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


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

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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?

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


Single Source Multicast (Cont...)

- ↳ All addresses are source specific
 - = 2²⁴ channels (232... reserved by IANA) per source
 - = 2³² 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

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CS551

Single Source Multicast


[Holbrook99a]

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

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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

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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


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Express Components

- ECMP: Express Count Management Protocol
 - like IGMF, 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)

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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?

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SSM Details

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

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