

IPv4 IPv6 Only PE Design & ALL SAFI Supported

`draft-ietf-bess-v4-v6-pe-all-safi-01`

IETF 120



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Updates

- Added section on SRv6 uSID applicability VPN overlay stitching
- Types SAFI (SAFI with Route Types) are data plane agnostic due to the IPv4 and IPv6 NLRI being in the data plane field and not directly in the NLRI and thus are not applicable to IPv4 Only PE Design & IPv6 Only PE Design
- Updates on testing - Juniper & Nokia are 100% completed all testing
- Cisco is planning to complete very soon
- Huawei testing waiting on ETA for completion
- Arista - no progress and will remove from draft

IPv6-Only PE Design Testing update / IPv4-Only PE Design Testing Update:

Vendors: Cisco, Juniper, Nokia, Arista, Huawei

Hardware Platforms, Router Code Revision & Testing Updates:

Vendors: Cisco, Juniper, Nokia, Arista, Huawei

Code & Platform chosen for testing platform by Vender

Cisco: Edge Router- XR ASR 9910 IOS XR 7.4.1, Core Router- NCS 6000
7.2.2, CRS-X 6.7.4

Update: Testing in progress. **Plan to be completed Fall 2024**

Vendor specific knob for forwarding IPv4 packets without IPv4 address configured on interface which is required for IPv6-Only PE design.

Juniper: Edge Router- MX platform MX480, MX960, Core Router- PTX
Platform PTX5000, PTC10K8 (JUNOS and EVO) Release 20.4R2

Update: All unicast testing is completed – **Testing is 100% completed**

Vendor specific knob exists for forwarding IPv4 packets without IPv4 address configured on interface required for IPv4-Only PE design & IPv6-Only PE design.

Nokia: Edge and Core-7750 Service Router, Release R21

Update: All unicast testing is completed – **Testing is 100% completed**

Vendor specific knob exists for forwarding IPv4 packets without IPv4 address configured on interface which is required for IPv6-Only PE design.

Huawei: Edge and Core-VRPv8, Release VRP-V800R020C10

Update: Huawei supports RFC 5549 & RFC 8950 and all 12 test cases confirmed supported with R&D team. **Requesting ETA for completion**

Vendor specific knob exists for forwarding IPv4 packets without IPv4 address configured on interface which is required for IPv6-Only PE design.

Typed NLRI Update Section

Below is a list of Typed NLRI SAFI

- MCAST VPN [RFC 6513 / RFC 6514]
- MCAST VPLS [RFC 7117]
- EVPN [RFC 7432]
- BGP-LS [RFC 7752]
- CAR (Color Aware Routing) [draft-ietf-idr-bgp-car-10]

With typed SAFI the data plane is
Instantiated due natively
separate control plane & data plane

IPv4 Only PE ⇔ Single IPv4 peer

IPv6 NLRI over IPv4 NH

Typed NLRI – since data plane independent

Does not need IPv6 data plane forwarding

(IPv4 Only PE Not Applicable)

Non Typed NLR – control plane & data plane
are in-line directly dependent

(IPv4 Only PE Applicable)

IPv6 Only PE ⇔ Single IPv6 peer (RFC 8950)

IPv4 NLRI over IPv6 NH

Typed NLRI – since data plane independent

Does not need IPv4 data plane forwarding

(IPv6 Only PE Not Applicable)

Non Typed NLR – control plane & data plane
are in-line directly dependent

(IPv6 Only PE Applicable)

Typed NLRI have the following format:

MP BGP AFI/SAFI

Route Type

Length

Route Type Specific (NLRI Data Field)

Typed Data Plane agnostic

IPv4 / IPv6

NLRI can be both carried
in the Data field of the NLRI

Making it - Data Plane Transport
independent

(RFC 8950 still comes into
play for next hop encoding)

Non Typed NLRI have the following format:

(Example: IP VPN RFC 4364)

MP BGP AFI/SAFI

NLRI Data

IPv4 / IPv6

NLRI is carried
directly in NLRI and thus is
Data Plane Transport
dependent

(RFC 8950 comes into play
For next hop encoding)

For Non Typed SAFI the NLRI data is encoded
directly into the NLRI

Non Typed is Data Plane dependent

SRv6 Compression (C-SID Next SID Endpoint Behavior Test cases Section)

SRv6 uSID Test Scenario's:

#1 SRv6 Core – Global Table Inter-AS PE-PE (4PE) - SRv6 Enabled on Inter-AS PE's

Mirror of test #9 IPv6 Core Global Table Inter-AS 4PE but now with SRv6 enabled
Test #9 Global table Option B (4PE) for Unicast

#2 SRv6 Core – Global Table Inter-AS PE-PE (4PE) - SRv6 Disabled on Inter-AS PE's

Mirror of test #9 IPv6 Core Global Table Inter-AS 4PE but now with SRv6 disabled
Test #9 Global table Option B (4PE) for Unicast

#3 SRv6 Core – IP VPN Inter-AS PE-PE - SRv6 Enabled on Inter-AS PE's (eBGP Next Hop Unchanged)

Mirror of test #11 IPv6 IP VPN Inter-AS but now with SRv6 enabled
Test #11 L3 VPN Inter AS Option B (Unicast)

#4 SRv6 Core – IP VPN Inter-AS PE-PE - SRv6 Disabled on Inter-AS PE's (eBGP Next Hop Unchanged)

Mirror of test #11 IPv6 IP VPN Inter-AS but now with SRv6 disabled
Test #11 L3 VPN Inter AS Option B (Unicast)



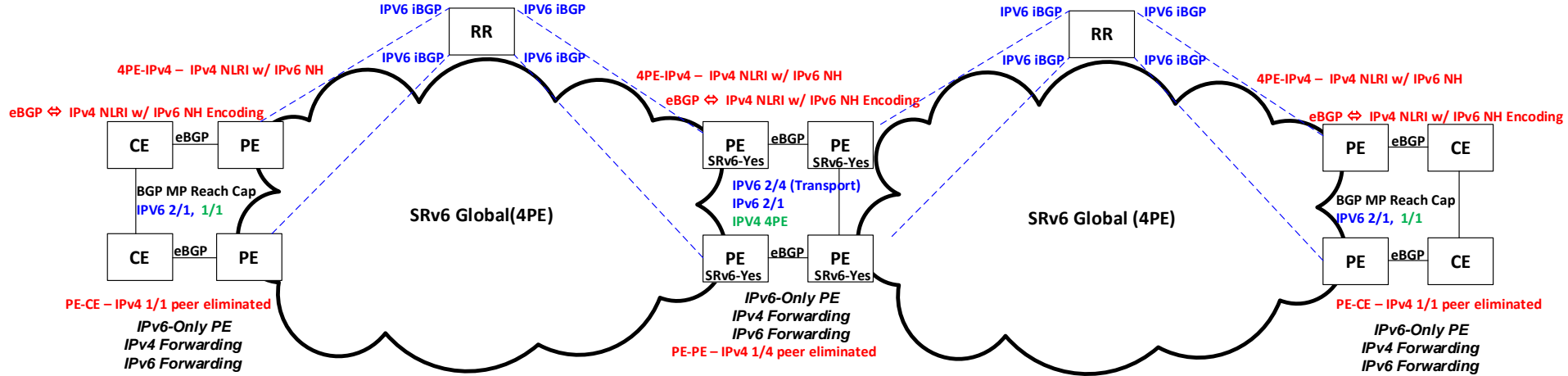
**POC Testing almost finished
Planning for Fall WGLC**

Thank You!



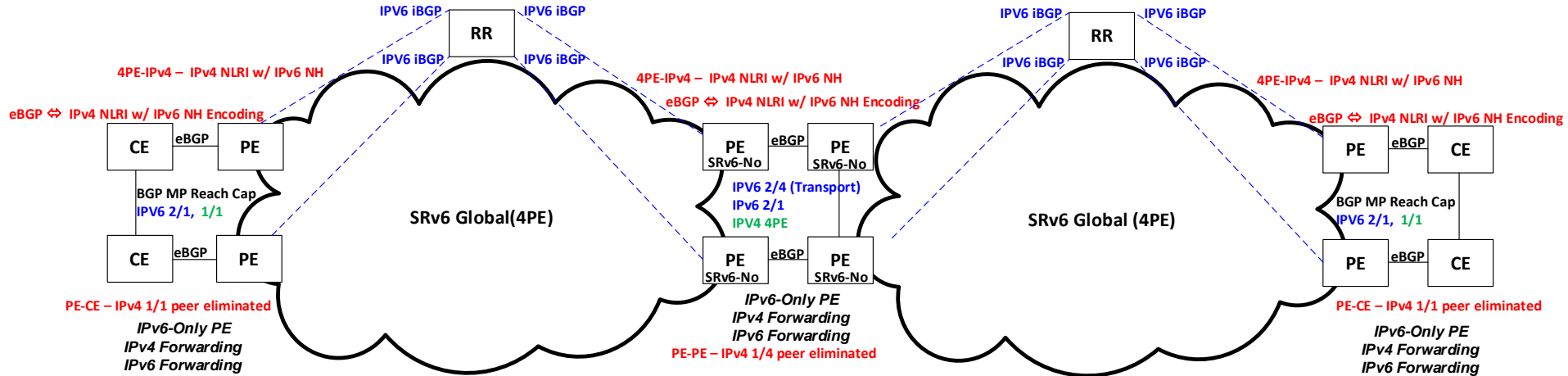
Test #1 SRv6 uSID Global Table w/ SRv6 Aware Inter-AS PE

SRv6 Global w/ IPv6 Only PE (4PE) (Inter-AS PE is SRv6 Aware) IPv6-Only PE Design "IPv6-Only Core" – Inter-AS Option B – 4PE (Test #9)



Test #2 SRv6 uSID Global Table w/ SRv6 Unaware Inter-AS PE

SRv6 Global w/ IPv6 Only PE (4PE) (Inter-AS PE is SRv6 Unaware) IPv6-Only PE Design "IPv6-Only Core" – Inter-AS Option B – 4PE (Test #9)



Test #3 SRv6 uSID IP VPN w/ SRv6 Aware Inter-AS PE

SRv6-VPN w/ IPv6 Only PE (Inter-AS PE is SRv6 Aware) IPv6-Only PE Design "IPv6-Only Core" – Inter-AS Option B (Test #11)

AFI/SAFI tested:

SAFI = 1 -Unicast

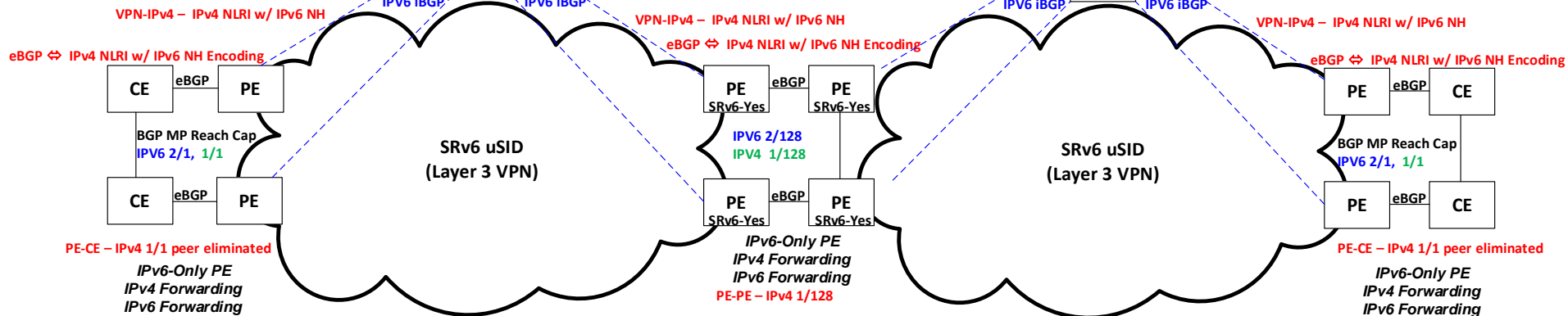
SAFI = 128 -VPN

BGP MP Reach Cap
VPN-IPv4 1/128
VPN-IPv6 2/128,

BGP MP Reach Cap
VPN-IPv4 1/128
VPN-IPv6 2/128,

BGP MP Reach Cap
VPN-IPv4 1/128
VPN-IPv6 2/128,

BGP MP Reach Cap
VPN-IPv4 1/128
VPN-IPv6 2/128,



Test #4 SRv6 uSID IP VPN w/ SRv6 Unaware Inter-AS PE

SRv6-VPN w/ IPv6 Only PE (Inter-AS PE is SRv6 Aware) IPv6-Only PE Design "IPv6-Only Core" – Inter-AS Option B (Test #11)

AFI/SAFI tested:

SAFI = 1 -Unicast

SAFI = 128 -VPN

BGP MP Reach Cap
VPN-IPv4 1/128
VPN-IPv6 2/128,

BGP MP Reach Cap
VPN-IPv4 1/128
VPN-IPv6 2/128,

BGP MP Reach Cap
VPN-IPv4 1/128
VPN-IPv6 2/128,

BGP MP Reach Cap
VPN-IPv4 1/128
VPN-IPv6 2/128,

