

## Lecture 17

CS625: Advanced Computer Networks  
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Bhaskaran Raman  
CSE, IIT-Kanpur

<http://www.cse.iitk.ac.in/users/braman/courses/cs625-fall2004/outline.html>

## Topics for Today

- Finish up Mobile-IP
- Multicast
- *Scribe for today?*

## Multicast Semantics

- Multicast group id/address
- Group semantics:
  - Sender does not know receiver set
  - Any receiver can belong to (m)any group(s)
  - Open group
  - Leave/join independently
- Delivery semantics:
  - Scoped possible
  - Best-effort

## Performance Criteria

- Efficient data delivery
  - Minimize bandwidth usage
  - Minimize delay
- Reduce control overhead
  - Bandwidth
  - State at routers
- Minimize join latency

## Multicast in LAN

- A set of ethernet addresses are multicast addresses
- Since medium is broadcast, can filter

## Multicast in Extended LAN

- Extended LAN: spanning tree protocol among bridges
  - Root bridge
  - SP tree rooted at root
  - Forwarding tables maintained based on packets seen
- For multicast:
  - Hosts send membership requests
  - Forwarding based on such received requests

## Multicast in DV-routed Network

- Unlike bridged LAN, no single tree is suitable
- Series of steps:
  - Reverse Path Flooding (RPF)
  - Reverse Path Broadcasting (RPM)
  - Truncated RPB (TRPB)
  - Reverse Path Multicasting (RPM)

## Reverse Path Flooding (RPF)

- Packet from source is sent
  - If it is from shortest-path to sender
  - Along all other links
- Packet can be duplicated on a link in such a case

## Reverse Path Broadcast (RPB)

- Designate parent node for each link
  - Node with shortest-path to sender
  - Break ties arbitrarily
- A node sends only along child links
- Truncation: TRPB
  - Truncate at leaves

## Reverse Path Multicast (RPM)

- Start with TRPB
- Routers may send Non-Membership-Reports (NMRs)
  - Propagated up the tree as necessary
  - NMR state is timed out if not refreshed
  - NMR cancel on demand
- Overhead:
  - Per (group X sender) state at each node