

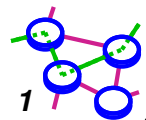
CS551

Single Source Multicast

[Holbrook99a]

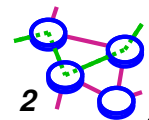
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<http://merlot.usc.edu/cs551-f12>



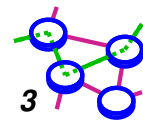
Key Ideas

- ➔ **Use channels: a single sender, many subscribers**
 - ▬ 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**



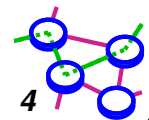
Changing the Service Model

- ➔ **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?**

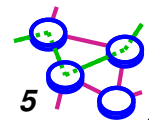


Single Source Multicast

- ➔ **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**



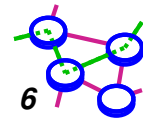
Single Source Multicast (Cont...)

- ➔ **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)

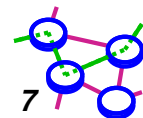
- ➔ **sub-cast support (encapsulate packet to any router on the tree, if you know who they are)**

- ➔ **Best-effort routing service**



SSM Details

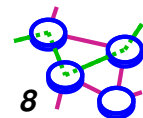
- ➔ Receiver specifies that it wants to join source S on group G
 - ▬ But this is already being designed in IGMP v3!
- ➔ Routers send source-specific joins towards S
 - ▬ But PIM-SM already does this!
- ➔ Only source S allowed to send traffic to group G
 - ▬ Routers silently drop other traffic if there 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?**

