

# **CCNA 1 v3.1 Module 5**

## **Cabling LANs and WANs**

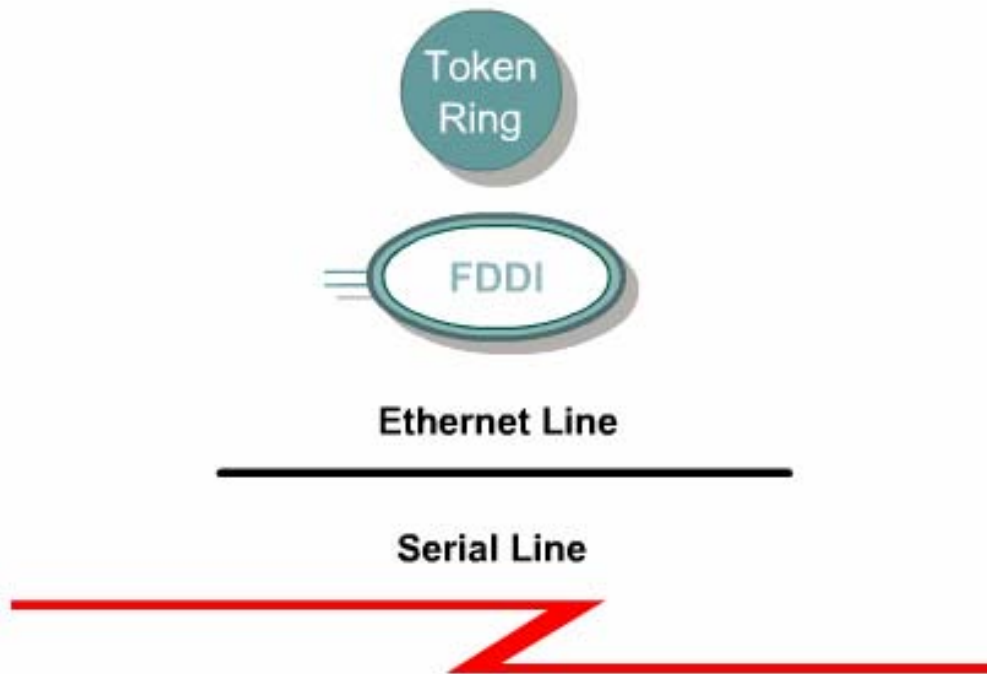
# Objectives

**Upon completion of this module, the student will be able to perform tasks related to the following:**

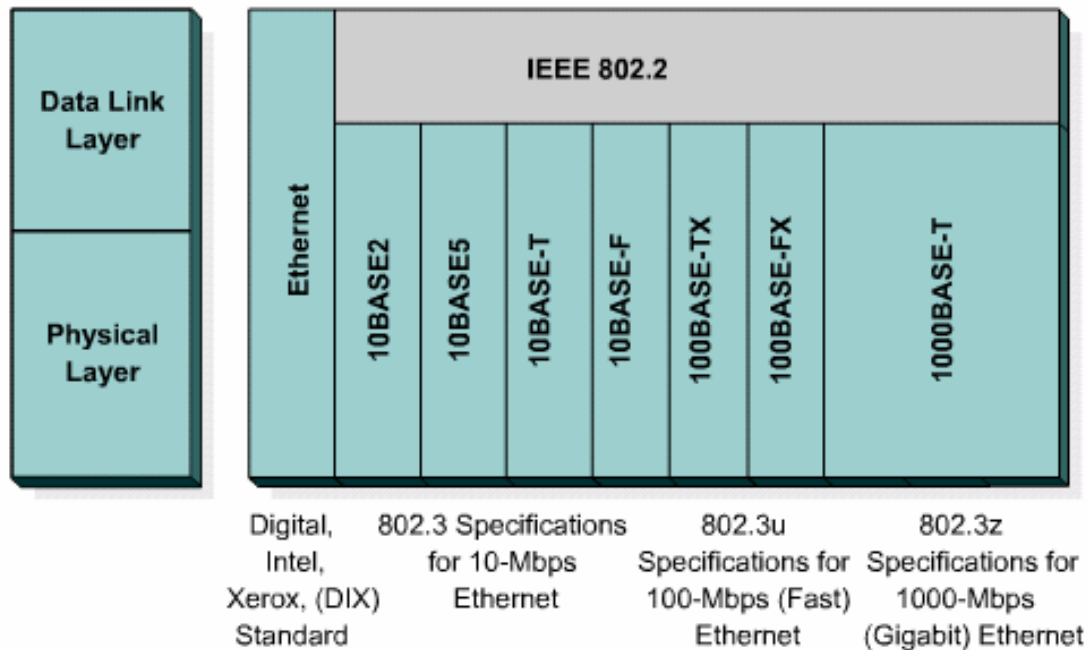
5.1 Cabling LANs

5.2 Cabling WANs

# LAN and Physical Layer



# LAN and Physical Layer



- Physical layer implementations vary.
- Some implementations support multiple physical media.

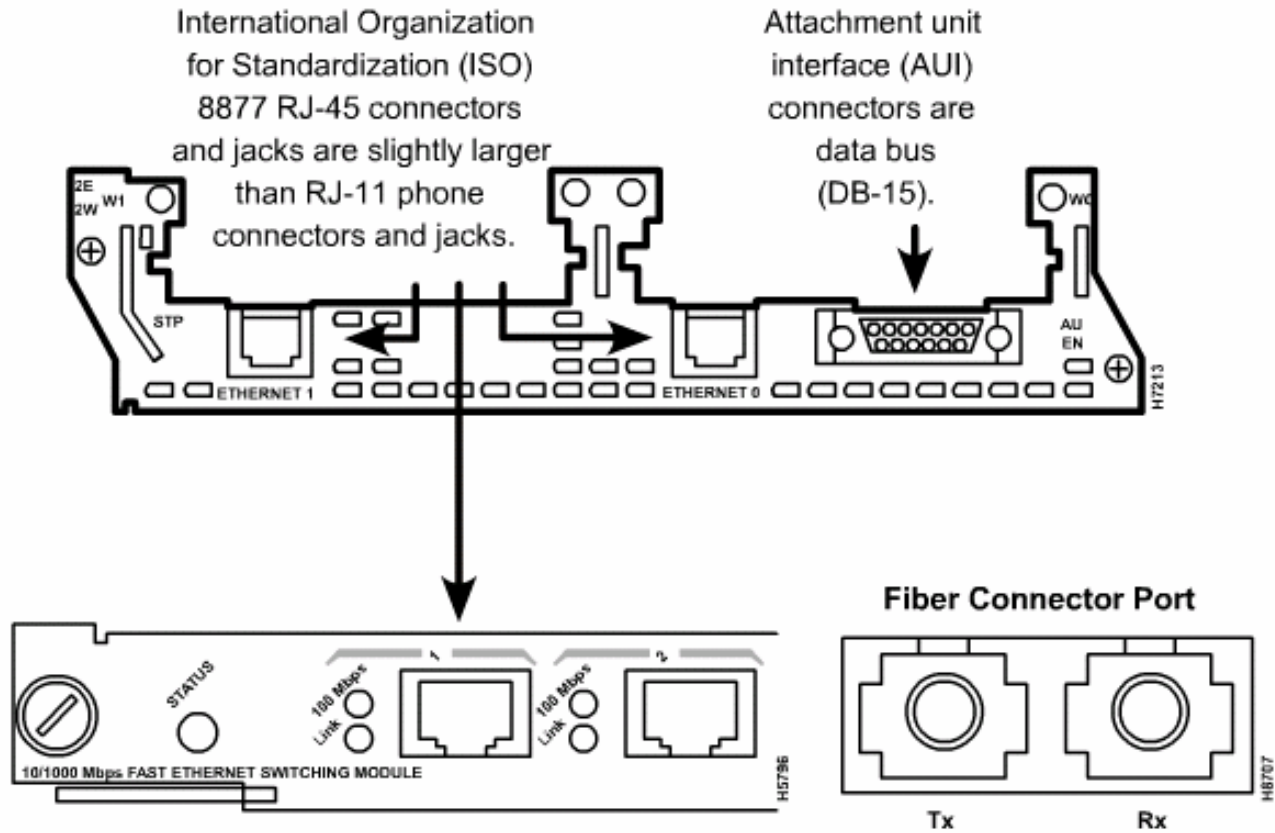
# Ethernet in the Campus

	Ethernet 10BASE-T Implementation	Fast Ethernet Implementation	Gigabit Ethernet Implementation
End-user Level (End-user device to workgroup device)	Provides connectivity for low-to medium-volume applications.	Gives high-performance PC workstations 100-Mbps access to the server.	Not typically used at this level.
Workgroup Level (Workgroup device to backbone)	Not typically used at this level.	Provides connectivity between the end user and workgroups. Provides connectivity from the workgroup to backbone. Provides connectivity from the server block to the backbone layer.	Provides high-performance connectivity to the enterprise server block.
Backbone Level	Not typically used at this level.	Provides connectivity from the workgroup server block to the backbone.	Provides high-speed backbone and network device connectivity.

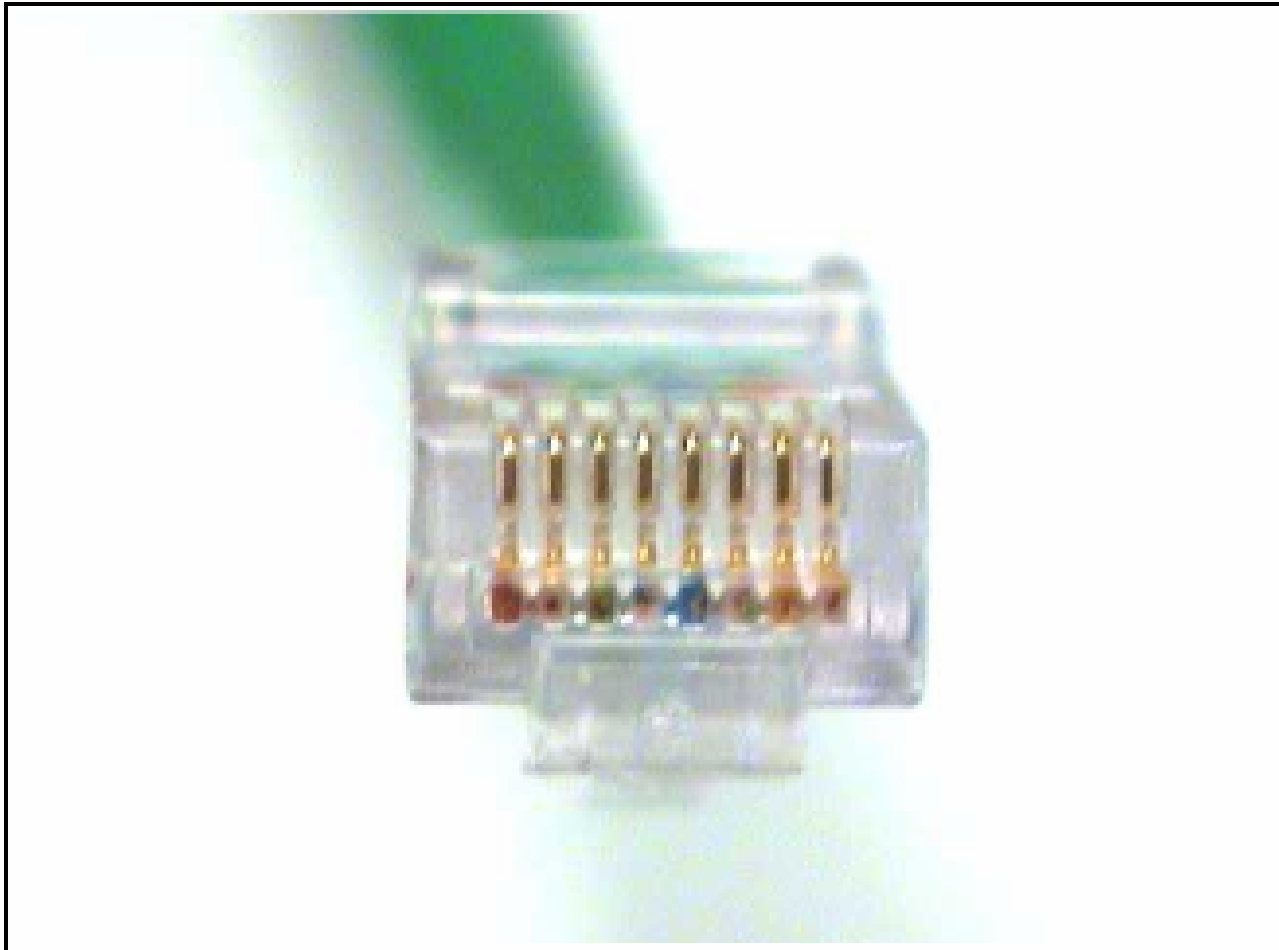
# Ethernet Media and Connector Requirements

	10BASE2	10BASE5	10BASE-T	100BASE-TX	100BASE-FX	1000BASE-CX	1000BASE-T	1000BASE-SX	1000BASE-LX
<b>Media</b>	50-ohm coaxial (Thinnet)	50-ohm coaxial (Thicknet)	EIA/TIA Category 3, 4, 5 UTP, two pair	EIA/TIA Category 5 UTP, two pair	62.5/125 multimode fiber	STP	EIA/TIA Category 5 UTP, four pair	62.5/50 micro multimode fiber	62.5/50 micro multimode fiber; 9-micron single-mode fiber
<b>Maximum Segment Length</b>	185 m (606.94 feet)	500 m (1640.4 feet)	100 m (328 feet)	100 m (328 feet)	400 m (1312.3 feet)	25 m (82 feet)	100 m (328 feet)	275 m (853 feet) for 62.5 micro fiber; 550 m (1804.5 feet) for 50 micro fiber	440 m (1443.6 feet) for 62.5 micro fiber; 550 m (1804.5 feet) for 50 micro fiber; 3 to 10 km (1.86 to 6.2 miles) on single-mode fiber
<b>Topology</b>	Bus	Bus	Star	Star	Star	Star	Star	Star	Star
<b>Connector</b>	BNC	Attachment unit interface (AUI)	ISO 8877 (RJ-45)	ISO 8877 (RJ-45)	Duplex media interface connector (MIC) ST or SC connector	ISO 8877 (RJ-45)	ISO 8877 (RJ-45)	SC connector	SC connector

# Connection Media



# UTP Implementation

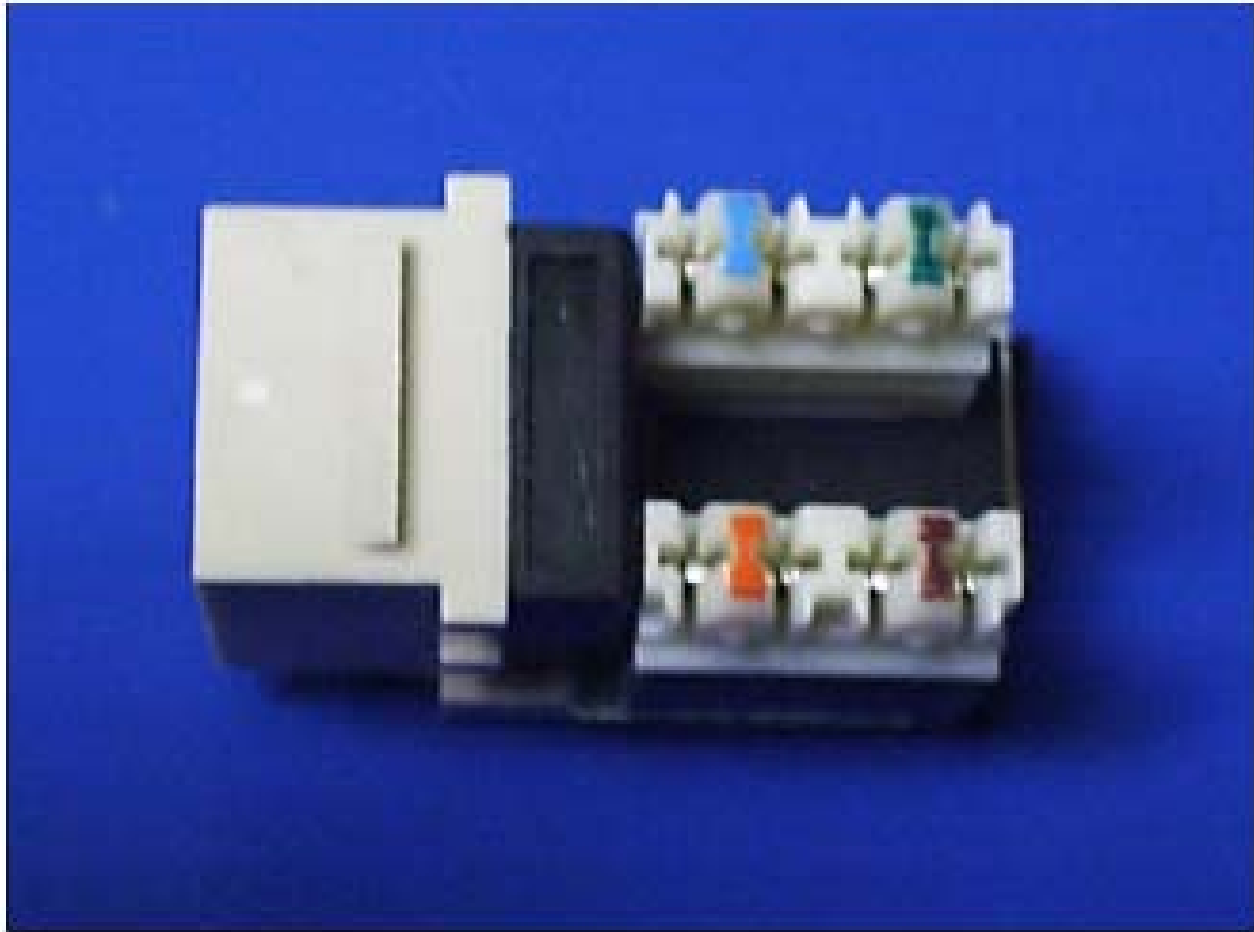




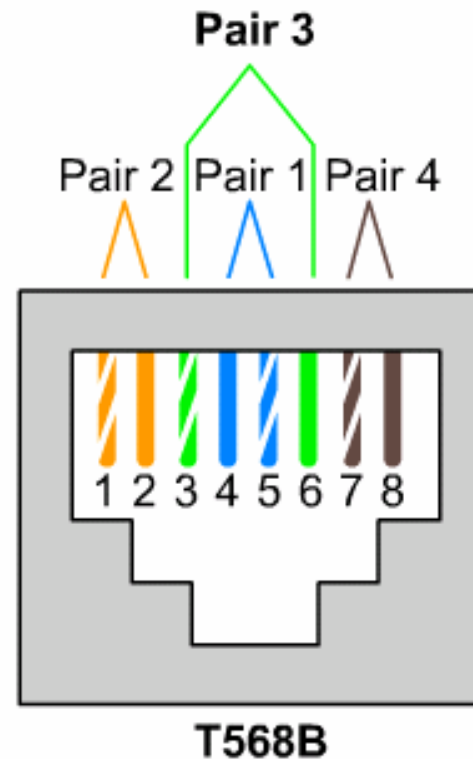
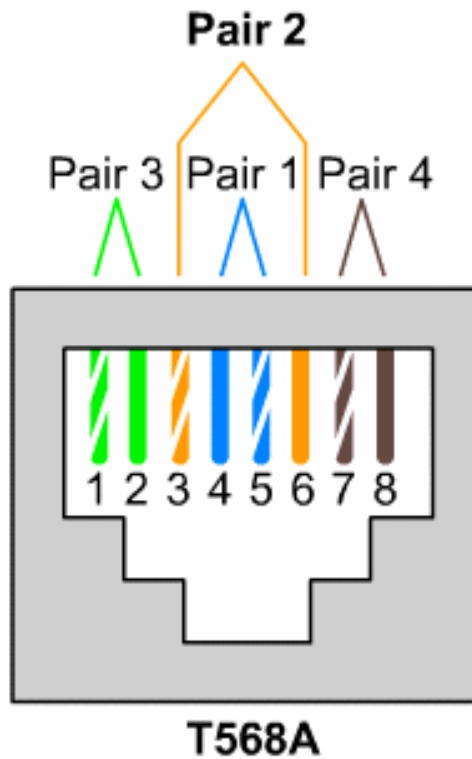
# UTP Implementation



# UTP Implementation

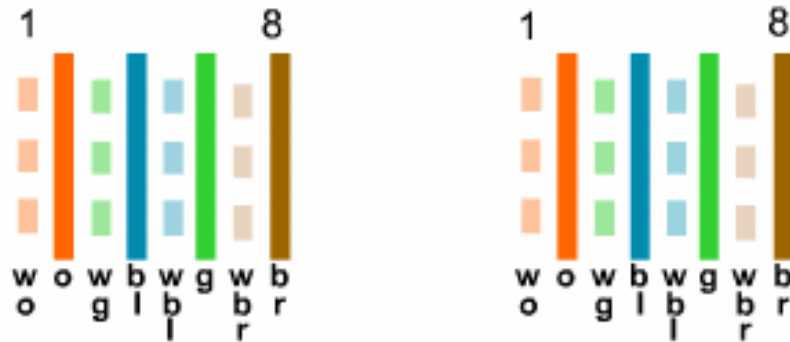


# UTP Implementation



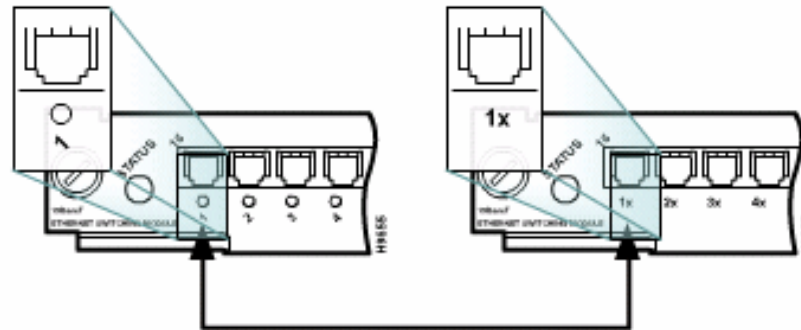
# UTP Implementation

Pin	Label
1	TD+
2	TD-
3	RD+
4	NC
5	NC
6	RD-
7	NC
8	NC

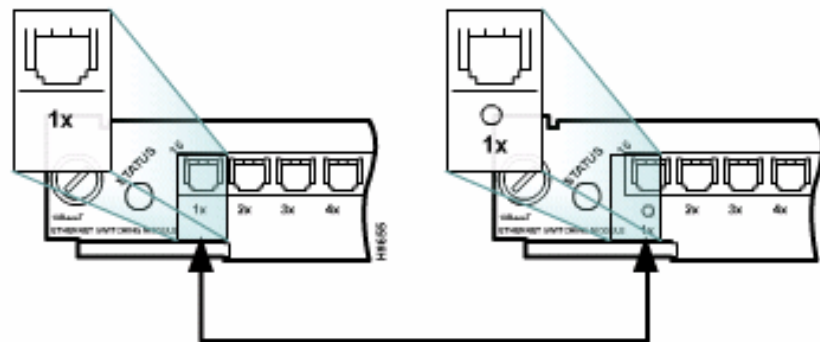


Wires on cable ends  
are in same order.

# UTP Implementation

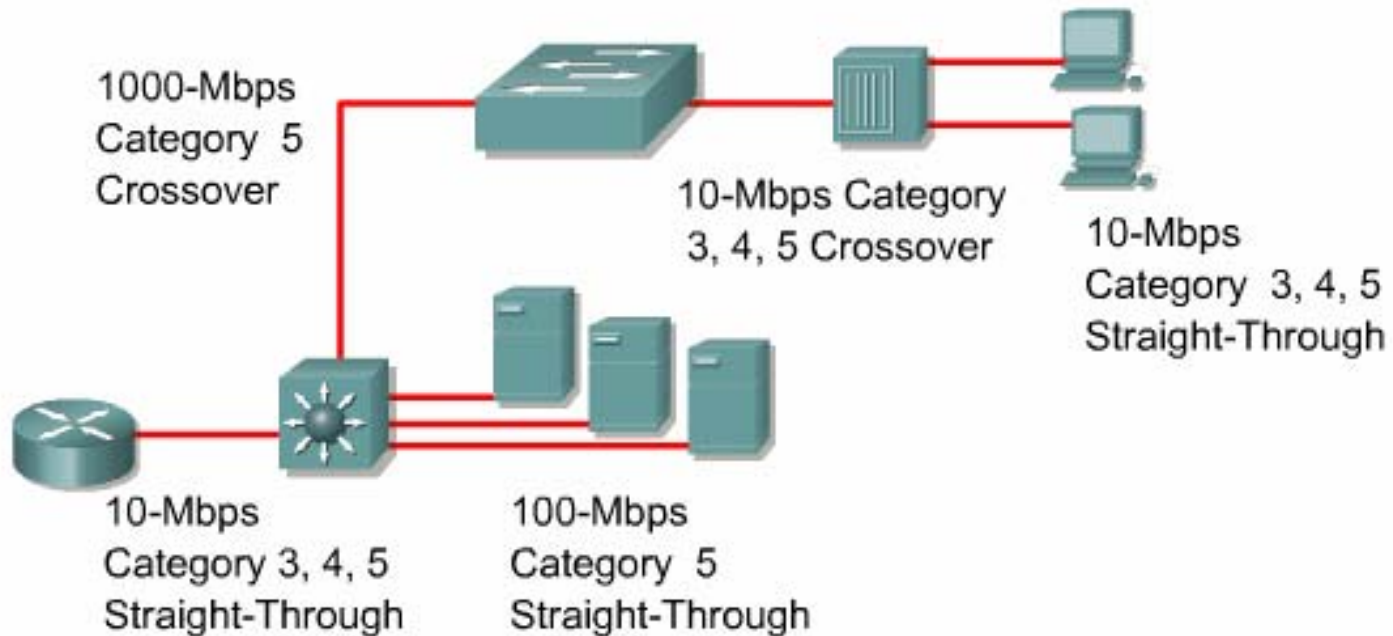


Use straight-through when only one port is designated with an "x".

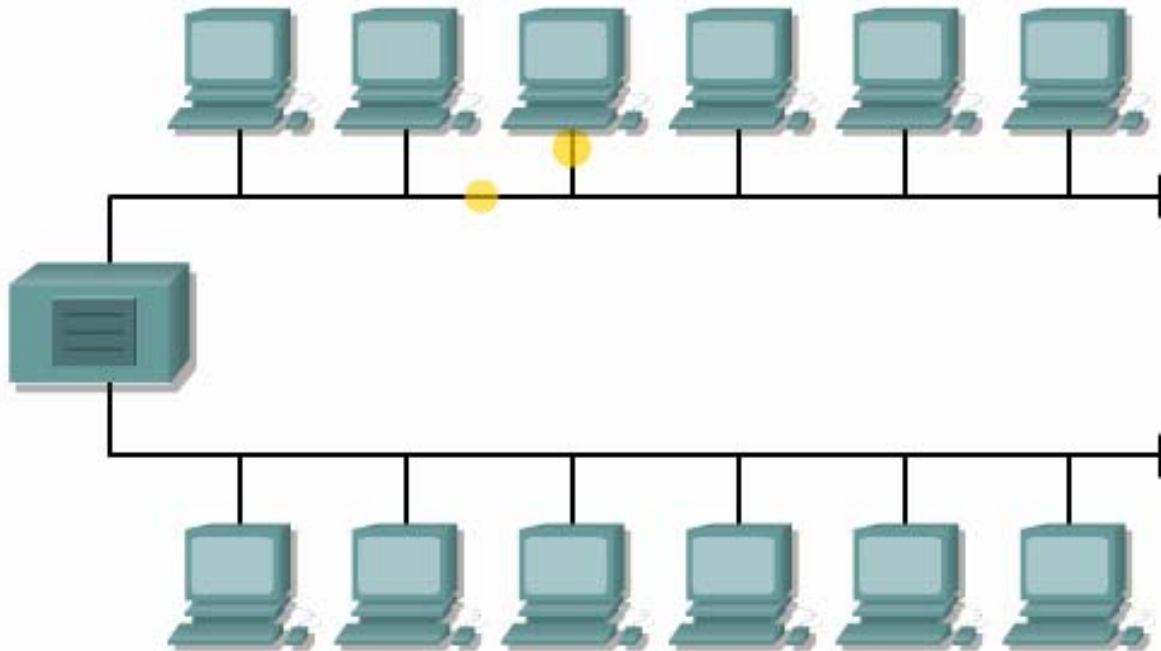


Use crossover cable when BOTH ports are designated with an "x" or neither port is designated with an "x".

# UTP Implementation

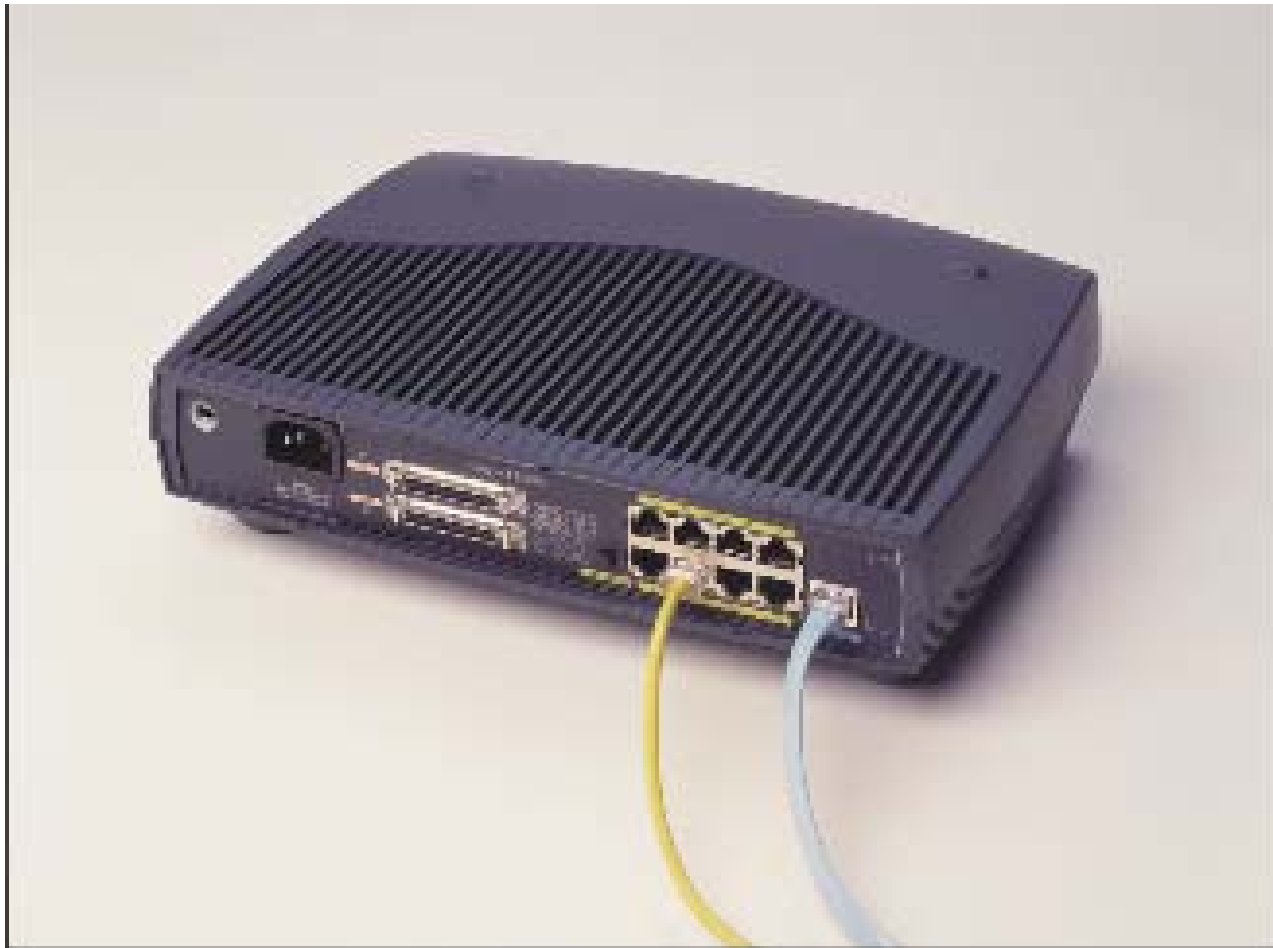


# Repeaters



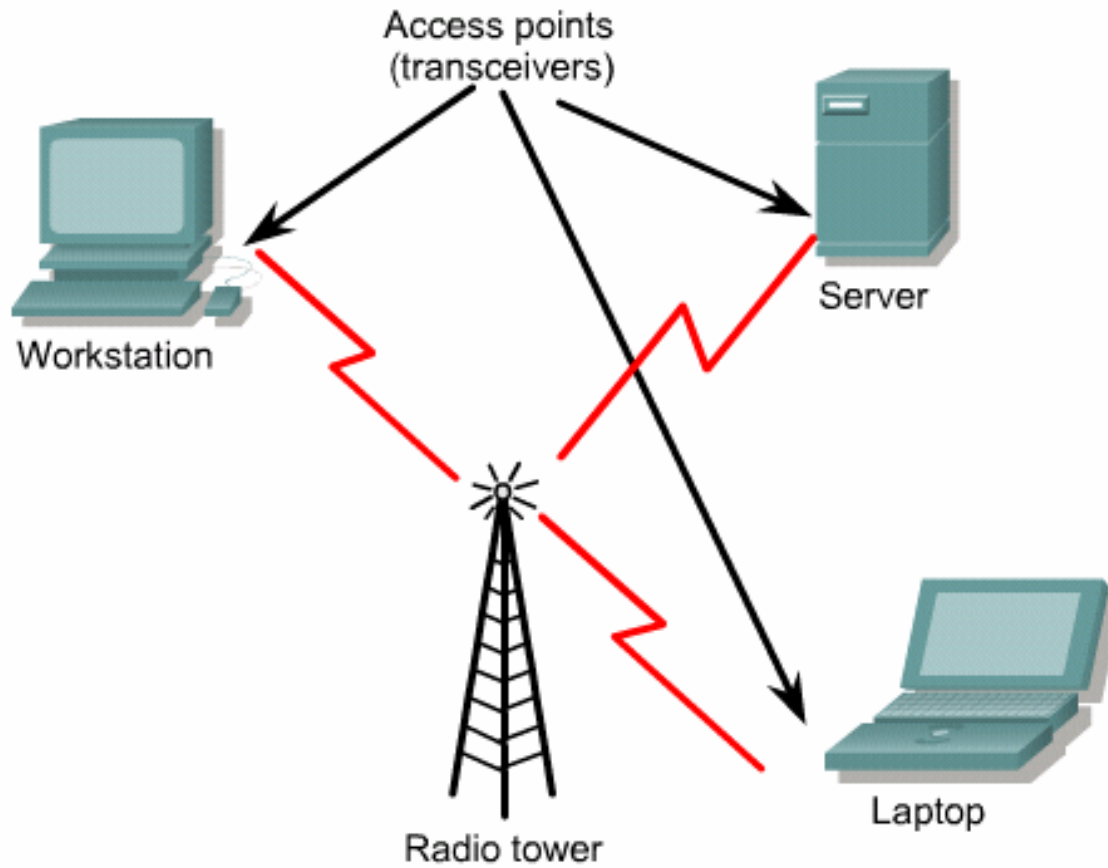
The purpose of a repeater is to regenerate and retime network signals at the bit level. This allows them to travel a longer distance on the media.

# Hubs

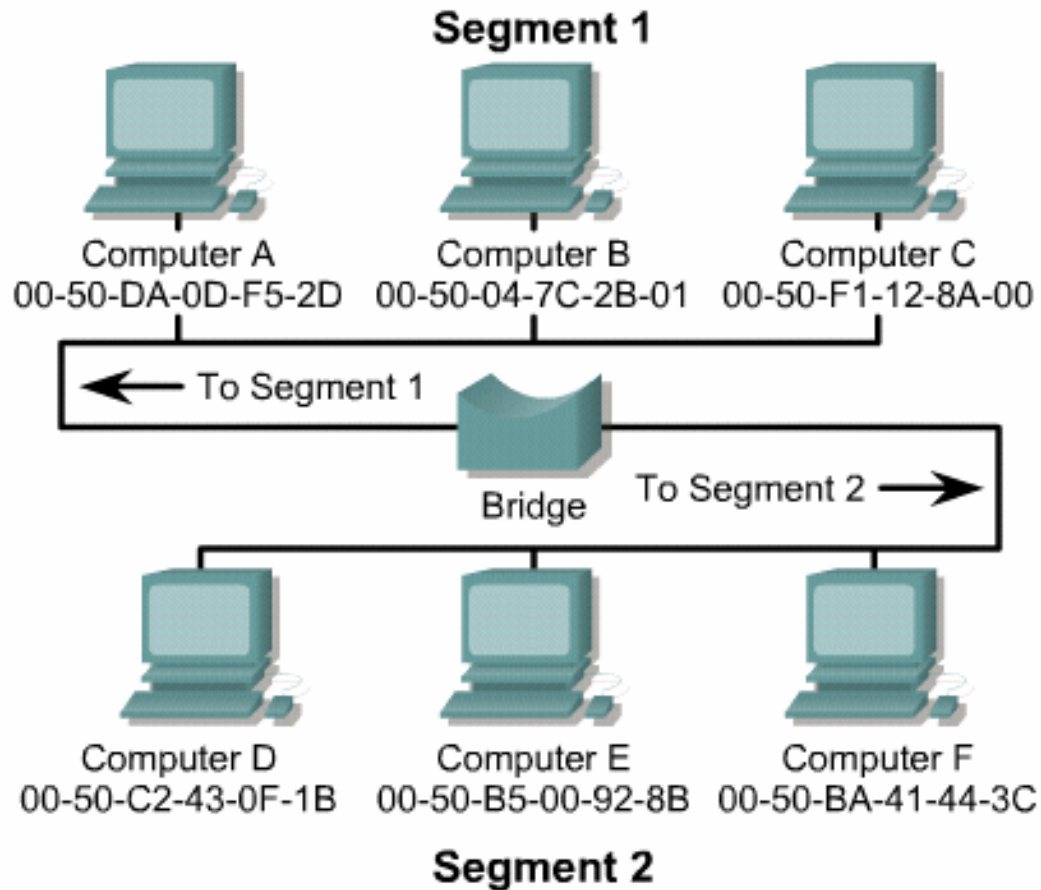




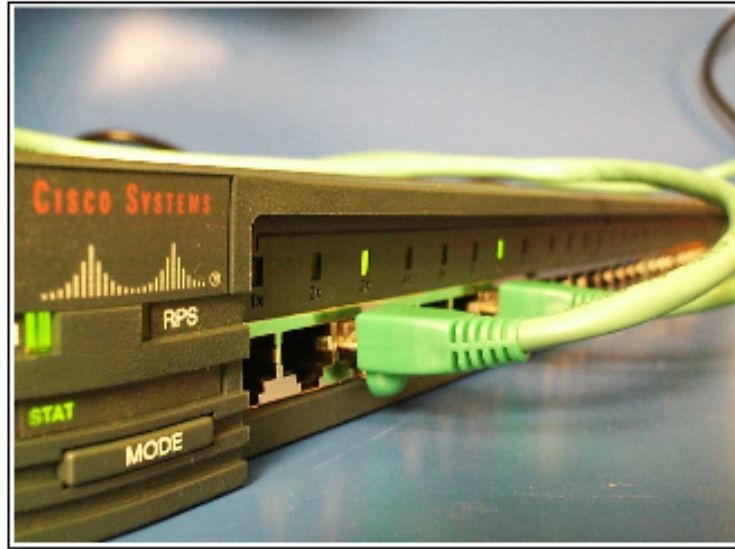
# Wireless



# Bridges



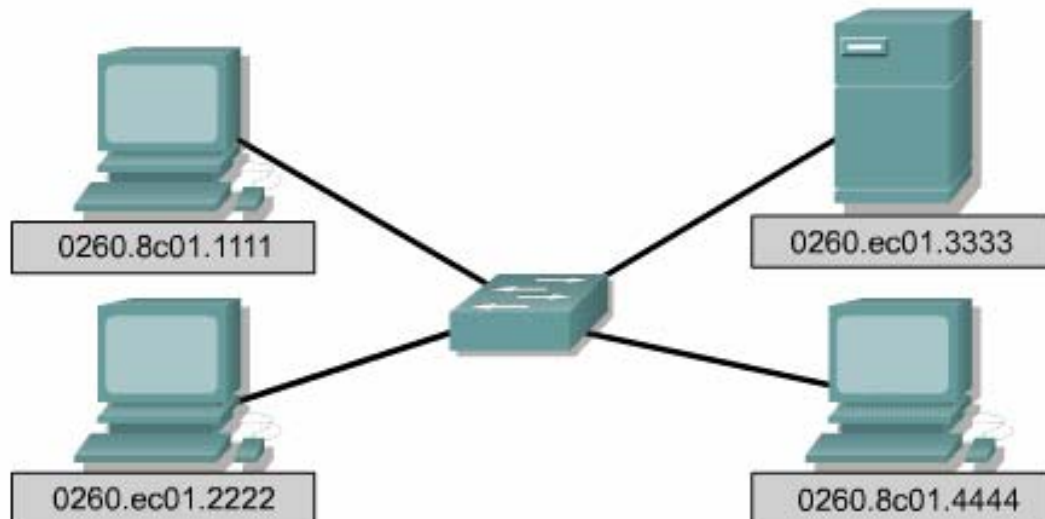
# Switches



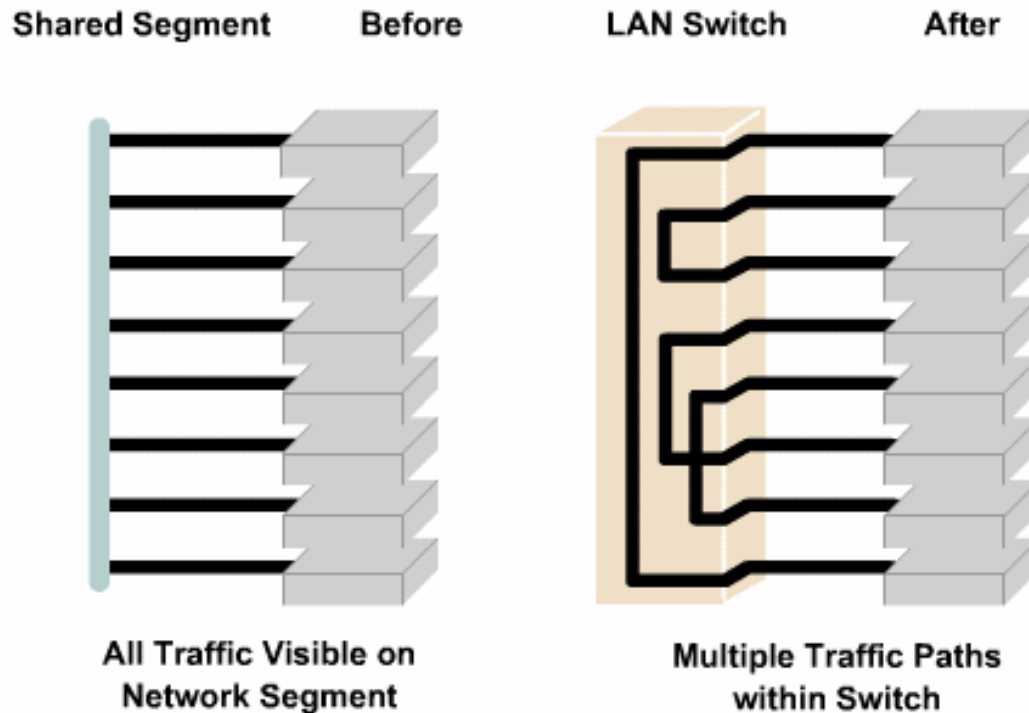
- A switch is sometimes described as a multiport bridge .
- Switches have multiports
- Switching is a technology that alleviates congestion in Ethernet LANs by reducing the traffic and increasing the bandwidth
- Replacing hubs

# Switches

Interface	MAC Address
E0	0260.8c01.1111
E1	0260.ec01.2222
E2	0260.ec01.3333
E3	0260.8c01.4444

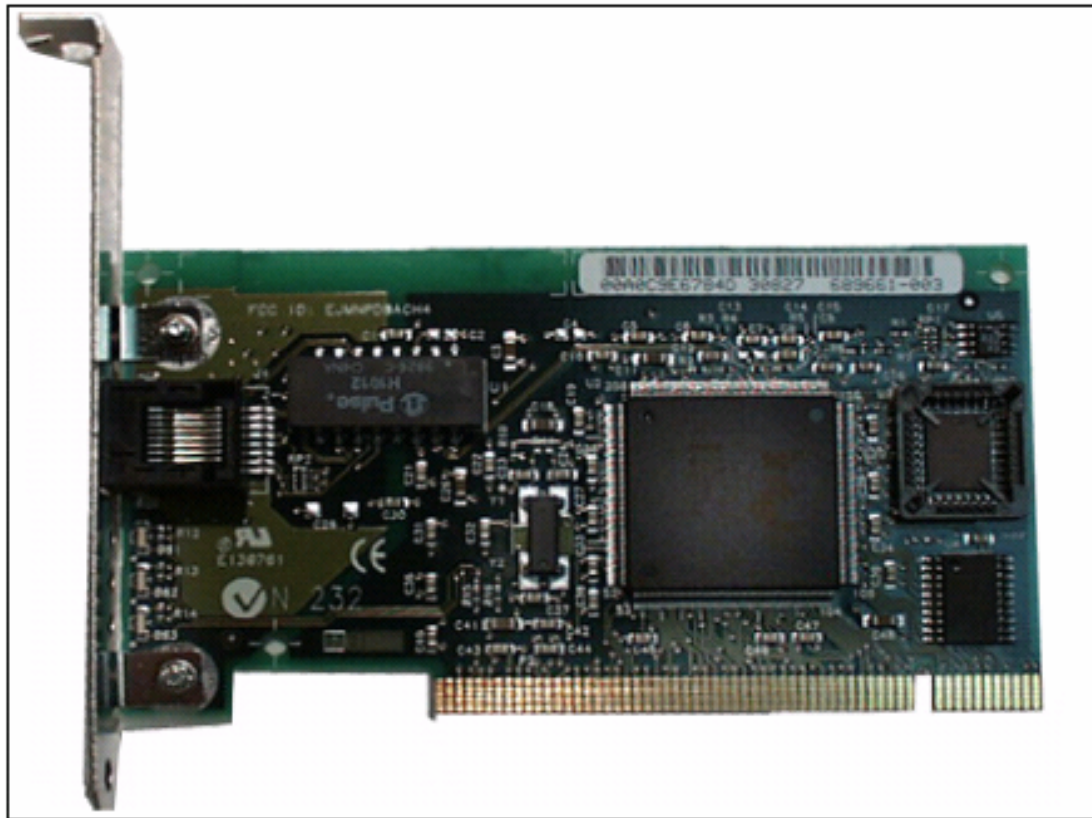


# Switches

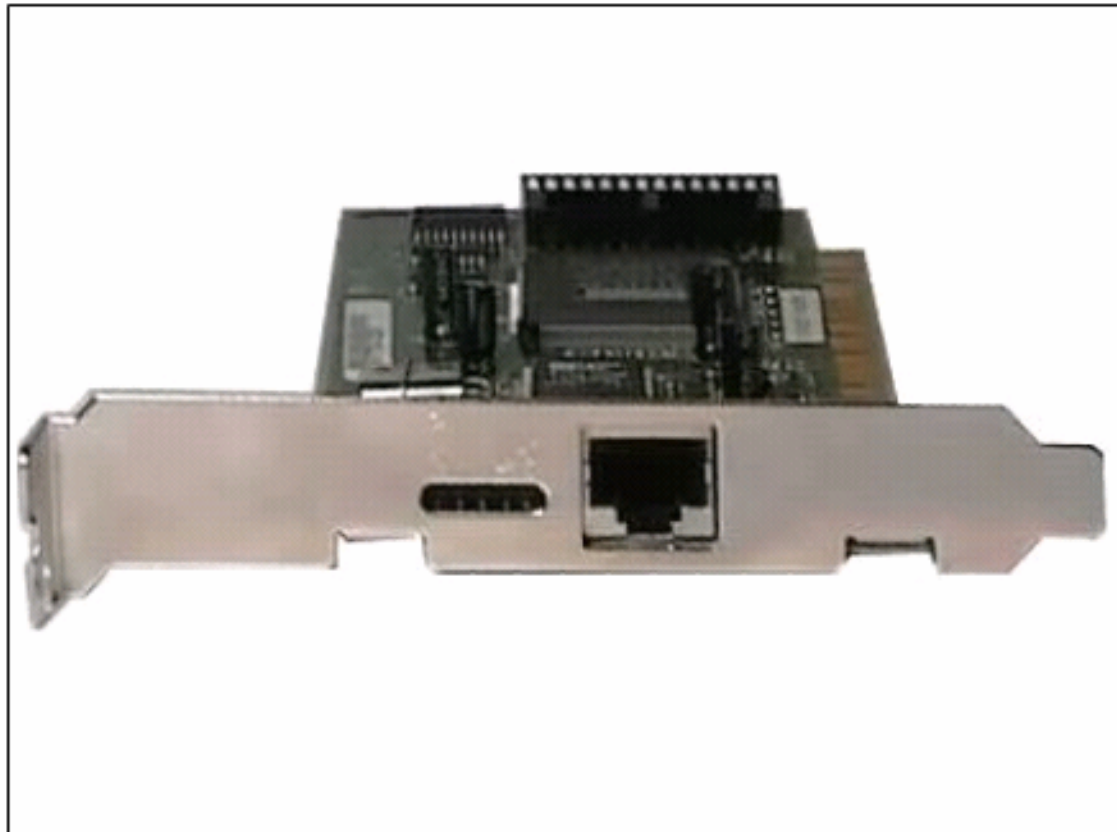


Dedicated paths between sender and receiver hosts.

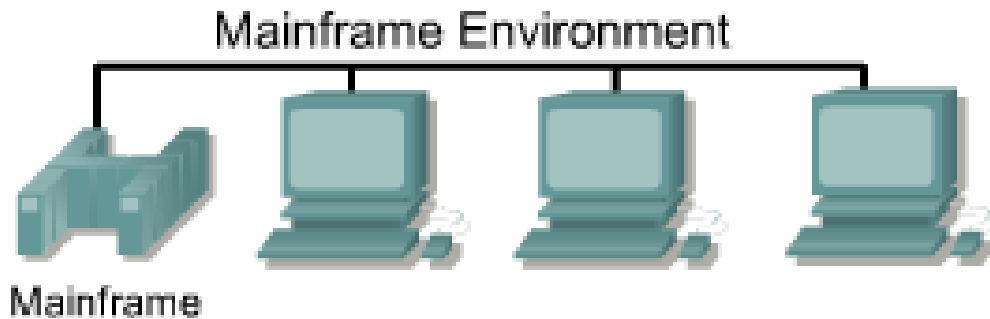
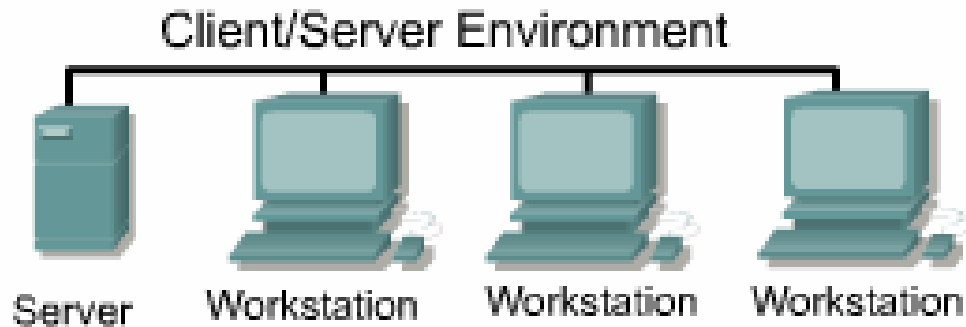
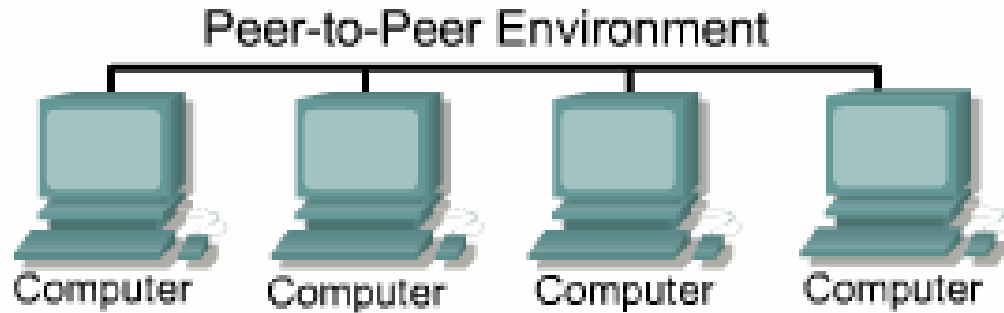
# Host Connectivity



# Host Connectivity



# Peer-to-Peer





# Client/Server

Advantages of a Peer-to-Peer Network	Advantages of a Client/Server Network
Less expensive to implement.	Provides for better security.
Does not require additional specialized network administration software	Easier to administer when the network is large because administration is centralized.
Does not require a dedicated network administrator.	All data can be backed up on one central location.

# Client/Server

Disadvantages of a Peer-to-Peer Network	Disadvantages of a Client/Server Network
Does not scale well to large networks and administration becomes unmanageable.	Requires expensive specialized network administrative and operational software
Each user must be trained to perform administrative tasks.	Requires expensive, more powerful hardware for the server machine.
Less secure.	Requires a professional administrator.
All machines sharing the resources negatively impact the performance.	Has a single point of failure. User data is unavailable if the server is down.

# WAN Physical Layer

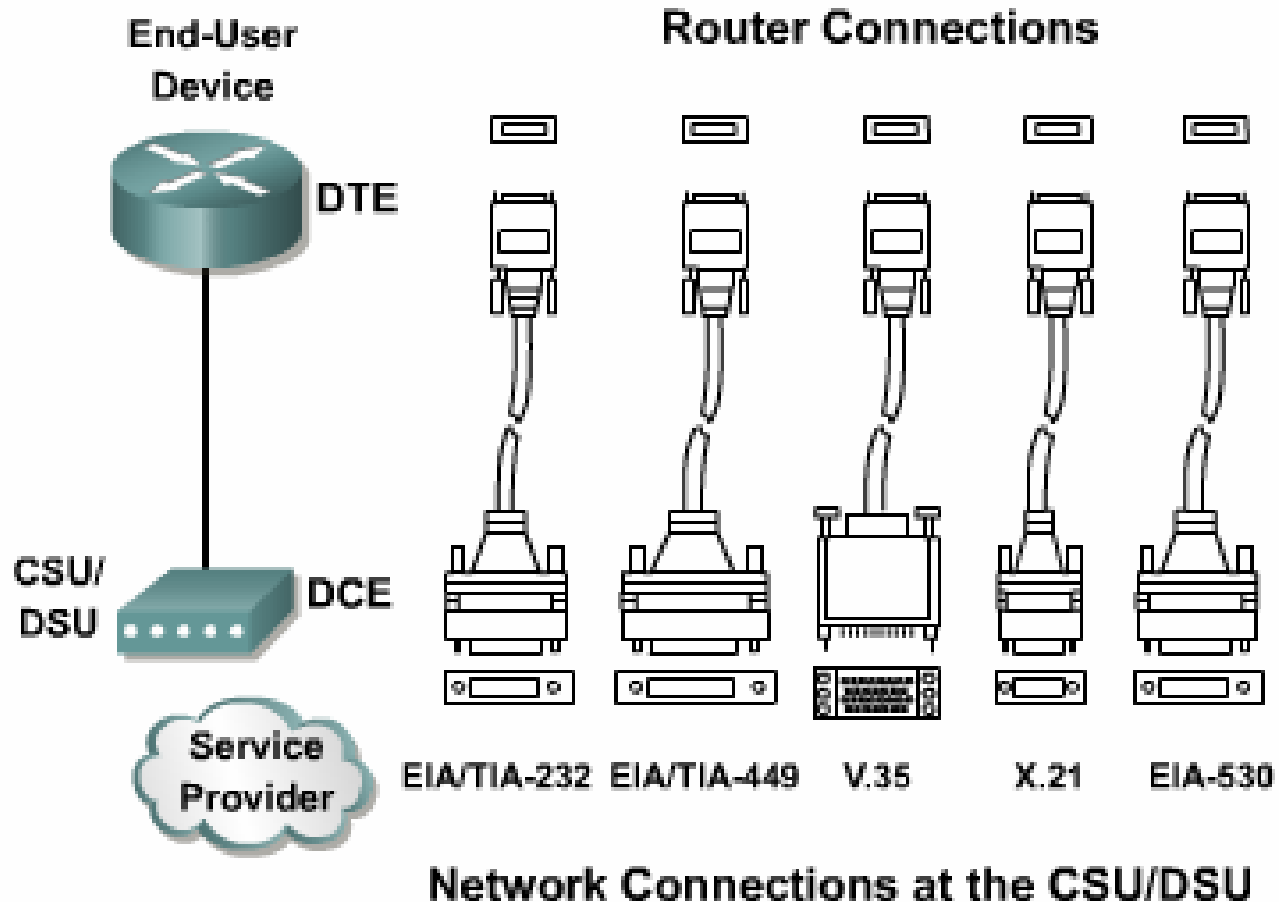
Cisco HDLC	PPP	Frame Relay	ISDN BRI	DSL Modem	Cable Modem
EIA/TIA-232 EIA/TIA-449 X.21 V.24 V.35 High Speed Serial Interface (HSSI)			RJ-45 Note: ISDN BRI cable pinouts are different than the pinouts for Ethernet	RJ-11 Note: Works over telephone line	F Note: Works over Cable TV line

- Physical Layer implementation vary
- Cable specifications define speed of link

# WAN Serial Connections

Data (bps)	Distance (Meters) EIA/TIA-232	Distance (Meters) EIA/TIA-449
2400	60	1250
4800	30	625
6900	15	312
19,200	15	156
38,400	15	78
115,200	3.7	—
T1 (1.544 Mbps)	—	15

# WAN Serial Connections



# Routers and Serial Connections

## Data Terminal Equipment:

- End of the user's device on the WAN Link

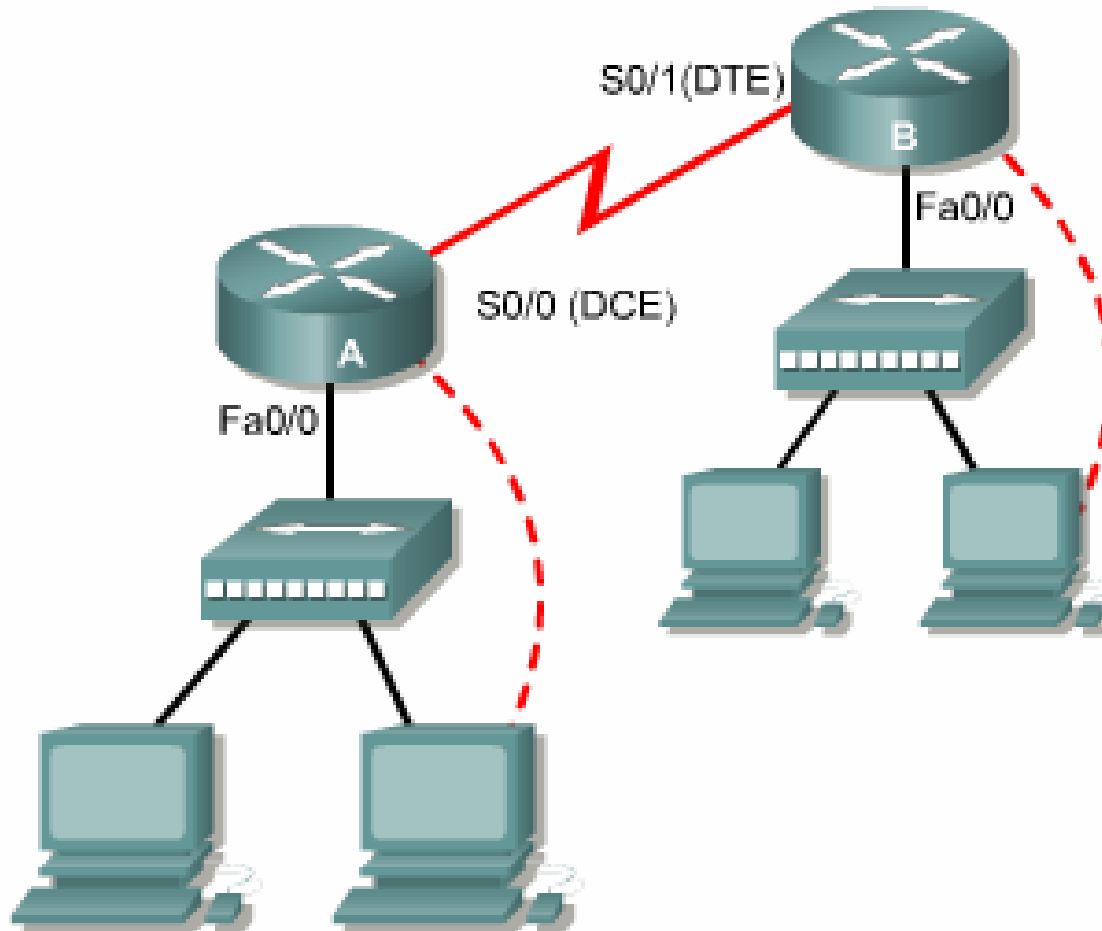
## Data Communications Equipment:

- End of the WAN provider's side of the communication facility
- Responsible for clocking

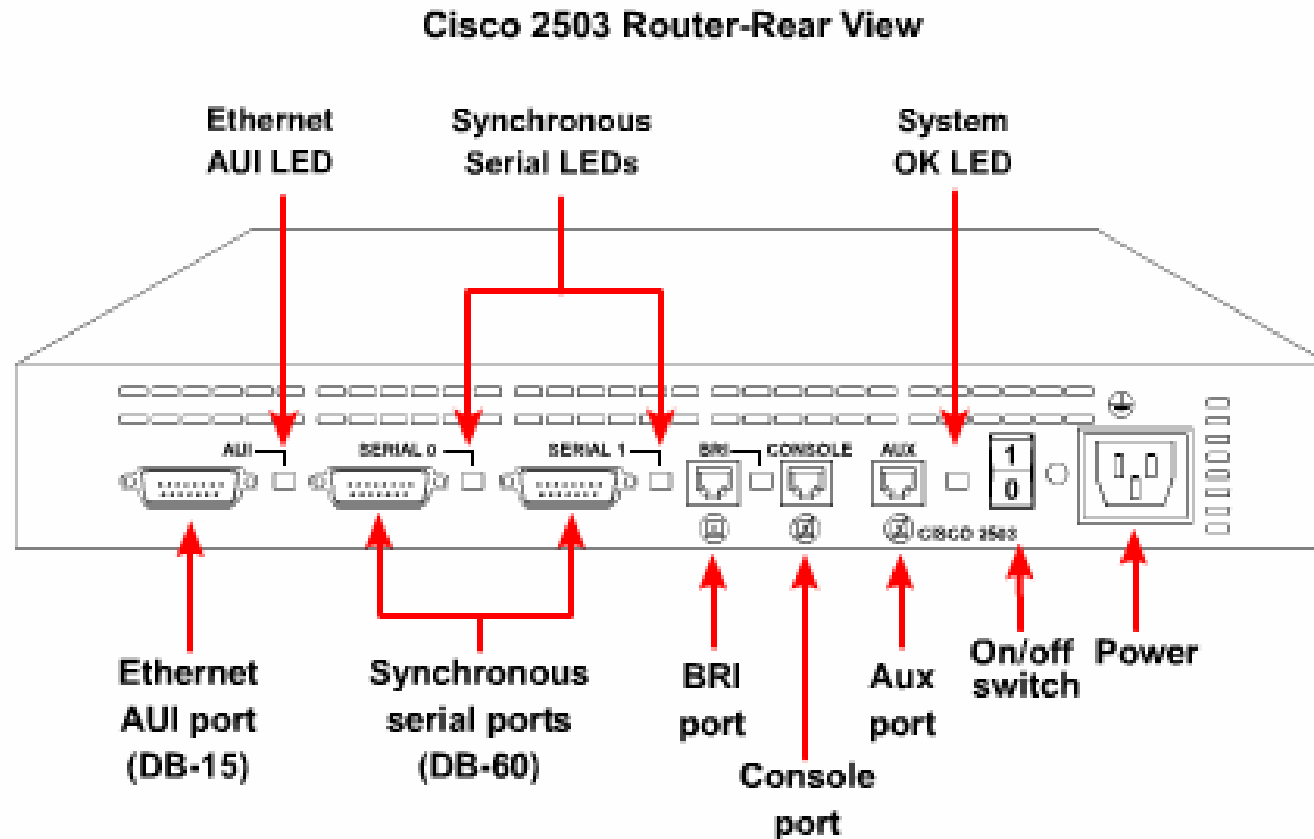


- **Routers are responsible for routing data packets from source to destination within the LAN,**
- **For providing connectivity to the WAN**

# Routers and Serial Connections

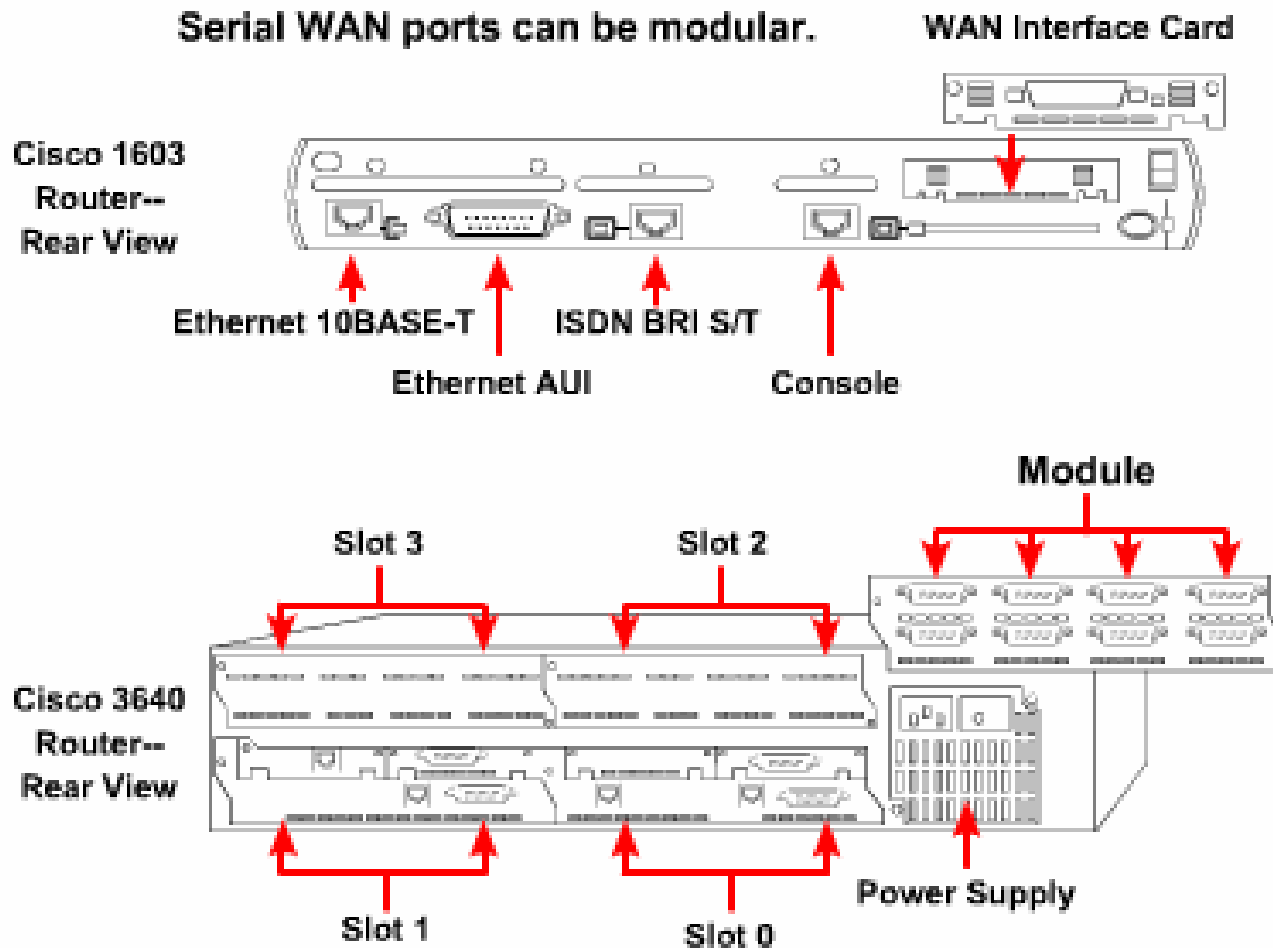


# Routers and Serial Connections



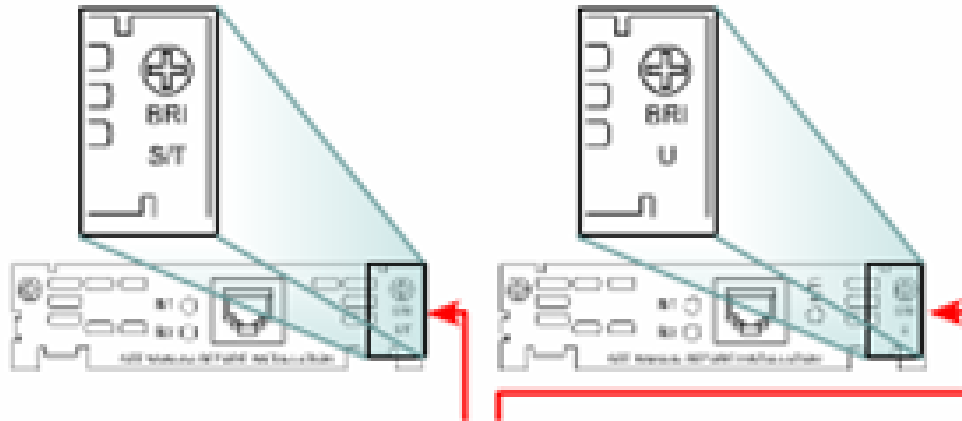


# Routers and Serial Connections

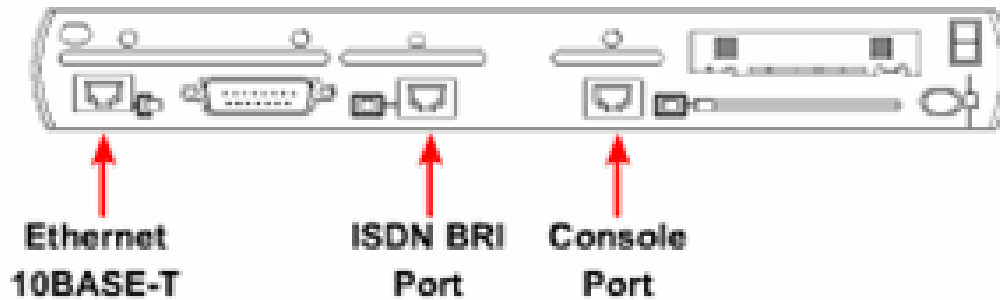


# Routers and ISDN BRI Connections

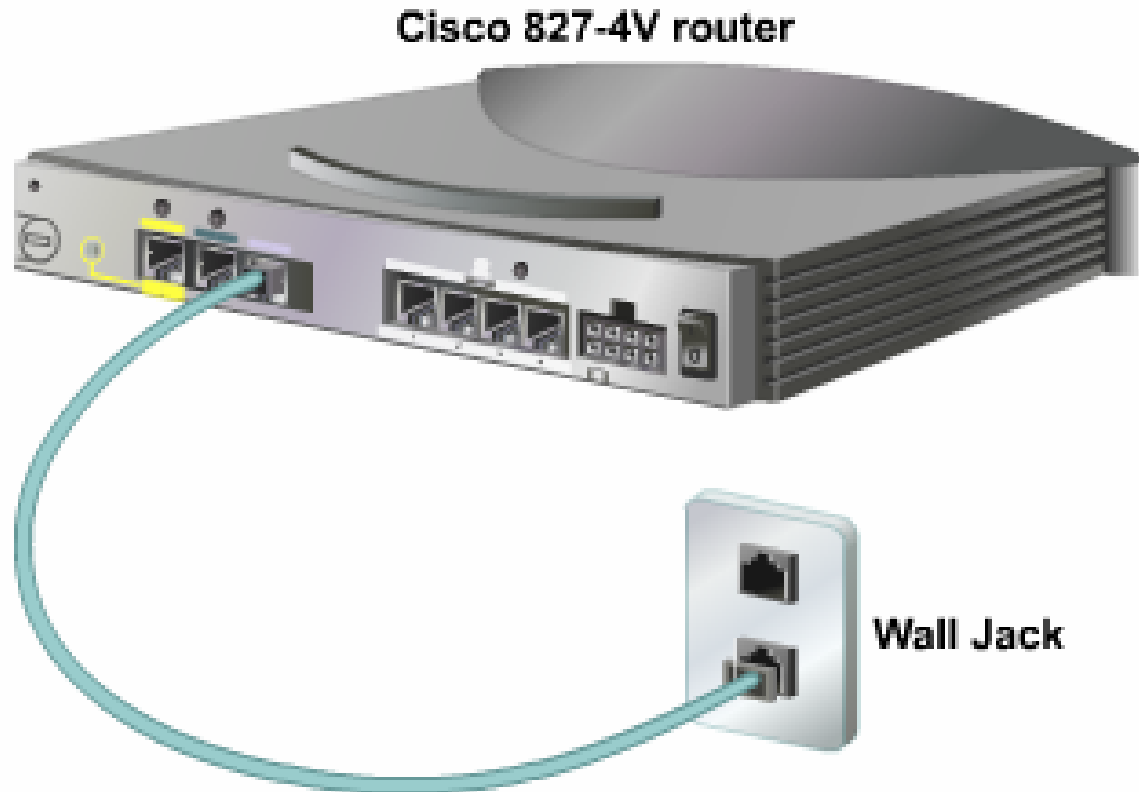
Determine if a BRI S/T or U interface is needed.  
Routers have one or both types of port.



Note Port Label



# Routers and DSL Connections



# Summary

## Cabling LANs and WANs

- Repeater, hubs, bridges, switches are common LAN devices.
- There are two major types of LANs, peer-to-peer and client-server.
- WANs use serial data transmission. WAN connection types include ISDN, DSL, and cable modem.