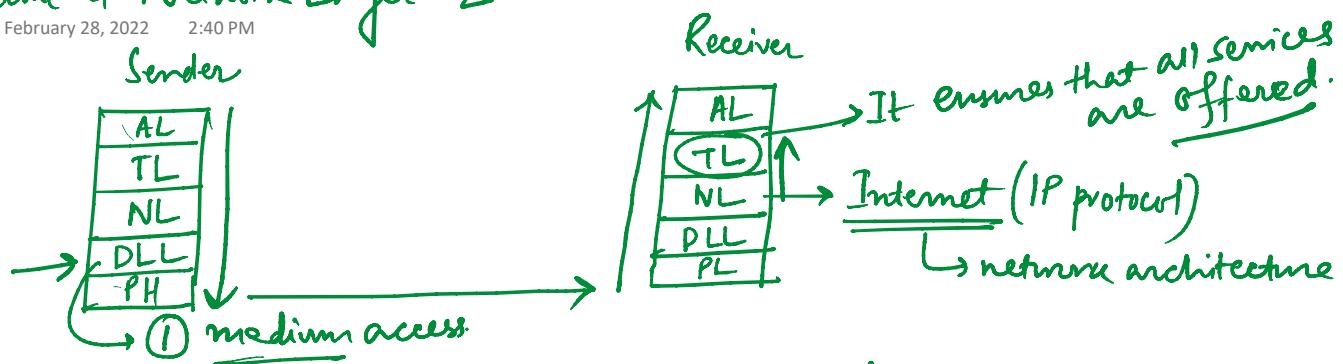


Module-4: Network Layer - 2

Monday, February 28, 2022 2:40 PM



Properties of Asynchronous Transfer Mode (ATM)

- a telecommunication standard for digital transmission of multi-modal data (voice, video, text, image, etc.) in one network without the use of separate overlay networks.
- can handle both traditional high-throughput data traffic and real-time, low-latency contents such as voice and video.
- uses asynchronous time-division multiplexing, and encodes data into small, fixed-sized network packets, called cells.
- uses a connection-oriented model in which a virtual circuit must be established between two end systems before the data exchange begins.

Virtual Circuit (VC) set up:

- ① Sending TL contacts the NL, specifies the receiver's address.
- ② TL waits for the network to set up the VC.
- ③ NL determines the path b/w sender and receiver
 - ↳ series of links and routers through which all packets in the VC will travel.

- ④ NL determines the VC number for each link along the path.
- ⑤ NL adds an entry in the forwarding table of each router along the path.
- ⑥ NL may also reserve bandwidth along the path of the VC.

Data transfer: Once the VC has been established, packets can begin to flow along the VC.

VC teardown:

- ① Sender/Receiver informs the NL of its desire to terminate the VC.
- ② NL informs the end-system on the other side of the network of connection-termination and updates the forwarding tables in each of the routers on the path to indicate that the VC does not exist.

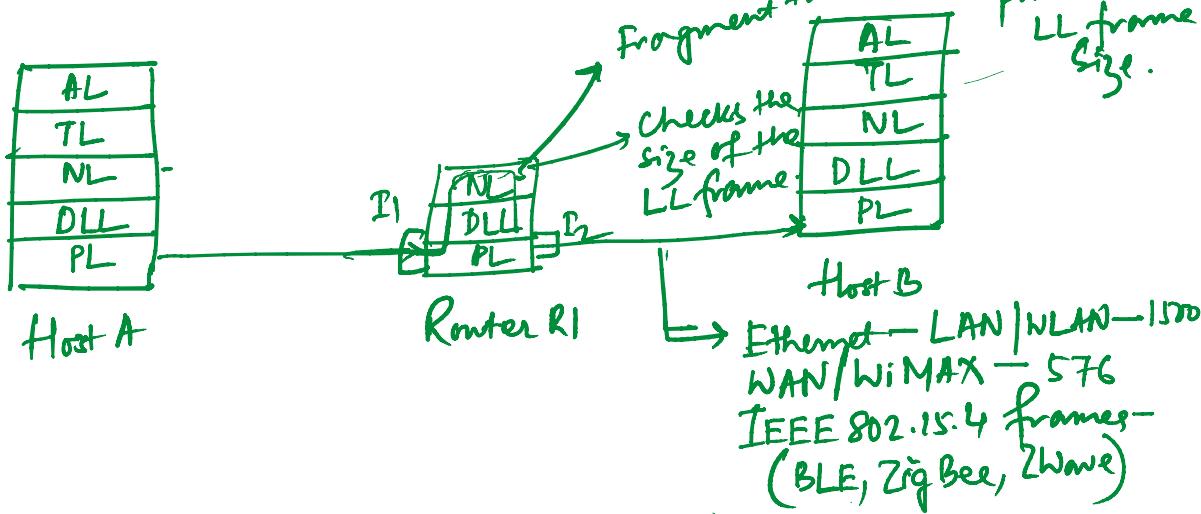
Longest Prefix Matching Rule

- Brute-force implementation: Forwarding table would have one entry for every possible destination address.
- This option is infeasible as there are more than 4 billion possible addresses.

- Two or more possible addresses.
- Suppose the router has four links, numbered 0 through 3, and the packets to be forwarded to the link interface as follows:

IPv4 Datagram Fields

- ① Type of Service: useful to distinguish real-time datagrams (such as those used by an IP telephony application) from non-real time datagrams (such as, email).



- ② Time-to-live: The time-to-live (TTL) field is included to ensure that the datagrams do not circulate forever in the network.

- ③ Protocol: Analogous to the role of the port number field in the transport layer segment — protocol number binds the NL and TL together — similar to port number that binds the TL and AL together.

Size of an IP datagram = 20 bytes of IP header (w/o options) +
(using TCP)
20 bytes of TCP Segment +
application message.