NETWORK-LAYER SERVICES

Unit-III

Lecture -1

Session Objectives

- Studying the services of network layer

Session Outcomes

At the end of this session, participants will be able to

- Discuss the packetizing, routing and forwarding

Agenda

Presentation Outline

Packetizing

- Encapsulating the payload in a network-layer packet at the source and decapsulating the payload from the network-layer packet at the destination.
- Source host receives the payload from an upper-layer protocol, adds a header that contains the source and destination addresses
- Destination host receives the network-layer packet from its data-link layer, decapsulates the packet, and delivers the payload to the corresponding upper-layer protocol.
- If the packet is fragmented at the source or at routers along the path, the network layer is responsible for waiting until all fragments arrive, reassembling them

Packetizing

- The routers in the path are not allowed to decapsulate the packets they received unless the packets need to be fragmented.
- The routers are not allowed to change source and destination addresses either.
- They just inspect the addresses for the purpose of forwarding the packet to the next network on the path.
- However, if a packet is fragmented, the header needs to be copied to all fragments

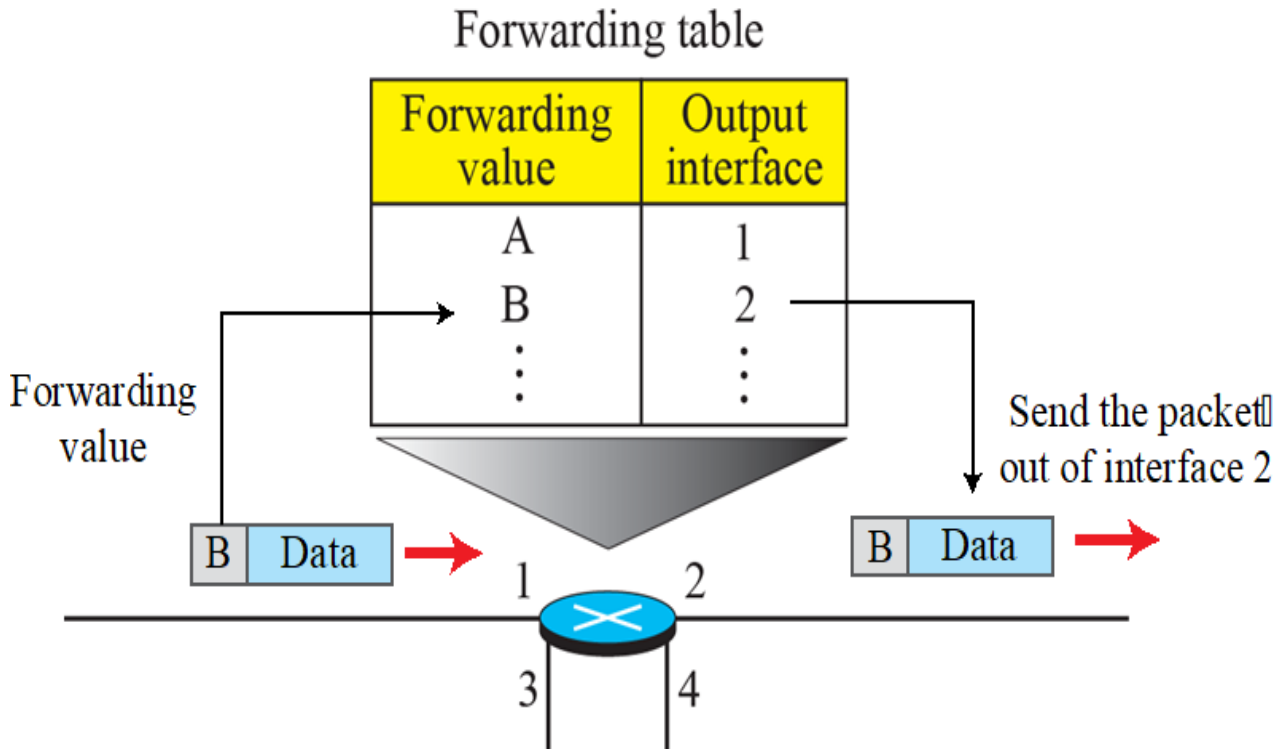
Presentation Outline

Routing

- Network layer is responsible for routing the packet
- There is more than one route from the source to the destination.
- The network layer is responsible for finding the best one among these possible routes
- Needs to have some specific strategies for defining the best route

Forwarding

- The action applied by each router when a packet arrives at one of its interfaces
- Uses a forwarding table / routing table.
- The router uses the the destination address or a label, to find the corresponding output interface number in the forwarding table



Presentation Outline

Error Control, Flow Control

- Network layer in the Internet does not directly provide error control, the Internet uses an auxiliary protocol, ICMP

Flow Control

- Regulates the amount of data a source can send without overwhelming the receiver.
- To control the flow of data, the receiver needs to send some feedback to the sender
- The network layer in the Internet, however, does not directly provide any flow control.
- Provided for most of the upper-layer protocols

Congestion Control

- A situation in which too many datagrams are present in an area of the Internet.
- May occur if the number of datagrams sent by source computers is beyond the capacity of the network or routers
- The system will collapse and no datagrams are delivered.
- Not implemented in the Internet.

Summary

Discussed about

- Packetizing, Routing
- Error and flow control
- Congestion Control
- Forwarding

Test your Understanding

- The network layer is concerned with of data.
  a) bits
  b) frames
  c) packets
  d) bytes
- The network layer protocol for internet is
  a) ethernet
  b) internet protocol
  c) hypertext transfer protocol
  d) file transfer protocol
- Congestion is ——————
- ——————Regulates the amount of data a source can send