

DE050 Computer Network and Security

H. Anthony Chan

<https://cis.cihe.edu.hk/Anthony-Chan/index.html>

What I have is only borrowed from God so that I may serve others. H. Anthony Chan

The value of an education in a liberal arts college is not learning of many facts but the training of the mind to think something that cannot be learned from textbooks. (Albert Einstein)

Communication Networks
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Communication Networks Overview

- ♦ What is the Internet?
- ♦ What's a protocol?
- ♦ Network structure, network edge
- ♦ Network core
- ♦ Access network
- ♦ LAN topology
- ♦ Physical media
- ♦ Internet structure and ISPs
- ♦ Performance: loss, delay
- ♦ Protocol layers, service models
- ♦ History

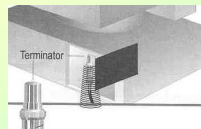
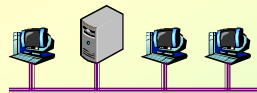
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LAN Topologies Bus

- ♦ Simple and low-cost
- ♦ A single cable called a **trunk (backbone, segment)**
- ♦ Only one computer can send messages at a time
- ♦ Passive topology - computer only listen for, not regenerate data
- ♦ No signal bounce allowed - **terminator** to absorb free signals
- ♦ Disadvantages
 - difficult to trouble-shoot
 - more computers, poorer performance
 - network down if a part of cable is broken



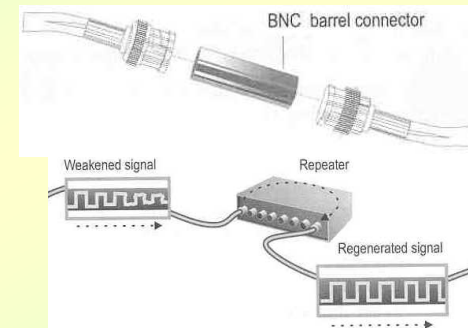
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LAN Topologies Bus Expansion

- ♦ Barrel connector: the signal is **weaken**
- ♦ **Repeater**: boosting signal before sending



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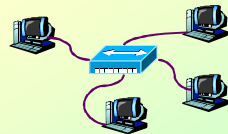
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LAN Topologies

Star

- ♦ Most common method
- ♦ More cabling, ∴ higher cost
- ♦ All signals transmission through the hub; if down, entire network down
- ♦ Advantages of star topology
 - easy to add computers to the network
 - if one computer/cable fails, the rest of the network still works
 - easy to trouble-shoot



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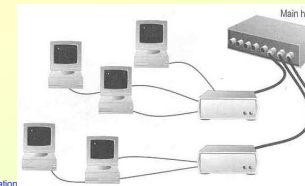
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LAN Topologies

Star: Types of Hub

- ♦ Passive hub: no regeneration of signal, no power
- ♦ Active hub: signal regeneration, multi-port repeater
- ♦ Hybrid hub: can house different types of cables
 - Serve as main hub for expanded network
- ♦ Intelligent hub
 - With network management features, e.g. security



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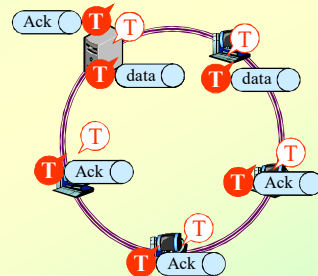
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LAN Topologies

Ring

- ♦ Better performance
- ♦ Every computer serves as a repeater to boost signals
- ♦ Token passing
 - can circle 200 m at about 10000 times per second
- ♦ Disadvantages
 - Difficult to add computers
 - More expensive
 - If one computer fails, whole network fails



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