

Juniper® Validated Design

JVD Solution Overview: Service Provider SRv6 Core and Edge



Executive Summary

sol-overview-JVD-SP-CORE-EDGE-SRv6-01-01

This JVD provides a high-level description and outlines the requirements for service provider networks using SRv6 μ SID (micro-SID, short name for NEXT-CSID) as the underlying transport, and incorporates many requirements received from customers aiming for SRv6 μ SID transport. The solution validation assumes a phased approach, with each phase bringing in an additional functional scope as well as new platforms. The scope of this SRv6 JVD phase 1 is limited to the multiple domain network transport with multiple transport planes realized through SRv6 Flex-Algo (without traffic engineering) and services level only, with particular focus around L3VPN (both traditional L3VPN with SAFI=128, as well as EVPN Type 5 based L3VPN with SAFI=70) and L2 Services (EVPN E-Line -VPWS).

Solution Overview

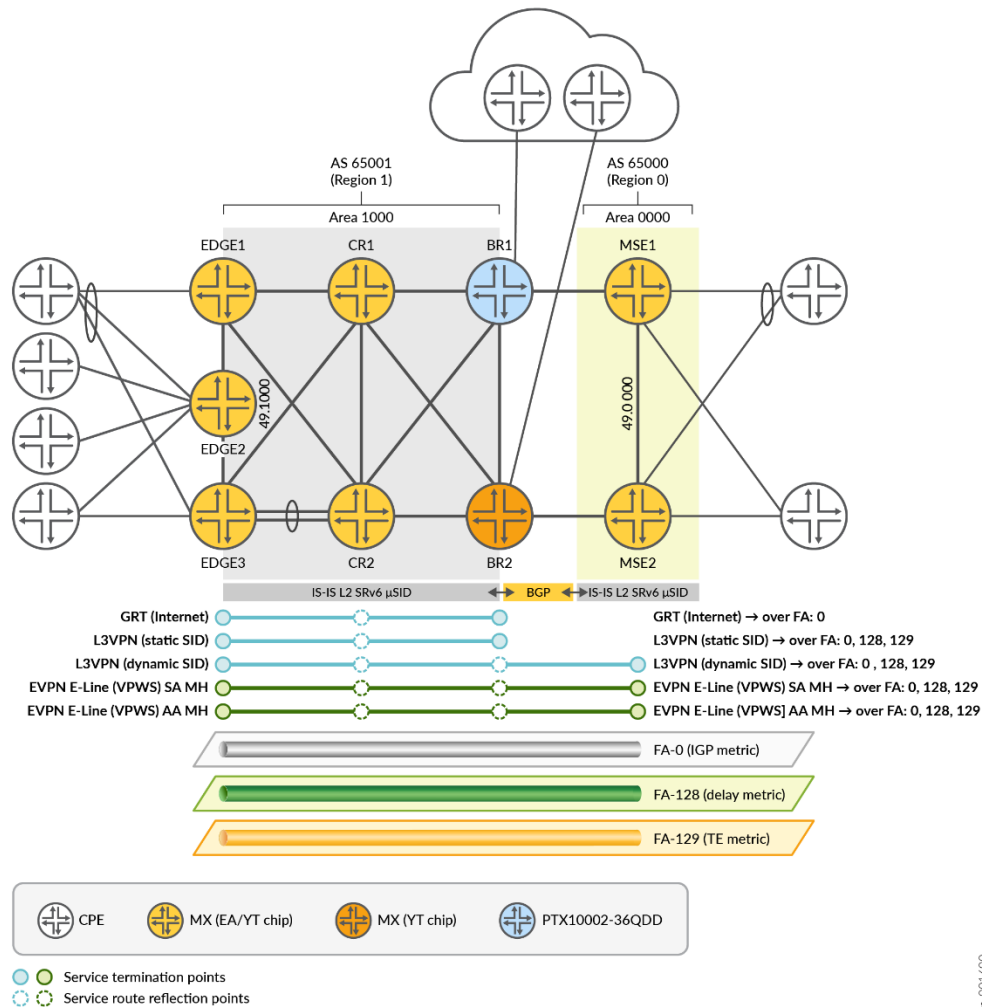
This JVD covers basic SRv6 μ SID transport, along with key services:

- Basic SRv6 μ SID transport (with Flex-Algo but without SRv6-TE)
- Basic SRv6 μ SID services (L3VPN and EVPN E-Line with Flex-Algo and multi-homing)
- L3VPN with direct PE-CE interfaces, as well as with IRB as PE-CE interface
- TI-LFA/MLA with dynamic and static μ A (Adj-SID)
- L3VPN and EVPN E-Line (VPWS) service resolution over non-ISIS routes (SRv6 dynamic tunnels)

Architecture

Generally, modern service provider networks include two main segments: core and edge. This solution focuses on reference designs, with the core and edge segments implemented in a single flat IS-IS Level 2 domain using a default IS-IS instance. Additionally, a service complex like Multi Service Edge (MSE) is placed in separate domains, with BGP-only reachability.

Figure 1: Juniper SRv6 Solution Architecture



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Appropriate redistribution policies, with or without summarization, between IS-IS and BGP are provisioned to provide end-to-end IPv6 connectivity between loopbacks and locators.

The major components under consideration are:

- SP reference architectures
- Seamless Segment Routing (SR) across SP edge, and core domains (Inter-AS BGP + SRv6 locator redistribution or summarization between domains)
- Fast failover and detection TI-LFA, MLA, BFD, ECMP, etc.
- SRv6 μSID with IS-IS
- Flex-Algo Application Specific Link Attribute (FA ASLA) TE and Delay metrics
- Flex-Algo Prefix Metric (FAPM) Transport Classes
- Strict and Cascade Transport Class Resolution schemes Inter-AS BGP Transport
- VPN Service Mapping to transport Flex-Algo
- Redundant Route Reflectors
- EVPN-VPWS with A/A and A/S Multihoming

- Inter-AS Option C
- TWAMP light for delay measurement


The following table shows the distribution of devices based on their role in the solution architecture:

Table 1: Distribution of Devices in Solution Architecture

Devices	Edge Node (EDGE)	Core Router (CR)	Border Router (BR)	Multi-Service Edge (MSE)
Device 1	MX480 with MPC7E	MX10004 with LC9600	PTX10002-36QDD	MX480 with MPC10E
Device 2	MX480 with MPC7E	MX2010 with MPC11E	MX304	MX304
Device 3	MX480 with MPC10E	None	None	None

Key Benefits

The solution delivers SRv6 μSID-based transport architectures, including features like multi-instance ISIS, Flex-Algo Prefix Metric (FAPM), and leveraging inter-domain designs with SRv6 locator summarization and Transport Classes, with end-to-end multi-domain Service Mapping.



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