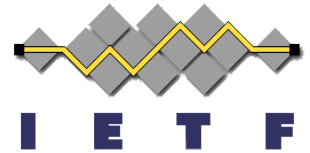
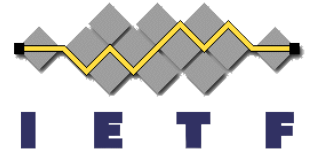


# BGP VPN service for SRv6 Plus IETF 105, Montreal

Ron Bonica, Juniper Networks  
Srihari Sangli, Juniper Networks



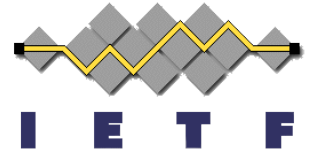


# Agenda

- Background
- Problem statement
- Proposal
- Ask & Next step

# BGP VPN on SRv6-Plus

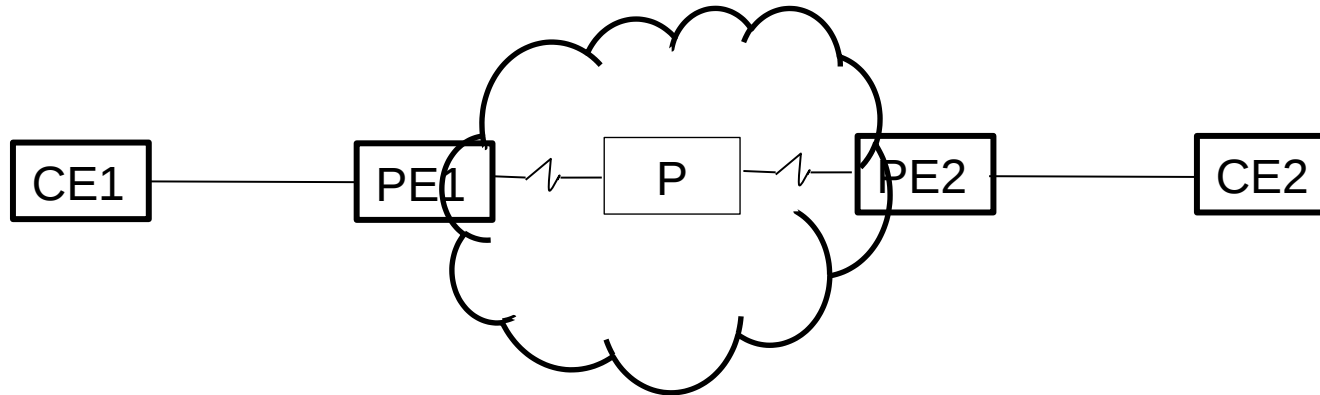
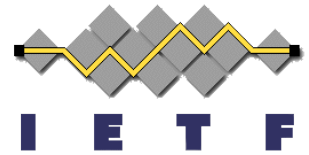
## Background



- SRv6+ [[I-D.bonica-spring-srv6-plus](https://datatracker.ietf.org/doc/draft-ietf-srv6-plus/)]
  - provides unidirectional connectivity from ingress  $\Rightarrow$  egress nodes
  - Introduces programmable instructions
  - Relies exclusively on IPv6 data plane
- BGP IP/E VPNs over various transport tunnel
  - MPLS, IP, GRE, etc.

# BGP VPN on SRv6-Plus

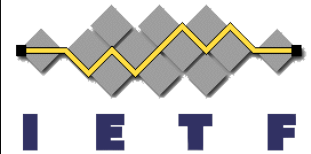
## Problem statement



VPN topology over MPLS free IPv6 network (SRv6+ underlay)

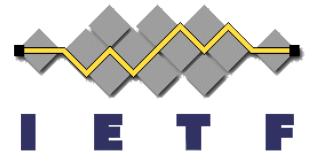
- SRv6+ underlay
  - PE aware of PPSI (Per-Path Service Instruction)
  - PPSI embedded in Destinations Options Header
  - P routers are IPv6 capable and not PPSI aware
- PE to distribute service instructions for IP/E VPN connectivity

# BGP VPN on SRv6-Plus Proposal



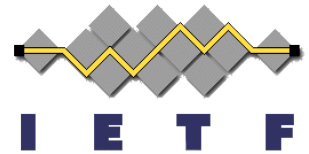
- Leverages Tunnel Encapsulation Attribute mechanism [[I-D.ietf-idr-tunnel-encaps](#)]
  - SRv6+ path considered as tunnel
  - New Tunnel type : SRv6+
    - Tunnel type codepoint : to be assigned by IANA
    - Sub-TLVs as per [[I-D.ietf-idr-tunnel-encaps](#)]
      - Tunnel-endpoint, Protocol type & Color
    - Sub-TLVs not needed
      - IPv4 DS Field, UDP Destination Port, MPLS Label Stack & Prefix SID
    - Extended Label Handling sub-TLV = 3
- IP/E VPN encoding treat PPSI as embedded label
- The Extended Label Handling sub-TLV value 3
  - Ingress router to embed the label field value into the Destination Options Header

# BGP VPN on SRv6-Plus Proposal – encoding examples



- Encoding for IPv4 VPN on SRv6+ enabled IPv6 Core
  - AFI : 1; SAFI : 128
  - Length of the Next Hop : 16 (or 32 if Link Local)
  - Network address of Next Hop : IPv6 address of the egress BGP
  - NLRI : IPv6-VPN routes
  - Label : PPSI Identifier
- +
- Tunnel Encapsulation Path Attribute for SRv6+ Tunnel
  
- Encoding for Ethernet Per ES Auto-Discovery (A-D) Route
  - NLRI encoding as per RFC7432 except the following
  - MPLS label : set to zero
- +
- Tunnel Encapsulation Path Attribute for SRv6+ Tunnel
- ESI label in the ESI label extended community : PPSI Identifier

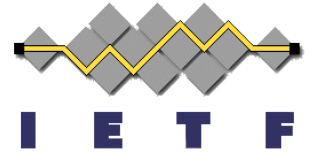
# BGP VPN on SRv6-Plus Proposal



- BGP procedures on egress PE
  - PPSI is associated with forwarding table, used for demux'ng in data plane
  - PPSI encoded as embedded label in IP/E VPN encoding
  - Tunnel Encapsulation attribute advertised with IP/E VPN NLRI
- BGP procedures on ingress PE
  - PPSI constructed – Top-order 1 byte zero'd and Low-order 3 byte is Embedded label field in IP/E VPN NLRI
  - Tuple (PPSI identifier, Prefix) programmed in forwarding table
- PPSI carried in IPv6 Destination Options Header
  - Inserted by ingress PE; Processed by egress PE
  - P routers do not process this header and unaware of PPSI

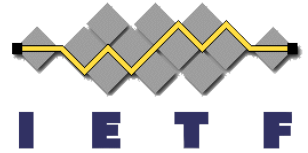
# BGP VPN on SRv6-Plus

## Ask & Next steps



- Comments Welcome
- Request workgroup to adopt the document





**Thank you**