Protocol – There are certain rules that must be followed to ensure proper communication

- Node – It can be any network device (router, printer, camera)
- Host – It represents computer / work stations. (interface)
- Hub – Network device used to increase the reach-ability of signal re-generator it works in physical layer.

(a Switch without IP address is neither a node or a host)

Workstation – is a computer intended for individual use that is

faster than and more capable than a personal computer.

Types of Networks. –

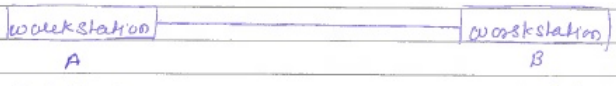
On the basis of transmission technology networks are classified into three categories.

1. Point-to-point 2. Multipoint 3. Broadcast n/w

Basic Concepts –

- Line configuration
- Topology
- Transmission mode
- categories of networks
- Internetwork

Line configuration – defines the attachment of communication devices to a link



point to point line configuration

Point-to-point provides a dedication link between two devices. (use an actual length of wire or cable) or microwave or satellite links are also possible

Multipoint (also called multidrop) line configuration is one in which more than two specific devices share a single link. (capacity of the channel is shared, either spatially or temporary)

Topology :— defines the physical or logical arrangement of links in a network.

Mesh	point-to-point	(n-1) dev i/o ports	n(n-1)/2 devices wise
Star	point-to-point	n i/o ports	n wire
Tree			
Ring	point-to-point	2n i/o ports	n wire
Bus — multipoint			

Q. The lucky Ducky corporation has a fully connected mesh network consisting of eight devices. Calculate the total number of cable links needed and the number of ports for each device. (mesh / star / ring)

Transmission Mode— refers to the direction of information flow between two devices.

• Simplex	unidirectional	key → TV Radio
• Half Duplex	direction of data at a time	walki-talkie internet browser cellphone
• Full Duplex	Direction of data all the time	two lane road

Compiled By — Ms. Nandini Sharma (Assistant Professor)

T
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Categories of Network –
LAN / MAN / WAN

Internetworks – two or more n/ws are connected.

Q In satellite communication, up-link frequency and down-link frequency are different, why?
Ans Interference can be avoided

Q. In a broad sense, a railway track is an example of
Ans Half duplex

Q The topology with highest reliability is – Mesh.

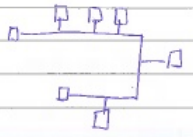
Q. The method of communication in which transmission takes place in both directions, but only one direction at a time is called – Half duplex

Q Security and privacy are less of an issue for devices in a which topology? Bus
bus

Q A cable break in a which topology stops all transmission

Q. In a mesh topology, the relationship b/w one device and another is peer-to-peer

Q. A network that contains multiple hubs is most likely configured in a Tree

Q 

Q Assume six devices are arranged in a mesh topology? How many cables are needed? How many ports are needed for each device?

Layered Architecture —

Established in 1947, the International standards Organization (ISO) is a multinational body dedicated to worldwide agreement on international standards. An ISO standard that covers all aspects of network communications is the open system Interconnection model (OSI).

The purpose of the OSI model is to open communication between different systems without requiring changes to the logic of the underlying Hardware & Software. It is not a protocol, it is a model for understanding and designing a network architecture that is flexible, robust and interoperable.

Mnemonic —

Please Do Not Throw Steve's Pet Alligator

Peer-to-peer process — Between machines, layer x on one machine communicates with layer x another machine. This communication is governed by an agreed-upon series of rules & conventions called protocols. The processes on each machine that communicate at a given layer are called peer-to-peer processes.

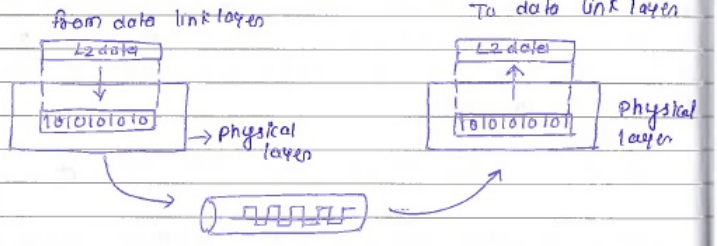
Interfaces between layers — Each interface defines what information ~~and~~ ~~is~~ ~~interfaces~~ ~~b/w~~ & services a layer must provide for the layer above it.

Organizations of layers — Layers 1, Layers 2 and Layers 3 are the network support layers. They deal with the physical aspects of moving data from one device to another.

Layers 5, 6 and 7 can be thought of as the user support layers, they allow interoperability among unrelated software systems.

functions of the layers —

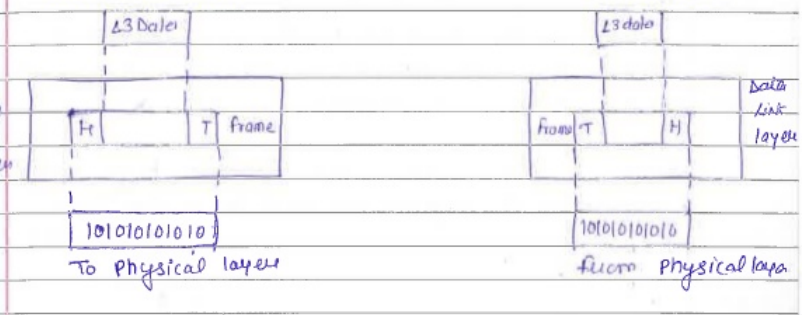
1. Physical layer - coordinates the functions required to transmit a bit stream over a physical medium. It deals with the mechanical & electrical specifications of the interface & transmission medium.



1. It defines the characteristics of the interface b/w the devices and the transmission medium.
2. It consist data, in a stream of bits without any interpretation.
3. Data rate - the number of bits sent each second.
4. Synchronization - The sender & receiver must be synchronized at the bit level.
5. Line configuration.
6. Physical Topology
7. Transmission mode.

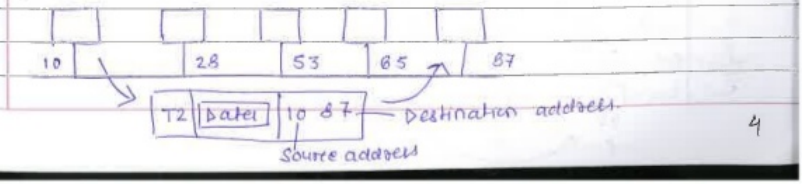
Data Link layer - transforms the physical layer, a raw transmission facility, to a reliable link and is responsible for node-to-node

delivery, it makes the physical layer appear error free to the upper layer.



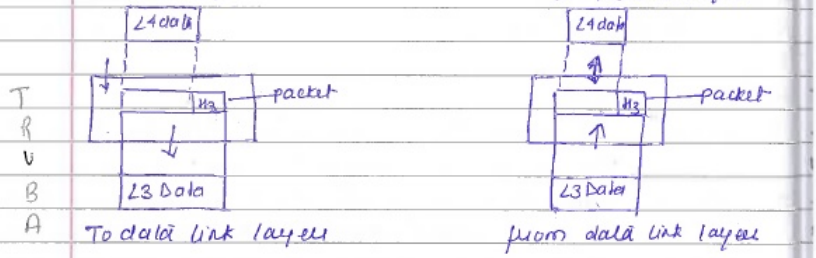
Responsibilities —

1. Framing - It (DLL) divides the stream of bit received from the n/w layer into manageable data units called frame.
2. Physical addressing - If frames are to be distributed to different systems on the n/w, the DLL adds a header to the frame to define the physical address of the sender and/or receiver of the frame.
3. Flow control :- DLL imposes a flow control mechanism to prevent overwhelming the receiver.
4. Error control :- It is normally achieved through a trailer added to the end of the frame.
5. Access control :- When two or more devices are connected to the same link, DLL protocols are necessary to determine which device has control over the link at any given time.



Network layer :- It is responsible for the source-to-destination delivery of a packet possibly across multiple n/w (links). Whereas the data link layer oversees the delivery of the packet b/w two systems on the same n/w (links), the n/w layer ensures that each ~~pack~~ packet get from its point of origin to its final destination.

Note - If two systems are connected to the same link, there is usually no need for a n/w layer.



Responsibilities -

1. Logical addressing - If a packet passes the n/w boundary, we need another addressing system to help distinguish the source & destination systems.
2. Routing :- When independent n/w or links are connected together to create an internetwork or a large n/w.