CSE and EE 461
Lecture 20

Summer Quarter 1998

Multicast Routing

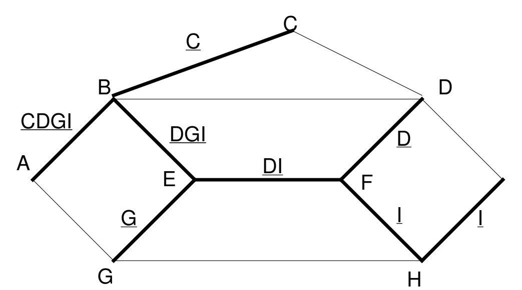
- Point-to-point - send to a specific host
- Broadcast - send to all hosts on the network
- Multicast - send to a specific subset of hosts
- Multicast is growing in demand
  - Distance learning
  - Teleconferencing
  - Entertainment
- Implemented in the Internet
  - Mbone (Multicast Backbone)
  - Microsoft Netshow

Broadcasting Algorithms

- Point-to-point to every host
- Flooding
- Multidestination routing - each packet contains a list of destinations
- Spanning tree routing - each router knows a spanning tree of the network and uses it for broadcasting.
- Reverse path forwarding - each router knows the source of the broadcast and uses that information to forward a broadcast packet.

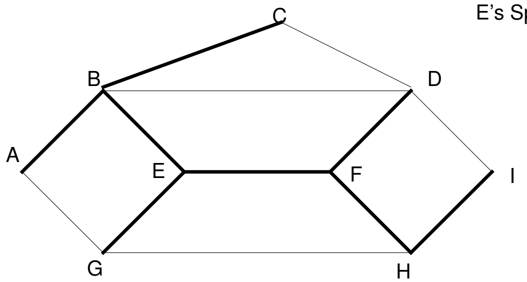
Multidestination Routing

- Can be used for broadcast or multicast



Spanning Tree Broadcast

- Spanning tree in a n node network has n-1 edges and no cycles
- If a broadcast packet arrives from X to Y, then Y sends it to all its neighbors in the spanning tree except X.

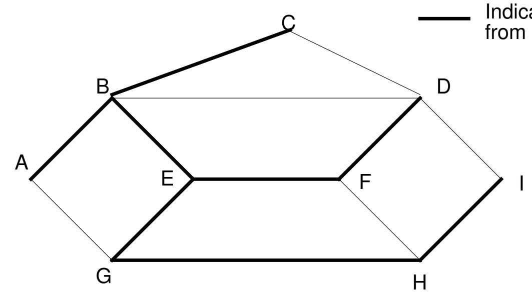


E's Spanning tree table

B G F

Reverse Path Routing

- If a broadcast packet from source X arrives at a router Y from router Z and Z is the next hop on Y's routing table for destination X, then send the broadcast packet to all neighbors of Y except Z.



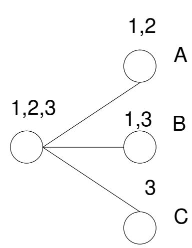
Indicates shortest path from node to A

Multicasting

- A single source with multiple destinations.
- Multicast packet contains source address plus group multicast address.
- Multicast routing table contains information about how to route multicast packets
- Note the resemblance of the multicast routing table an a virtural circuit table. Multicast tables give the opportunity for QoS.

Multicast routing table

group address	next hop
1	A, B
2	A
3	B, C



Multicast Groups

- A source and a set of destinations form a group.
- Construct a spanning tree that contains the source and all the destinations.
- All the routers in the spanning tree must have a multicast routing table entry for this group.

multicast routing tree