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Multiple Upstream Interfaces Support for IGMP/MLD Proxy

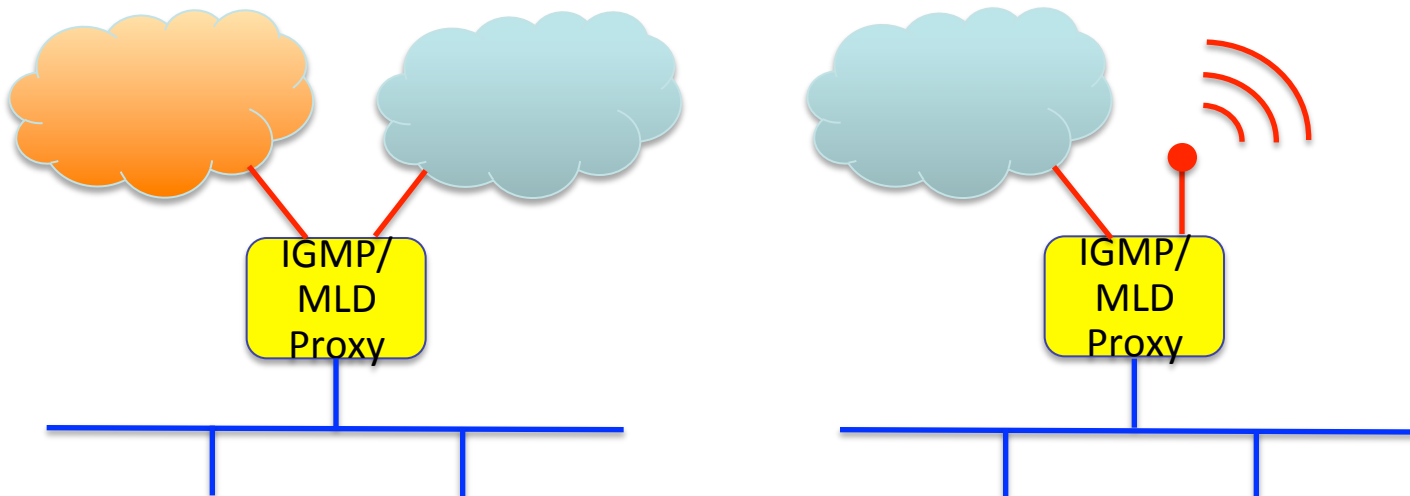
draft-asaeda-pim-mldproxy-multif-00

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Overview

- RFC4605 says;
 - A proxy device performing IGMP/MLD-based forwarding has a single upstream interface and one or more downstream interfaces. These designations are explicitly configured.
- Enable IGMP/MLD proxy to support multiple upstream interfaces
 - IGMP/MLD proxy attached to different networks
 - E.g., Internet and Intranet
 - IGMP/MLD proxy attached to different interfaces
 - E.g., ethernet and wireless link (WiFi, WiMAX, LTE, etc.)
- Simple extension
 - Upstream interfaces are configured **by manual operation**

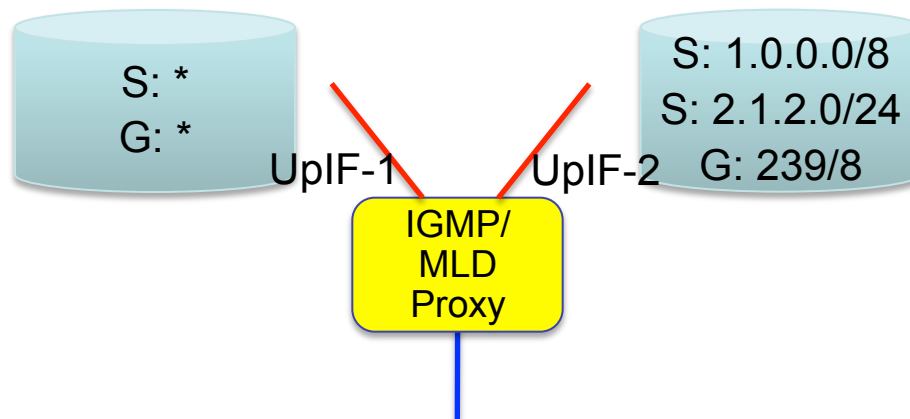


Terminology, Configuration

- Upstream interface (or selected upstream interface)
- Downstream interface
- Configured upstream interface
- Configuration methods
 - Configure “supported address prefixes” on each configured upstream interface
 - Configure “interface priority” on each configured upstream interface
 - Configure “ECMP” for load splitting among configured upstream interfaces

Supported Address Prefix

- Source and multicast addresses supported by configured upstream
 - Default value is (*,*)
- This configuration MAY be configured for each configured upstream interface by operation and SHOULD NOT be configured if ECMP is configured on the proxy device



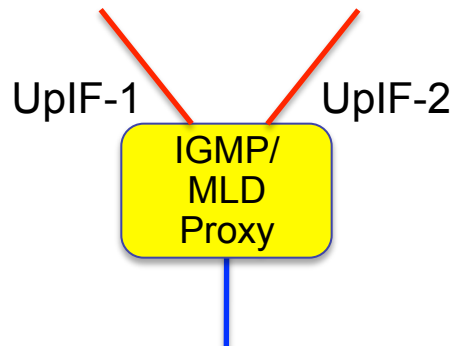
Supported Address Prefix

– Error or Non-Error

- Multiple UpIFs configure wildcard address prefix
 - Non-error: UpIF is selected based on both interface priority values
- Multiple UpIFs configure same (but non-wildcard) address prefixes
 - Error: ignore the configuration and warn it
- Multiple UpIFs configure overlap address prefixes (e.g., 1/8 and 1.1/16, or 239/8 and 239.254/16)
 - Non-error: UpIF is selected based on longest match
- For (S,G) channel, UpIF-1's configuration (S's prefix) and UpIF-2's configuration (G's prefix)
 - Non-error: Source prefix is prioritized, hence UpIF-2 is selected for the (S,G) channel

Interface Priority

- Each configured upstream interface has own priority value
 - Default value is 0 (bigger value is higher priority)
- The interface priority **SHOULD** be configured for each configured upstream interface by operation and **SHOULD NOT** be configured if ECMP is configured on the proxy device



Load Splitting by ECMP

- UpIF is selected based on (*,G) or (S,G) hash value
 - Default value is “turn off”
- When ECMP is configured;
 - All configured upstream interfaces MUST configure ECMP
 - Both “selected address prefix” and “interface priority” are ignored
- Pros
 - Give the better path selection mechanism
 - Easy configuration
- Cons
 - Add additional requirement
 - Upstream router must support ECMP and enable it
 - Add additional complexity
 - PIM ECMP redirect (RFC6754) should be supported for the optimized paths
 - Difficult for operation and trouble shooting?

Default Values

- The default of “supported address prefixes” is $(*,*)$
- The default of “interface priority” is “0”
- The default of “ECMP” is “turn off”
- When all values are default, the configured upstream interface having lowest IP address is selected as the upstream interface for all multicast channels

Open Issues: Downstream Source

- RFC4605 says;
 - A proxy device forwards packets received on any downstream interface to the upstream interface, and to each downstream interface other than the incoming interface based upon the downstream interfaces' subscriptions and whether or not this proxy device is the IGMP/MLD Querier on each interface.
- What should we do for downstream sources?

Next Step

- Revision with more precise wordings
- WG draft adoption?