CS551
Single Source Multicast
[Holbrook99a]

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Key Ideas

- Use channels: a single sender, many subscribes
  - makes multicast tree easier to configure
  - easier to tell who can send

- Add mechanism to let you count

- Easier to think about billing

- Goal: define a simpler model
Multicast Problems

- Need billing mechanism
  - need to know number of subscribers

- Need access control
  - need to limit who can send and subscribe
  - ISPs concerned about multicast

- IPv4 multicast addresses too limited

- Current protocols too complex
Changing the Service Model

What we’ve discussed so far
- Any source multicast

Problems:
- How do you charge users?
- How do you manage the bandwidth allocation?
- How can you ensure secure communication?
- All of these are still research topics

Other problems
- Multicast state aggregation

Is there a simpler alternative we can deploy now?
Single Source Multicast

- ISP acceptance will be higher
  - If the multicast service model restricted the senders
  - If there was a way to figure out how many receivers there were

- They can then have a viable billing and accounting model

- Simplest such scheme
  - Single-source per multicast group
  - Receivers can still join and leave at will
All addresses are source specific
- \(2^{24}\) channels (232.*.*.* reserved by IANA) per source
  - \(2^{32}\) sources
- a group in SSM is denoted by (S,G)
  - S is the source’s address
  - G is the group identifier
- address allocation -- no problem (unlike for any-source multicast, G doesn’t have to be globally unique)

Access control
- only source can send
- channels optionally protected by "key" (really just a secret)

sub-cast support (encapsulate packet to any router on the tree, if you know who they are)

Best-effort counting service
SSM Details

 Receiver specifies that it wants to join source S on group G
  - But this is already being designed in IGMP v3!

 Routers send source-specific joins towards S
  - But PIM-SM already does this!

 Only source S allowed to send traffic to group G
  - Routers silently drop other traffic if there is no state

 Note that we don’t need a special inter-domain multicast routing protocol!
Express Components

ECMP: Express Count Management Protocol
- like IGMP, but also adds *count* support
- counts used to determine receivers or for other things like voting
  - not clear how general this is

Session relays
- service at source that can relay data on to tree (similar to PIM tunneling)
Observations

- Simpler indeed
- Enough to justify multicast to ISPs? (not clear)
- SSM Status
  - currently being standardized and is partially deployed
  - so, if 90% of multicast applications can use SSM, and the rest need MSDP
  - do we need anything more for Internet multicast?