Dense-mode PIM Status

Toronto IETF

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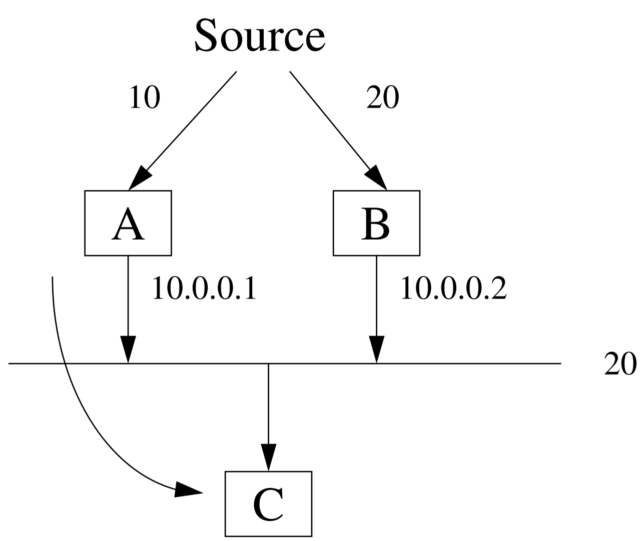
Agenda

- Protocol changes from last IETF
  - Assert message changes
  - Aggregation and pruning
- Implementation and deployment status

Assert message changes

- Problem:

  Non-optimal paths were chosen when LAN cost is high



- Solution:

  Carry metrics in Assert messages

Assert message changes

- Packet format

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|Version| Type  |     Code      |           Checksum            |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                              Group                            |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                           Host Address                        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                         Metric Preference                     |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                              Metric                           |
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Group - From the fixed IGMP header, this is the group
    address (destination IP address) from the IP multicast
    datagram that triggers the Assert packet to be sent.

Host Address - Source IP address from IP multicast datagram
    that triggers the Assert packet to be sent.

Metric Preference - Preference value assigned to the unicast
    routing protocol that provided the route to Host address.

Metric - The unicast routing table metric. The metric is in
    units applicable to the unicast routing protocol used.
```

- Send Asserts when multicast packet received on outgoing interface
- Prune interface when advertised metric is better
- Winner schedules to delete interface when there are no group members attached

Aggregation and pruning

- Problem:

  Tree branches were not pruned all the way to source

- Reason:

  Sources in Prune message were encoded as aggregates from unicast routing table

- Solution:

  Send host addresses in Prunes

  Cache (S,G) relative to unicast routing at each point in the topology

Implementation and Deployment

- USC doing simulation on sparse/dense-mode - still ongoing
- cisco completed dense-mode implementation before Seattle IETF
  - 10 routers in cisco production environment
  - Several sites testing
- Since last IETF - CBONE was built
  - Connects all cisco sites
  - All of cisco ran dense-mode PIM on 20+ routers
  - DVMRP/PIM interaction at BarrNet
  - NetWorkers was multicast on MBONE through the CBONE
- Recently - CBONE goes sparse-mode
  - All of cisco runs sparse-mode PIM on 20+ routers
  - Using a single RP
  - Merging in some dense-mode regions
  - Formal beta testing starting
- Looking for other implementors