

Multicast

Outline

- Multicast for LS
- Multicast for DV
- Protocol Independent Multicast

Process Groups

- Any set of processes that want to cooperate
- Processes can join/leave either implicitly or explicitly
- A process can belong to many groups
- Groups can be either open or closed
- Use multicast rather than point-to-point messages
 - group name (address) provides a useful level of indirection
- Example uses
 - data dissemination (e.g., news)
 - replicated servers

Multicast Routing: LS

- Each host on a LAN periodically announces the groups it belongs to using IGMP
- Augment update message (LSP) to include set of groups that have members on a particular LAN
- Each router uses Dijkstra's algorithm to compute shortest-path spanning tree for each source/group pair
- Each router caches tree for currently active source/group pairs

Spring 2007

CSE30264

3

Multicast Routing: DV

- Reverse Path Broadcast
 - Each router already knows that shortest path to S goes through router N
 - When receive multicast packet from S, forward on all outgoing links (except one it arrived on), iff packet arrived from N
 - Eliminate duplicate broadcast packets by letting only “parent” for LAN (relative to S) forward
 - shortest path to S (learn from distance vector)
 - smallest address to break ties

Spring 2007

CSE30264

4

DV (cont)

- Reverse Path Multicast
 - Goal: prune networks that have no hosts in group G
 - Step 1: determine if LAN is a *leaf* w/ no members in G
 - leaf if parent is only router on the LAN
 - determine if any hosts are members of G using IGMP
 - Step 2: propagate “no members of G here” information
 - augment (destination, cost) update sent to neighbors with set of groups for which this network is interested in receiving multicast packets
 - only happens when multicast address becomes active

Spring 2007

CSE30264

5

Protocol Independent Multicast

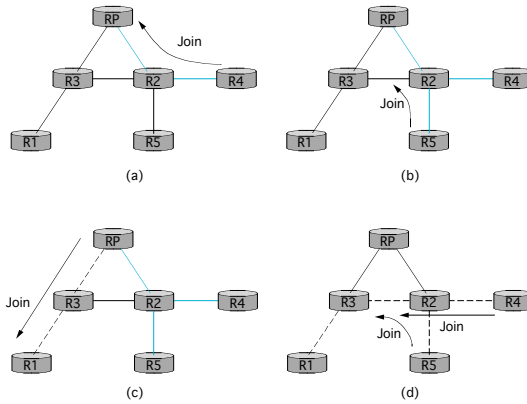
- PIM: sparse mode (PIM-SM) and dense mode
- Routers join/leave groups: Join/Prune messages
- Rendezvous Point (RP) for each group
- Shared trees and source-specific trees

Spring 2007

CSE30264

6

PIM



RP = Rendezvous point
— Shared tree
- - - Source-specific tree for source R1

Spring 2007

CSE30264

7