Lecture 12

Fibre Channel

There is always a need for greater speed in delivering data to the processor, for applications that involve graphics and video. This requirement involves two methods of data communications with the processor

1. I/O Channel
2. Network Communication

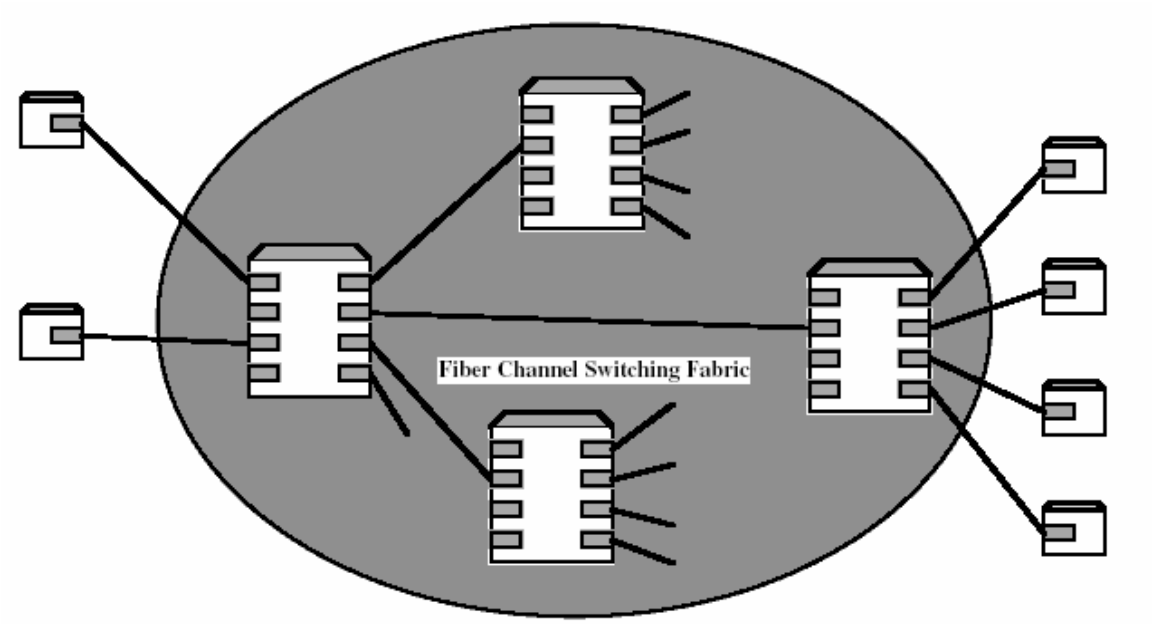
An I/O Channel is a direct point-to-point or multipoint communication link, inherently hardware based and designed for high speed over very short distances. The I/O channel transfers data between a buffer at the source device and a buffer at the destination device, moving only the user contents from one device to another.

A network is a collection of interconnected access points with a software protocol structure that enables communication.

Fibre channel is designed to combine the best features of both technologies, the simplicity and speed of channel communication with the flexibility and inter connectivity that characterize protocol based network communications.

Fibre Channel Elements

The key elements of Fibre channel network are the end systems, called nodes and the network itself, which consist of one or more switching elements. The collection of switching elements is called as fabric. These switching elements are connected by point-to-point links between ports on the individual nodes and switches. Communication consists of the transmission of frames across the point-to-point links as shown in figure below.



Each node includes one or more ports, called N_ports, for interconnection. Similarly each fabric-switching element includes multiple ports, called F-ports. Interconnection is by bidirectional links between ports. All routing of frames between N_ports is done through the fabric. There is no requirement of MAC algorithm for communication as fibre channel is based on either circuit switched or packet switched.

Fibre Channel Protocol Architecture

Fibre Channel Protocol Architecture consists of five layers. The layers are as follows

1. FC-0 Physical Media: Optical fiber is used for long distance applications.
   Coaxial Cable is used for high-speed over short distances.
   STP is used for lower speeds over short distances.
2. FC-1 Transmission Protocol: For transmission encoding is done, and the encoding technique is 8B/10B.
3. FC-2 Framing Protocol: Deal with flow control, error control, and framing.
4. FC-3 Common Services: Deals with multicasting.
5. FC-4 Mapping: Defines the mapping to achieve the compatibility with IEEE 802, ATM etc.