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PMIPv6 Multicast Routing Optimization with PIM-SM

draft-asaeda-multimob-pmip6-ropt-with-pim-00

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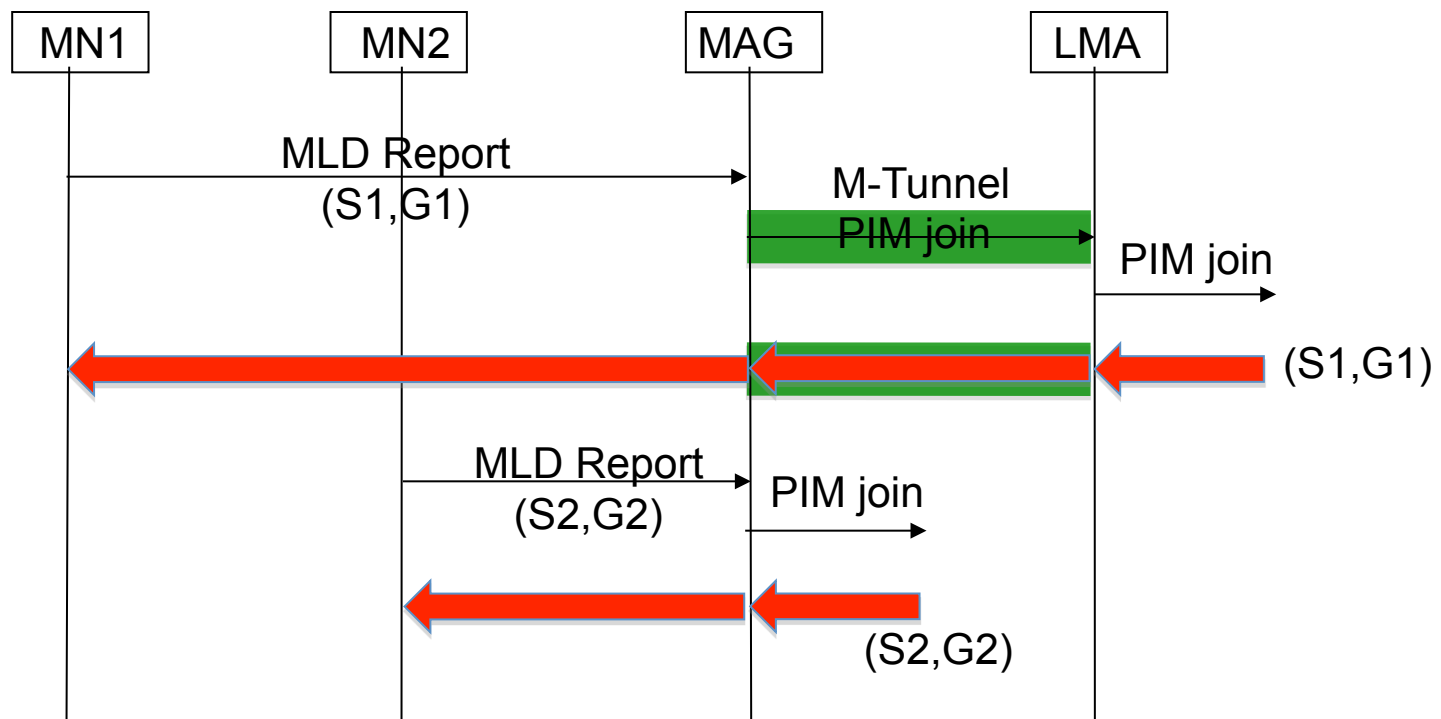
Pierrick Seite

Overview

- Draft based on;
 - draft-asaeda-multimob-pmip6-extension-11
- Multicast route optimization using PIM-SM routing protocol running on both LMA and MAG in PMIPv6
 - Source and/or RP addresses selected by the RPF lookup algorithm
 - No tunnel convergence problem
 - Optimized routing
 - Both ASM and SSM supported
- Localized routing and direct routing friendly
- Mobility support
 - Works with most of handover scenarios such as SIAL , COTP-extension
 - Only handover using MN's policy profile mentioned

Basic Data Flow – Example

- MAG and LMA act as PIM-SM routers
 - Upstream IF for (S1,G1) is MAG's M-Tunnel IF
 - Upstream IF for (S2,G2) is MAG's physical IF (i.e., direct routing without any tunnel)



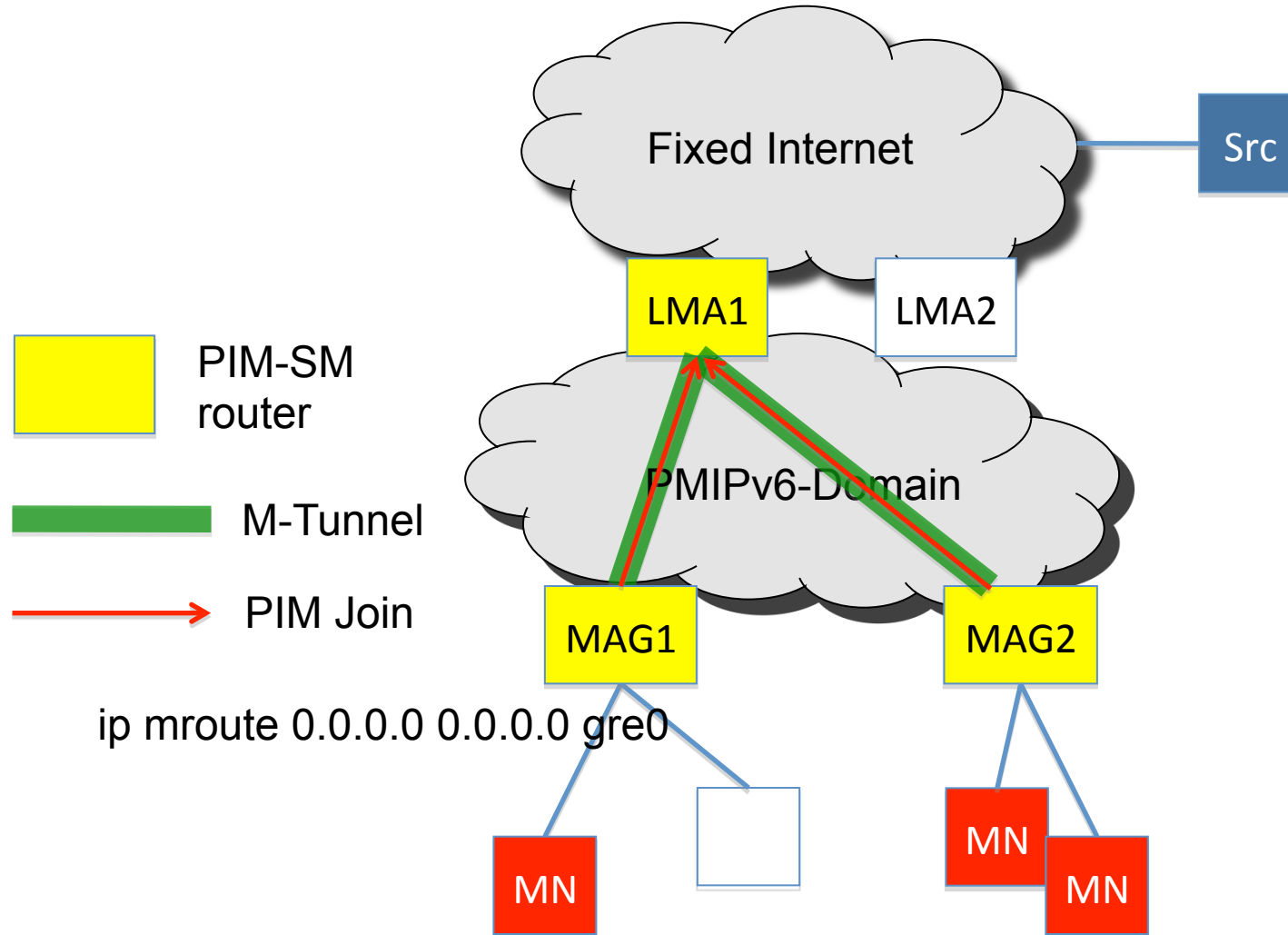
M-Tunnel (GRE Tunnel)

- M-Tunnel is a GRE tunnel set up between MAG and LMA
 - Dedicated for multicast packet transmission
 - Independent from LMA-MAG bi-directional tunnel for unicast
 - GRE key is manually configured by operation, or dynamically negotiated with RFC5845
 - Tunnel end points can be;
 - LMA
 - Other MAG (for localized routing)
 - PIM-SM routers in a local domain (for direct routing via tunneling)
 - Multicast routes with M-Tunnel are configured in MRIB
 - One upstream interface per channel is selected by RPF

M-Tunnel Configuration (Basic operation)

- MAG uses an M-Tunnel (attached to LMA) as an upstream link for external multicast packets
 - E.g., `ip mroute 0.0.0.0 0.0.0.0 gre0`

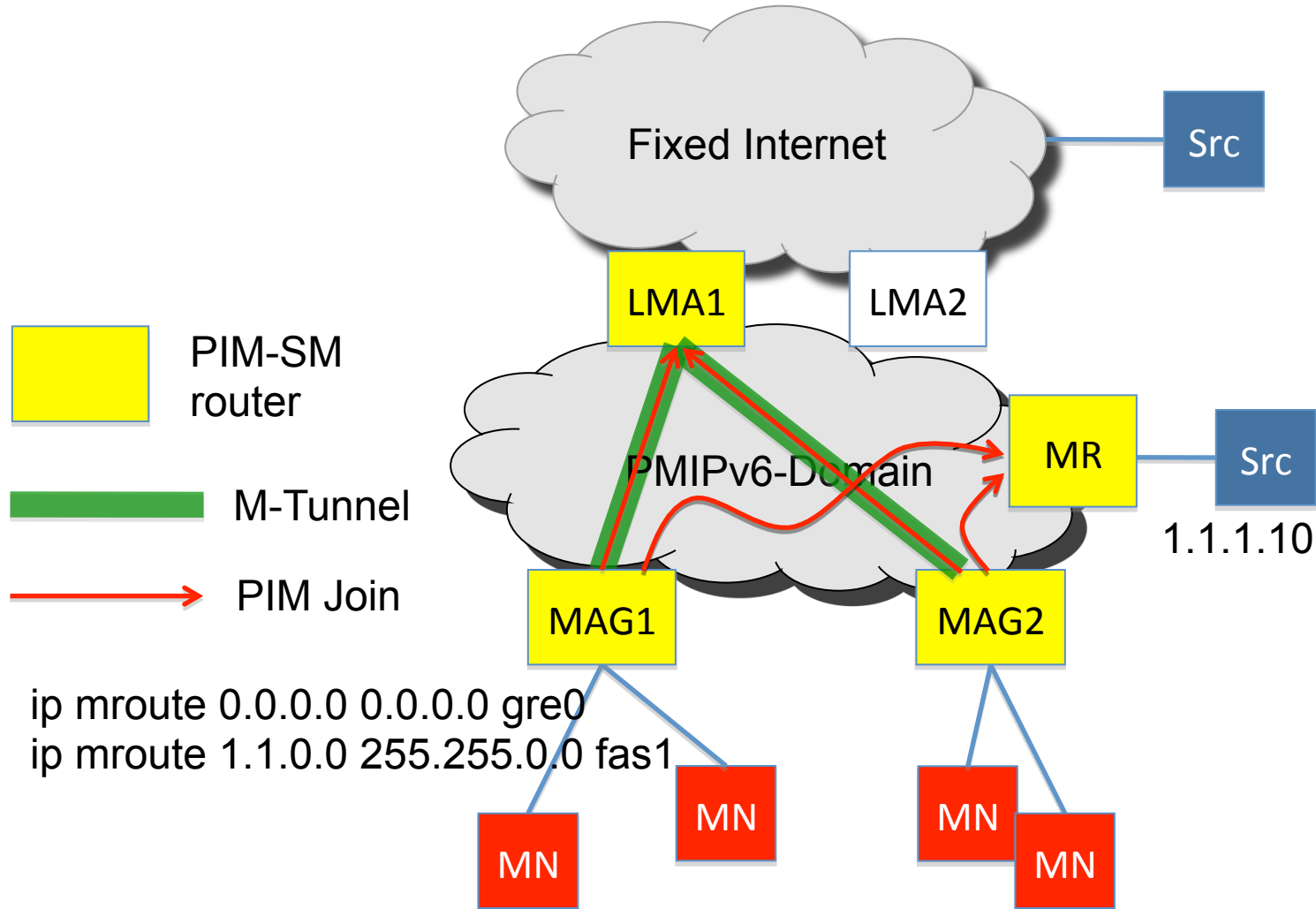
Example 1: Basic Operation



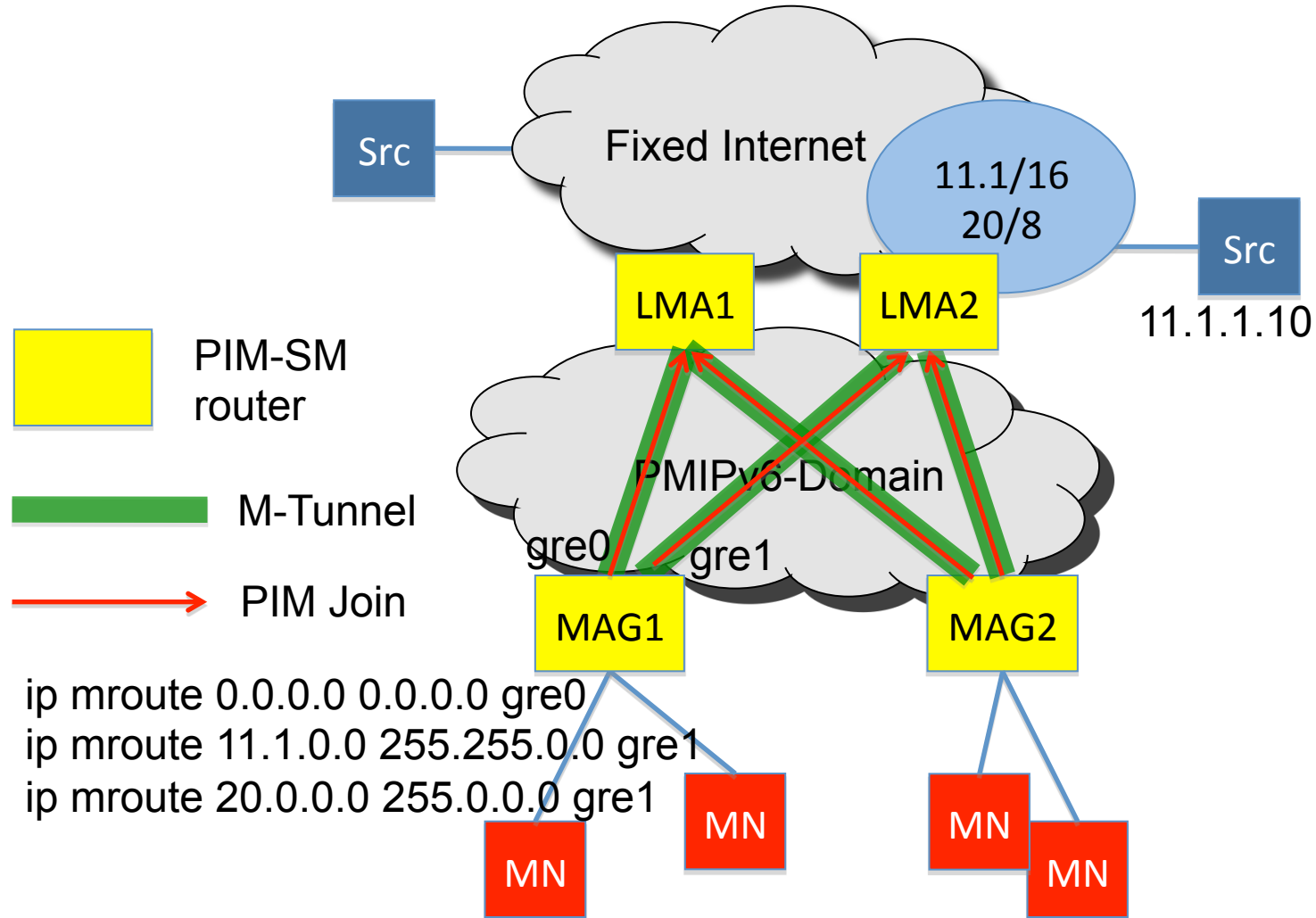
M-Tunnel Configuration (Advanced operation)

- Operators may want to set up multiple upstream interfaces at MAG to support different scenarios;
 - Case 1: Remote contents from a single LMA and local contents via direct routes (static or dynamic)
 - Case 2: Remote contents from different LMAs for different source prefixes
 - Case 3: Remote contents from different LMAs managed by ECMP (not for load balancing, but for load split)

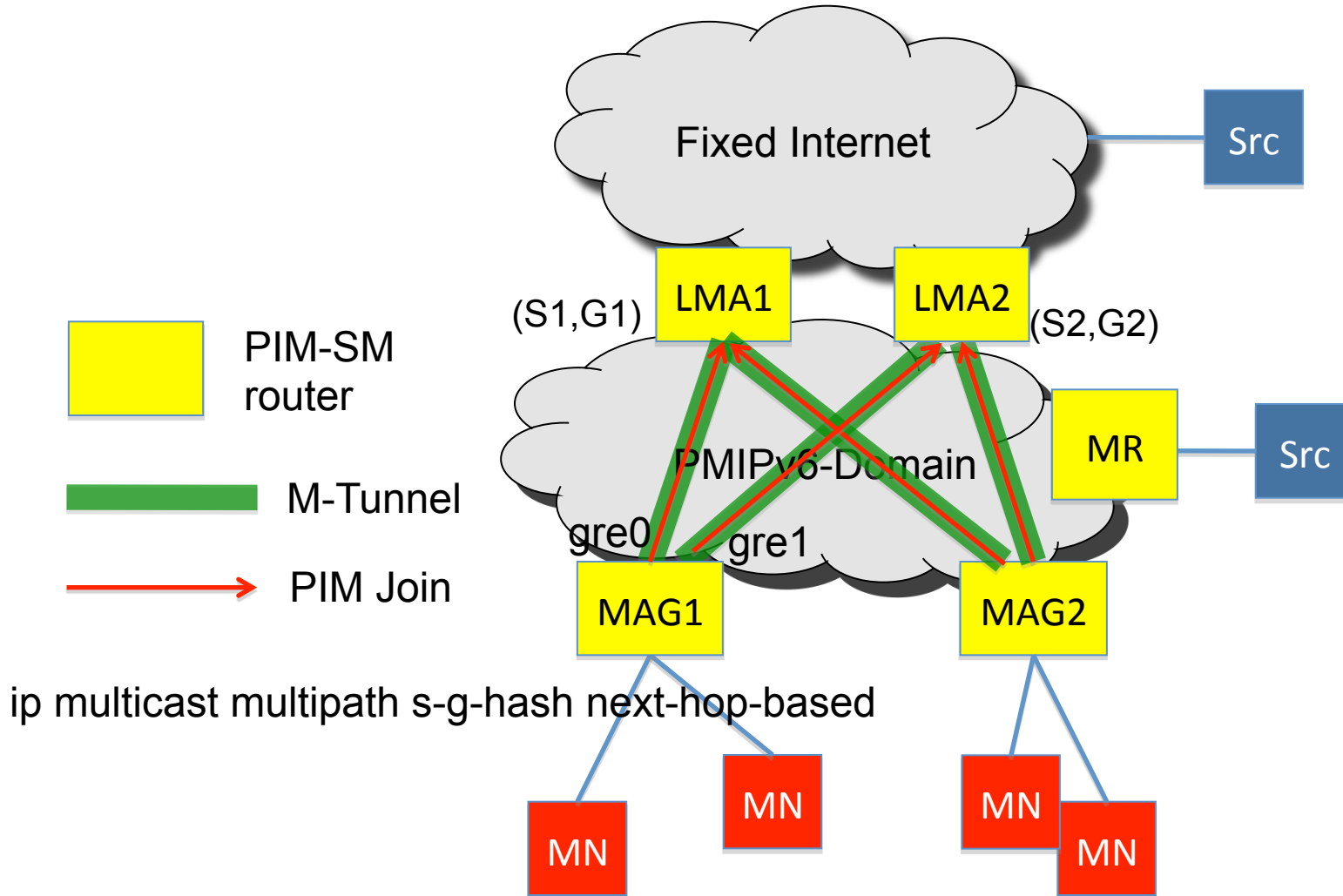
Advanced Operation – 1: M-Tunnel + Direct Routing



Advanced Operation – 2: Multiple M-Tunnels for Different Prefixes



Advanced Operation – 3: Multiple M-Tunnels by ECMP



Mobility Support

- Mobility support (i.e. seamless handover)
 - Ex. 1: With Policy Profile
 - When MN's subscribing channel list is always maintained
 - Ex. 2: With multicast extended PBU/PBA
 - draft-ietf-multimob-handover-optimization-02
 - Ex. 3: With multicast extended CXTP
 - draft-vonhugo-multimob-cxtp-extension-03

Conclusion

- This draft provides “Multicast Routing Optimization with PIM-SM”
- WG item?