PRESENTATION ON ROUTING ALGORITHM

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AGENDA :-

- Routing protocols
- Routing issues
- Routing algorithm
  - Fixed path routing
  - Shortest path routing
  - Flooding
  - Distance vector routing
  - Link state routing

ROUTING PROTOCOL

- Allows the router to communicate with others router by updating and maintaining routing table

POPULAR ROUTING PROTOCALS ARE:

- ✓ Routing information protocol(RIP)
- ✓ Open Shortest Path First
- ✓ Interior Gateway Routing Protocol (IGRP)

ROUTING ISSUES

I. Scalability:-Able to support large number of hosts, routers and networks.
II. Adaptability:-adapt change in topology/ significant change in traffic quickly and efficiently.
III. Automated:-automated as possible little or no human intervention.

Routing algorithm

- Process of selecting best paths in a network.
- Task of selecting a path for transport of the packet across the network
- Most important function of network layer
- Function to choose best suitable shortest path.

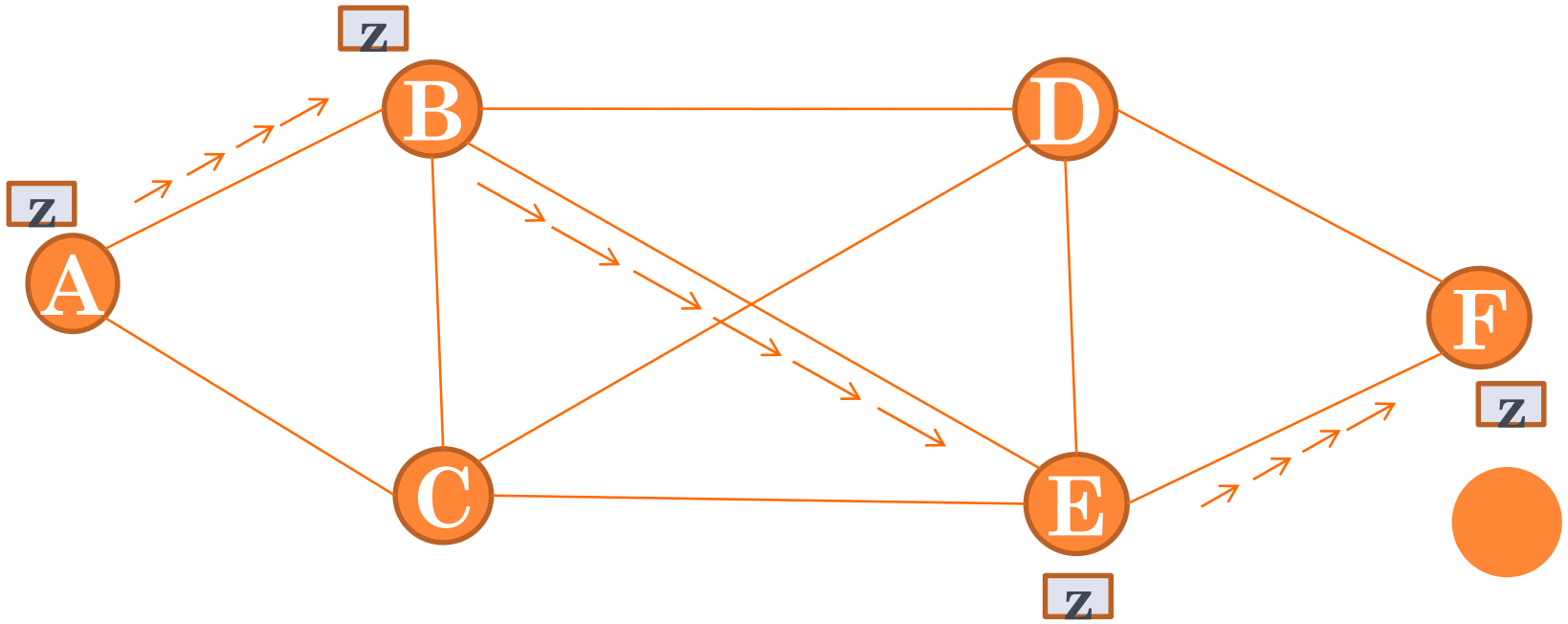
Different algorithm are used to route the packets such as:

ROUTING ALGORITHMS

- FIXED PATH ROUTING
- SHORTEST PATH ROUTING
- FLOODING
- DISTANCE VECTOR ROUTING
- LINK STATE ROUTING

Fixed Path Routing

- The network layer maintains a routing table that lists for each possible destination network.



FIXED PATH ROUTING

- **ADVANTAGE**
  - **Simple and work well in a reliable network in a stable load.**
- **Disadvantages**
  - **Lack of Flexibility.**
  - **Doesn't react with network Failures.**

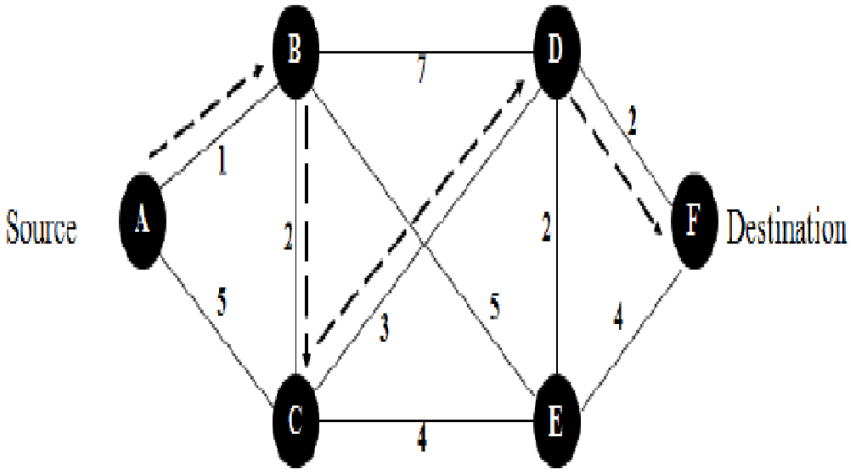
SHORTEST PATH ROUTING

- process of finding paths through a network that have a minimum of distance or other cost metric.

- Shortest path is found by counting the number of hops Or by using Dijkstra Algorithm.

PROCESS OF FINDING SHORTEST PATH

- Initially no path is known.
- All nodes are labelled infinity.
- As packets are sent, the labels change reflecting the distance or better path
- Label may be temporary or permanent
- When packets are to be routed, label is used to kno the distance.
- Hourly tests are performed to find to update the label



FLOODING

- simple routing technique, source or node sends packets through every outgoing link.
- When a packet is received,
- the routers send it to all the interfaces except the one on which it was received.
- creates too much burden on the network and lots of duplicate packets wandering in the network.

MERITS

- all possible routes are active so could be used to send emergency message.
- all nodes are visited by the data packets so useful to distribute information.
- At least one copy of packet will arrive at the destination

DEMERITS

- High traffic load generates at the node
- Congestion problem is frequently occur
- Changes of duplicate message deliver at the destination.

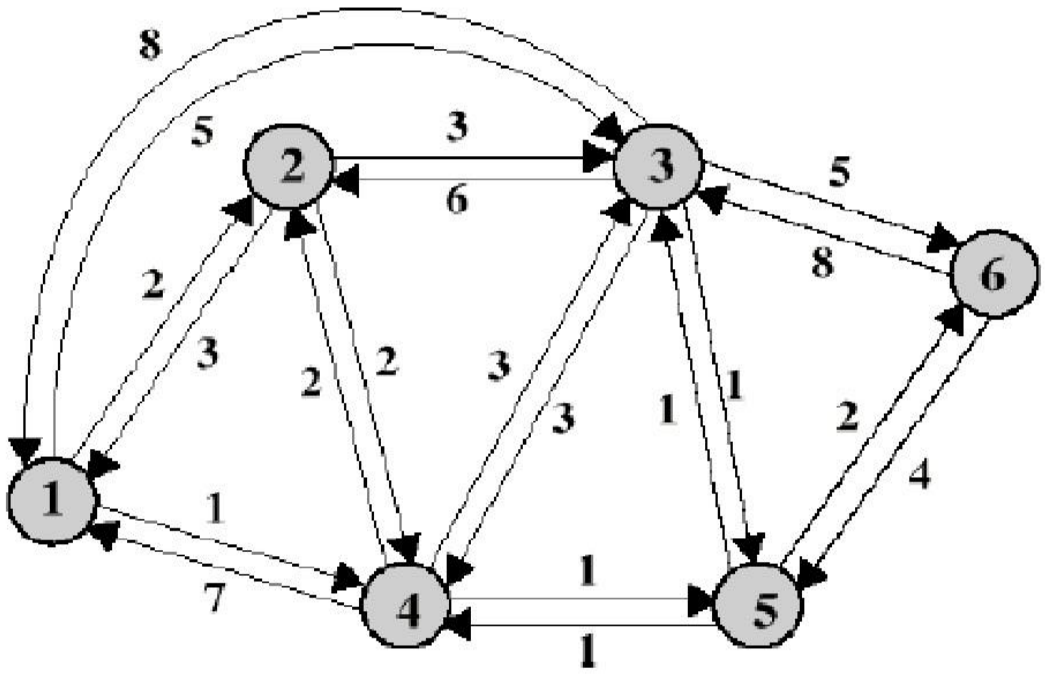


FIG: FLOODING

DISTANCE VECTOR ROUTING

- Distance means routing metric, vector means destination.

- RIP is an example of DVR
- Completely decentralized

- No node has complete information about the costs of all network links

- Gradual calculation of path by exchanging information with neighbors

LINK STATE ROUTING

- **Learning about the neighbors:**
- It discover its neighbors and learn their network addresses.
- It sends Hello packet on each point-to-point line.
- Router on other end expected to send back reply.
- **Measuring line cost:**
- Measure the delay or cost to each of its neighbors.
- Send echo packets
- By measuring round trip & dividing it by 2.
- Router can get reasonable estimated of delay

- **Link state packets:**
- Construct a packet telling all it has just learned.
- Packets are made with identity of sender & list of neighbors.
- **Disturbing the link state packets:**
- Send the packets to all other routers.
- **Computing the new Routes:**
- Compute the shortest path to every other router.
- Dijkstra's algorithm can be run locally to construct the shortest path to destination.

LINK STATE ALGORITHM PROCEDURE

- Send update only when a network change
- Device that detect the change generate LSA.
- LSA is transmitted to all neighbours device
- Link state routing find the best path by using Dijksta's algorithm .

Reference

- Handouts
- Wikipedia
- Rasbin
- Google
- YouTube

Thank you