Support for Hierarchically Encoded Flows

- or "Mutliple multicast groups vs RSVP filers"

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What Is the Question?

How to support layer-encoded flows

- **In the original design, RSVP uses packet filters to separate substreams**
  – Substreams with reservations treated properly
  – Others without reservations?? "Not an RSVP concern"
- **Van et al suggested to use multiple mcast groups (MMG), one group for each substream**
  – (I dropped the words "so you can get rid of filters...")

What's Bad about MMG

If substreams follow different mcast trees

- **Possible to see substantial delay jitters that last forever**
- **Possible to see higher loss rate for high priority packets while lower loss rate for low priority packets**

These undesired behavior can be eliminated, or reduced, if multicast routing can, or try hard to, route all substreams over the same multicast tree

Also increased overhead in mcast routing but others have told me not to worry

What's Good about MMG

1. Convenient constraint on bw selection

- **Prevent naive users from making silly bandwidth requests**
- **Simplify reservation merging**
  – **Receivers choose their bw usage by deciding which mcast group(s) to join**
  – **To merge reservations for each substream, now only need to compare delay**

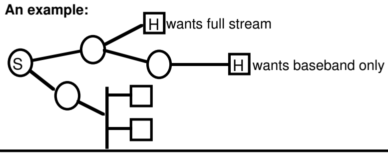
2. Finer control granularity for multicast routing

What's Good about MMG(cont')

Give multicast routing finer granularity

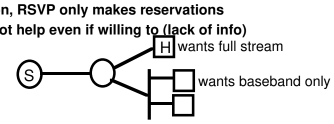
- **Making substreams visible to QoS routing, so that substream(s) can be routed thru small pipes that the whole stream cannot**
- **Get rid of unwanted substreams**

An example:



What We Learned Here

- **Unwanted datagrams is not an RSVP issue**
  – **By definition, RSVP only makes reservations**
  – **RSVP cannot help even if willing to (lack of info)**



- **It is a mcast routing problem**
  – **mcast routing delivers data to all expecting hosts**
  – **mcast routing prunes off all streams that nobody wants**
- **MMG provides finer routing granuarity, so that individual substreams get forwarded to no further than all the wanted places**

Deviding Responsibilites between RSVP & Mcast Routing

- Routing decides where to forward packets
- RSVP sets up reservation state which decides how to foward each packet
- Unless all packets are treated equally, otherwise one needs packet filters to sort packets into different classes for different treamtment

Recommendations

Use MMG for layer-encoded flows

However we note that

- Unless we rule out the option, individual applications may decide to use, or not to use, MMG
- If we leave the “not” option open, reservation merging must be prepared to handle it.