

Course Name: A Level (2nd Sem)

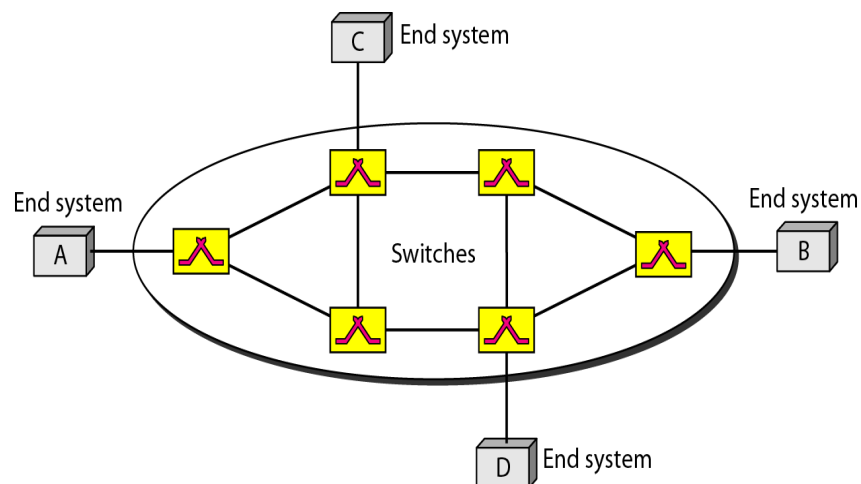
Subject: DCN

Topic: Switching Techniques contd.

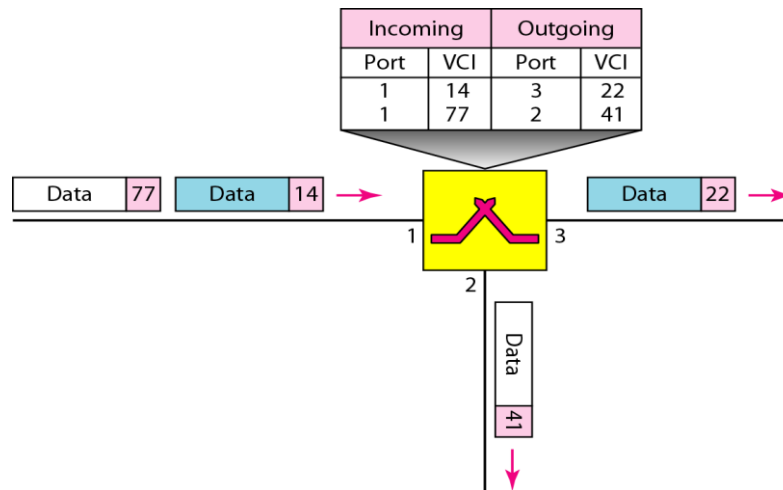
Date: 25-03-20

Virtual-Circuit Network:

- A virtual-circuit network is a cross between a circuit-switched network and a datagram network. It has some characteristics of both.
- As in a circuit-switched network, there are setup and teardown phases in addition to the data transfer phase.
- Resources can be allocated during the setup phase, as in a circuit-switched network, or on demand, as in a datagram network.
- Networks route the first packet based on the datagram address idea, but then create a virtual circuit network for rest of the packets coming from the same source and going to the same destination.
- A virtual-circuit network is normally implemented in the data link layer (while a circuit-switched network is implemented in the physical layer and a datagram network in the network layer).
- Figure shows an example of a virtual-circuit network. The network has switches that allow traffic from sources to destinations. A source or destination can be a computer, packet switch, bridge, or any other device that connects other networks.



- The identifier that is actually used for data transfer is called the virtual-circuit identifier (VCI). A VCI is a small number that has only switch scope; it is used by a frame between two switches (as shown in the figure below).



Performance:

- In virtual-circuit switching, all packets belonging to the same source and destination travel the same path; the delay for each packet is the same during setup phase but the packets may arrive at the destination with different delays if resource allocation is on demand.
- Also, in a virtual-circuit network even if resource allocation is on demand. The source can check the availability of the resources, without actually reserving it.

Example:

- Switching at the data link layer in a switched WAN (such as Frame Relay and ATM networks) is implemented by using virtual-circuit techniques.

Exercises:

1. "A virtual-circuit network is a cross between a circuit-switched network and a datagram network." Justify the comment.
2. What is the role of the address field in a data travelling through a virtual-circuit network?