Extension of the MLD proxy functionality to support multiple upstream interfaces

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Motivation

• The support of multiple upstream interfaces on an MLD proxy functionality has been identified as an opportunity for system optimization

• Advantages:
  • Traffic routing optimization within the PMIPv6 domain
  • Simultaneous support of remote & local multicast subscription
  • Avoidance of multi-MLD proxy instances on MAG

• Complexity
  • Handling of control messages for/from multiple upstreams
  • Efficient handling of data traffic for/from multiple upstreams

• Purpose
  • Requirements identification for supporting multiple upstreams
  • Specification of the needed MLD proxy functional extensions
Scenarios of applicability for MULTIMOB

• Listener mobility
  ✓ Single MLD proxy instance on MAG
  ✓ 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
## Summary of needed functionality per scenario

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Multicast Listener</th>
<th>Multicast Source</th>
<th>Dual Subscr. during HO (4.1.3)</th>
<th>Route Optimiz. (4.2.3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Single MLD proxy</td>
<td>Remote &amp; Local Subscr. (4.1.2)</td>
<td>Direct &amp; Remote Subs. (4.2.1)</td>
<td></td>
</tr>
<tr>
<td>Upstream Control Delivery</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Downstream Control Delivery</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td></td>
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<tr>
<td>Upstream Data Delivery</td>
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<tr>
<td>Downstream Data Delivery</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td></td>
</tr>
<tr>
<td>1:1 MN to Upstream Association</td>
<td>✗</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>1:N MN to Upstream Association</td>
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</tr>
<tr>
<td>Upstream i/f selection per mcast group</td>
<td>✗</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upstream i/f selection for all groups</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Upstream traffic replication</td>
<td></td>
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</tbody>
</table>

The table indicates that certain functionalities are required for both multicast listeners and sources, depending on the scenario. The symbols represent the availability of these functionalities.
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<draft-contreras-multimob-multiple-upstreams-00.txt>

Backup slides
Applicability Scenarios for MULTIMOB
Listener mobility

Single MLD proxy instance on MAG

Orange LMA

Green LMA

Orange MLD proxy

Green MLD proxy

MAG

Orange MNs

Green MNs

Orange LMA

Green LMA

MLD proxy with multiple upstreams

Orange MNs

Green MNs
Listener mobility

Remote and local multicast subscription

PMIPv6 domain

MTMA

MAG

MLD proxy with multiple upstreams

Multicast Router

(S_{remote}, G_1)

(S_{local}, G_2)
Listener mobility

Dual subscription to multicast groups during handover

Handover assisted by some adaptation of FPMIPv6 protocol for multicast traffic (e.g., draft-schmidt-multimob-fmipv6-pfmipv6-multicast)
Source mobility

Support of remote and direct subscription in basic source mobility

(S_MN, G_a)

PMIPv6 domain

(S_MN, G_a)

(S_MN, G_a)

MLD proxy with multiple upstreams
Source mobility

Route optimization support in source mobility for remote subscribers
Source mobility

Direct communication between source and listener associated with distinct LMAs but on the same MAG