

EVPN Route Types and Procedures for EVN6 draft-xie-bess-evpn-extension-evn6-00

Chongfeng Xie(Presenter) China Telecom

Jibin Sun China Telecom

Xing Li CERNET Center/Tsinghua University

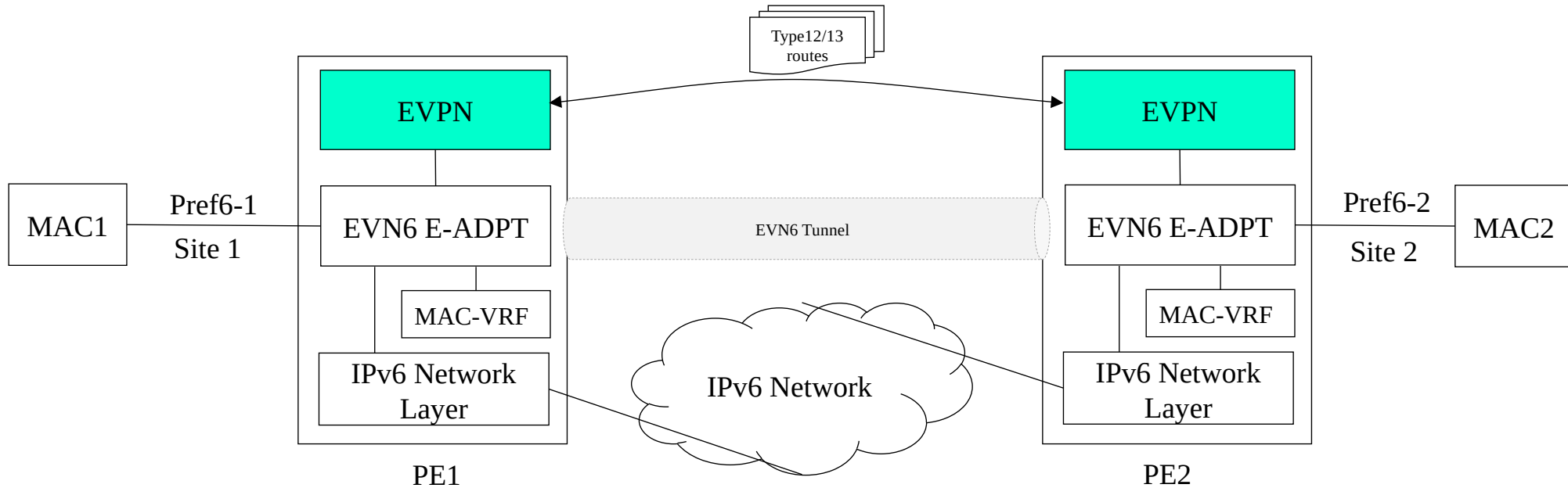
Guoliang Han Indirection Network Inc.

IETF 121 , November 2024

Overview

- EVN6 is a mechanism designed to carry Ethernet virtual networks, providing Ethernet connectivity between customer sites dispersed on public IPv6 networks.
- EVN6 directly places the Ethernet frames in the payload of IPv6 packet, and dynamically generates the IPv6 addresses of the IPv6 header using host MAC addresses and other information.
- For dynamic creation of EVN6 network instances, draft-xie-bess-evpn-extension-evn6 introduces the extensions of EVPN [RFC7432], including two newly defined route types and the related processes.

Overall Architecture



- The EVN6 tunnel can be dynamically created using BGP EVPN as the Control Plane. To support the operation of EVN6, the following new route types, i.e. Type 12 route and Type 13 route are defined.
- **Type12.** EVN6 Auto-Discovery Route (tentative name)
- **Type13.** MAC/IPv6 Advertisement Route (tentative name)

EVPN Type 12 Route

- EVPN Type 12 Route is used to advertise VEI and IPv6 mapping prefix allocated by PE for virtual network between PEs, to establish a head end replication list, which is used for automatic discovery of PE and dynamic establishment of EVN6 tunnel.

	Field name	Value (Example)
	Route Type	12
	Route Distinguisher (8 Bytes)	1:10
EVPN	Virtual Ethernet Identification (4 Bytes)	100
NLRI	IPv6 Mapping Prefix length (1 Bytes)	64
	IPv6 Mapping Prefix (16 Bytes)	3010::

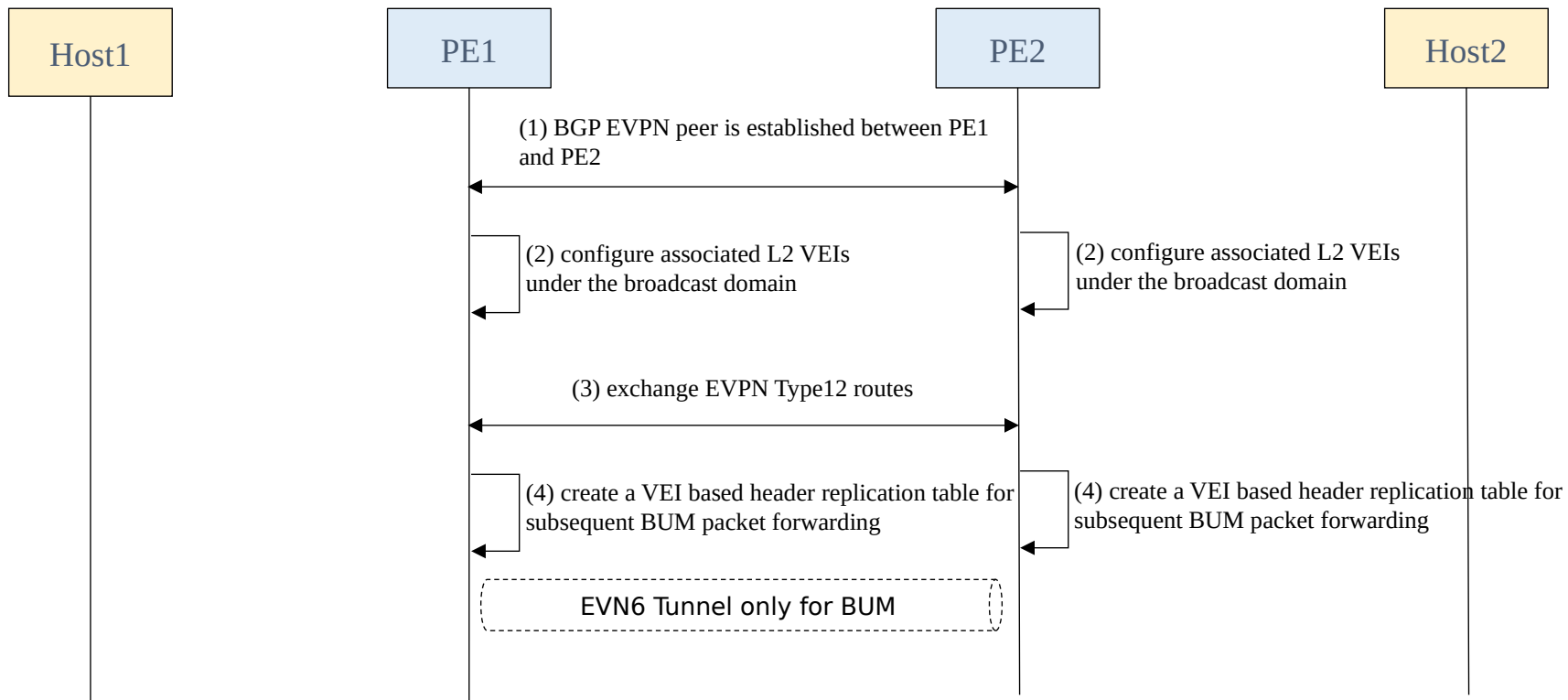
EVPN Type 13 Route

- EVPN Type 13 route is used to advertise the MAC address and IPv6 address of the host between PE peers, and to dynamically establish control plane entries at both ends of the tunnel.

	Field name	Value (Example)
	Route Type	13
	Route Distinguisher (8 Bytes)	1:10
	Ethernet Segment Identifier (10 Bytes)	0
EVPN NLRI	MAC Address Length (1 Bytes)	48
	MAC Address (6 Bytes)	MAC1
	IPv6 Address Length (1 Bytes)	64
	IPv6 Address (16 Bytes)	1::1:A
	Virtual Ethernet Identification (4 Bytes)	100

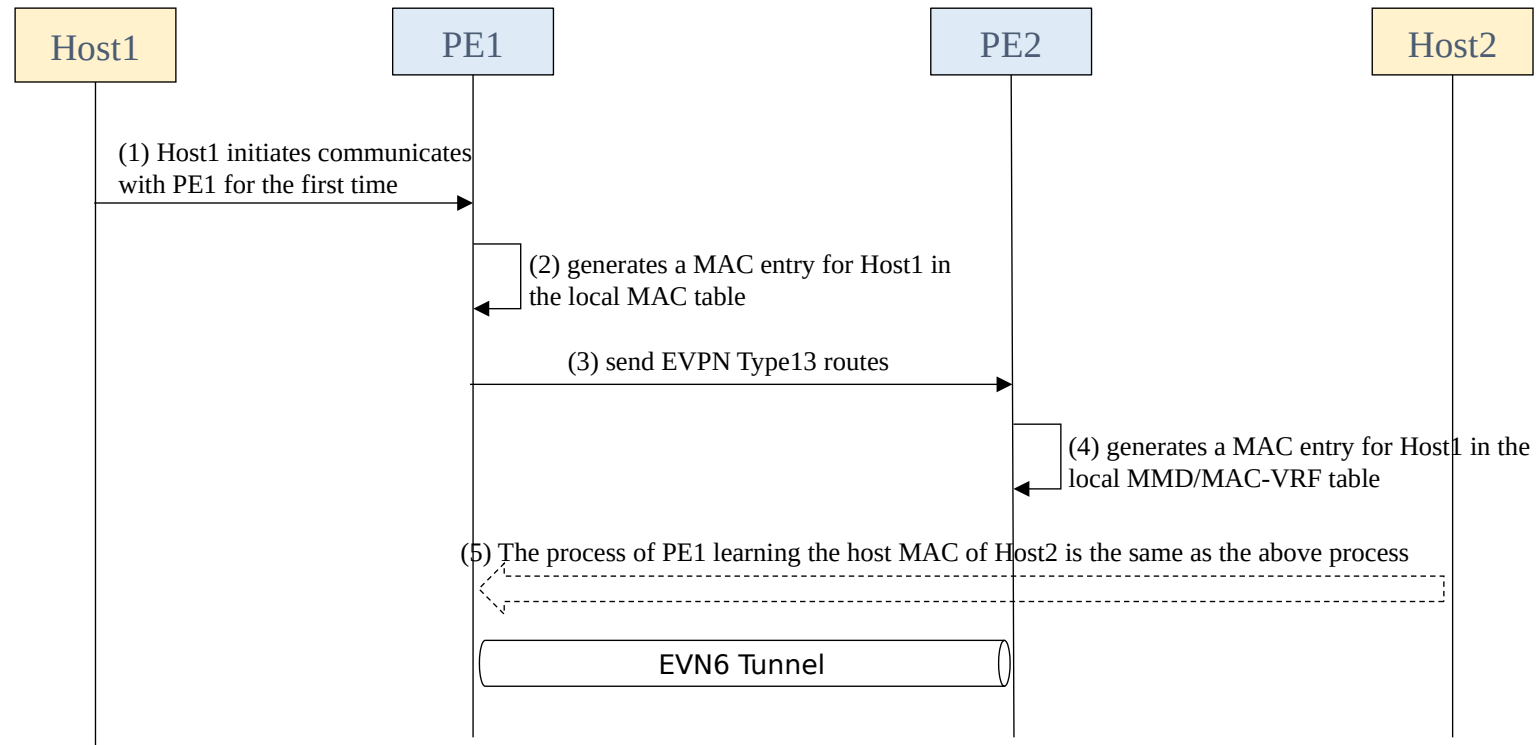
Step1. EVN6 Tunnel Setup for BUM Traffic

- Broadcast, unknown-unicast and multicast (BUM) traffic refers to that kind of network traffic that will be forwarded to multiple destinations or that cannot be addressed to the intended destination only.



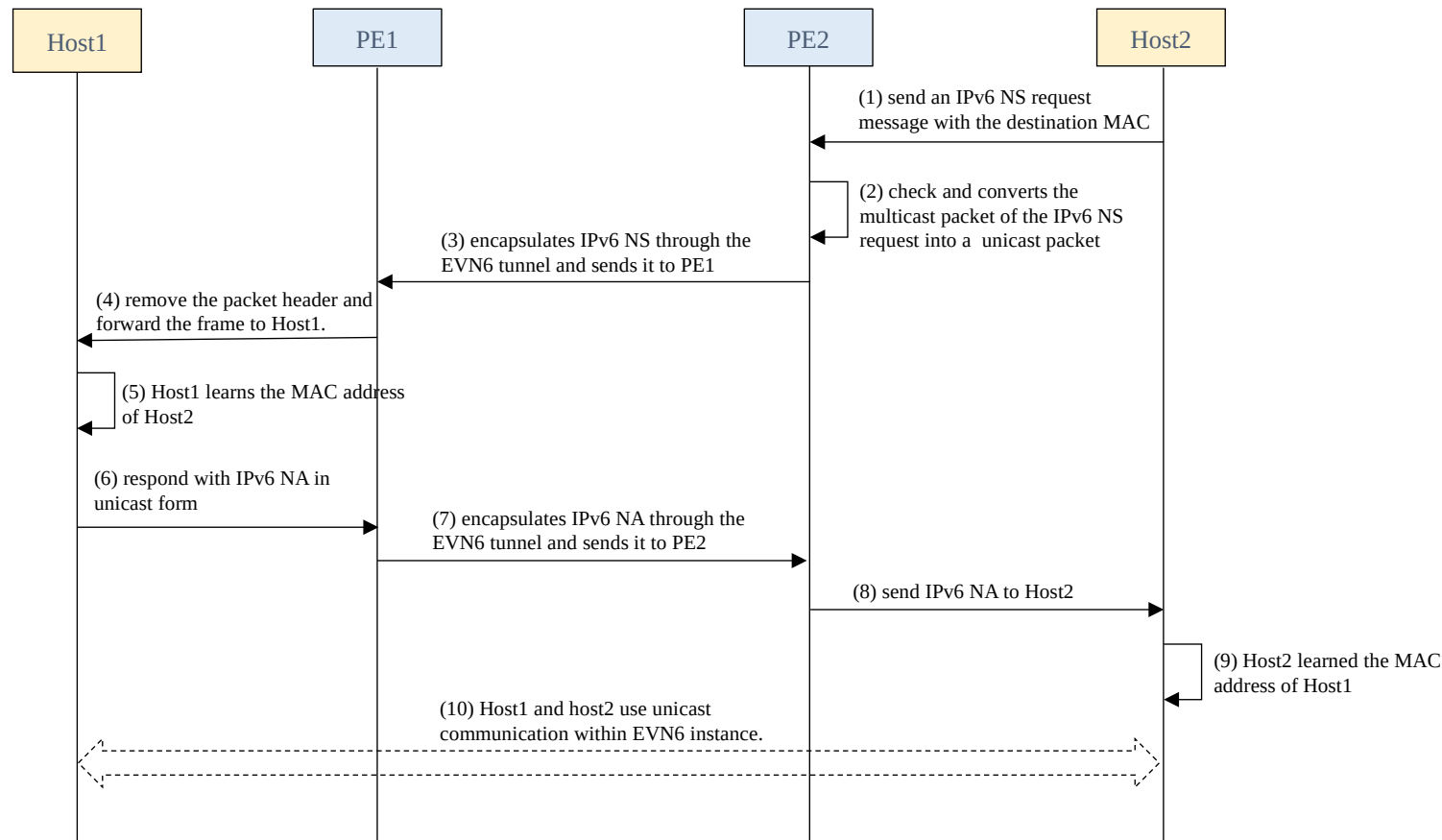
Step2. Host Entry Generation in MMD/MAC-VRF

- The general EVN6 tunnel is designed for unicast Ethernet frame forwarding. The prerequisite for establishing a universal EVN6 tunnel is to generate Host MAC mapping entry in MMD/MAC-VRF table, which is achieved by dynamically exchanging Type 13 route.



Step3. Ethernet Frame Transmission

- This process is about hosts sending Ethernet frames to each other. Hosts at different sites can transmit unicast Ethernet frame to each other through the EVN6 virtual network.



Characteristics

- EVPN is a universal Control Plane protocol that can be combined with various Data Plane technologies (including MPLS, SRv6, VxLAN, etc.) to achieve a complete forwarding and control separation SDN solution.
- As the control layer of EVN6, EVPN has the following advantages:
 - (1) EVPN can automatically establish EVN6 Tunnel, thereby reducing the complexity of network operation and improving network scalability.
 - (2) EVPN can automatically announce IP, MAC, VEI, and host routing information, effectively reducing BUM flooding traffic.

Next Steps

- System implementation and field trial.
- Comments and suggestions are welcome, and make further refinement to improve the document.
- Authors would like to ask for WG adoption of this document.

Thank you !
Q&A