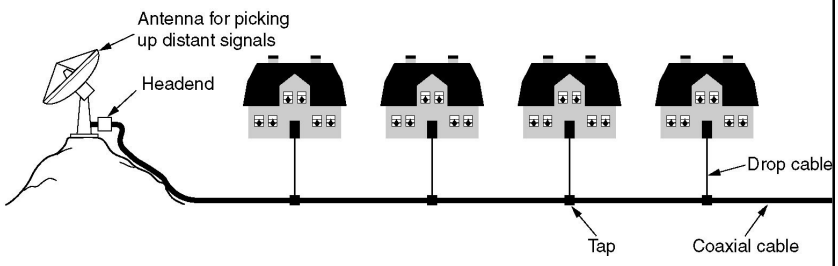
Cable Television

- Introduction
- Internet over cable
- Cable Modems
- Comparison

History

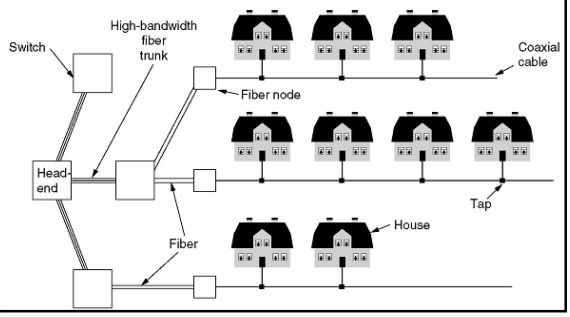
- Community Antennas to provide better reception to people living in rural or mountainous areas



- Cable only channels Time, Inc. launches Home Box Office (HBO) distributed only on cable
- Cable networks were formed and linked together to create a cable TV network.

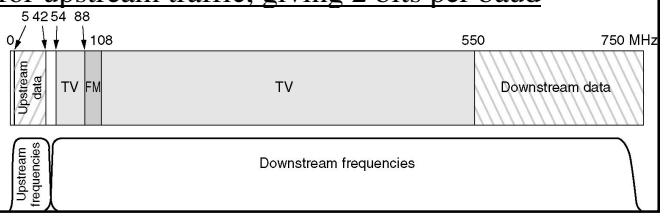
Internet over cable

- HFC Hybrid Fiber Coax
  - Fibre trunks offer a lot of bandwidth
  - Coaxial multidrop cables though, mean the available bandwidth has to be shared,
  - Switches must be changed to fit traffic in both directions, not only downstream



Spectrum Allocation

- Leave TV & Radio intact leaving two frequency ranges for data
- Asymmetric data: 5-42MHz upstream, 550-750 downstream
- Two amplifiers needed for upstream and downstream directions
- Transmission
  - QAM-64 / QAM-256 for each 6 MHz or 8MHz downstream channel
  - Payload, net payload (after overhead) 27 / 39 Mbps
  - QPSK for upstream traffic, giving 2 bits per baud

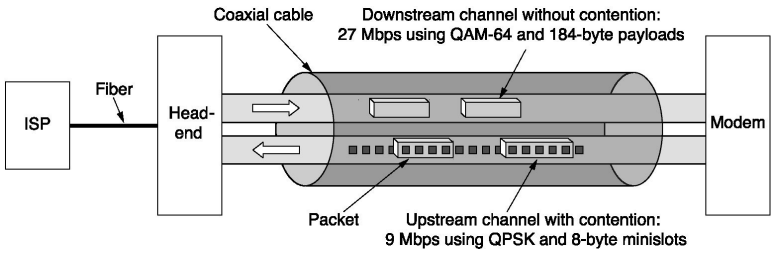


Cable Modems

- Interfaces
  - Modem-to-computer: 10Mbps ethernet
  - Modem-to-headend…
    - Always on: if the modem is on
    - Startup phase (when turned on):
      - System parameters determined from a frame regularly transmitted by the head end,
      - Channel assignments these are requested by the device and are assigned by the head end
      - Ranging: device needs to know the distance from the head end
      - IP address: is requested using DHCP
      - Security is established for the communication with encryption keys as all stations hear all the traffic on the coax

Cable Modems (2)

- Upstream payload
  - 8 byte minislots for requests for the number of minislots needed for the packet
  - Contention as requests are shared between stations
    - » Algorithm: slotted Aloha with binary exponential backoff
- Downstream payload no possibility of contention
  - 204 byte packets 184 bytes are user data
  - TDM Time Division Statistical Multiplexing algorithm



DSL vs. Cable

- Local wiring: Twisted Pair for DSL, Coaxial for Cable
- Bandwidth shared: Shared in Cable
- Service level: Specified for DSL, whereas for Cable it depends on the number of users
- Availability: Have to be close to end office to make use of DSL, for Cable distance is not an issue
- Security: DSL is more secure as is point-to-point
- Reliability: Telephone System is generally more reliable
- Choice: Most DSL providers allow choice of ISP. Not the case with cable operators