

A background image showing a close-up of a hand holding a glass of orange juice with a straw. The glass is partially filled with orange liquid, and the straw is visible on the right side. The background is slightly blurred, focusing on the glass and the hand.

MIS 131: Information Systems Administration

Part VI: Networks

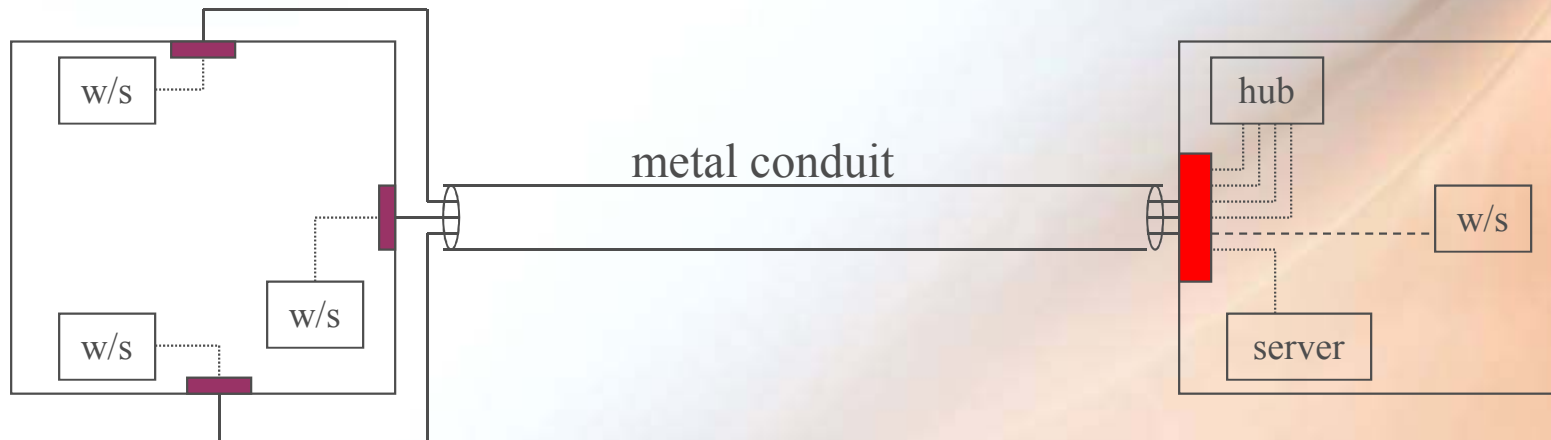
Section B: Structured Cabling and Wireless Networks

Structured Cabling

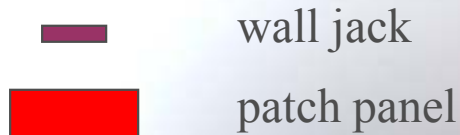
- **Cabling system installed in building or work area where data cables and network ports (together with electrical outlets and voice ports) are integrated in the building facilities**
- **Enables easy connection to the network despite addition, transfer, or movement of workstations**

Structured Cabling

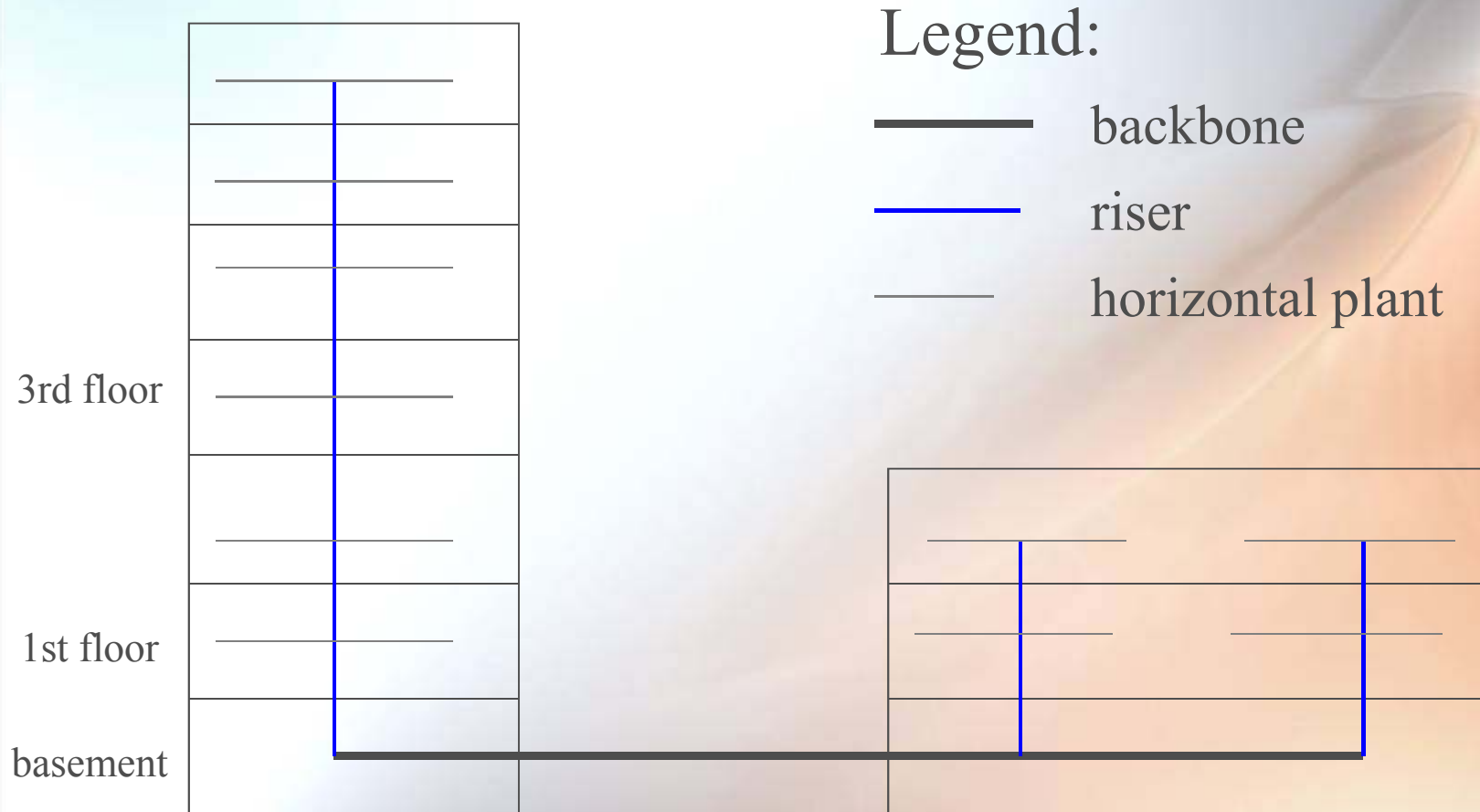
- Cabling method provides flexibility
- Units can be moved without re-cabling



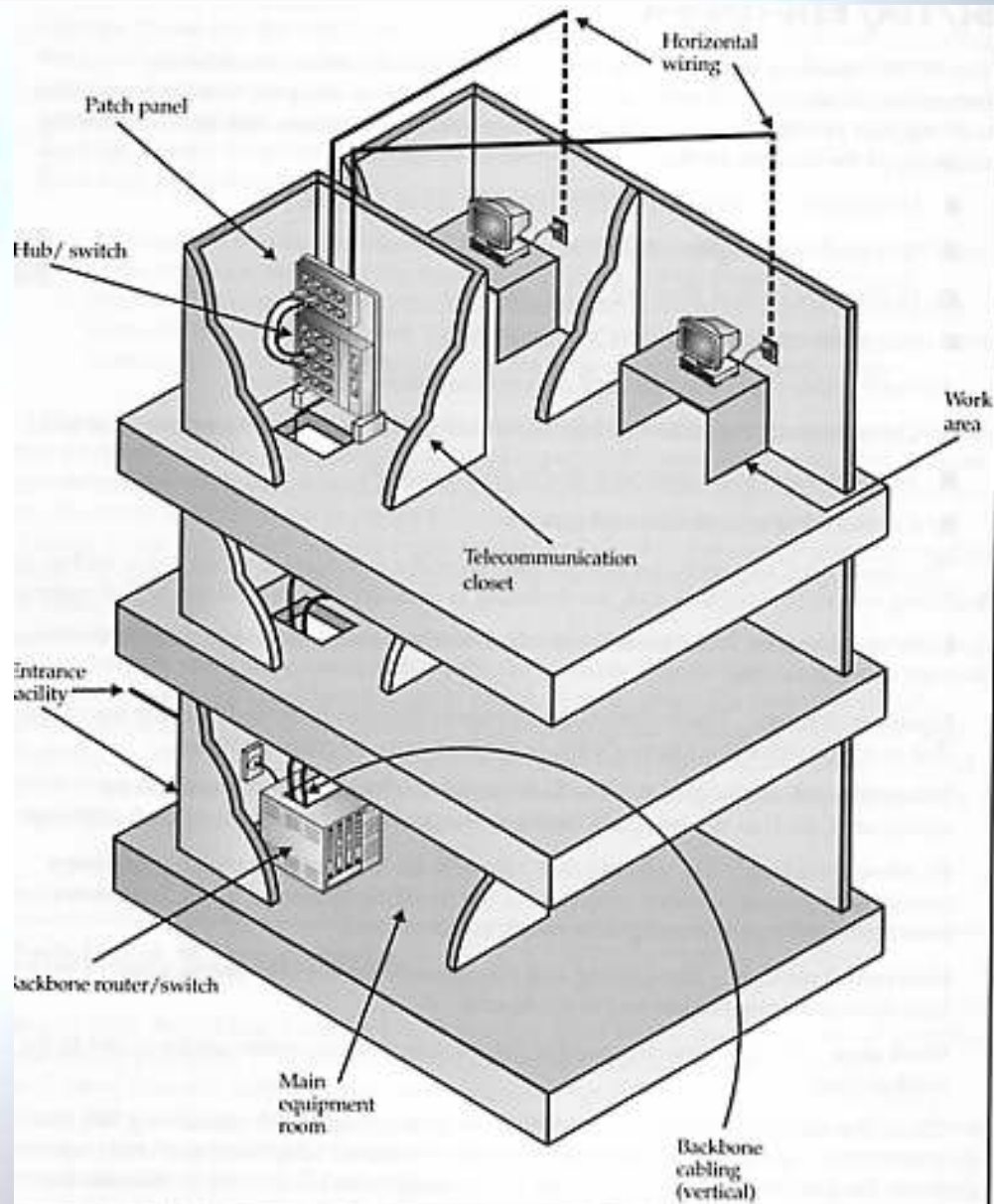
Legend:



Cabling Buildings



Generic Building Cabling System



Forming the Backbone

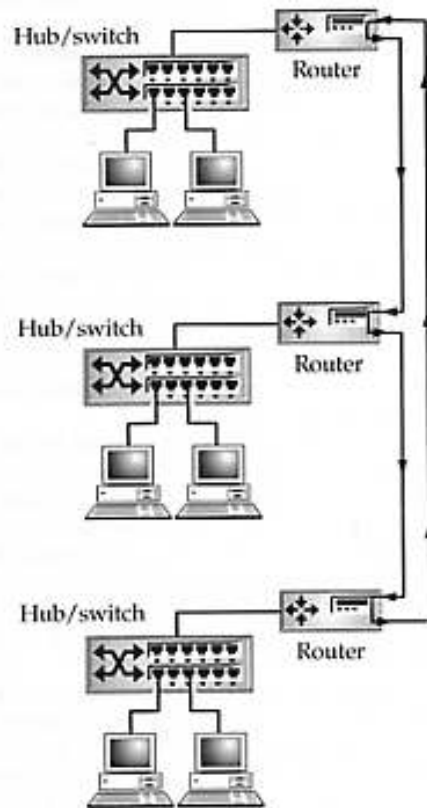


Figure 9-1: An enterprise network, consisting of multiple LANs connected by a backbone

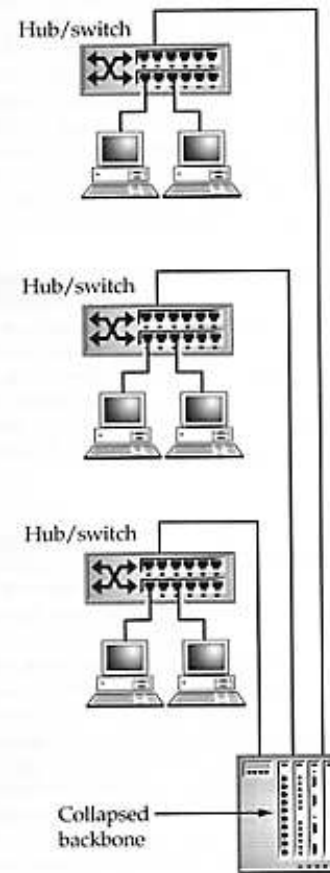


Figure 9-2: A collapsed backbone connects all of the LANs to a single router or switch.

Structured Cabling Considerations

- **Whenever possible, avoid cascading (standalone connected in series) hubs - use stackable hubs instead**
- **Do not exceed recommended distances for each type of media - use repeaters when necessary**
- **If affordable, cable with fault tolerance**
- **For UTP, ensure that the proper bandwidth is provided**
- **For UTP, take care of unraveling the pairs as too much will degrade the cable**

Wireless Networks

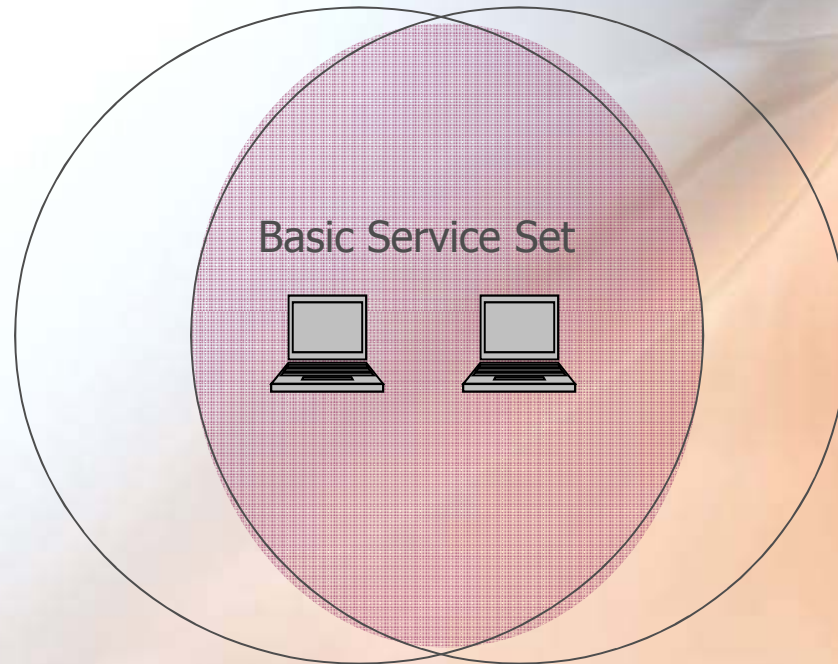
- **Used when impractical or impossible to install a cabled network**
- **Advantages**
 - No wires!
 - Easy installation
- **Disadvantages**
 - Limited range and performance (e.g. bandwidth)
 - Interference
 - Security

Wireless Classifications

- **WLAN (LAWN) or Wi-Fi**
- **Bluetooth**
- **Infrared**

WLAN (LAWN)/ Wi-Fi

- Short for **Wireless LAN** or **Wireless Fidelity**
- Connects to a network through “hotspots”
- Communication occurs inside the basic service set (BSS)



Characteristics of WLAN

- **Unbounded media**
- **Dynamic topology**
 - Layout changes frequently, if not continuously
 - Layout does not need meticulous planning
- **Unprotected media**
 - Interference affects signal quality
- **Unreliable media**
 - Does not guarantee packet reception
- **Asymmetric media**
 - Propagation of data to all stations does not occur at the same rate

WLAN Standards

- **802.11b (formerly known as Wi-Fi)**
 - The first to be established
 - Currently the most accepted
- **802.11a (formerly known as Wi-Fi5)**
 - An improvement of 802.11b
 - Not compatible with 802.11b
- **802.11g**
 - As fast as 802.11a but compatible with 802.11b
- **802.11n**
 - Offers much higher speed than 802.11g



Wi-Fi Standards Comparison

| | Operating Freq. | Performance (Max) | Range (M, max) | Penetration | Enhanced Mode | Price |
|---------|-----------------|-------------------------|-----------------------------|---|--------------------------------|--------------------------|
| 802.11b | 2.4 GHz | 11 Mbps (act. 4-5) | 154 indoors 500 outdoors | Strong due to lower frequency | 22 Mbps (act. 6) | |
| 802.11a | 5 GHz | 54 Mbps (act 20-25) | 100 indoors 350 outdoors | Less consistent due to higher frequency | 72 – 108 Mbps (act. small inc) | |
| 802.11g | 2.4 GHz | 54 Mbps on 2.4 GHz band | Same as 802.11b on 2.4 GHz | Same as 802.11b on 2.4 GHz | | Relatively not expensive |
| 802.11n | 2.4 or 5 GHz | 300 Mbps | 175 | Same as 802.11b on 2.4 GHz | | Prices going down |

Bluetooth

- Named after 10th century Danish king
- Not compatible with Wi-Fi
- Range more limited than Wi-Fi
- Slower than Wi-Fi (723.2 Kbps to 1 Mbps under ideal conditions)
- Also operates in the 2.4 GHz range
- Is becoming the standard in handheld devices, cellular phones, and other devices (e.g. printers, headsets, etc.)



Infrared

- **Uses infrared frequency (below red; not visible to naked eye)**
- **Very limited range**
- **Limited flexibility (“line-of-sight” must be established)**
- **Limited applications (cellular phones, PDAs, computer peripherals)**
- **Slower than Bluetooth**