**Multicast Routing**

Unicast: one source to one destination

Multicast: one or more sources to many destinations (so you don’t have to send an individual message to each destination)

Main Functions:

- Efficient data distribution
- Logical naming of a group

**Multicasting**

Multiplayer games

Group skype chats

Based on many-to-many model with “multicast groups”

- Each group has its own IP multicast address
- Hosts receive copies of any packets sent to that group’s multicast address
- Someone sending a message will send one packet to the multicast address, which will then distribute to all the members of the group
- It is the responsibility of the routers to make sure the message reaches all the members

It is possible to have one-to-many multicasting (Source Specific Multicast) as opposed to ASM (Any Source Multicast)

- The receiving hosts specify both a multicast group and a specific sending host.

A host joins a multicast group by sending a special protocol to its local router.

- The router must create multicast forwarding tables, which have links for forwarding multicast packets. It is made up of a set of distribution trees.

- Groups may be of any size, and members could be anywhere on the internet
- Members can join and leave any group at will
- A multicast address is defined by 224.0.0.0/4 in IPv4
  - Well known addresses are assigned by IANA/ICANN, all others are assigned and reclaimed dynamically

Routers must report their multicast group membership to all neighboring routers, so the trees can be constructed (protocol is called IGMP). Operates over LANs and point-to-point links. (Query interval is 60-90 seconds).
Host starts random timers between 0 and 10 seconds for each multicast group they belong to. When this timer expires, a membership report is sent to the group. Other members of said group get the report and stop their timers for the group. Thus, the routers will hear all the reports and can time-out groups that aren’t responding.

Two ways to build the routing trees:

1) Flood the whole network with packets, and trim off all the routers that don’t respond
2) Build the tree from the ground up by sending requests to nearby routers, who advertise to the network and compute the trees on demand

**With Unicasting**

-you have to send a separate packet with the exact same data to each member of a group, which uses more bandwidth

-Server must keep track of the IP addresses of each of the members, and the group may be changing constantly