LISP L2 and L3 EID mobility using a unified control plane

draft-portoles-lisp-eid-mobility-00

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Vrushali Ashtaputre
Dino Farinacci
Fabio Maino
Victor Moreno
Marc Portoles
Scope of the Draft

Implications and methods for using a common control plane to concurrently support:

• Layer 3 overlays

• Layer 3 overlays w/dispersed subnets
  – Intra-subnet across sites

• Layer 2 overlays
  – unicast and multi-destination
  – Non-IP & IP intra-subnet
  – LISP assisted ARP resolution

• EID Mobility
L3 overlays

• w/o subnet dispersion \implies RFC 6830
• subnet dispersion:
  – Subnet members dispersed across LISP sites
  – Hosts may roam to remote segments which host foreign subnets
  – Cross-site inter-subnet traffic is L3 forwarded
    • ETRs register host EIDs for their locally attached hosts
    • Cross site inter-subnet traffic is sent to the ITR’s router MAC (selective proxy reply for remote hosts)
    • Layer 3/Routing lookup at the iTR
    • TTL decrements per L3 forwarding rules

• IP traffic only: Intra and Inter subnet
L2 overlays

• Register MAC addresses as EIDs in the mapping system (EID-AFI = 6) within the scope of an Instance-ID (IID)
• L2 and L3 separation:
  – Dedicate IIDs for L2 purposes (separate from L3 IIDs)
  – IID scoped bridging map cache with MAC EIDs and IP RLOCs (separate from L3 Map Cache)
• Handle Non-IP and IP-Intra-subnet traffic
L2 overlays multi-destination traffic

• ETRs with the same Layer 2 overlay (same IID) configured will join a common L2 multicast group

• Join a replication-list for a MAC-level (S,G) per lisp-signal-free:
  – Broadcast: (0000.0000.0000/0, ffff.ffff.ffff/48)
  – Link-local Multicast: (0000.0000.0000/0, 0100.0000.0000/8)
  – Used as a flood service

• Unknown Unicast considerations:
  – Unknown status may be temporary
  – “No Action” negative map-reply cached \(\Rightarrow\) Forward to Broadcast replication-list
  – Upon discovery of unicast destination (unknown -> known)
    • Send SMR to sending ITRs
    • ITRs refresh their cache and stop flooding
L2 overlays – Intra-subnet IP and ARP resolution

- Intra-subnet IP traffic may use the L2 overlay
  - Forward on MAC addresses after ARP resolution
  - Either operate in L3 mode or L2 mode for intra-subnet traffic

- Option 1: ARP requests are flooded to all RLOCs in the Layer 2 overlay.

- Option 2: Suppress floods, use information in the Mapping System to reply to ARP requests from the ITR
L2 Overlays – LISP assisted ARP resolution

- ETRs register a MAC to IP binding for each host
- Use the IID corresponding to the layer 2 overlay
- MAC as associated data with the locator - LCAF encoded:
  \[ \text{EID} = \langle \text{afi=lcaf, instance-id-type} \rangle \langle \text{iid} \rangle \langle \text{afi=1} \rangle \langle \text{ip-address} \rangle \]
  \[ \text{RLOC} = \langle \text{afi=lcaf, afi-list-type} \rangle \]
  \[ \langle \text{afi=1} \rangle \langle \text{rloc-ip-address} \rangle \]
  \[ \langle \text{afi=lcaf, encap-format-type} \rangle \langle \text{vl} \rangle \langle \text{rloc-ip-address} \rangle \]
  \[ \langle \text{afi=6} \rangle \langle \text{mac-address} \rangle \]
- Upon Reception of ARP request, an ITR ARP agent will:
  - Cache ARP request
  - Issue Map Request for EID = IP in IID = Layer-2-overlay
  - Cache map-reply in ARP-cache for future replies
  - Assemble an ARP reply with the resolved host source addresses
  - On negative Map Reply fall back to flooding ARP
Next steps

• Review of the draft by WG
• Decision on where to document mobility
  – Part of this draft
  – Separate mobility draft