10BASE-T

- Star shaped physical topology
- Cheap twisted pair cables
- 2 UTP pairs, one Tx, one Rx
- Central *hub* or *multiport repeater*
- Hub-station link max 100m
- Optical fibre (10BASE-F) yields 500m
- 10 Mbps total bandwidth shared between all attached stations
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Switches vs Hubs

- Incoming packet is switched to correct port
- Hence full bandwidth is available between any pair of stations
- Several simultaneous transmissions @ full 10Mbps
- When do collisions occur ?
- Switch backplane bandwidth often several Gbps - expensive !

Fast Ethernet

- 100Mbps (need established around 1992)
- Possible solutions were
  - FDDI - expensive optical technology
  - ATM - widely used for WAN, slow standardisation
  - Fast Ethernet - existing standard, compatability

How can 100Mbps be achieved ?

- Increase signalling rate
  - Increase packet length ?
  - Reduce maximum propagation delay ?
- Hence maximum 100m cable run
- Hub or Switch implementation *only*
  - Hub mimics a shared bus
  - Switch forwards packet to correct ports
  - No multi drop cables -> higher signalling rate
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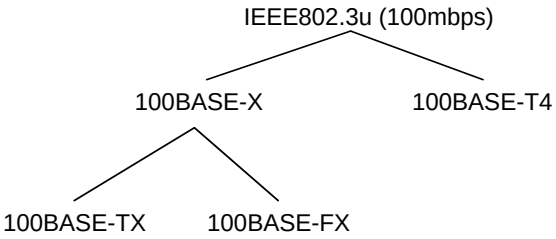
Physical specifications



- 100BASE-X uses 2 links Tx and Rx
  - 100BASE-TX
    - STP or UTP (cat 5) cable
  - 100BASE-FX
    - Twin optical fibres

Physical Specifications

- 100BASE-T4
  - 4pairs of category 3 UTP
  - Category 3 UTP supports max of 25Mbaud
  - Ternary signalling provides 33.3Mbps
  - So 3 of the 4 pairs provide 100Mbps
  - 1 pair used to signal collision detect
  - Half duplex (2 pairs act as Tx & Rx)

Gigabit Ethernet

- May 1996 - Gibabit Ethernet Alliance formed (11 companies)
- July 1997 IEEE Draft standard 802.3z, Aka 1000BASE-X
- Fibre physical channel
  - 1000BASE-SX up to 550m
  - 1000BASE-LX up to 3Km
  - 1000 BASE-CX STP up to 25m
- 1000 BASE-T under development
  - cat 5 UTP, 4 pairs up to 100m