Connect IPv4 Islands over IPv6 Core (4PE)
draft-mishra-idr-v4-islands-v6-core-4pe-00

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Motivations & Goals of this draft

RFC 4798 (6PE) Connect IPv6 Islands over IPv4-Only core

- Mechanism using BGP labeled unicast RFC 3107 to connect IPv6 islands over an IP4 core.
- Based on softwire mesh framework RFC 5565 6to4 softwire where IPv6 packets are tunneled over an IPv4-Only core.
- Ingress PE signals to egress PE for BGP IPv6 labeled unicast to carry IPv6 prefixes.
- BOS S-bit set for service label, added to the stack to carry IPv6 labeled prefixes

New Draft (4PE) Connect IPv4 Islands over IPv6-Only core

- Mechanism using BGP labeled unicast RFC 3107 to connect IPv4 islands over an IP6 core.
- Based on softwire mesh framework RFC 5565 6to4 softwire where IPv4 packets are tunneled over an IPv6-Only core.
- Utilizes MP-BGP to dynamically discover if the peer can exchange IPv4 NLRI over an IPv6 next hop and utilizes IPv6 next hop encoding per RFC 8950.
- Ingress PE signals to egress PE for BGP IPv4 labeled unicast to carry IPv4 prefixes.
- BOS S-bit set for service label, added to the stack to carry IPv4 labeled prefixes
- Extending draft to support IPv6-Only PE scenario to carry IPv4 packets using 4PE per draft-ietf-bess-deployment-guide-ipv4nlnri-ipv6nh-02.
- 4PE is applicable to Segment routing architecture SR-MPLSv6 & SRv6 core.
RFC 4798 – Connecting IPv6 islands over IPv4 MPLS using IPv6 Provider Edge Routers (6PE)

(MPLS / SR-MPLS Core – Softwire Mesh Framework 6to4 (6PE)
“Dual Stacked PE” ⇔ New draft adopted by BESS

Dual Stacked CE

Dual-Stacked PE

MPLS LDP / SR-MPLS
(MPLSv4 Data Plane)
IPv4-Only Core
Connecting IPv4 Islands over IPv6-Only Core using IPv4 Provider Edge Routers (4PE)

MPLS LDPv6 / SR-MPLSv6 / SRv6 – Softwire Mesh Framework 4to6 (4PE)
“Dual Stacked PE”

IPv6-Only Core

PE

RR

BGP MP Reach Cap
IPV4 1/4 BGP LU (4PE)
IPV6 2/1

IPV6 iBGP
4PE – IPv4 NLRI w/ IPv6 NH
Dual Stacked CE
Dual-Stacked PE

Dual Stacked CE
Dual-Stacked PE

MPLS LDPv6 / SR-MPLSv6/ SRv6
(IPv6 / MPLSv6 Data Plane)
IPv6-Only Core
Test Case #1 E2E IPv6-Only PE-CE, Global Table over IPv4-Only Core (6PE) 
Softwire mesh framework 6to4 softwire

MPLS / SR-MPLS Core – Softwire Mesh Framework 6to4 (6PE) 
"IPv6-Only PE" Recently adopted by BESS

IPv6-Only PE IPv4 CE IPv6-Only PE
IPv4 CE IPv4 CE
IPv4/IPv6 CE IPv4/IPv6 CE
IPv4 Forwarding IPv6 Forwarding
IPv4 Forwarding IPv6 Forwarding

MPLS LDP / SR-MPLS (MPLSv4 Data Plane) IPv4-Only Core

BGP MP Reach Cap
IPV4 1/1
IPV6 2/4 BGP LU (6PE)

BGP MP Reach Cap
IPV6 2/1, 1/1
Test Case #1 E2E IPv6-Only PE-CE, Global Table over IPv4-Only Core (6PE)
Softwire mesh framework 6to4 softwire

MPLS LDPv6 / SR-MPLSv6 / SRv6 – Softwire Mesh Framework 4to6 (4PE)
“IPv6-Only PE” Draft ↔ Recently adopted by BESS

PE-CE – IPv4 1/1 peer eliminated
IPv4 Forwarding
IPv6 Forwarding

IPv4 Forwarding
IPv6 Forwarding

IPv6-Only Core
THANK YOU