PIM Upstream Detection among Multiple Addresses

<draft-suz-pim-upstream-detection-00.txt>

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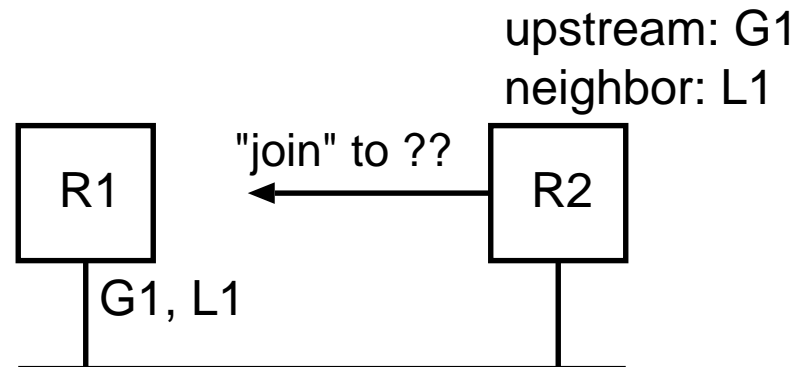JINMEI, Tatsuya <jinmei@isl.rdc.toshiba.co.jp>
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Summary

- Overview of the Problem
- Possible Solutions
- Comments & Questions

Overview of the Problem

□ How to detect the RPF upstream among multiple addresses

○ if neighboring address != RPF upstream address, the downstream router cannot build join/prune or graft

```
                                    upstream: G1
                                    neighbor: L1
        ┌──────┐   "join" to ??   ┌──────┐
        │      │ ◄─────────────── │      │
        │  R1  │                  │  R2  │
        └──┬───┘                  └──┬───┘
        G1, L1                       │
           └─────────────────────────┘
```

□ Not typical for IPv4, but quite possible to happen for IPv6

○ PIM neighboring address should be linklocal
○ RPF upstream address can be global
◇ manual configuration, MBGP
◇ RP address may share a global prefix with downstream routers

□ Need a solution to deploy IPv6 multicast using PIM

Possible Solutions

- □ 1. Operational solution
- □ 2. Use a new PIM Hello option
- □ 3. Use a separate protocol
- □ 4. Loosen the PIM protocol

Solution 1: operational solution

- ☐ 1-1 Always use linklocal nexthop in MRIB
- ☐ 1-2 Assignes RP address on a separate interface
  - ○ so that the global prefix should not be shared
  - ○ e.g. assign a separate address on loopback IF

- ☐ Pro
  - ○ no need to change the PIM protocol / implementations

- ☐ Cons
  - ○ increase operational cost
    - ◇ cannot assign global upstream address
    - ◇ need to advertise a particular host route
  - ○ reduce operational flexibility

Solution 2: Use a new PIM Hello option

☐ Introduces a new PIM Hello option to inform all the router's addresses on the link

upstream: G1
||
neighbor: L1

"hello" from L1
with G1

R1   "join" to L1   R2

G1, L1
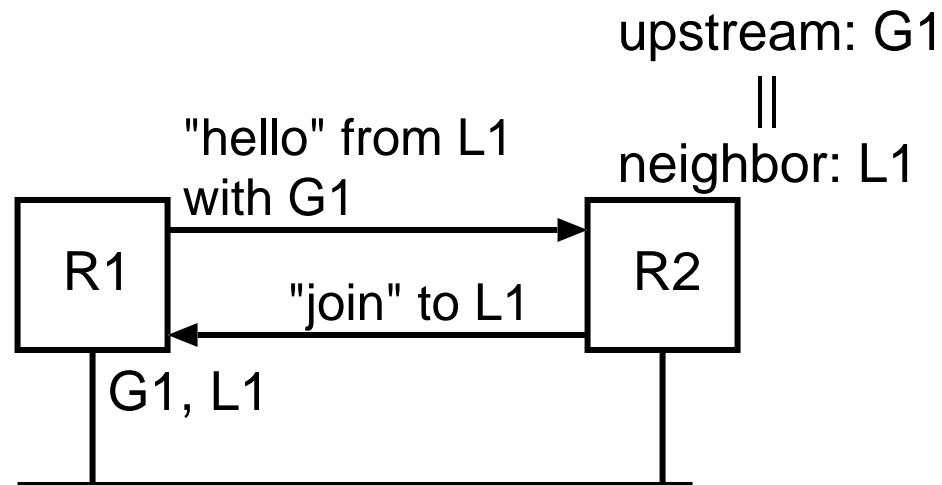
☐ Pro
- do not increase operational cost
  - ◇ mapping among multiple addresses is provided automatically
☐ Con
- need to change the PIM protocol / implementations

Solution 3: Use a separate protocol

- To detect the mapping among the multiple addresses
  - use ARP/NDP and compare the layer-2 addresses
  - ICMPv6 Node Information Query

- Pros
  - do not increase operational cost
  - no need to change the PIM or other protocols
- Cons
  - need to change PIM implementations
    - (may) also need to implement the new protocol
  - need more implementation consideration for corner cases

Solution 4: Loosen the PIM protocol

- Loosening the restriction of the PIM protocol
  - e.g. allow a non-linklocal address in PIM Join/Prune or Graft messages

upstream: G1
neighbor: L1

"join" to G1

R1 ← R2

G1, L1
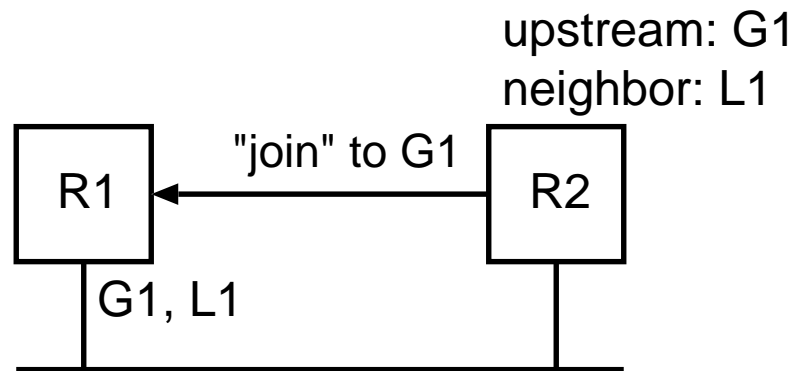
- Pro
  - do not increase operational cost
- Cons
  - need to change the PIM protocol / implementations
  - not a complete solution
    - still no relation among the addresses
    - prohibit the benefit of Generation ID

Comments & Questions

- Comments so far
  - a new solution: multiple PIM hello messages
  - details about the new hello option
  - editorial comments
  - other comments are welcome

- Questions to the wg
  - Should the problem be solved in this wg?
  - If yes, what's next on this draft?
    - should it pick up a particular solution?
    - or just describe the problem and possible solutions?

    - should it be a wg document?
    - or should be merged to the base PIM spec?
    - or others?

Summary of Possible Solutions

Comparison of the negative impacts of these solutions

	increase in operational cost	Amount of change in PIM protocol	Amount of change in PIM implementation	Amount of change in the other part of routers
1. Operational hack	Some/A lot	None	None	None
2. A new PIM Hello option	None	Some	Some	None
3. A new protocol	None	Some	Some	A lot
4. Loosen the PIM protocol	None	Some	Some	None