LISP for the Satellite Network

draft-farinacci-lisp-satellite-network-01

IETF London
November 2022

Dino Farinacci, Victor Moreno, Padma Pillay-Esnault
High-Level Goals

• The LISP overlay can run over any IP packet delivery underlay

• If a satellite network can deliver IP packets, we can have a LISP overlay run over it

• Very much like how LISP runs over the (capital-I) Internet, the 3GPP network, the ICAO network
How it Works

• There is no **EID** state in the satellite network underlay

• The satellite network is unaware of the LISP overlay running over it

• The overlay requires the underlay to deliver packets to **RLOC** addresses the underlay can route to

• The underlay network can transport **IPv4** or **IPv6** packets and can be dual-stack

• When path optimization in the underlay is available, an **RLOC**-record can be a **source-route** of satellite node hops
How it Works

Overlay on Earth, Underlay in Space

LISP runs here
Features

- **EIDs** can roam among GS-xTRs and keep connections up per `draft-ietf-lisp-eid-mobility` and could get zero-packet loss roaming per `draft-ietf-lisp-predictive-rlocs`.

- GS-xTRs can load-split traffic across different **RLOCs** on the satellite network (or across RLOCs in space and terrestrial RLOC links).

- All packets encapsulated over satellite network are encrypted per `draft-ietf-lisp-crypto` [RFC 8061].

- GS-xTRs can be used as alternate paths per `draft-ietf-lisp-te` when ISLs are not available:
  - (xTR-up => sat => ISL => sat => down-xTR)
  - (xTR-up => sat => down-RTR-up => sat => down-xTR)

- GS-xTRs can do telemetry measurements on the satellite network underlay per `draft-farinacci-lisp-telemetry`.

- GS-xTRs can offer an **EID** multicast service by doing head-end-replication or using any underlay multicast service per `draft-ietf-lisp-signal-free-multicast` [RFC 8378].

- **EIDs** can talk to non-EIDs via `draft-ietf-lisp-interworking` [RFC 6832] when either non-EIDs are reachable via the satellite network of the terrestrial network.
Changes to -01

- Clarify the mapping system can run on the ground when a GS-xTR has no terrestrial links
- Added test scenarios
Test Scenarios - Direct

Figure 2: Each GS-xTR is one-hop away on WiFi Network

Figure 3: Each GS-xTR is one-hop away on WiFi Network
Test Scenarios - Sat to Earth

Figure 4: GS-xTR on WiFi Network to LISP-xTR in VM
Test Scenarios - Interworking

Figure 5: GS-xTR and Host one-hop away on WiFi Network

Figure 6: GS-xTR onn WiFi to non-LISP-Host in VM
Test Scenarios - EID Mobility

Figure 7: Each GS-xTR is one-hop away on WiFi Network
LISP for Satellite Networks
draft-farinacci-lisp-satellite-network-01

Abstract

This specification describes how the LISP architecture and protocols can be used over satellite network systems. The LISP overlay runs on earth using the satellite network system in space as the underlay.

Should we make draft a Working Group document?