

I E T F[®]

Dedicated Multicast-LMA (M-LMA)

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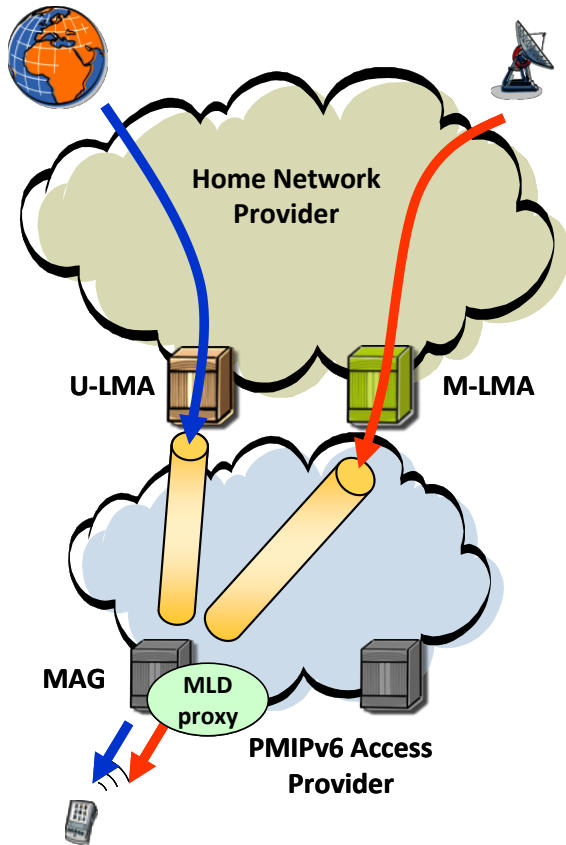
Dedicated Multicast LMA (1/2)

- <https://datatracker.ietf.org/doc/draft-zuniga-multimob-smsspmpip/>
- Basic concept discussed since IETF 76
- Scope of Changes:
 - Enhanced deployment scenarios
 - Multicast LMA definitions and terminology updated
 - PMIP enhancements:
 - Binding Update
 - Policy Profile
 - MAG to LMA attach requirements
 - Added M-LMA data structure definition

Dedicated Multicast LMA (2/2)

- Features
 - Not all LMAs need to support multicast capability and connectivity
 - Reduces total resources and states at LMAs
 - Reduces tunnel convergence issue at the MAG
 - Minimizes the replication of multicast traffic when MNs with different LMAs join the same multicast group
 - Simplifies the multicast tree topology
 - Allows a PMIPv6 domain to closely follow a simple multicast tree topology for Proxy MLD forwarding
 - Allows the implementation of a single MLD proxy instance per MAG to support the multicast service
 - Reduces the complexity of the MAG
 - Permits different PMIPv6 deployment scenarios
 - Deployment strategies can be tailored for expected traffic scenarios

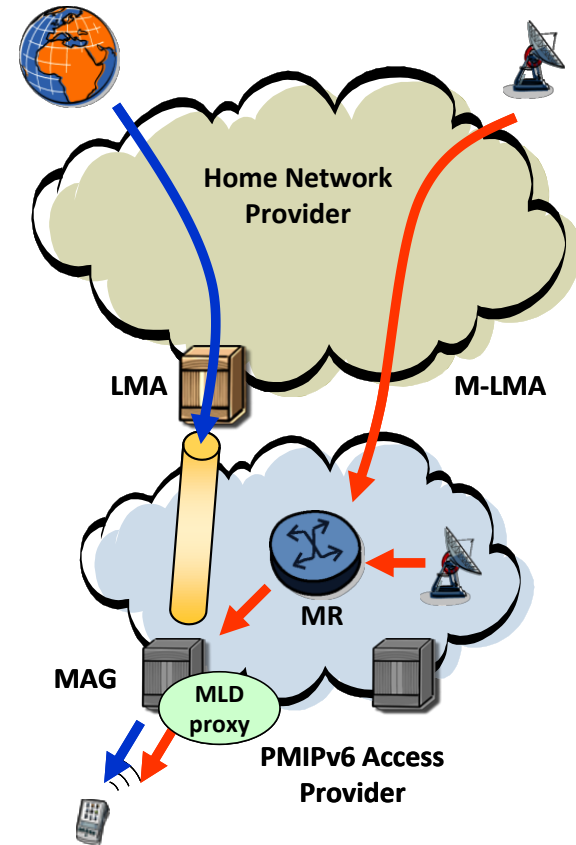
Dedicated M-LMA architecture



Brief description of M-LMA approach

- MAGs incorporate MLD proxy functionality
- Dedicated infrastructure for multicast service delivery to MNs in PMIPv6 domain
- Multicast traffic to MNs tunnelled from Home Network Provider

Local Routing architecture



Brief description of Local Routing approach

- MAGs incorporate MLD proxy functionality
- Multicast infrastructure should be available in PMIPv6 access provider
- Multicast traffic to MNs is natively served from Access Provider

Major advantages of M-LMA approach

- **Service provision**
 - M-LMA allows for a total control by the Home Network Provider of the service delivered to the MNs while moving in a PMIPv6 domain, facilitating the billing, the QoS provision, etc.
- **Service definition**
 - M-LMA does not need multicast addressing coordination per content between both providers, e.g. to avoid address overlapping. Hence, it makes the multicast service provision independent from one provider to the other
- **Service deployment**
 - M-LMA facilitates the multicast service deployment because the node providing multicast service (e.g. M-LMA) is well identified. Hence, there is no need to do customization of multicast router definition on every PMIPv6 domain available for the MNs
- **Others**
 - Most of the existing PMIPv6 features (security, load balance, heartbeat, etc) can be directly re-used

Minor drawbacks of M-LMA approach (as per draft-sijeon-multimob-direct-routing-pmip6-00)

- LMA signaling process overload
 - In fact, both solutions have similar multicast signaling processing requirements. M-LMA only requires additional tunnel establishment, which is negligible due to the semi-permanent nature of the tunnels.
 - Even if tunnels are dynamically created, the same tunnel is used for all the multicast traffic, for all the MNs in the PMIPv6 domain
- Overhead
 - The tunneling process in M-LMA approach imposes an overhead of 40 bytes due to the tunnel heading. Nevertheless, the typical multicast packet length is large in nature and the average overhead is minimal

Case study: MPEG-2 TS over IP video transmission

video packet length = $7 * 188 = 1316$ bytes

RTP header = 12 bytes

UDP header = 8 bytes

IPv6 header = 40 bytes

Total length = 1376 bytes

Tunnel overhead = $40 / (40 + 1376) = 2,8\%$

Comparison table

Main feature	Dedicated M-LMA	Local Routing
Allows home billing	✓	✗
Requires MAG upgrade	✗	✗
Avoids tunnel convergence problem	✓	✓
Allows multicast services from Visited	✓	✓
Allows multicast services from Home	✓	✗
No need for multicast addressing coordination between providers	✓	✗

✓ = Advantage

✗ = Disadvantage