## Store-and-Forward Packet Switching - 1

- All PSDNs, WANs and FR operate in "store and forward" mode:
- Packet stored at a node and transmitted to next node.
- Next node receives it completely in a buffer.
- Routing decision selects outgoing link to "forward" it toward its final destination.
- Steps above repeated until packet fully received at destination node.
- FR node involves much less processing per frame than PSDN node but still operates in store and forward mode.

Note:FR=FrameRelay!

## Store-and-Forward Timing - 1



TransP = Length of packet (bits) / (Link transmission rate (bits/s))

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Store and Forward Timing - 2

- Timing diagram for simple store and forward: Minimum times required to transfer a single packet from Node 1 to Node 4 in the absence of errors and with no waiting at the node for frames from other sources.
- Transmission delay of a packet:
- TransP = Length of packet (bits) / (Link transmission rate (bits/ s))
- Different links may have different transmission rates.
- Propagation delay depends only on length of link.
- Processing delay depends on node but is often small compared with other delays.
- Scale of delays shown is arbitrary; nodal delays may exceed transmission delays.



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## Effects of Packet Size - 2

- Figure shows file transfer from Station X to Station Y through intermediate store-and-forward nodes a and b. (Based on Stallings fig 8.2).
- Effect of length of packets on file transfer delay (S fig 8.2):
- Segmentation into smaller packets shortens delay up to a point by reducing the store and forward delay at each node.
- But cause extra overhead in packet headers and in processing requirements at nodes which may increase processing delays .
- Every LAN or FR network or PSDN has its own maximum packet size.

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