



Extension of the MLD proxy functionality to support multiple upstream interfaces

<draft-contreras-pim-multiple-upstreams-00.txt>

Luis M. Contreras
Telefónica I+D

Carlos J. Bernardos
Universidad Carlos III de Madrid (UC3M)

Juan Carlos Zúñiga
InterDigital

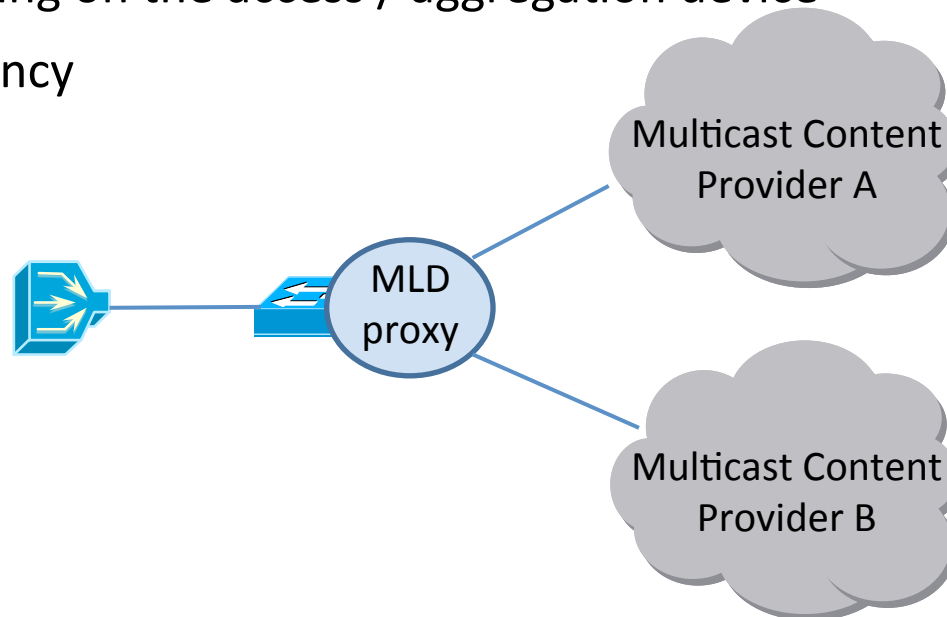
Berlin, PIM WG, July 2013

Proposal Status

- The draft covers a number of use cases where an MLD proxy functionality supporting more than one upstream interface would be useful
- A number of requirements for those scenarios are collected
- A functional specification is not yet described
- Draft history:
 - Initial versions submitted to MULTIMOB WG as the original use case was motivated there
 - Presented to both MULTIMOB and PIM WGs in Atlanta (85th) and Orlando (86th) IETF meetings
 - Now moved to PIM WG for developing the draft in this community

Problem statement

- General application:
 - Sharing of a common network access infrastructure among different multicast content providers
- Advantages
 - Subscribers can get their preferred contents from different multicast content providers without network constraints and without requiring PIM routing on the access / aggregation device
 - Redundancy



Motivation

- The support of multiple upstream interfaces on an MLD proxy functionality has been identified as an opportunity for system optimization
- Complexity
 - Handling of control messages for/from multiple upstreams
 - Efficient handling of data traffic for/from multiple upstreams
- Purpose
 - Identification of requirements for supporting multiple upstreams
 - Specification of the needed MLD proxy functional extensions

Fixed network communication scenarios

- Fixed broadband based
 - Multicast wholesale offer for residential services
 - ✓ Complementary multicast service offered by alternative operators in an efficient manner
 - Multicast resiliency
 - ✓ Path diversity through the connection to distinct leaves in a given multicast tree (skipping routing based mechanisms)
 - Load balancing for multicast traffic in the metro network
 - ✓ Demand split on different paths
- **Benefits**
- ✓ Resource efficiency on distribution network
 - ✓ Avoidance of multicast routing complexity as far as possible from the access / aggregation devices

Needed functionality per fixed scenario

Functionality	Fixed Network Scenarios		
	Multicast Wholesale	Multicast Resiliency	Load Balancing
Upstream Control Delivery	✗	✗	✗
Downstream Control Delivery	✗	✗	✗
Active / Standby Upstream interface		✗	
Upstream i/f selection per mcast group			✗
Upstream i/f selection for all groups		✗	

Mobile network communication scenarios

- PMIPv6-based (MULTIMOB)
- Listener mobility
 - ✓ Single MLD proxy instance on MAG per LMA
 - ✓ Remote and local multicast subscription
 - ✓ Dual subscription to multicast groups during handover
- Source mobility
 - ✓ Support of remote and direct subscription in basic source mobility
 - ✓ Direct communication between source and listener associated with distinct LMAs but on the same MAG
 - ✓ Route optimization support in source mobility for remote subscribers

➤ Benefits

- ✓ Traffic routing optimization within the PMIPv6 domain
- ✓ Simultaneous support of remote and local multicast subscription
- ✓ Avoidance of multiple MLD proxy instances on MAG

Needed functionality per mobile scenario

	Multicast Listener			Multicast Source		
Functionality	Single MLD proxy	Remote & Local Subscr.	Dual Subscr. during HO	Direct & Remote Subs.	Listener & Source on MAG	Route Optimiz.
Upstream Control Delivery	✗	✗	✗	✗	✗	✗
Downstream Control Delivery	✗	✗	✗		✗	
Upstream Data Delivery				✗		✗
Downstream Data Delivery	✗	✗	✗		✗	
1:1 MN to Upstream Association	✗					
1:N MN to Upstream Association		✗	✗	✗	✗	✗
Upstream i/f selection per mcast group		✗				
Upstream i/f selection for all groups			✗			
Upstream traffic replication				✗		✗

Proposed next steps

- Extend the scope to cover also IGMP
- Any scenario missing?
- Please, review and provide comments
- Request for adopting the draft as informational WG document
- Start describing MLD proxy extension to cope with required functionality
 - Should it be part of a different doc?