Layer-3 Accessible EVPN Services

[draft-wang-bess-l3-accessible-evpn]

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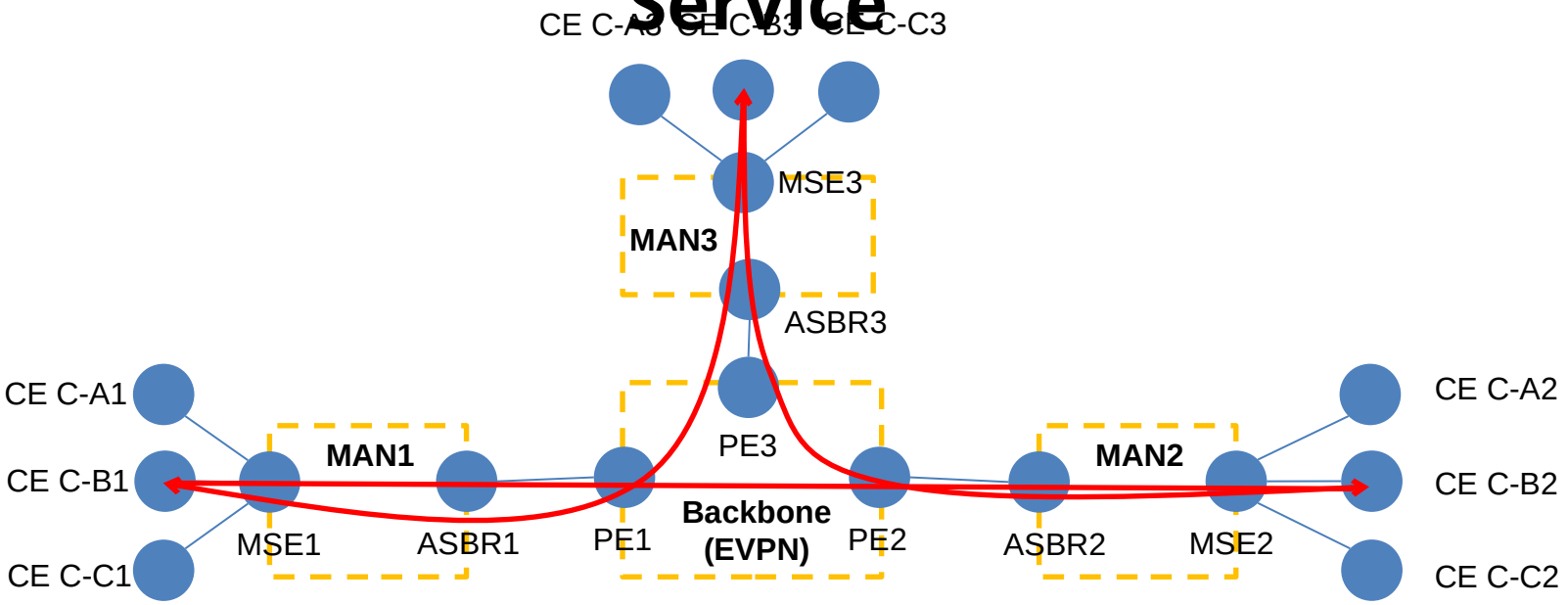
- Recap of the Proposed Solutions
- Summary of Discussions after IETF 123
- Further Action

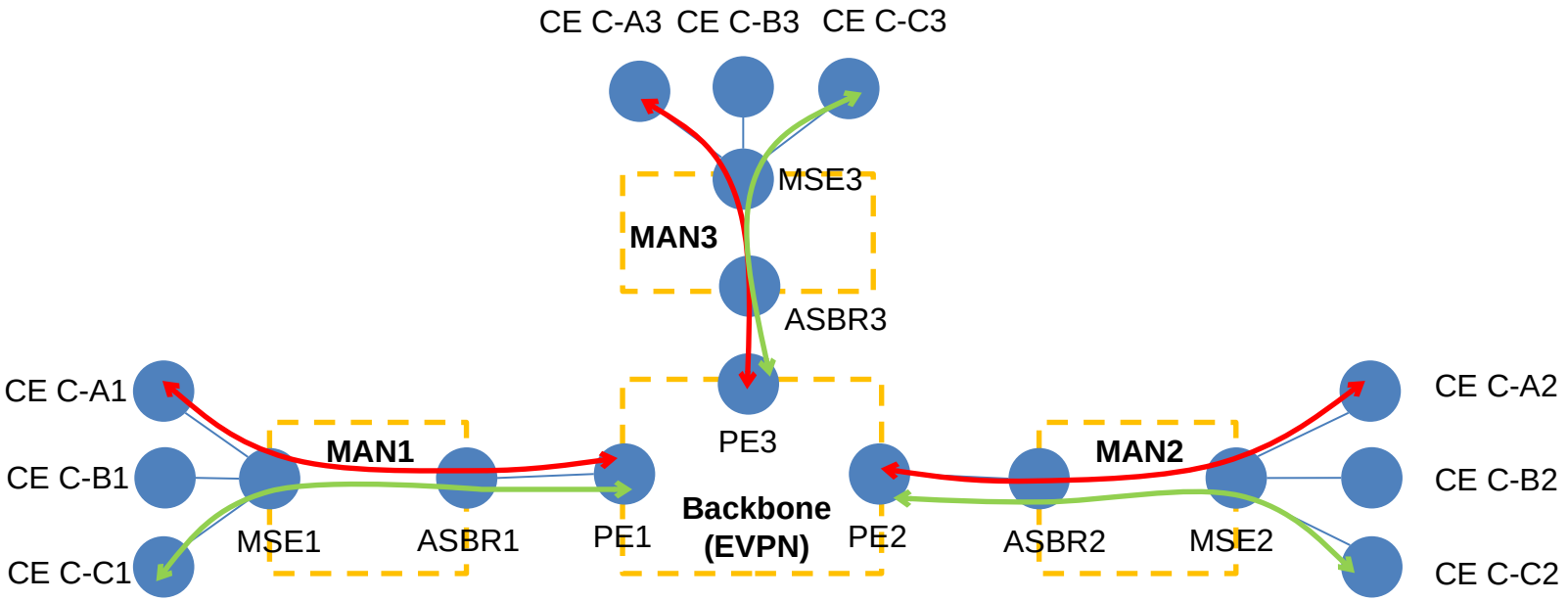
Requirements for Layer-3 Accessible EVPN Service



- Backbone is EVPN domain, and MAN1-3 are Layer-3 network.
- Customer C has different branches that located in sites under different MANs(Metro Area Network).
- Customer C buys the EVPN service within the backbone from the service provider.
- Customer C wants its branches in different sites(C-A1/C-A2/C-A3) communicates in layer 2 mode, and keep the traffic isolation among different branches(C-A, C-B, C-C).

- QinQ communication style requirement

Solution for Layer-3 Accessible EVPN Service



- We connect the sites under the MAN to the Backbone EVPN, via one pseudo wire(for example, VxLAN) to transport the Ethernet frame to the PE of the Backbone EVPN.
- The identification of pseudo wire(LSI, Logical Session Identifier) can be used to differentiate the traffic from customer's different branches.

- LSI aware bundle service------Encapsulation the customer LSI/VNI information within the backbone EVPN encapsulation

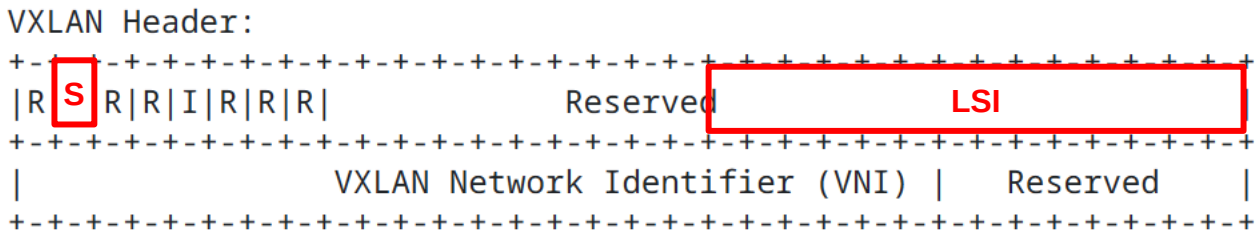
Summary of Discussions after IETF 123

- **Lots of discussions about other possible solution:**
  - RFC 9784(Virtual Ethernet Segments for EVPN and Provider Backbone Bridge EVPN)/Sasha
    - it is similiar approach, but is suitable for MPLS network
  - RFC 8214(Virtual Private Wire Service Support in Ethernet VPN)/Ali
    - Mainly for the P2P communication
  - core-VNI+VLAN ID or one core-VNI per BD/Ali
    - customer packet have no VLAN ID info.
    - one core-VNI per BD is difficult to associate the traffic from different branches of one customer together

- **RFC 7432(6.3 VLAN-Aware Bundle Service Interfaces)**
  - The advertising PE MAY advertise the MPLS Label1 in the MAC/IP Advertisement route representing ONLY the EVI or representing both the Ethernet Tag ID and the EVI.(Jeffrey)
  - Control Plane can achieve the VLAN-aware bundle service. Data Plane can't
- **Double VxLAN encapsulatioin/Selvakumar Sivaraj**
  - It is impractical----Ingress PE must decapsulation the incoming VxLAN first

- **Conclusion:**
  - For VLAN aware bundle service, there is no "bundle" identifier in the data

Forwarding Plane Extension for LSI-Aware Bundle Service



The extensions to VxLAN header(Based on RFC 7348)

- For LSI-Aware Bundle Service, if the customer want to differentiate the traffic from its different branches, there should be indicator(LSI) within the VxLAN header.
- We define one flag “S” from the reserved bits of the current VxLAN header, to indicate the last 16 bits of first 4-bytes indicates the value of “LSI”.

Control Plane Extensions for LSI-Aware Bundle Service

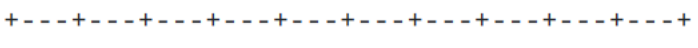


Figure 5: The format of new ESI type

Where:

* T (1 octet): specify the ESI Type. The recommended value is 0x06.

* CE Identifier (3 octets): the route ID/IPv4 address of CE.

* LSI (2 octets): the LSI information.

Control Plane Extensions for LSI-Aware Bundle Service

- We propose to define one new type of ESI(Ethernet Segment Identifier) to transfer the LSI information, that associated with the destination MAC address advertisements.

Further Action

- Request WG Adoption Call.

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Backup Slides

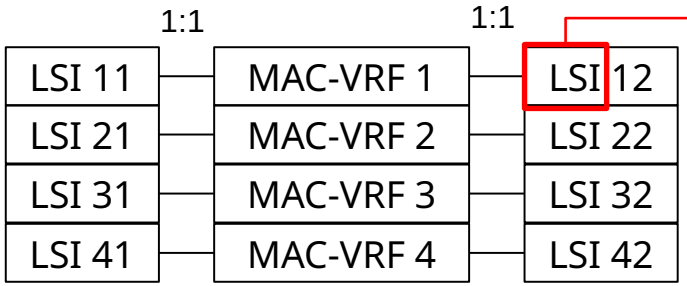
Gap analysis

- **L3 Accessible EVPN vs EVPN**
  - L3 Accessible EVPN is designed for scenarios where **CE-PE needs to cross a Layer-3 network**.
  - EVPN is designed for scenarios where customers directly access the provider's PE **through Layer-2 links**.

- **L3 Accessible EVPN vs EVPN-VPWS**
  - EVPN-VPWS provides **point-to-point** Layer-2 dedicated line connections by advertising Ethernet A-D routes through BGP, without handling traffic isolation for multiple customers on the same PE.
  - L3 Accessible EVPN focuses on traffic isolation for **multipoint-to-multipoint** customers accessing the same PE through a Layer-3 network, achieving logical isolation of different customers' Layer-2 traffic via LSI/MAC-VRF mapping.

- **L3 Accessible EVPN vs EVPN-Etree**
  - EVPN-ETree supports **point-to-multipoint** tree-shaped topologies, optimizing traffic forwarding to reduce duplicate traffic.
  - L3 Accessible EVPN aims at isolating traffic for **multipoint-to-multipoint** connections in Layer-3 network, dividing logical planes through LSI and MAC-VRF mapping to prevent intercommunication of different customers' traffic.

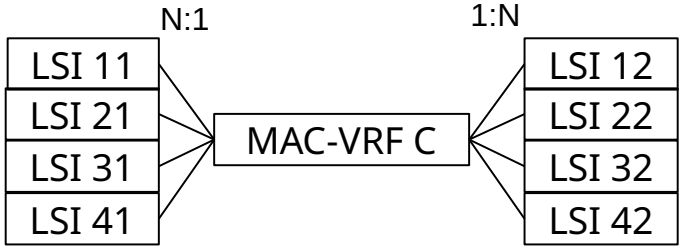
Layer-3 Accessible Interfaces for EVPN Services



LSI-Based Service Interface

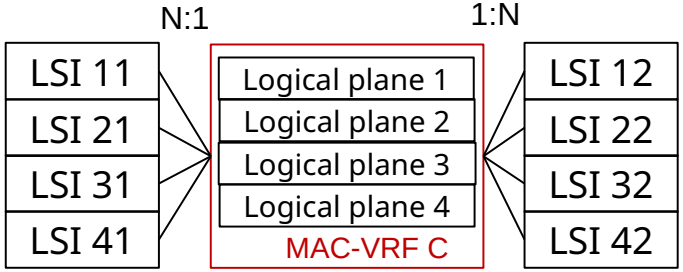
LSI: Logical Session Identifier, for example VNI.

- 1:1 mapping between LSI and MAC-VRF
- Each MAC-VRF has a single broadcast domain



LSI-Bundle Service Interface

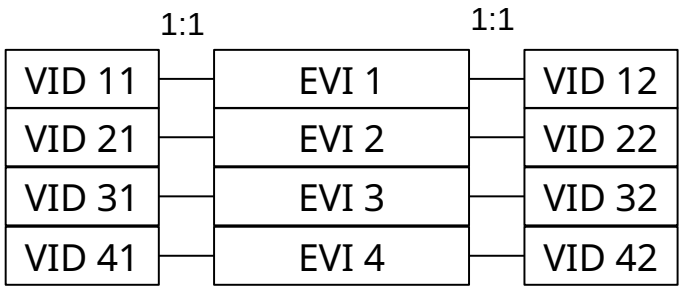
- N:1 mapping between LSI and MAC-VRF
- Each MAC-VRF has a single broadcast domain
- MAC address MUST be unique



LSI-Aware Bundle Service Interface

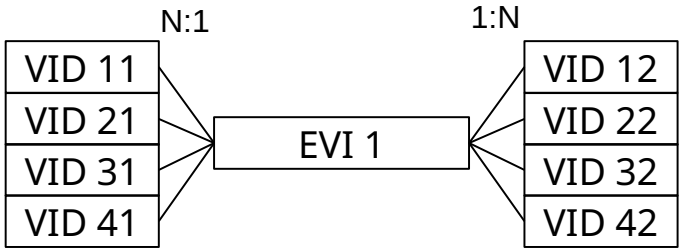
- N:1 mapping between LSI and MAC-VRF
- Each MAC-VRF has multiple broadcast domain
- MAC address can overlap
- 1:1 mapping between LSI and broadcast domain

Layer-2 Accessible Interfaces for EVPN Service



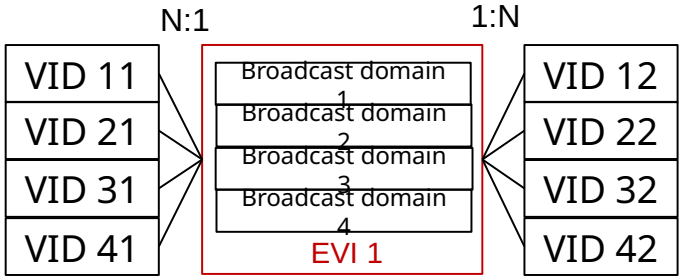
VLAN-Based Service Interface

- 1:1 mapping between VID and EVI
- Each EVI has a single broadcast domain



VLAN-Bundle Service Interface

- N:1 mapping between VID and EVI
- Each EVI has a single broadcast domain
- MAC address MUST be unique



VLAN-Aware Bundle Service Interface

- N:1 mapping between VID and EVI
- Each EVI has multiple broadcast domains
- MAC address can overlap
- 1:1 mapping between VID and Broadcast domain