Multiple Upstream Interface Support for IGMP/MLD Proxy

draft-asaeda-pim-multiif-igmpmldproxy-05

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Background

• There are many situations where an IGMP/MLD proxy is multiply attached to the same or different networks (e.g., Internet and Intranet, different slices in 5G) or by means of different interfaces (e.g., ethernet and wireless link, LTE and WiFi)

• 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.
Objectives and expected benefits

**Objectives**

- Support multiple upstream interfaces for an IGMP/MLD proxy device
  - An IGMP/MLD proxy device enables the reception of multicast sessions/channels through the different upstream interfaces
- Propose the solution by following the requirements draft
  - draft-ietf-pim-multiple-upstreams-reqs-08

**Benefits**

- Flexible operation
  - 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 path to another active (backup) path
Use cases requiring multiple upstream interfaces

• Use cases in draft-ietf-pim-multiple-upstreams-reqs-08
  • Multicast wholesale offer for residential services
  • Multicast resiliency
  • Load balancing for multicast traffic in the metro segment
  • Network merging with different multicast services
  • Multicast service migration

• All of them are applicable for both fixed and mobile networks

• Other cases emerge in relation with robust reception of flows
  (emphasis on reliability)
Upstream Selection Mechanisms

- Static Upstream Interface Selection
  - Channel-Based Selection
  - Subscriber-Based Selection
  - Priority-Based Selection

- Automatic Upstream Interface Selection
  - Signaling-based Upstream Interface Configuration
    - TBD – this requires IGMP/MLD extensions, probably subject of a different draft

- Controller-based Upstream Interface Configuration
  - SDN-like centralized control
SDN-like Centralized Control

- A centralized controller instructs the proxy what upstream interface to use based on the multicast channel or the user
  - Control and management interface has to be supported by the proxy in order to receive configuration instructions from the controller.
- The controller could interact with a number of proxies in the network
  - Optimized decisions for managing all the multicast traffic in the network in a coordinated manner
  - Decisions based on congestion, user location, etc.
Controller-based Upstream Interface Selection

• Options for association to a specific upstream interface
  • Specific user (source IP)
  • (S,G)
  • (*,G)
  • (S,*)
• Precedence should be defined to indicate priority
• Default upstream interface when no matching an explicitly configured behavior.
Next steps

• Authors want to revive this draft pursuing future adoption
• PoC performed and documented in a conference publication [ICIN]
• Draft refreshed with few updates (reference to PoC, reference to requirements, ...)

• Collect feedback from the WG
• Work on identified ToDo
  • Value of the default active interval to detect an inactive upstream interface
  • Signaling methods (i.e. IGMP/MLD messages) for configuring the upstream interface(s) of interest
  • Security threats from potential DoS attacks
• Provide a new version for IETF#117 and discuss again

• Comments are more than welcome