MUP Architecture for DMM

draft-mhkk-dmm-mup-architecture-00

IETF119, DMM Working Group

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Updates: Dataplane Independent

- MUP is a Dataplane Independent Architecture
  - Not depends on any specific dataplane protocols anymore
  - I-D.mhkk-dmm-mup-architecture superseded the previous draft: “I-D.mhkk-dmm-srv6mup-architecture”
  - SRv6MUP is a MUP architecture implementation with SRv6 dataplane in the draft
    - Section 4.1: Dataplane consideration
    - Section 7: Illustrations
Updates: Architecture Principles (1)

- “Segment” defined in MUP Architecture
  - Defined as the mobile user plane abstraction in MUP architecture
  - Two types of MUP Segment defined in the draft (Section 4):
    - Interwork Segment
    - Direct Segment
  - NOTE: “Segment” can be seen in many technologies, and is defined in each technology context:
    - “Segment” in Ethernet
    - “Segment” in (Multi-Segment) Pseudo-Wire (RFC5659)
    - “Segment” in EVPN (RFC7432)
    - “Segment” in Segment Routing Architecture (RFC8402)
    - “Segment” in Network Slicing (RFC9543)
    - “Segment” in MUP Architecture (This I-D)
Updates: Architecture Principles (2)

- **MUP Segment Auto-Discovery**
  - MUP PE should be able to discover MUP Segments in the remote MUP PEs
    - MUP PE advertises auto-discovery route for hosted MUP Segments
  - MUP Segment Auto-Discovery Route (Section 5)
    - Interwork Segment Discovery (ISD) route
    - Direct Segment Discovery (DSD) route
    - Dataplane independent
    - Any dataplane specific attributes should be able to attach to the auto-discovery route
      - Service-SID in BGP Prefix-SID Attribute for SRv6MUP
      - **BGP Tunnel-encap Attribute** allows many dataplane options
# BGP Tunnel Encapsulation Attribute Tunnel Types

## Registration Procedure(s)
First Come First Served

## Reference
- RFC9012

## Available Formats
- CSV

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[https://www.iana.org/assignments/bgp-tunnel-encapsulation/bgp-tunnel-encapsulation.xhtml](https://www.iana.org/assignments/bgp-tunnel-encapsulation/bgp-tunnel-encapsulation.xhtml)
Updates: Architecture Principles (3)

- Transforms Session to Routing
  - To leverage dataplane protocol to optimize the datapath for DMM

- Session Transformed (ST) Route (Section 6)
  - MUP Controller (MUP-C) advertises following ST routes:
    - Type1 ST (ST1) Route
    - Type2 ST (ST2) Route
  - Auto-discovery route should be used to resolve reachability for the ST routes
  - ST routes should be dataplane independent as well
Reminder: DMM Requirements (RFC7333)

MUP Architecture Principles guide DMM design and operation to fulfill the Reqs

- **REQ1: Distributed mobility management**
  - IP mobility, network access solutions, and forwarding solutions provided by DMM **MUST** enable traffic to avoid traversing a single mobility anchor far from the optimal route. It is noted that the requirement on distribution applies to the data plane only.

- **REQ3: IPv6 deployment**
  - DMM solutions **SHOULD** target IPv6 as the primary deployment environment and **SHOULD NOT** be tailored specifically to support IPv4, particularly in situations where private IPv4 addresses and/or NATs are used.

- **REQ4: Existing mobility protocols**
  - A DMM solution **MUST** first consider reusing and extending IETF standard protocols before specifying new protocols.

- **REQ5: Coexistence with deployed networks/hosts and operability across different networks**
  - A DMM solution may require loose, tight, or no integration into existing mobility protocols and host IP stacks. Regardless of the integration level, DMM implementations **MUST be able to coexist with existing network deployments, end hosts, and routers** that may or may not implement existing mobility protocols. Furthermore, a DMM solution **SHOULD** work across different networks, possibly operated as separate administrative domains, when the needed mobility management signaling, forwarding, and network access are **allowed by the trust relationship between them**.
MUP Architecture designed under the principles provides:

- Independent from specific mobile service architecture
  - MUP is consumable by any mobile service architectures

- Pluggable User Plane part of mobile service architecture
  - MUP can be co-exist with genuine user plane defined in each mobile service architecture

- Independent from specific dataplane protocols
  - MUP can be implemented with any dataplane protocols
Next Step

- The co-authors will review the section contents against the architecture principles
  - Review and feedbacks from WG members should be welcome

- Update the draft to reflect the review results
  - WG adoption will be requested after the updates