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Multiple Upstream Interface Support for IGMP/MLD Proxy

draft-asaeda-pim-multiif-igmpmldproxy-02

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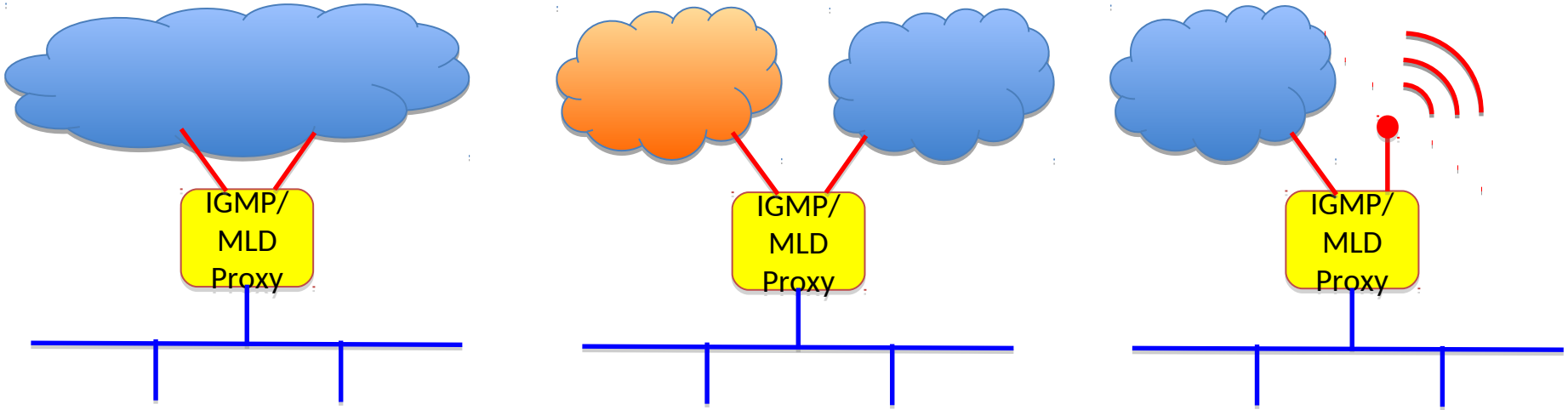
Document History

- Multiple Upstream Interfaces Support for IGMP/MLD Proxy
  - draft-asaeda-pim-mldproxy-multif-00, Oct. 2012
  - draft-asaeda-pim-mldproxy-multif-01, Feb. 2013
  - draft-asaeda-pim-multiif-igmpmldproxy-00, Mar. 2015
  - (draft-ietf-pim-multiple-upstreams-reqs-00, Jul. 2015)
  - draft-asaeda-pim-multiif-igmpmldproxy-01, Jul. 2015

Background

- There are many situations an IGMP/MLD proxy multiply attached to same or different networks (e.g., Internet and Intranet, different slices in 5G) or different interfaces (e.g., ethernet and wireless link, LTE and WiFi), yet RFC4605 does not support such multihoming situations.
- Enable an IGMP/MLD proxy device to use multiple upstream interfaces and receive multicast packets through these interfaces.



Objective

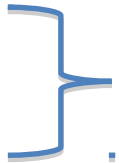
- Support multiple upstream interfaces for an IGMP/MLD proxy device
  - An IGMP/MLD proxy device enables to receive multicast sessions/channels through the different upstream interfaces
- Propose the solution by following the requirement draft

Benefits

- Load balancing
  - Subscriber-based (i.e. client address based) upstream selection: One or more upstream interface(s) is selected per subscriber/receiver
  - Channel-based upstream selection: One or more upstream interface(s) is selected per channel/session
- Robust data reception
  - More than one upstream interface used per channel/session when more than one upstream interface is enabled for the channel/session
- Upstream interface takeover
  - Switch inactive upstream IF to other active (backup) IF

Upstream Interface Configuration

- Parameters for candidate upstream interface configuration
  - Subscriber address prefix
  - Channel/session ID
    - Source address prefix and multicast address prefix
  - Priority value
  - Backup interface(s)



Called “address prefix record”

- Configuration syntax
  - (R: subscriber-addr-prefix, S: source-addr-prefix, G: multicast-addr-prefix) (P: value) (B: IF-name)
  - Default: (null, null, null) (0) (null)
- Decision order
  - Subscriber prefix > Channel ID > Priority > Lowest IP address

Default Interface

- The default of “address prefixes” is “(null, null, null)”
- The default of “priority” is (0)
- The default of “backup interface” is “null”

- When all values are default for all candidate upstream interfaces, the configured upstream interface having lowest IP address is selected as the upstream interface for all multicast channels

Automatic Configuration

- Bootstrapping using hash values
  - Given RFC2991: Multipath Issues in Unicast and Multicast Next-Hop Selection
    - But robust data reception is not supported as only one interface is selected
- Open questions
  - How routers automatically select appropriate upstream interfaces for all channels?
    - Just a selection using hash value is sufficient?
    - BTW, how can we know it is “appropriate”?
  - How routers quickly detect inactive upstream interfaces?
    - Monitoring IGMP/MLD Query and/or PIM Hello does not give quick actions
    - Defining a new IGMP/MLD message costs
  - What is the trigger?; when (i.e., in what kinds of conditions) routers switch to the secondary (or backup) upstream interfaces? Static timer is not sufficient?

Conclusion

- Multiple upstream interface support must be proposed by following the requirement draft
  - Load balancing and robust data reception
  - Upstream interface takeover
  - Configuration for each candidate upstream interface
- Open questions
  - How automatic upstream interface configuration should be detailed?
    - Just a selection using hash value is not sufficient?
  - RFC4605bis?
    - Not just a proposal for the additional function, but carefully revisit/revise RFC4605? (Hope no long journey anymore..)