Multi-Access Multi-Use SD-VAN

LISP WG IETF Yokohama
Sharon Barkai

- LISP Nexgon Informational
- LISP PubSub Standard Track
- LISP and IPSec Standard RFCs
- RFC 8378 SFMCAST Experimental
Multi-Access Multi-Use

Identity Location Connectivity:
- Infotainment connected to Internet
- Using OEM public IP address space
- Vehicles toggle wifi/cellular RLOC
- Seamless to the Internet sessions

Function Location Delegation:
- Dynamic Mapping while Driving
- Regional Inference while Parked
- H3 based EIDs of Edge Geo Agents
- Ephemeral EIDs of Far-Edge Agents

Network Virtualization Overlays (NVO)

Network Function Distribution (NFD)
Multi-Access Multi-Use SD-VAN

OEM Address
Space EIDs

Ephemeral EIDs
NVIDIA SOC + XTR

WiFi/Cellular
Access RLOC

Internet Subnets

NVO

BGP

OEM Subnets

LISP-Nexagon

NFD

HID.FID EIDs

Multi Use

Geo Location

Edge Agents

CDN VPC

ScaleOut RFC9300

RTR

LISP/BGP Catalyst
Automotive Network Functions

- Immediate && Multi-Vehicle
  - Agents consolidate Vehicle Perception AI while driving => Dynamic Maps
  - Agents delegate Vehicle Perception HW while parked => Regional Inference

If Immediate && ! Multi => Vehicle
If Multi && ! Immediate => Cloud
Automotive Network Functions

**Automotive Edge Agents**

<table>
<thead>
<tr>
<th>Observed Entity</th>
<th>Digital Entity</th>
<th>Connection</th>
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<tbody>
<tr>
<td>Locations current Conditions</td>
<td>Location Edge Agents</td>
<td>SD-VAN DFV: Vehicles &lt;&gt; Edge Agents</td>
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<tr>
<td>Through Driving Vehicles</td>
<td>Delegation Edge Agents</td>
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<tr>
<td>Virtual Clusters of AI Models</td>
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<tr>
<td>Across Parked Vehicles</td>
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**Datamodel**

- Enumerated Tiles
- Behavior & Routes
- AI Model & Capacity per Vehicle & regional Agent

**Services**

- Mapping
- Notifications
- Navigation
- Reflecting Models and Capacities per area
- Steering RPC to Vehicles

**Diagram**

- Geolocation and Delegation Agents at Edge Location 1
- Multi-Use Overlays Vehicular Edge Network
- Realtime HDMappi and Intelligent Driving

- In-Vehicle Far-Edge Agents
- In-Vehicle Far-Edge Agents
Ex: Large Language Models

Perception AI: Media to Language While Driving
Delegated AI: Language-Language While Parked
In this use case the vehicular edge network executes LLM RPC using shared-perception edge/far-edge resources.

**Resources**
- Edge/Far-Edge Compute
  - In-Vehicle 100 TOPS/GB-RAM In-Vehicle SOC
  - Metro-area data-center locations GPUs/CPUs
- Software Agents
  - In-vehicle Perception and LLM-RPC agents
  - Edge Geolocation and Delegation Agents
- Dataflow (On-Path) Virtualization Overlays
  - DFV GWs steering/tracking/encapsulating flows
  - Endpoint Identity to current IP Mapping system

**Requirements**
- Track Driving/Parked Vehicles GeoLocation/ In Memory-Model
- Dynamically Rearrange Geolocation / Delegation Agents Mix
- Consolidate Driving Vehicles Perception in Geolocation Agents
- Steer LLM-RPC calls to Parked Vehicles by Delegation Agents

https://aecc.org/proof-of-concepts/