More with Application-layer Multicast

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Application-level Multicast

- Application-layer (or end-system) multicast
  - end systems communicate through an overlay structure
  - assuming only unicast paths provided by underlying network
- Advantages
  - no need to change routers
  - allow features (reliability, flow control, QoS) to be easily incorporated
- Performance implications of using an overlay structure
  - link bandwidth consumption (link stress)
  - source-to-end latency

Applications of Internet Multicast

Applications:
- network conferencing
- multi-player interactive games
- software/news/files distribution
- video/audio on demand

Needs:
- real-time support
- multi-receiver on-demand retrieval (buffering)

Two-step Approach with Real-time Support

Two steps:
- Forming an overlay mesh with good links, don’t worry about loops at this step
  - too dense a mesh results in too much overhead in the second step; more probable to have high link stress
  - too sparse a mesh restricts what the second step can do
- For each multicast source, generating a multicast tree on top of the overlay mesh

Real-time support:
- given a particular bandwidth requirement, find a multicast tree resulting in short source-end latency.
Software/News Distribution on Demand

- Software distribution:
  - Microsoft is distributing a new version of Windows and many licensed (and unlicensed) users would like to get the new software in a short period of time.
  - All interested users download from a central Microsoft distribution site won't work.
- Revisiting content distribution network
  - Having a group of dedicated servers forming an overlay structure - efficiently distributing the content over these servers
  - Interested users connect to one of the nearby servers to get the copy

Determining a Nearby Server

- Closeness is defined by the latency
- Just-in-time probe all servers are too costly