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Clarification of Segment ID Sub-TLV Length for RFC 8287

Abstract

RFC 8287 defines the extensions to perform LSP Ping and Traceroute for Segment Routing IGP-Prefix and IGP-Adjacency Segment Identifiers (SIDs) with the MPLS data plane. RFC 8287 proposes three Target Forwarding Equivalence Class (FEC) Stack sub-TLVs. While RFC 8287 defines the format and procedure to handle those sub-TLVs, it does not sufficiently clarify how the length of the Segment ID sub-TLVs should be computed to be included in the Length field of the sub-TLVs. This ambiguity has resulted in interoperability issues.

This document updates RFC 8287 by clarifying the length of each of the Segment ID sub-TLVs defined in RFC 8287.

Status of This Memo

This is an Internet Standards Track document.

This document is a product of the Internet Engineering Task Force (IETF). It represents the consensus of the IETF community. It has received public review and has been approved for publication by the Internet Engineering Steering Group (IESG). Further information on Internet Standards is available in Section 2 of RFC 7841.

Information about the current status of this document, any errata, and how to provide feedback on it may be obtained at https://www.rfc-editor.org/info/rfc8690.

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[RFC8287] defines the extensions to MPLS LSP Ping and Traceroute for Segment Routing IGP-Prefix and IGP-Adjacency Segment Identifiers (SIDs) with the MPLS data plane. [RFC8287] proposes three Target FEC Stack sub-TLVs. While RFC 8287 defines the format and procedure to handle those sub-TLVs, it does not sufficiently clarify how the length of the Segment ID sub-TLVs should be computed to be included in the Length field of the sub-TLVs, which may result in interoperability issues.

This document updates [RFC8287] by clarifying the length of each Segment ID sub-TLVs defined in [RFC8287].

2. Terminology

This document uses the terminology defined in [RFC8402], [RFC8029], and [RFC8287]; readers are expected to be familiar with the terms as used in those documents.

3. Requirements Notation

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

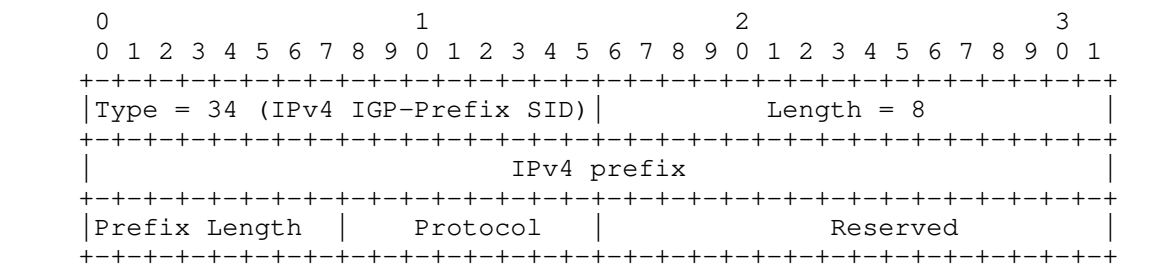
4. Length Field Clarification for Segment ID Sub-TLVs

Section 5 of [RFC8287] defines three different Segment ID sub-TLVs that can be included in the Target FEC Stack TLV defined in [RFC8029]. The length of each sub-TLV MUST be calculated as defined in this section.

The TLV representations defined in Sections 5.1, 5.2, and 5.3 of [RFC8287] are updated to clarify the length calculations, as shown in Sections 4.1, 4.2, and 4.3, respectively. The updated TLV representations contain explicitly defined lengths.

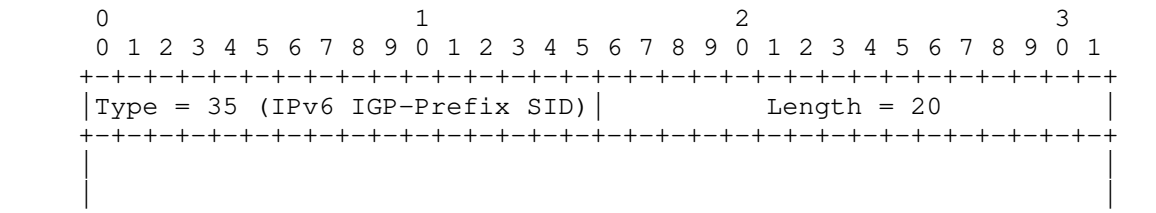
4.1. IPv4 IGP-Prefix Segment ID Sub-TLV

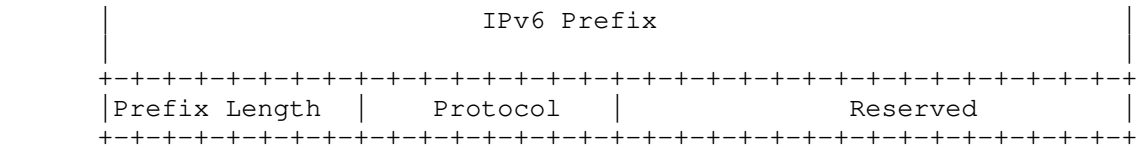
The sub-TLV length for the IPv4 IGP-Prefix Segment ID MUST be set to 8, as shown in the TLV format below:



4.2. IPv6 IGP-Prefix Segment ID Sub-TLV

The sub-TLV length for the IPv6 IGP-Prefix Segment ID MUST be set to 20, as shown in the TLV format below:





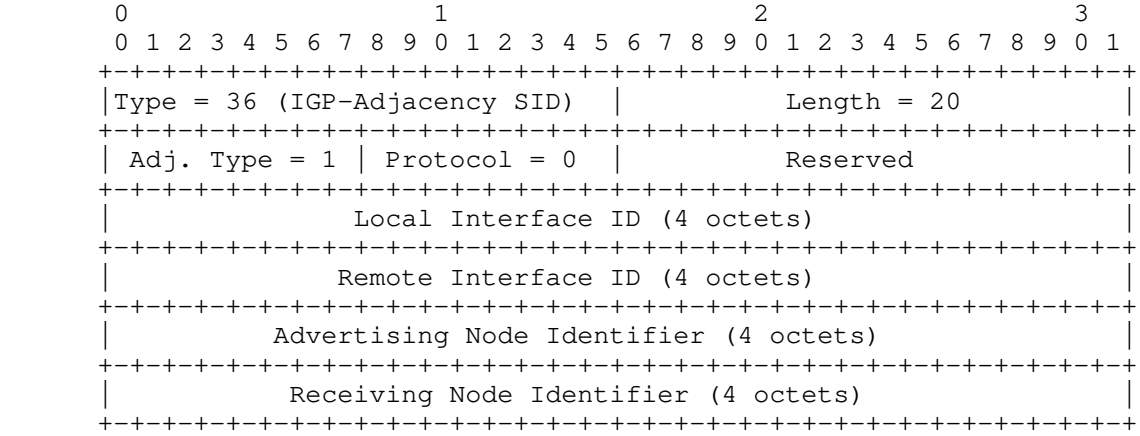
4.3. IGP-Adjacency Segment ID Sub-TLV

The sub-TLV length for the IGP-Adjacency Segment ID varies depending on the Adjacency Type and Protocol. In any of the allowed combinations of Adjacency Type and Protocol, the sub-TLV length MUST be calculated by including 2 octets of the Reserved field. Table 1 lists the length for different combinations of Adj. Type and Protocol.

Protocol	Length for Adj. Type			
	Parallel	IPv4	IPv6	Unnumbered
OSPF	20	20	44	20
ISIS	24	24	48	24
Any	20	20	44	20

Table 1: IGP-Adjacency SID Length Computation

For example, when the Adj. Type is set to Parallel Adjacency and the Protocol is set to 0, the sub-TLV will be as below:



5. IANA Considerations

IANA has listed this document as an additional reference for the following entries in the "Sub-TLVs for TLV Types 1, 16, and 21" registry:

Sub-Type	Sub-TLV Name	Reference
34	IPv4 IGP-Prefix Segment ID	Section 5.1 of [RFC8287]; RFC 8690
35	IPv6 IGP-Prefix Segment ID	Section 5.2 of [RFC8287]; RFC 8690
36	IGP-Adjacency Segment ID	Section 5.3 of [RFC8287]; RFC 8690

Table 2: Sub-TLVs for TLV Types 1, 16, and 21 (Updated Entries)

6. Security Considerations

This document updates [RFC8287] and does not introduce any additional security considerations.

7. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, DOI 10.17487/RFC2119, March 1997, <https://www.rfc-editor.org/info/rfc2119>.

[RFC8029] Kompella, K., Swallow, G., Pignataro, C., Ed., Kumar, N., Aldrin, S., and M. Chen, "Detecting Multiprotocol Label Switched (MPLS) Data-Plane Failures", RFC 8029, DOI 10.17487/RFC8029, March 2017, <https://www.rfc-editor.org/info/rfc8029>.

[RFC8174] Leiba, B., "Ambiguity of Uppercase vs Lowercase in RFC 2119 Key Words", BCP 14, RFC 8174, DOI 10.17487/RFC8174, May 2017, <https://www.rfc-editor.org/info/rfc8174>.

[RFC8287] Kumar, N., Ed., Pignataro, C., Ed., Swallow, G., Akiya, N., Kini, S., and M. Chen, "Label Switched Path (LSP) Ping/Traceroute for Segment Routing (SR) IGP-Prefix and IGP-Adjacency Segment Identifiers (SIDs) with MPLS Data Planes", RFC 8287, DOI 10.17487/RFC8287, December 2017, <https://www.rfc-editor.org/info/rfc8287>.

[RFC8402] Filsfils, C., Ed., Previdi, S., Ed., Ginsberg, L., Decraene, B., Litkowski, S., and R. Shakir, "Segment Routing Architecture", RFC 8402, DOI 10.17487/RFC8402, July 2018, <https://www.rfc-editor.org/info/rfc8402>.

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