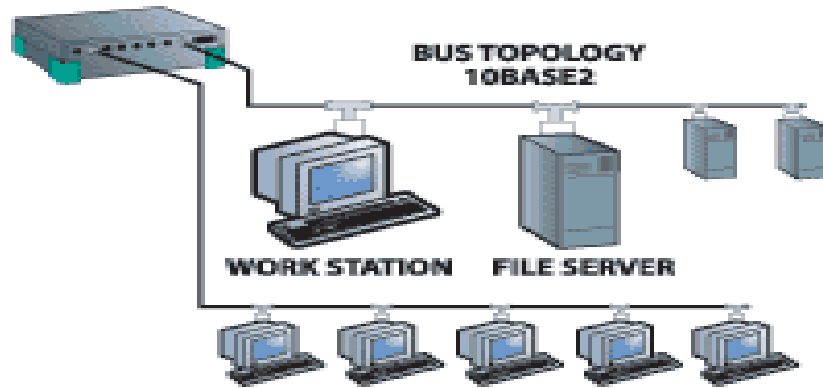
Switches

Switch-Based LAN Architecture

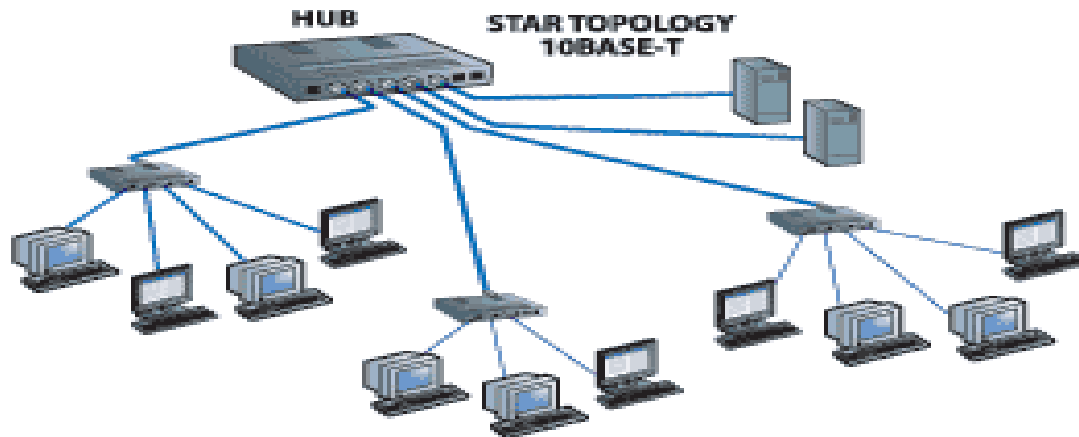


Topology Examples

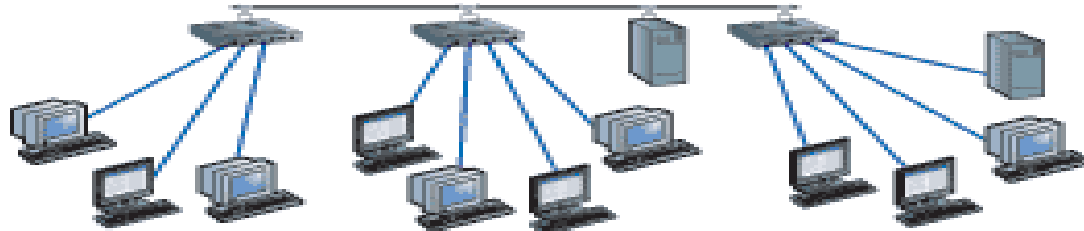
REPEATER



HUB



MIXED TOPOLOGY AND MEDIA



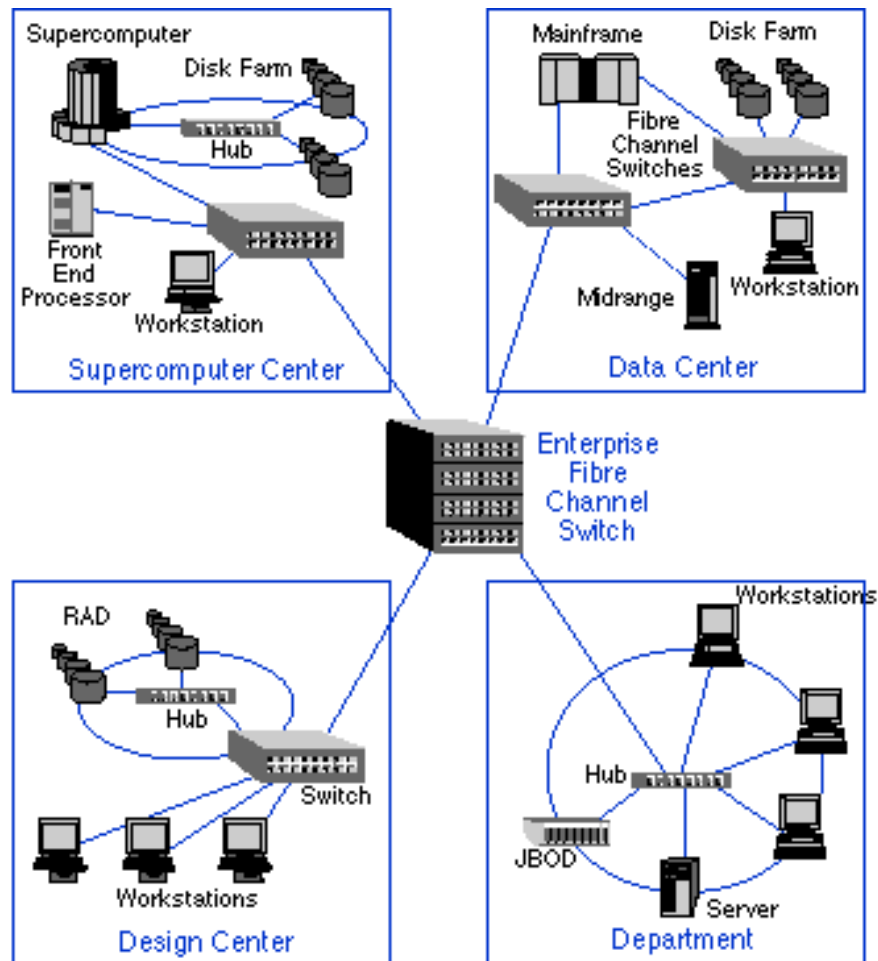
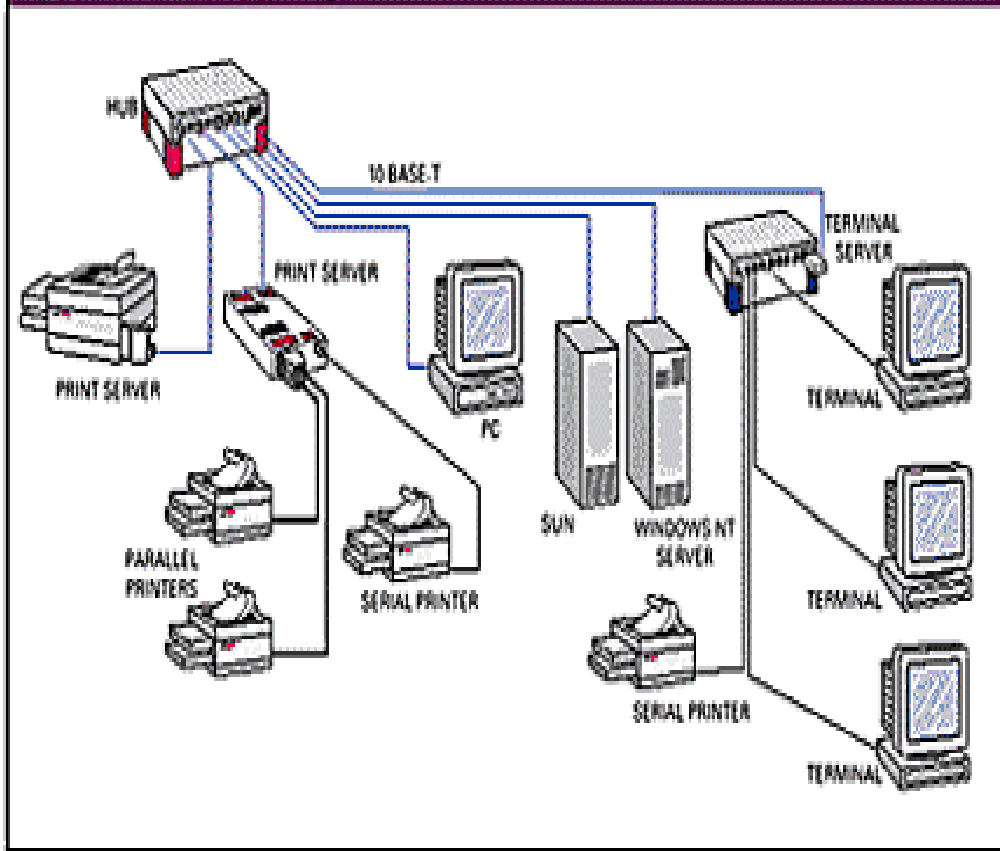
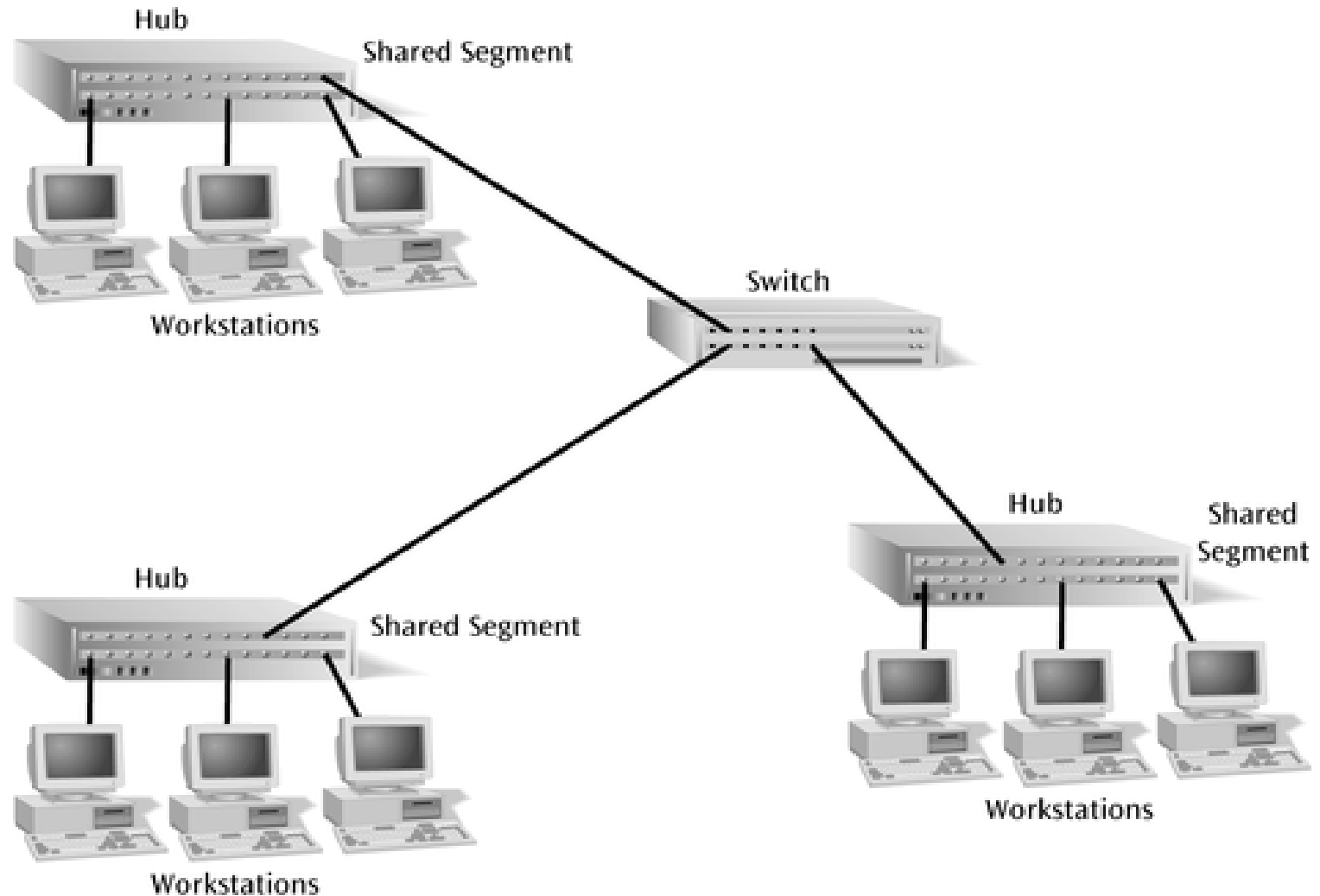


Figure 1.1 Fibre Channel meets the demands of IT systems

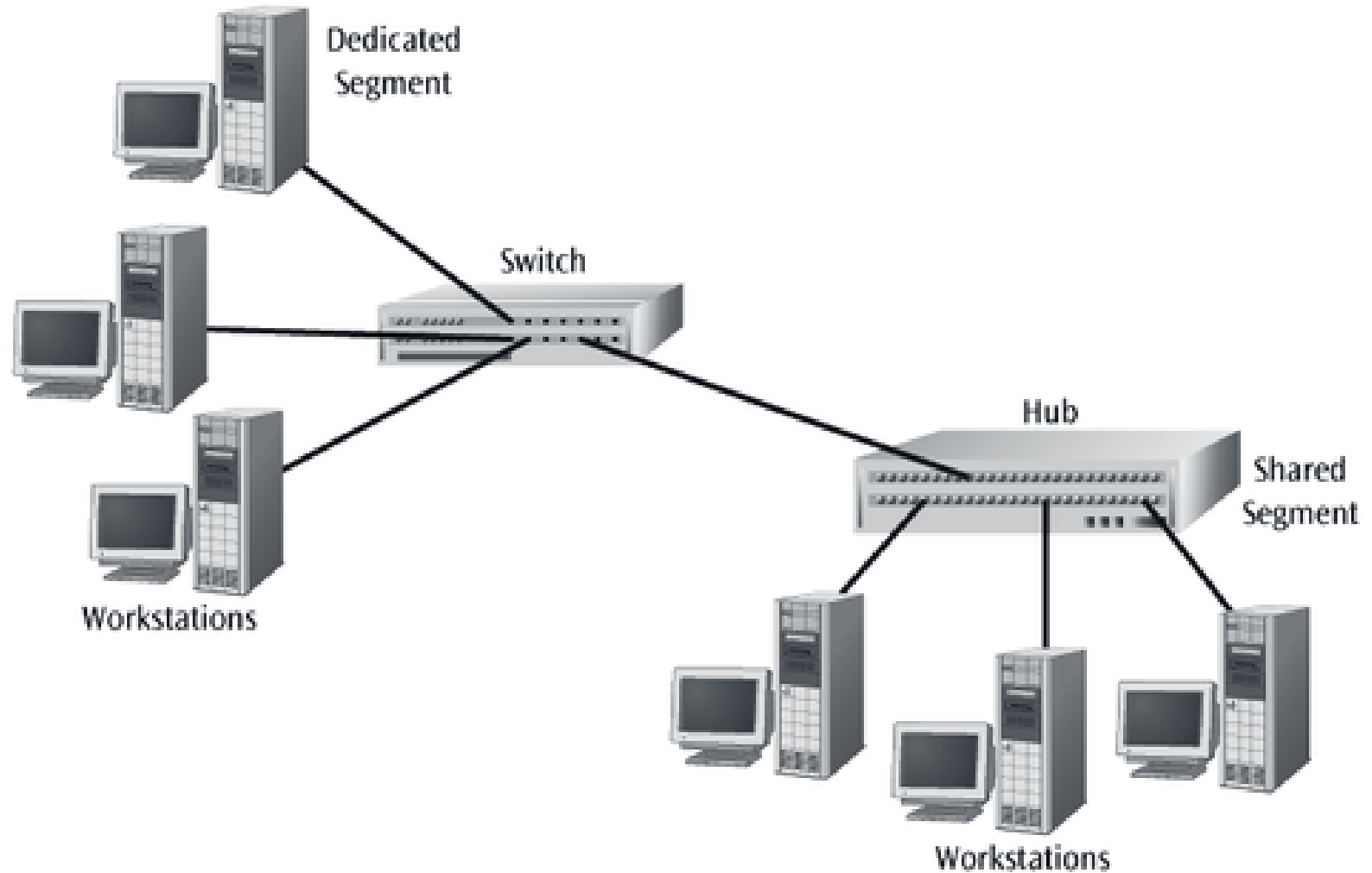
Terminal/Printer Server Example



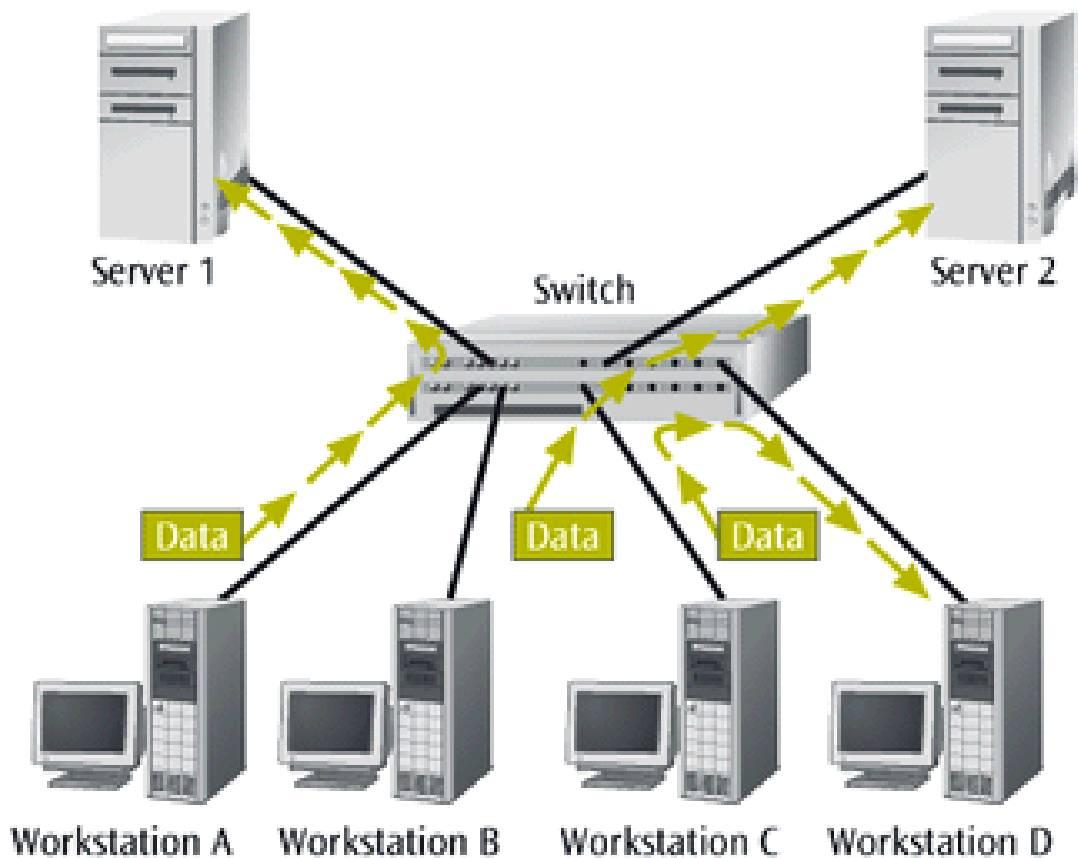
Workstations connected to a shared segment of a LAN



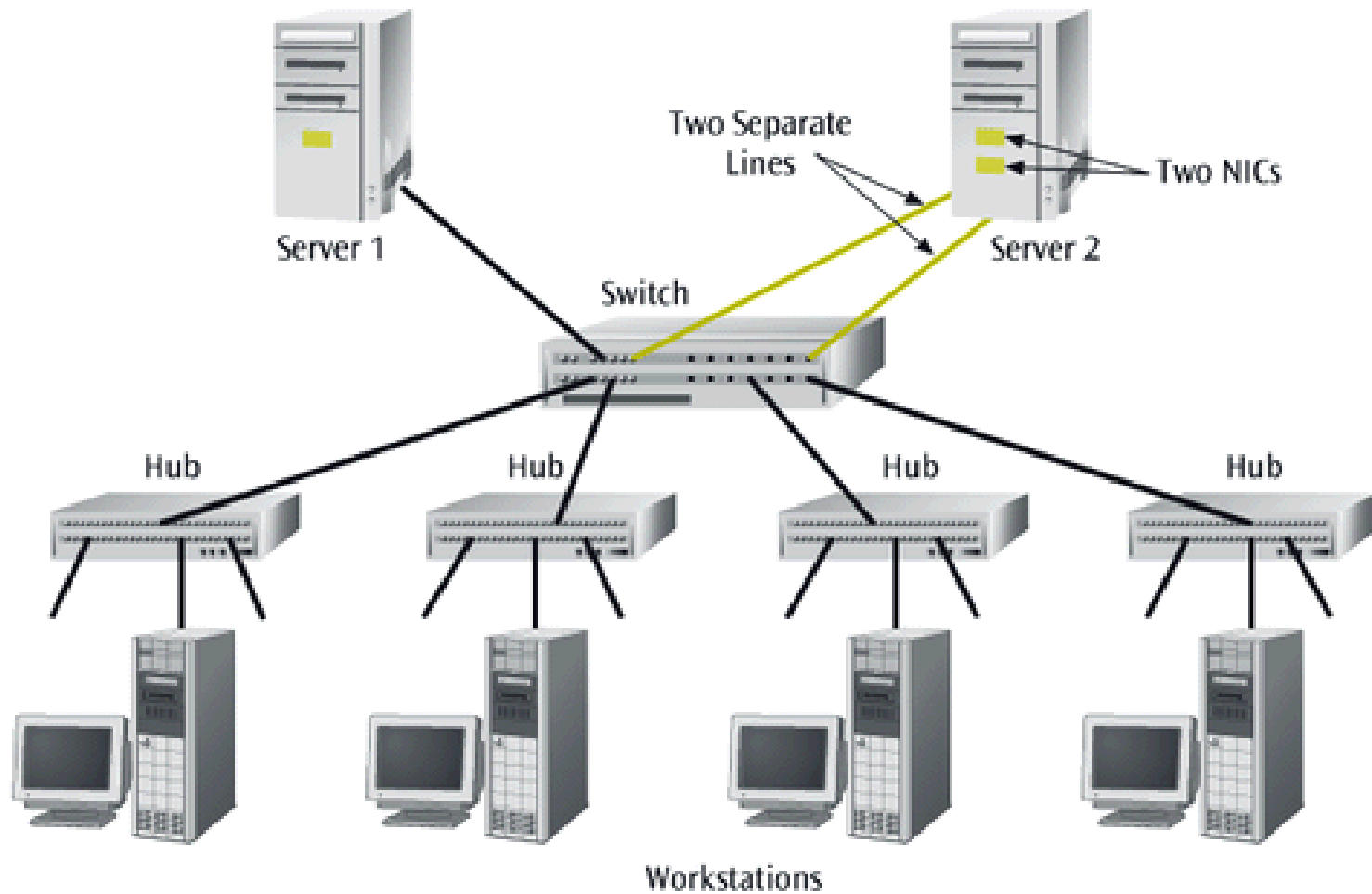
Workstations connected to a dedicated segment of a LAN



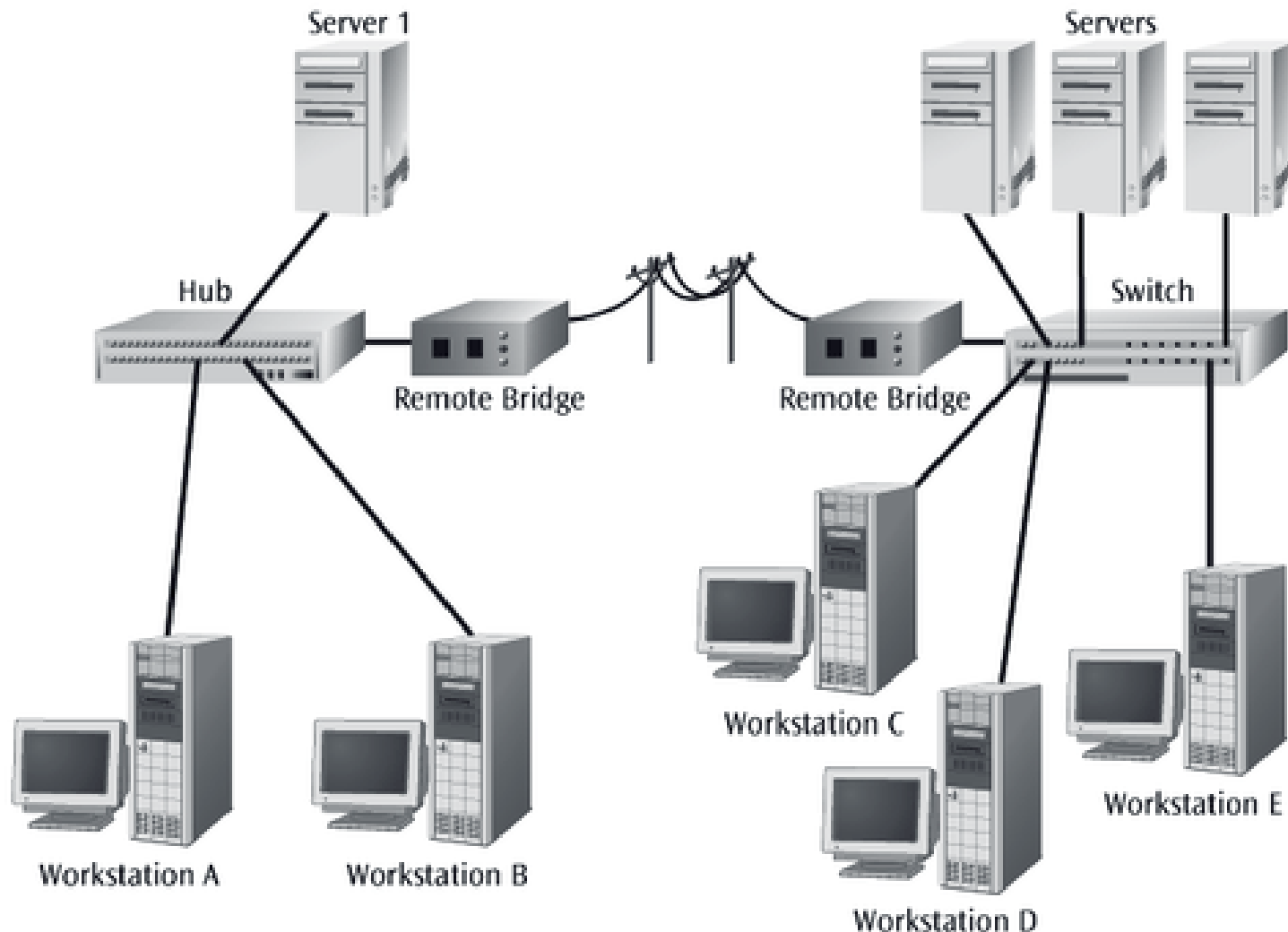
A Switch with Two Servers Allowing Simultaneous Access to Each Server



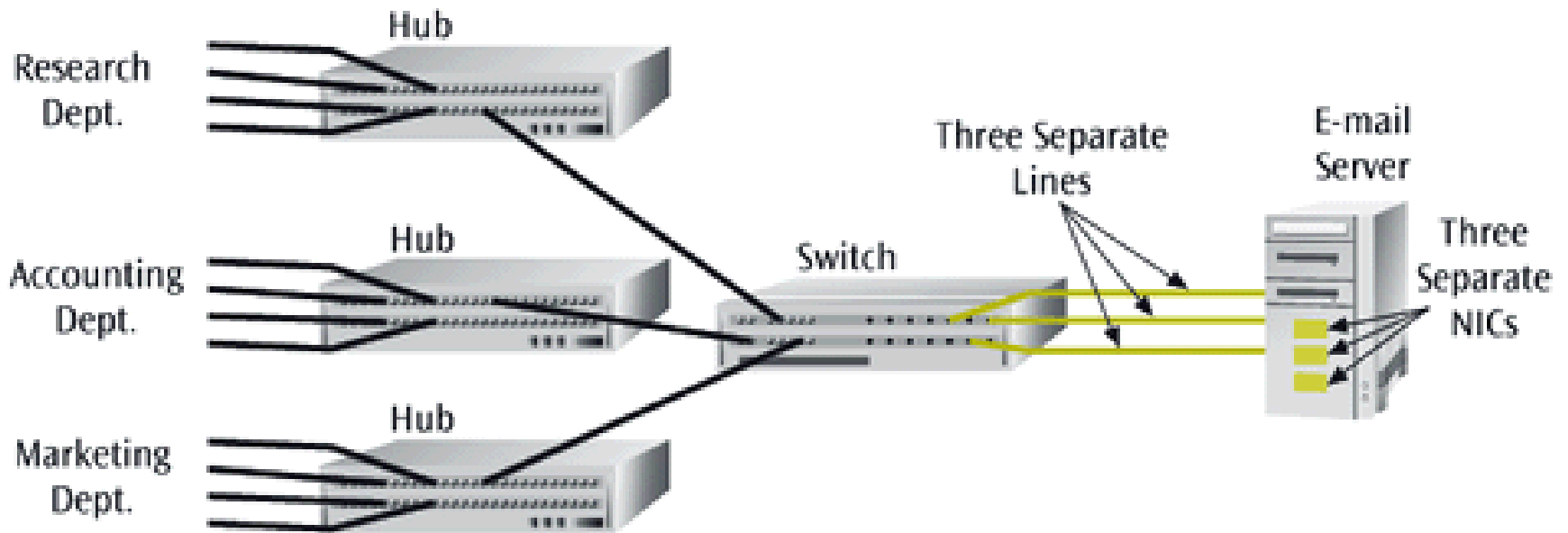
A server with two NICs and two connections to a switch



A pair of remote bridges and switch combination designed to isolate network traffic



Switch providing multiple access to an e-mail server



Connections (in general)

Bridges for LANs and hubs.

Switches for LANs and workstations.

Routers for LANs and WANs (the Internet).

EXERCISE

- ❑ Connect 2 buildings 3 storey high with a distance of 500m between each building.
- ❑ Each floor is occupied by the Finance Department, Administration Department and Computing Department.
- ❑ Your report should have the following items. Anything extra is encouraged.
 - ❑ a. Introduction
 - ❑ b. Network Diagrams
 - ❑ c. Devices that will be used.
- ❑ You are required to use MS Visio to draw the Network Diagrams.