7 Ethernet Switching

7.1 Ethernet Frame

- Data Link Sublayers
  - LLC Sublayer: IEEE 802.2: Typ-Feld (IPv4 / IPv6 / ARP)
  - MAC Sublayer: IEEE 802.3
    - Ethernet Frame-format
    - Ethernet Addressing
    - Ethernet Error Detection
- Ethernet Frame
  - 8 Byte: Preamble and SFD (Start Frame Deliniter)
  - 6 Byte: Destination MAC Address
  - 6 Byte: Source MAC Address
  - 2 Byte: Type / Lenth
  - 46-1500 Byte: Data
  - 4 Byte: FCS (Frame Check Sum): CRC (Cyclic Redundancy Check)

7.2 Ethernet MAC Address

- AA-AA-AA-BB-BB-BB
  - 6 Byte: OUI (Organizationally Unique Identifier)
  - 6 Byte: Vendor Asssigned
- MAC Addresses
  - Unicast
  - Broadcast: FF-FF-FF-FF-FF-FF
  - Multicast:
    - 01-00-5E- ... IPv4 Multicast
    - 33-33- ... IPv6-Multicast

7.3 The MAC Address Table

- Switch MAC Address Table: CAM (Content Addressable Memory)
- Switch speichert QuellMAC
- Switch leitet anhand von ZielMAC weiter
- 7.3.6: Activity – Switch It!

7.4 Switch Speeds and Forwarding Methods

- Switch Forwarding Methods
  - Store-and-forward switching
  - Cut-through switching
    - Fast-forward switching: nach 6 Byte
    - Fragment-free switching: nach 64 Byte

- Memory Buffering Methods
  - Port-based memory: queues linked to specific incoming and outgoing ports
  - Shared memory: dynamically allocated (besser!)
- Duplex autonegotiation
  - Full-duplex
  - Half-duplex
- Speed autonegotiation
- Auto-MDIX
  - Crossover
  - Straight through