IETF 110
draft-srcompdt-spring-compression-requirement

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The design team is to produce (rough) consensus (of the DT) outputs to the WG on two related topics:

1) What are the requirements for solutions to compressing segment routing information for use over IPv6;

On-Going -05 version

2) An analysis of proposed approaches to compressing segment routing information for use over IPv6.

On-Going -00 version

Overview of Requirements draft

- The latest revision is -05, which included all the requirements we've received, only three of which with rough but not unanimous consensus in design team was put in the appendix
- Compared to revision -02, the blue highlighted items were moved to main text from appendix due to consensus in DT; the red highlighted items were new added.

3. SRv6 SID List Compression Requirements
3.1. Dataplane Efficiency and Performance Requirements
3.1.1. Encapsulation Header Size
3.1.2. Forwarding Efficiency
3.1.3. State Efficiency
4. SRv6 Specific Requirements
4.1. SRv6 Based
4.2. Functional Requirements
4.2.1. SRv6 Functionality
4.2.2. Heterogeneous SID lists
4.2.3. SID list length
4.2.4. SID summarization
4.3. Operational Requirements
4.3.1. Lossless Compression
4.3.2. Preservation of non-routing information
4.3.3. Address Planning
4.4. Scalability Requirements
4.4.1. Adjacency segment scale
4.4.2. Prefix segment scale
4.4.3. Service Scale
4.4.4. Compression Levels
5. Protocol Design Requirements
5.1. SRv6 Base Coexistence
5.2. PS or BCP Compliance
6. Security Requirements
6.1. Security Mechanisms
6.2. SR Domain Protection
Appendix A. Proposed Requirements
A.1. IPv6 Based
A.2. Point to Multipoint
A.3. Parsability

New Requirements With Consensus in design team

Scope Clarification

It is a goal of the design team to identify solutions to SRv6 SID proposals to SR over IPv6 SID list compression that are based on the SRv6 standards. As such, this document provides requirements for SRv6 SID list compression solutions that utilize the existing SRv6 data plane and control plane.

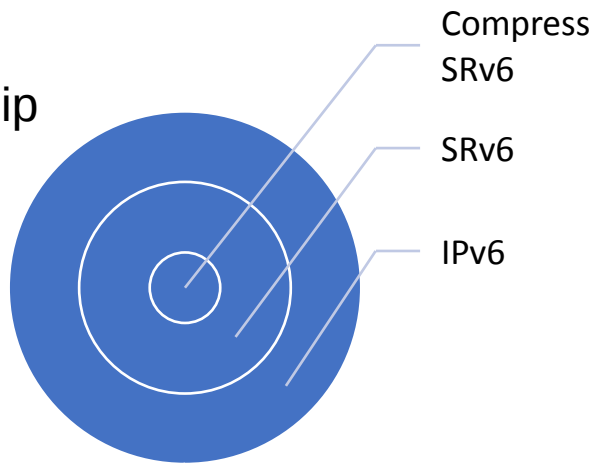
It is also a goal of the design team to consider proposals that are not based on the SRv6 data plane and control plane. As such, this document includes requirements to evaluate whether a compression proposal provides all the functionality of SRv6 (section "SRv6 Functionality") in addition to satisfying compression specific requirements.

SRv6 Based(from appendix to main text)

"**Description**: A solution to compress SRv6 SID Lists SHOULD be based on the SRv6 architecture, control plane and data plane"

*"**Rationale**: A compression proposal built on existing IETF standards is preferable to creating new standards with equivalent functionality and performance."*

Here Preferred relationship



SRv6 Functionality(from appendix to main text)

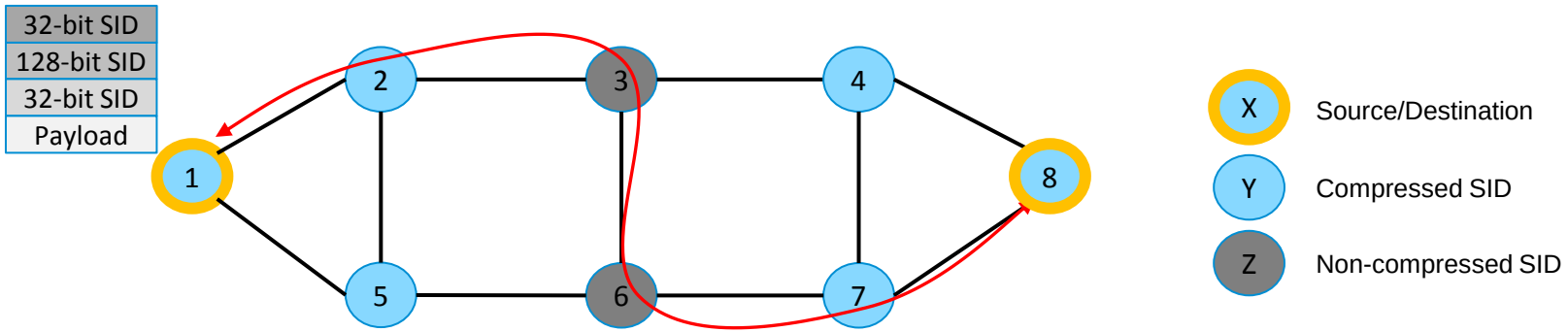
“Description: A solution to compress an SRv6 SID list MUST support the functionality of SRv6. This requirement ensures no SRv6 functionality is lost. It is particularly important to understand how a proposal, as evaluated in section "SRv6 Based", provides this functionality.

*“**Rationale**: Operators require SRv6 functionality. Evaluating the extent to which a proposal supports SRv6 functionality is important for operators and implementors to understand the impact on network operations.”*

Heterogeneous SID lists(from appendix to main text)

"**Description**: The compression proposal SHOULD support a combination of compressed and non-compressed segments in a single path."

*"**Rationale**: Support of SID lists with compressed and non-compressed SIDs reduces encapsulation size when not all SRv6 nodes deploy the compression proposal or 128-bit SIDs are required."*



Preservation of non-routing information

Description: The compression mechanism MUST NOT cause the loss of non-routing information when delivering a packet from the SR ingress node to the egress/penultimate SR node.

*“**Rationale**: SRv6 ingress nodes encode non-routing information in the IPv6 header chain. This information can be encoded in the following fields.”*

```
o DSCP bits
o ECN bits
o Flow label
o HBH Options Extension header
o Fragment Extension header
o Authentication Extension header
o Encrypted Security Payload Extension header
o Destination Options Extension header
```

Address Planning

Description: Network operators require addressing plan flexibility, The compression mechanism MUST support flexible IPv6 address planning, it MUST support deployment by using GUA from different address blocks.

Rationale: *The address planning of the network may vary based on the addressing scheme of the operator, so the solution MUST support a flexible addressing scheme. Operators need to deploy the solution based on their own address planning.*

Compression Levels

Description: The compression proposal SHOULD be able to support multiple levels of compression.

*“**Rationale**: The compression proposal will be deployed in networks of varying size with SID numbering spaces of varying size. Network and service scale can directly impact SID length and the ability of a proposal to compress the SID list.”*

PS or BCP Compliance

Description: The compression mechanism SHOULD comply with any proposed standard or BCP. If it does not comply with any PS or BCP it SHOULD update the related document.

***Rationale**: Compliance with existing standards makes the internet more robust.*

Security Mechanisms

Description: The compression solution SHOULD be able to address security issues that it introduces, using existing security mechanisms.

*“**Rationale**: It is important to identify security issues and how to address them in any specification.”*

SR Domain Protection

Description: A compression solution must not require nodes outside the SR domain to know SID values within the SR domain, and it must provide the ability to block nodes outside an SR domain from accessing SIDS.

*“**Rationale**: The unauthorized use of SIDs within the SR domain by nodes outside the domain can disrupt an operators' network.”*

Requirements with rough but not unanimous consensus in design team

Feedback appreciated

SR Domain Protection

Description: The compression mechanism requires every node along the packet's delivery path to be IPv6-capable. It MUST not require any node along the packet's forwarding path to support any other forwarding plane (e.g., IPv4, MPLS)

Rational: According to RFC 8402, SRv6 is an instantiation of the SR Architecture over the IPv6 data plane.

Point to Multipoint

Description: The compression mechanism SHOULD support point-to-multipoint SR paths.

***Rationale**: Many VPN services require point-to-multipoint SR paths.*

Parsability

Description: The compression mechanism MUST be parsable. That is, the node that consumes the compressed SID list must be able to decode the active and next segment. Parsing information MAY be conveyed in either the forwarding or control plane.

Rationale: *Failure to parse the compressed SID list leads to undesired behaviors.*

Next Steps

- **WG Review**
- **WG adoption?**

Comments & Questions?