PMIPv6 Extensions for Multicast

draft-asaeda-multimob-pmip6-extension-00

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Introduction

• Target
  – This document describes PMIPv6 extensions and solutions to support IP multicast communication for mobile nodes in PMIPv6-Domain

• Conditions
  – Base requirements are defined in [draft-deng-multimob-pmip6-requirement-01].
  – MLD related extensions are not discussed in this draft
    • See [draft-asaeda-multimob-igmp-mld-mobility-extensions-01]
  – Unicast communication methods or protocols assuming in [RFC5213] are not modified.
  – Seamless handover scenario is considered.
    • CXTP [RFC4067] is used in some situations.
Outline

• Local Mobility Anchor operation
  – LMA is PIM-SM router / MLD proxy / AMT relay
• Mobile Access Gateway operation
  – MAG is PIM-SM router / MLD proxy / AMT gateway
• Mobile Node operation
• Dual-Mode (i.e. both router and MLD proxy) implementation
• Handover process
• IPv4-Only and Dual-Stack Node support
PMIPv6-Domain

Fixed Internet

Local Routing

MAG

MAG

LMA

LMA

Src

Src

MN

MN

MN
Basic Protocol Sequence

Note: MAG=MLD proxy, LMA=PIM router
LMA and MAG Operations

• When LMA is PIM-SM router
  – MAG MUST be MLD proxy or PIM-SM router

• When LMA is MLD proxy
  – MAG MUST be MLD proxy

• When LMA is AMT relay
  – LMA MUST also work as PIM-SM router
    • Therefore, MAG MUST be MLD proxy or PIM-SM router
  – In addition, MAG MAY be AMT gateway
    • AMT data SHOULD not be transmitted through bi-directional tunnel between LMA and MAG, but forwarded toward LMA (i.e. AMT relay) hop-by-hop
MN Operation

• MN usually acts as a receiver host
  – Source mobility is out of scope of this draft
• When MN is MLD proxy
  – MAG MUST be MLD proxy or PIM-SM router
• When MN is PIM-SM router
  – MAG MUST be PIM-SM router
• Recommendation
  – [RFC5213] allows a mobile node is a router. However, to avoid complexity, this document recommends MN should not be a PIM-SM router but an MLD proxy, when MN needs to forward multicast data to its downstream nodes. Reasonable?
Dual-Mode Implementation

• Enabling LMA/MAG to support both PIM-SM and MLD proxy simultaneously
  – To avoid handover’s complexity, p-MAG and n-MAG MUST behave the same operation for the same MN.
Handover Scenarios

• MAG operating as MLD proxy
  – MLD listener handover with CXTP
  – MLD listener handover with MN's Policy Profile

• MAG operating as PIM-SM router
  – MLD listener handover with CXTP
  – MLD listener handover with MN's Policy Profile
Multicast Context Transfer Data Format (M-CTD)

• Receiver address (128 bits)
  • Address of a receiver host sending the Current-State Report

• Mobility option in PBU-M (following slide)
  • Filter mode
    • INCLUDE or EXCLUDE as defined in [RFC3810]
  • Source addresses and multicast address pair the receiver has joined
Proxy Binding Update with Multicast Extension (PBU-M)

- Multicast Channel Subscription Flag (add “C” flag to RFC5213)
Mobility Option in PBU-M

- When (C) flag is specified in PBU-M message, the mobility options field includes the “Multicast Address Record (i.e. (S,G) pair etc.)” inherited from MLDv2 Report format
IPv4-Only and Dual-Stack Node Support

• Use AMT
  – AMT data SHOULD not be transmitted through bi-directional tunnel between LMA and MAG, but forwarded toward LMA (i.e. AMT relay) hop-by-hop
  – Other requirements?
Next Step

• Just improve the documentation
• Add security consideration