Gigabit Ethernet

- Easy migration to higher speed networks, as opposed to ATM or FDDI (no translation)
- Cost is always the issue
- Support for new applications and new data demands
- Flexibility in network design
- MIB (SNMP) management is the same as 802.3

Migration Issues

- Frame formats
  - Same variable length (64 to 1514 byte) frames
  - Allows seamless integration
  - No frame translation necessary
  - Where to install the upgrade (desktop to switch to backbone) ?

Physical Layer

- 1000 Base-X based on **F**iber **C**hannel **P**hysical **L**ayer (FCPL)
  - Proven technology
  - 1000 Base-SX :- 850 nm laser multimode
  - 1000 Base-LX :- 1300 nm laser single and multimode laser
  - 1000 Base-CX copper Shielded Twisted Pair
  - table 1
- 1000 Base-T:- long haul 4 pair category 5 UTP cable (802.3ab task force)

MAC Layer - *Carrier Extension*

- Carrier Extension
  - 10 times faster than Fast Ethernet, 10m would be max slot size…. Problem
  - Slot size of 1512 bytes employed, with pads.
  - Carrier Extension allows longer distances
  - Transparent to LLC

Carrier Extension Diagram

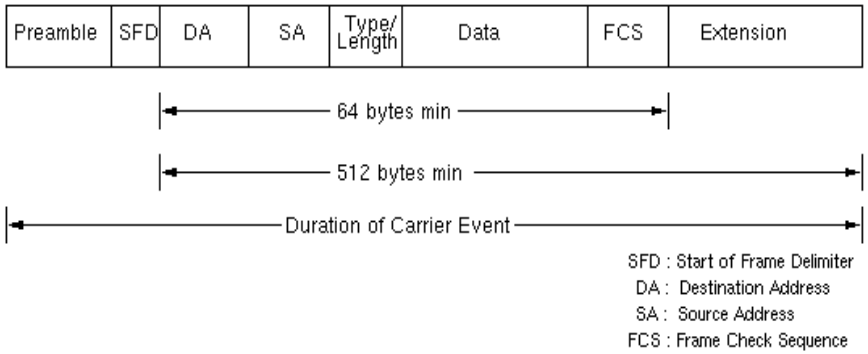

Fig 1. Ethernet Frame Format with Carrier Extension

MAC Layer - *Packet Bursting*

- Carrier extension wastes bandwidth, with 448 pad bytes in small packets.
- For small packets, throughput only marginally better than fast Ethernet, 802.3X…. Problem !
- Solution:- extend the Carrier Extension
  - Pad 1st packet to slot time (512 bytes), subsequent packets back to back with minimum inter-packet-gap until burst timer (1500 bytes) expires.

Packet Bursting Diagram

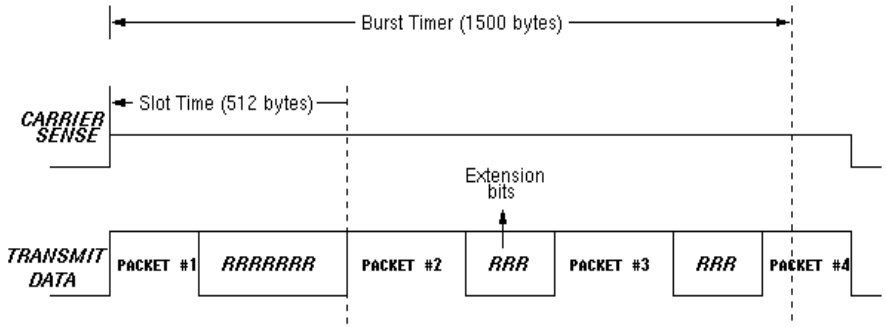

Fig. 2. Packet Bursting

Topologies

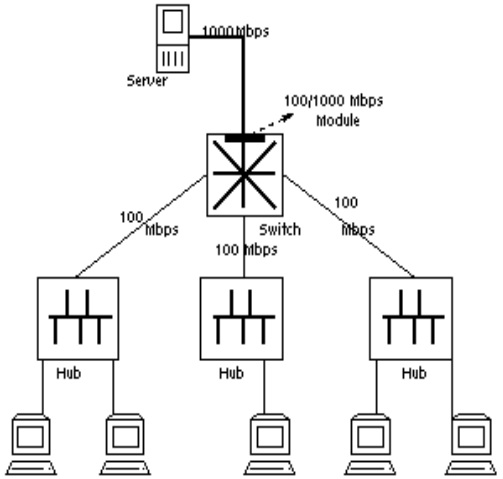

Fig. 5. Server-Switch Connection

Encapsulation and Protocol Hierarchies

- Higher layer entities build packets and provide these as a bit\byte stream to lower layer entities.
- Wrapping like Russian Dolls.