Module 3: Network Module 3 PT1

Physical Layer – Layer 1 – Bits

- Bits
  - 1,0
- Wired
  - T/P (`Pair)
    - STP (Shielded Twisted Pair)
    - UTP (Unshielded Twisted Pair)
- Coax Cable
- Fiber
  - Straight Tip
  - Lucent Connection
  - Subscriber Connection
- Media Converter
- Amplifier
- Router
- Hub – Not smart. Only takes 1,0s.
  - Repeater on steroids
  - Half-Duplex (400 meters)
- Wireless
  - Antenna

Data Link

- MAC
  - Physical
  - Address
  - Frames
- Switch – Listen and talk simultaneously
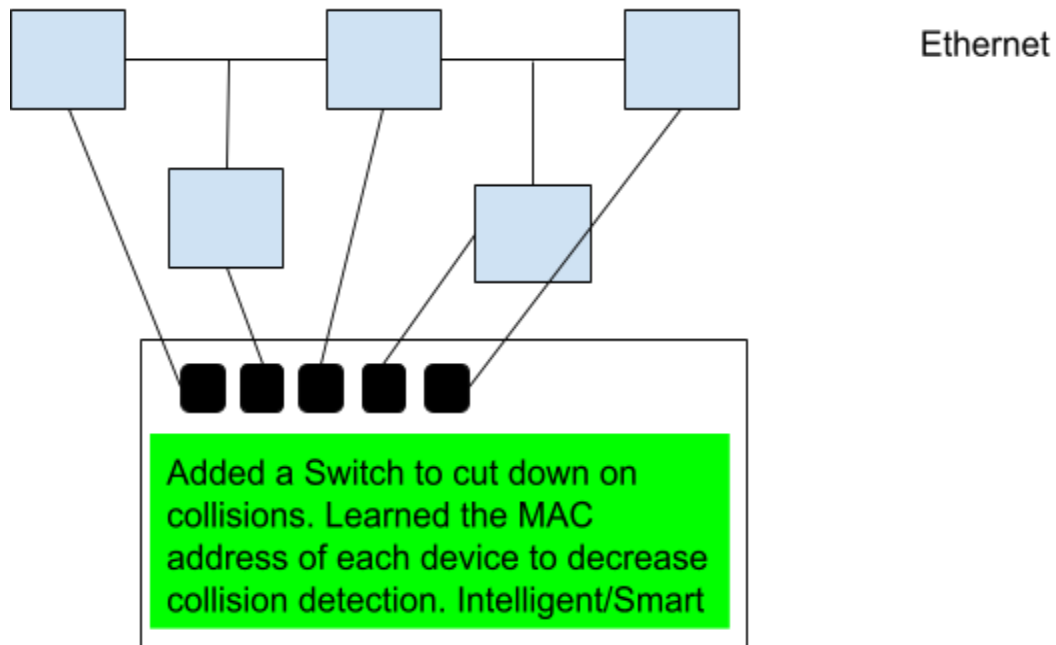 - Learns the MAC address for assignment
  - Full Duplex (2 kilometers)

"Polling"

Token – Token Rings
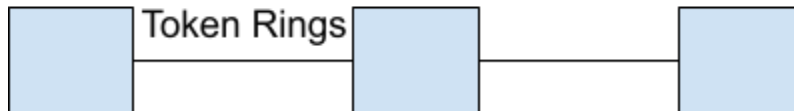
Ethernet "Chao Theory"

- Fast
- Backoff
- CSMA/CD
  - [CSMA/CD Summary](#)
  - Carrier-Sense Multiple Access with Collision Detection.
    - It is a media access control method
- Different standards of Ethernet
  - Twisted Pair
  - Coax
  - Fiber
- [Ethernet – IEEE 802.3](#)
- [Ethernet Standards](#) (N10-008)
- [Ethernet Standards](#) (N10-009)
- FDDI – Token card that uses fiber (FDDI Fiber)
- 100Base-FX – Fiber card
- 100Base-TX – Twisted Pair card
- Wavelength-Division Multiplexing (WDM)
  - Bidirectional Communication over a single strand of fiber.
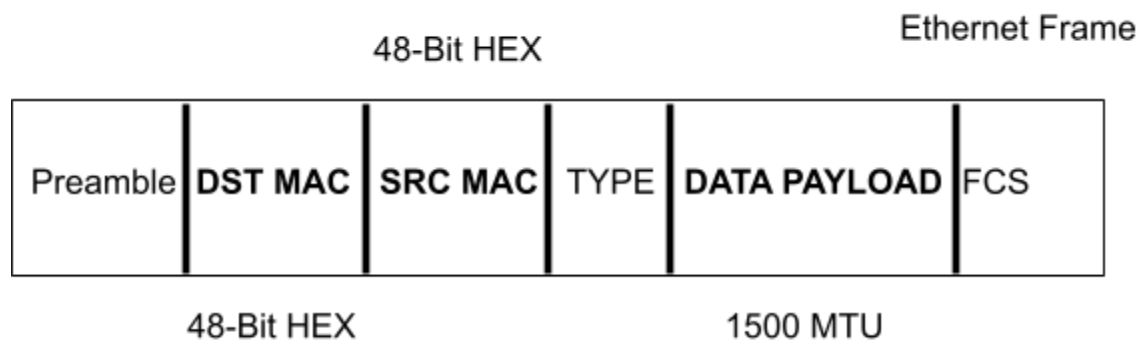
- CWDM (Coarse WDM)
- DWDM (Dense WDM)

Ethernet

Added a Switch to cut down on collisions. Learned the MAC address of each device to decrease collision detection. Intelligent/Smart

Difference between a hub and a switch –
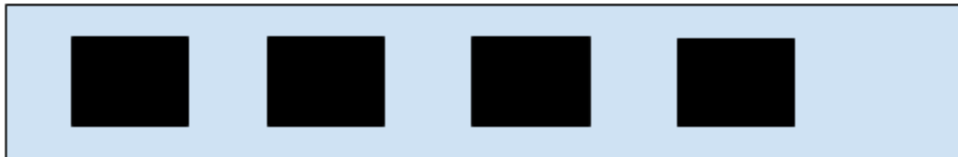A hub only knows a device is connected while a switch can identify each device and learn its MAC address.

Inside the CAM table (MAC Address table)

7 parts of an Ethernet

Ethernet Frame

48-Bit HEX

Preamble	DST MAC	SRC MAC	TYPE	DATA PAYLOAD	FCS

48-Bit HEX   1500 MTU

1518 frame (Greater than 1500 MTU
means JUMBO Frames)

Hub - "star"

- CS MA/CD
- "Half-Duplex"

Ethernet

Bus

Switch

- No CS MA/CD
- "Full-Duplex"

TX ——————————— RX
TX ——————————— RX
RX ——————————— TX
RX ——————————— TX