Multicast blackhole mitigation with PIM adjacency conditions on routing announcements

draft-morin-mboned-mcast-blackhole-mitigation-00

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Context

• Multicast more and more deployed
• Focus on multicast QoS / convergence

Multicast routing reminder

• PIM-SM/SSM is the multicast routing protocol used
• PIM relies on unicast routing
  – e.g. PIM-SSM builds a replication tree from receivers to a multicast source, by propagating “PIM Joins” hop-by-hop toward the source, following unicast routing to the source

Today's tagline

• “multicast needs you”!
Problem statement

- It can occur that the IGP advertises a link while the PIM-SM adjacency on a link is not ready yet, e.g.:
  - if PIM Hellos not exchanged yet
  - or if PIM is not configured on both sides (not yet, or config mistake)
  - etc.

- What happens:
  - the SPF computed by the IGP uses a link on which PIM is not ready
  - PIM Joins propagate along this path...
  - ...but fail at the router before that link...
  - resulting in a traffic blackhole

- PIM need cooperation from the IGP to solve this

- By the way, LDP has the same issue
  - see draft-jork-ldp-igp-sync
  - (proposed solution is to advertise a link with maximum cost before LDP is ready)
(0) Initially, A and B receive multicast sent by multicast source S toward group address G.

(1) a link comes up, the IGP adjacency comes up, but PIM adjacency is not up

(2) the IGP advertises the new link

(3) SPF toward S is recomputed, PIM updates the RPF interface for S; PIM sends Prune(S,G) on old path and Join(S,G) on new path

(4) router fails to send PIM Join on link, because PIM is not up

(5) Receiver A will not receive traffic from S, until the PIM adjacency comes up
- We want minimal impact unicast traffic/routing
  - raising a link cost before PIM is ready would have a significant impact

- A possible solution is to...
  - use a multi-topology-instance IGP
  - make PIM follow a dedicated IGP topology-instance
  - make the IGP use some “PIM adjacency ready” condition to advertise/not-advertise a link in the multicast topology-instance

- Advantages
  - low impact on unicast routing
  - purely local behavior
  - no need to extend the IGP

- Criteria for advertising a link in the multicast topology
  - have PIM be enabled on this link
  - having sent and received PIM Hellos on the link
  - multiple options => ...more “intelligence” depending on implementations...
- Draft to be proposed to mboned working group as an informational or BCP document
- Feedback of the unicast routing community is welcome
- Please read the draft!

Questions ? Comments ?