SDH/SONET

introduction to **SDH**

- The basis of Synchronous Digital Hierarchy (SDH) is synchronous multiplexing that is data from multiple tributary sources are byte interleaved.

- In SDH the multiplexed channels are in fixed locations relative to the framing byte.

- Demultiplexing is achieved by gating out the required bytes from the digital stream.

- This allows a single channel to be 'dropped' from the data stream without demultiplexing intermediate rates

SONET/SDH Architecture

- SONET devices: STS multiplexer/demultiplexer, regenerator, add/drop multiplexer, terminals
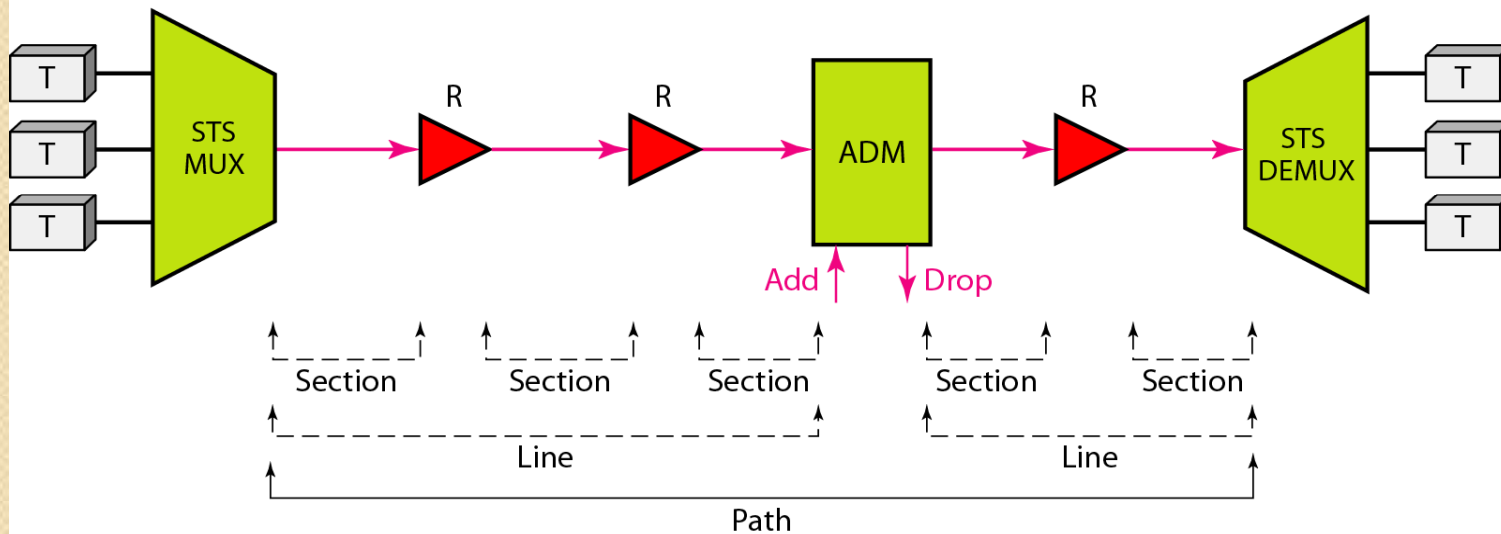
ADM: Add/drop multiplexer   R: Regenerator

STS MUX: Synchronous transport signal multiplexer   T: Terminal

STS DEMUX: Synchronous transport signal demultiplexer

SONET/SDH Architecture

- **Connections:** SONET devices are connected using *sections*, *lines*, and *paths*

- *Section:* optical link connecting two neighbor devices: mux to mux, mux to regenerator, or regenerator to regenerator

- *Lines:* portion of network between two multiplexers

- *Paths:* end-to-end portion of the network between two STS multiplexers

SONET Layers

- SONET defines four layers: path, line, section, and photonic

- Path layer is responsible for the movement of a signal from its optical source to its optical destination

- Line layers is for the movement of a signal across a physical line

- Section layer is for the movement of a signal across a physical section, handling framing, scrambling, and error control

- Photonic layer corresponds to the physical layer of OSI model

	Path layer
	Line layer
Data link	Section layer

Physical	Photonic layer
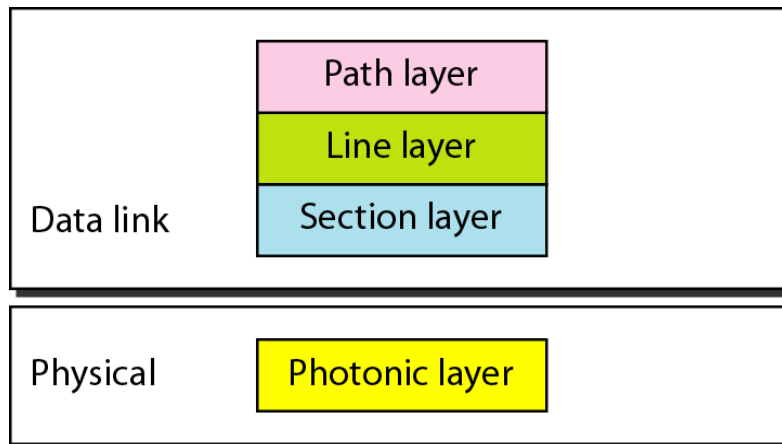
# Device-Layer Relationship in SONET
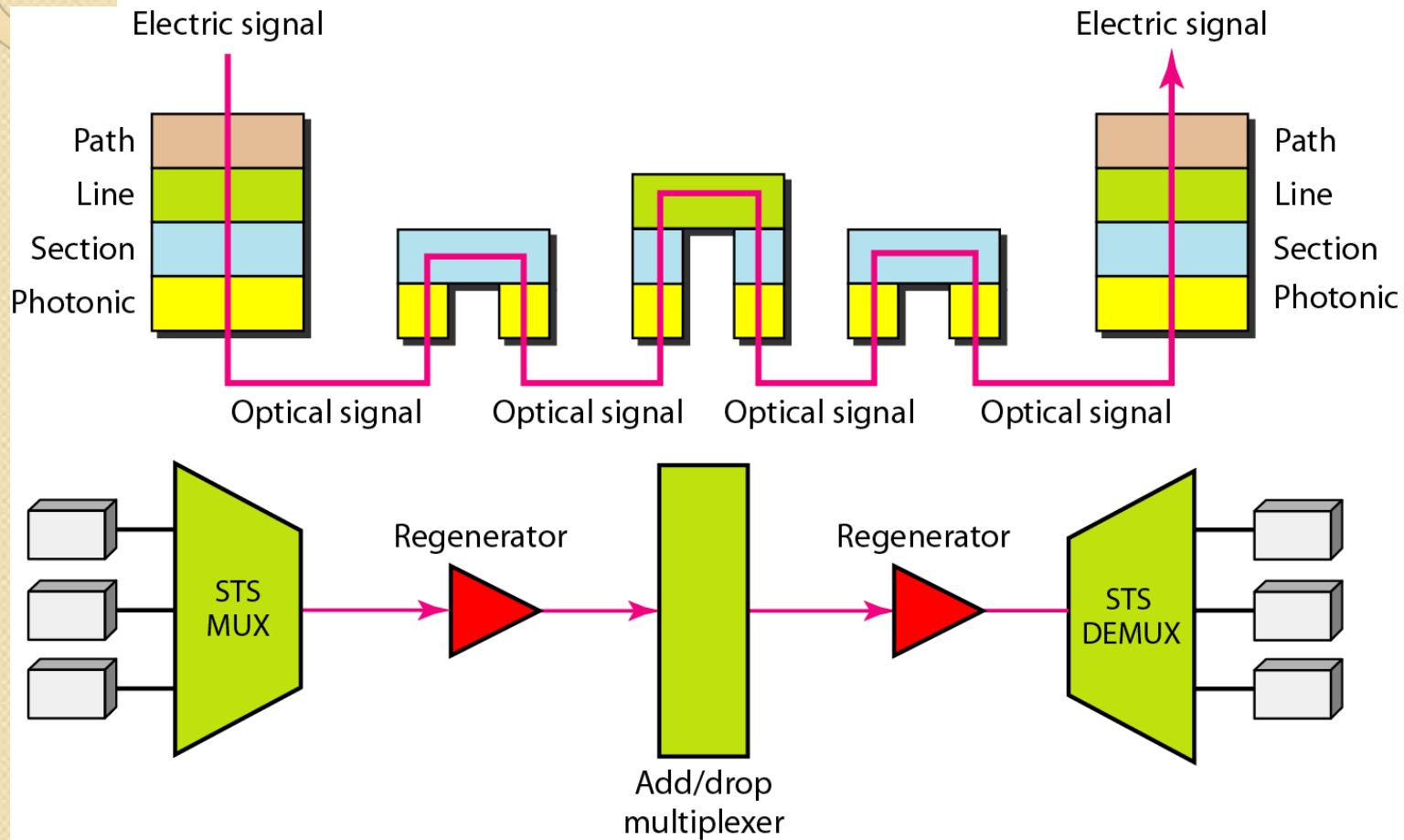
SONET/SDH

- Digital transmission standards for fiber-optic cable
- Independently developed in USA & Europe
  - ◦ SONET (Synchronous Optical Network) by ANSI
  - ◦ SDH (Synchronous Digital Hierarchy) by ITU-T
- Synchronous network using synchronous TDM multiplexing
- All clocks in the system are locked to a master clock
- It contains the standards for fiber-optic equipments
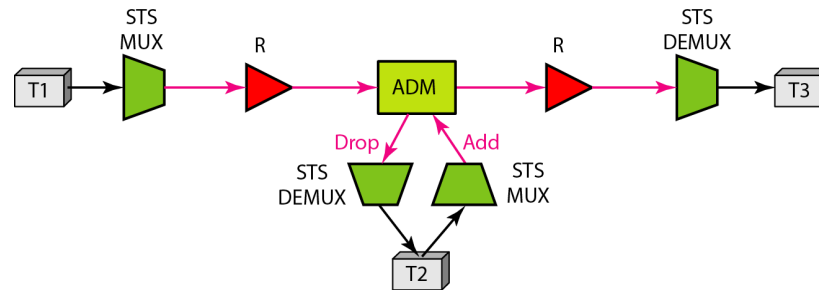- Very flexible to carry other transmission systems (DS-0, DS-1, etc)

SONET Network
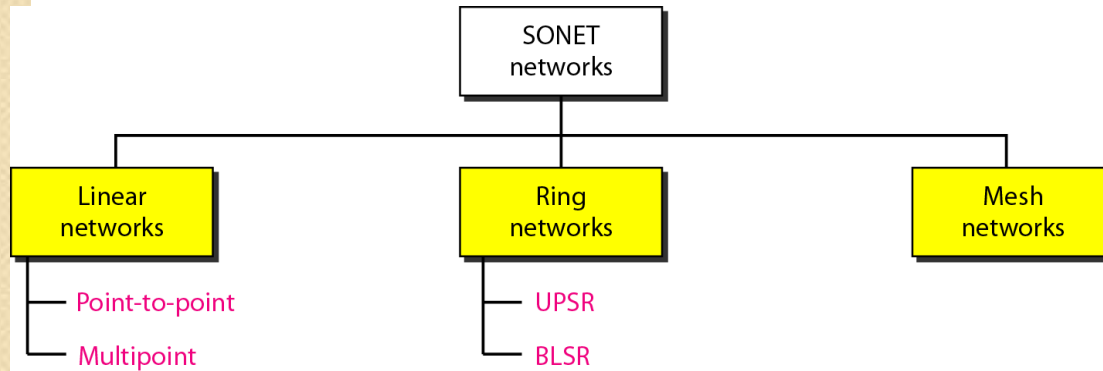
- Point-to-point network
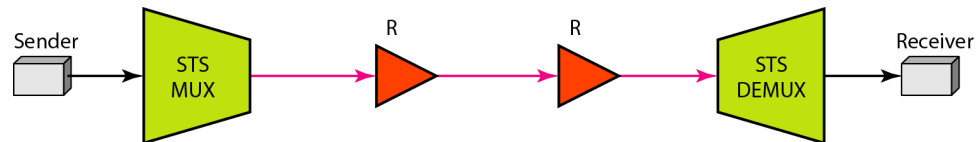
- Multipoint network

applications

- SONET is used for connecting different LANs using optical fiber
- To connect different campuses or buildings with optical fiber cables

Scope of research

- SONET based network architectures.

Assignment

- How multiplexing is done in SONET?
- Why don't we use Ethernet for long distance connection instead of SONET?