

IPv6 Address Assignment for SRv6

draft-liu-srv6ops-sid-address-assignment-00

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Background

- SRv6 SID as consisting of LOC:FUNCT:ARG per RFC8986



- RFC8986 Section 3.2 "SID Allocation within an SR Domain" provides basic principle and practice for allocating SRv6 SIDs within SRv6 networks. Assigning large IPv6 prefixes to the SR domain and further subdividing them into smaller prefixes for individual nodes
- Existing work primarily focuses on basic SRv6 deployments without considering the complexities introduced by advanced features like SRv6 compression and diverse service provider requirements
- Provide service providers and network engineers with a comprehensive and practical guide for optimizing SRv6 SID allocation in diverse deployment scenarios

SRv6 SID Block Considerations

- Service providers typically allocate IPv6 addresses based on "administrative divisions" (e.g., state/province, city) and "network types" (e.g., IP network, wireless network, transport network).
- Assign distinct unicast addresses (e.g., interface and loopback addresses) for network device.
- **Fragmented SRv6 Space:** Independent allocations result in scattered SRv6 address blocks across the provider's network, hindering SRv6 SID aggregation. Aggregation simplifies network management and allows efficient use of address space.
- **Edge Filtering Complexity:** With fragmented SRv6 space, filtering SRv6 traffic at network edges becomes significantly more complex due to the dispersed nature of the addresses. This complicates network security and policy enforcement.

SRv6 SID Block Allocation Practice

- Allocate a "dedicated IPv6 address block" for SRv6 across the entire service provider network.
- integrated SRv6 SIDs planning simplifies edge configuration by requiring only a single policy for the dedicated SRv6 prefix

Scenario 1 : Integrated SRv6 SIDs Planning

Assume Block A:A:X:X::/24 is allocated for SRv6

simple configuration, such as: deny A:A:X:X::/24

Scenario 2 : Separate SIDs Planning in different administrative division

Each administrative division has its own SRv6 block

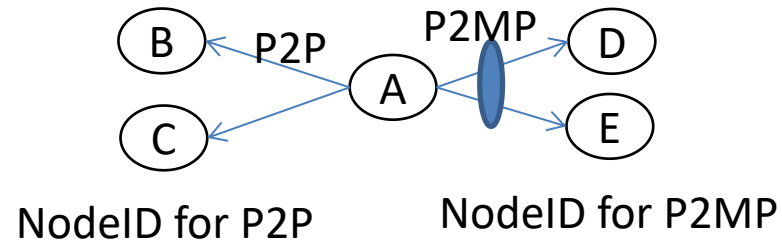
Multiple policies for each discrete prefix in edge configuration,

such as: deny A:B:X:X:C1:D:/48 deny A:B:Z:Z:C2:D:/48

C1...Cn represent n administrative divisions

SRv6 SID Assignment Considerations for P2P and P2MP

- Both SRv6 P2P and P2MP utilize unicast IPv6 addresses, how to set address pools for SRv6



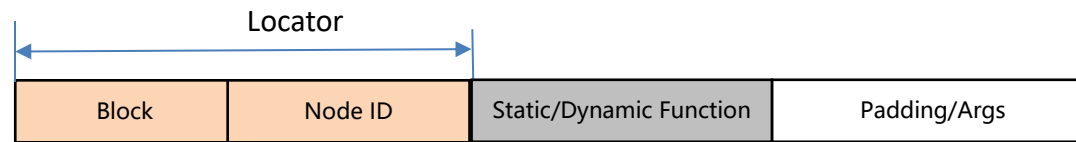
- Separate address pools for SRv6 P2P and P2MP Consideration:
 - 1) It's crucial to avoid allocating SRv6 SIDs for both P2P and P2MP connections under the same Node ID. This prevents address space contention and simplifies traffic management.
 - 2) Independent Locator Advertisement for P2MP SIDs
- Dedicate distinct SID ranges or Node IDs for P2P and P2MP traffic flows within a service provider's network to ensure clear differentiation.

SRv6 SID Compression Assignment Considerations

- Full SID

Node ID allocation flat vs structured ? less resource vs easy management

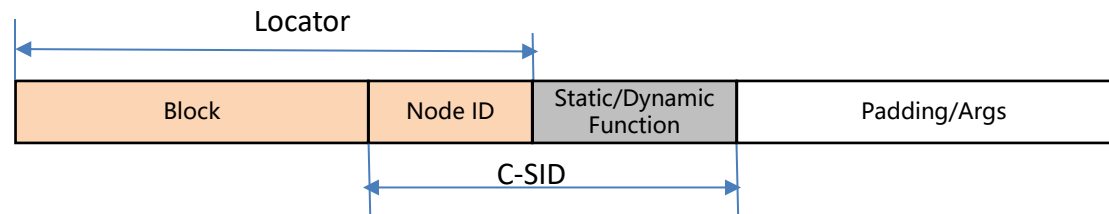
Function ID allocation static vs dynamic ? manageable allocation vs automatic allocation



- Compressed SID

Balancing the length of Node ID and Function ID for Compressed SIDs

Due to the inherent length limitations of compressed SIDs, a trade-off must be made between the scope of manageable nodes and the range of network functions



Next Steps

- Seeking for feedback from WG