Computer Network

Types and Topology

# Scale

Interprocessor distance	Processors located in same	Example
1 m	Square meter	Personal area network
10 m	Room	Local area network
100 m	Building	Local area network
1 km	Campus	Local area network
10 km	City	Metropolitan area network
100 km	Country	Wide area network
1000 km	Continent	Wide area network
10,000 km	Planet	The Internet

Fig :Classification of interconnected processors by scale.

Local Area Networks (LAN)

- These are privately-owned networks within a single building or campus of up to a few kilometers in size.
- LAN can be further classified understanding the way in which they are connected.
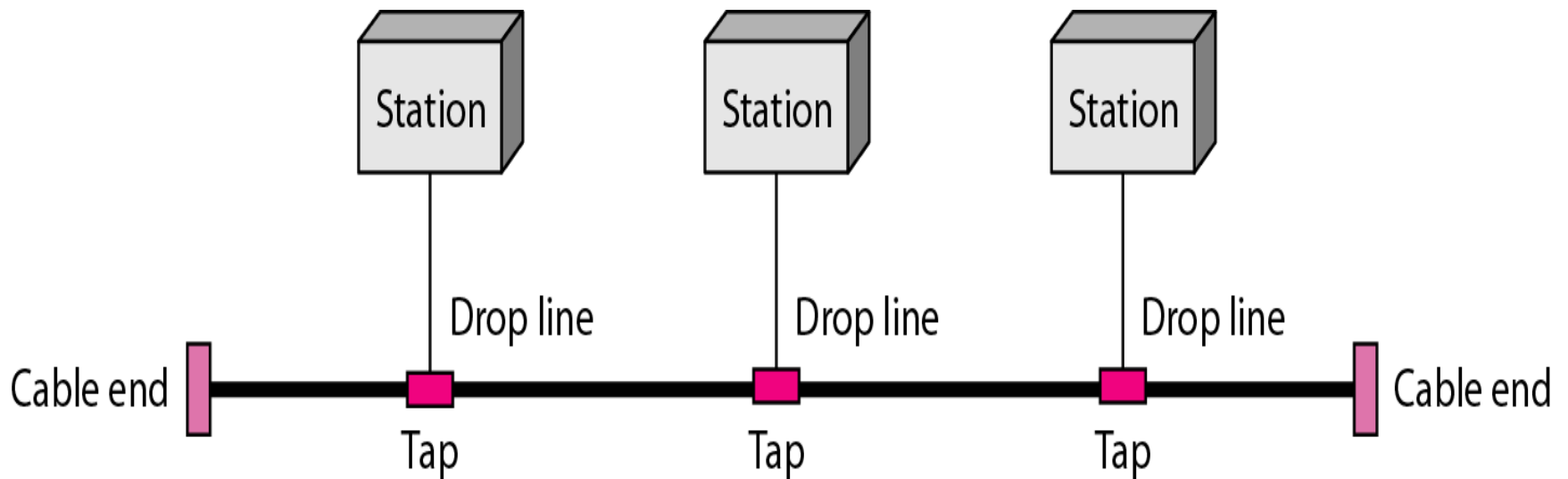- LAN runs at a speed of 10Mbps to 100Mbps

Network Topology
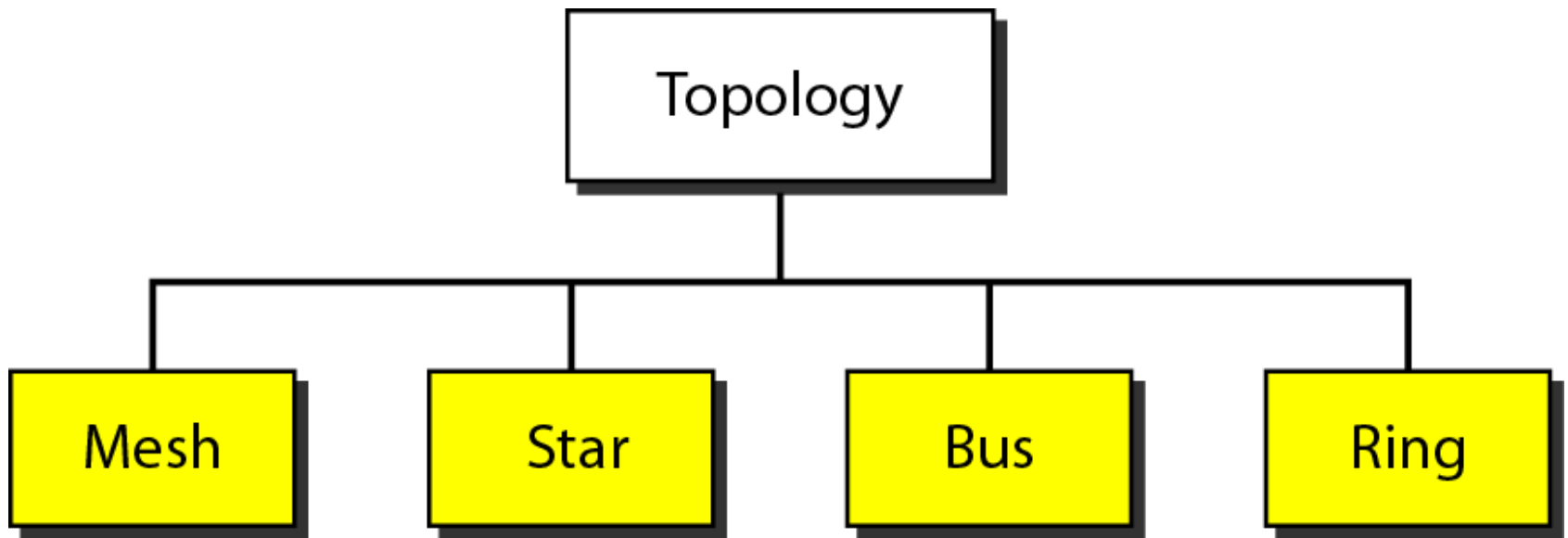
BUS

- At any instant at most one machine is the master and is allowed to transmit. All other machines are required to refrain from sending.

- IEEE 802.3 (**Ethernet**) *is a bus-based broadcast network with decentralized control, usually operating at 10 Mbps to 10 Gbps.*
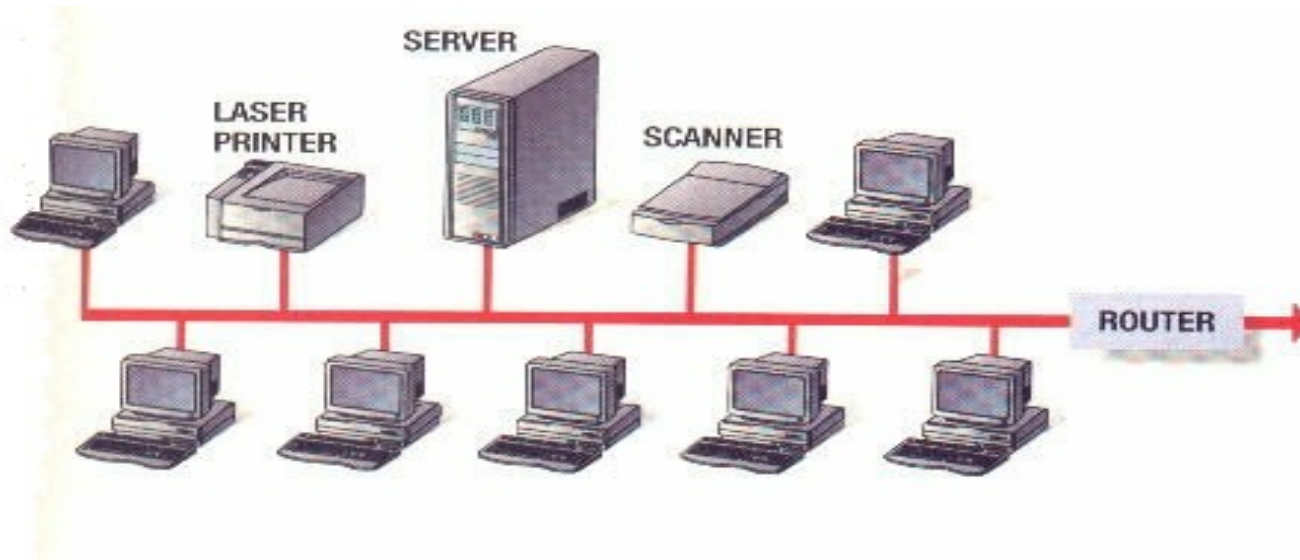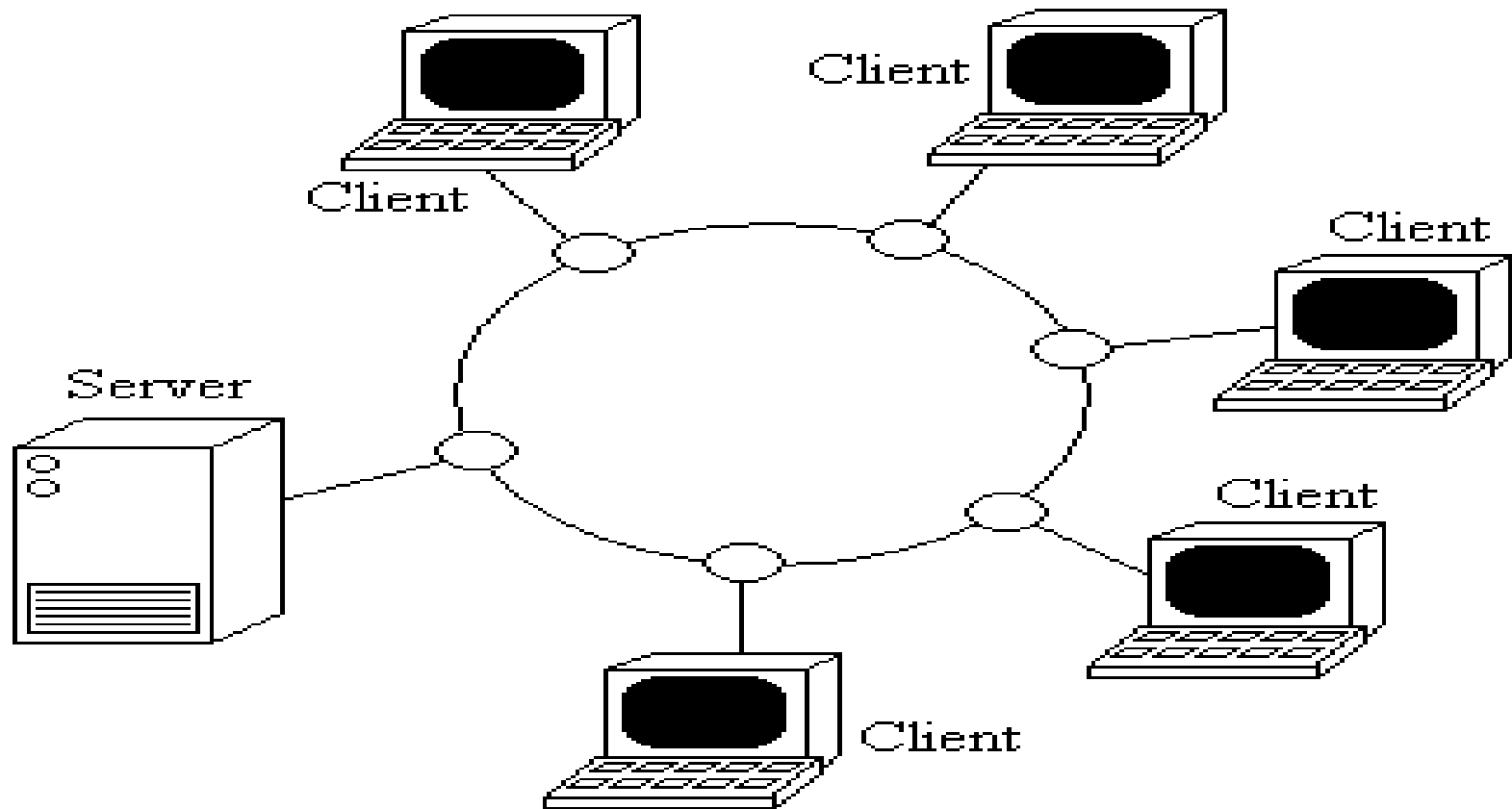
Bus

Bus

- **Advantages**
  - Easy to setup
  - Less no. of wire . (Single Backbone Line & N dropline)
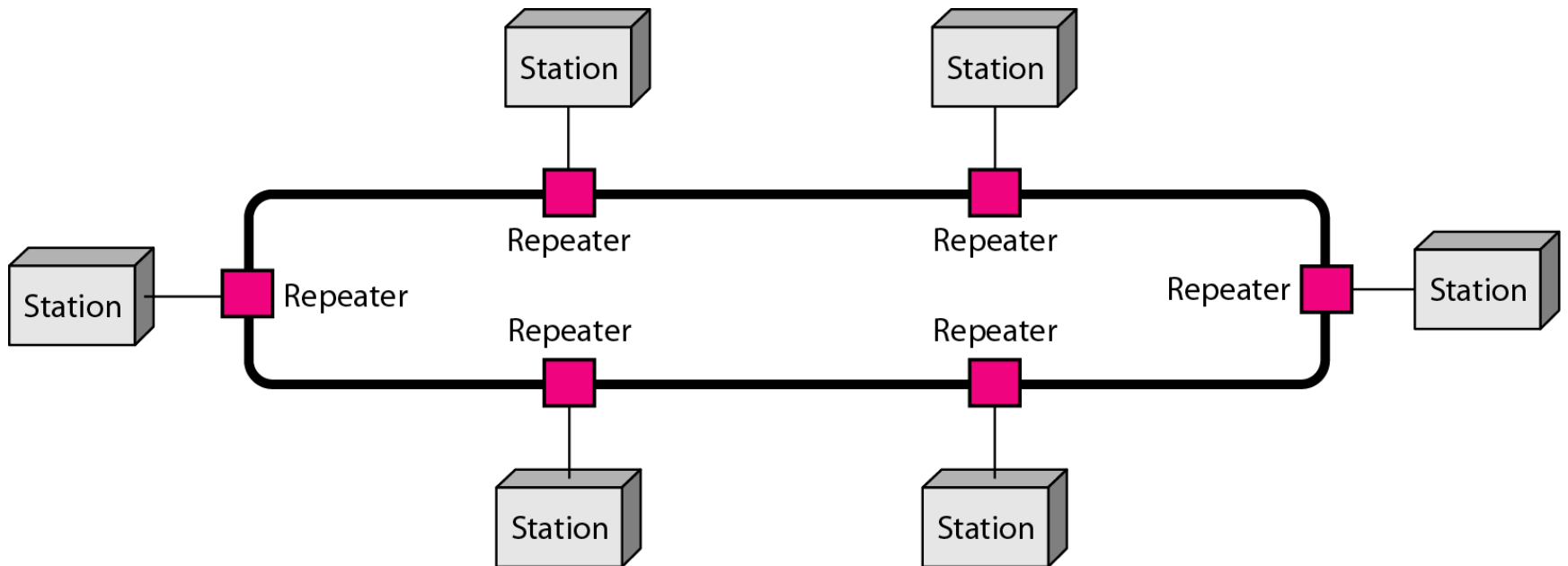
- **Disadvantages**
  - Adding new device require modification in Backbone cable.
  - Performance : Slow
  - Easy to crash
  - Difficult fault detection.

Ring

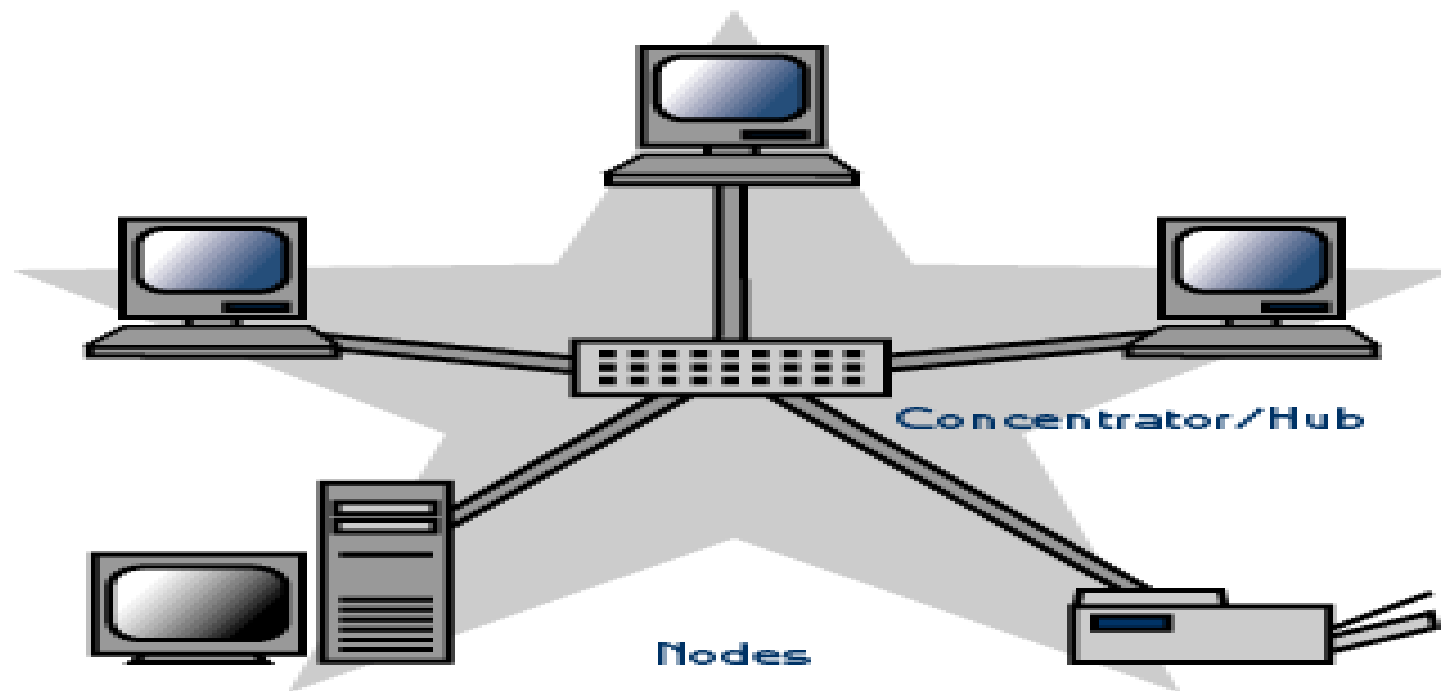- IEEE 802.5 (the IBM token ring).

Ring

Ring

- **Advantage :**
  - Performance is better in Ring than bus.
  - Easy to install and reconfigure

- **Disadvantage :**
  - A failure in any cable or device breaks the loop and can take down the entire network.

Star

- A star network features a central connection point called a "hub" that may be a hub, switch or router.
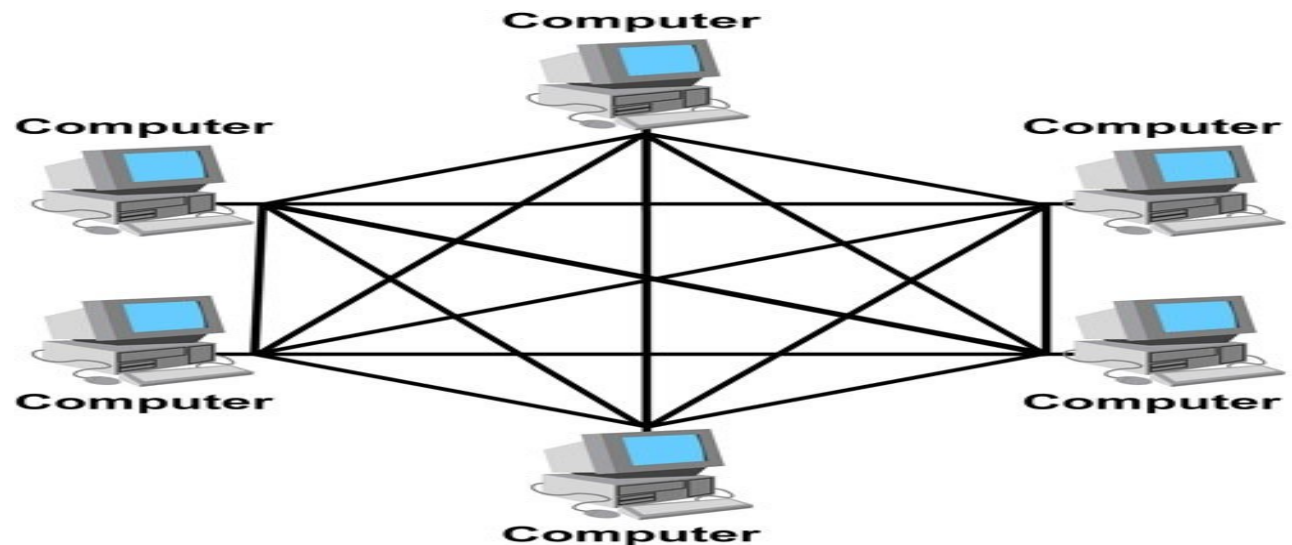
Star

- **Advantages**
  - Less no. of ports
  - Dedicated link between hub and device.
  - Easy to setup
  - Single cable can not crash entire network
- **Disadvantages**
  - One hub crashing downs entire network
  - Uses lots of cable

Mesh

- Mesh topologies involve the concept of routes.
- Messages sent on a mesh network can take any of several possible paths from source to destination.

Mesh

- **Advantage**
  - Guaranteed delivery of data
- **Disadvantages**
  - Lots of cable
  - Hard to setup
  - More number of ports

Comparison

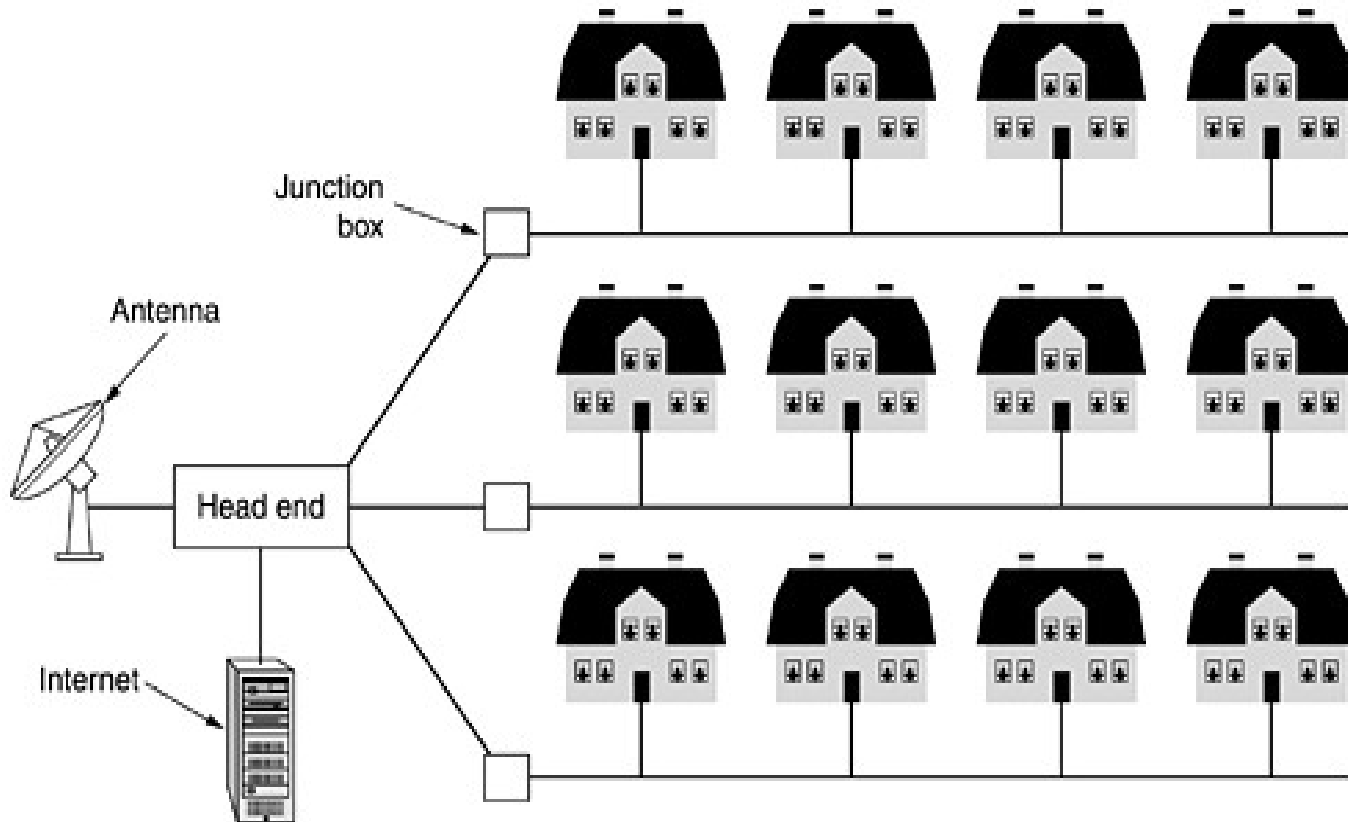| Topologies	Total No. of Wires Required	No. of Ports on end machine
Bus	N Dropline + 1 Backbone Line	1
Ring	N Dropline + 1 Backbone Line	1
Star	N wires	1
Mesh	N(N-1) Wires	(N-1)

Metropolitan Area Networks (MAN)

Fig.. A metropolitan area network based on cable TV.

Wide Area Networks (WAN)