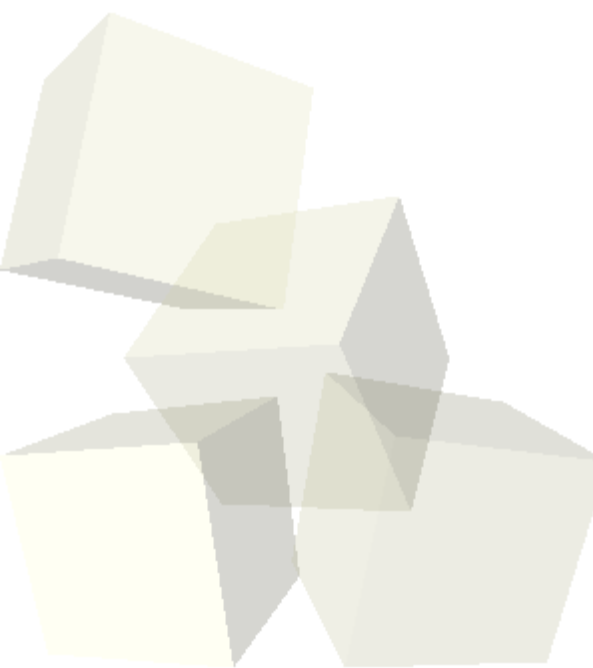




Multicast blackhole mitigation with PIM adjacency conditions on routing announcements

[draft-morin-mboned-mcast-blackhole-mitigation-00](#)

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Context / Problem statement

■ Context

- ◆ Multicast more and more deployed
- ◆ Focus on multicast QoS / convergence

■ It can occur that the unicast routing 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, misconfig)
- ◆ etc.

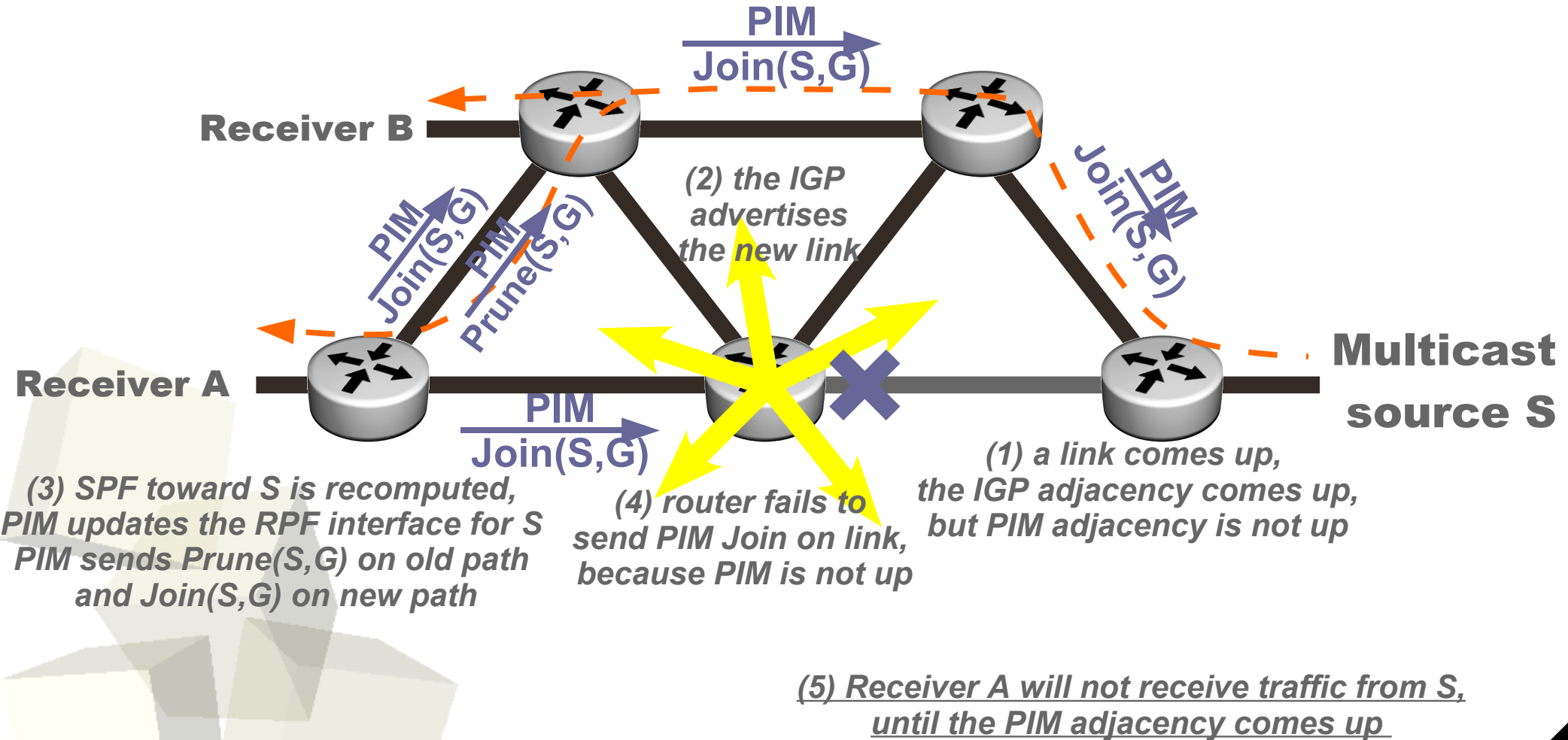
■ What happens:

- ◆ the SPF computed by unicast routing 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**



Illustration

(0) Initially, A and B receive multicast sent by multicast source S toward group address G.





■ What RFC4601 says

- ♦ when a link comes up, wait [0-5s] before sending a Hello
- ♦ neighbor waits [0-5s] before sending a Hello in reply
- ♦ if need to send a Join to a neighbor and no Hello was sent yet on the interface, send a Hello now before sending the Joins

■ What is not discussed:

- ♦ nothing said about whether or not a router needs to have received from a neighbor before sending a Join
- ♦ might be done
- ♦ **but** Hellos carry options that are meant to be extended, and may impact how Joins are sent

■ Improvements

- ♦ improvements can be considered
- ♦ will help addressing the problem statement



Proposed approach

- We want minimal impact on unicast
 - ♦ raising a link cost before PIM is ready would have a significant impact on unicast
- A possible solution is to...
 - ♦ use a multi-topology IGP
 - ♦ make PIM follow the multicast-dedicated IGP topology
 - ♦ make the IGP use some “PIM adjacency ready” condition to advertise/not-advertise a link in the multicast topology
- 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 configured on this link
 - ♦ having sent and received PIM Hellos on the link
 - ♦ neighbor not currently being in graceful restart operation
 - ♦ multiple options => ...more “intelligence” depending on implementations...



- Same problem happens with BGP:
 - ◆ a BGP neighbor advertise a route to a unicast source on a link where PIM is not ready yet
- The proposed approach can be generalized:
 - ◆ use non-congruent unicast routing
 - in an IGP : use multi-topology IGP (or multi-instance)
 - in the i/eBGP case : use SAFI 2 BGP routes
 - applicable to the context of multicast in a VPN
 - ◆ take into account the PIM status on a link to..
 - IGP case: advertise the link in the IGP
 - BGP case: accept/advertise BGP routes on this link





Next steps

- Proposed approach is a local implementation matter
 - ◆ useful to document this practice
- PIM Hello adjacency improvements
 - ◆ to be discussed
- Feedback is welcome!

Questions ? Comments ?

