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Signaling Entropy Label Capability and Entropy Readable Label Depth Using IS-IS
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Abstract

Multiprotocol Label Switching (MPLS) has defined a mechanism to load balance traffic flows using Entropy Labels (EL). An ingress Label Switching Router (LSR) cannot insert ELs for packets going into a given tunnel unless an egress LSR has indicated via signaling that it has the capability of processing ELs, referred to as Entropy Label Capability (ELC), on that tunnel. In addition, it would be useful for ingress LSRs to know each LSR's capability of reading the maximum label stack depth and performing EL-based load-balancing, referred to as Entropy Readable Label Depth (ERLD), in the cases where stacked LSPs are used for whatever reasons. This document defines mechanisms to signal these two capabilities using IS-IS. These mechanisms are useful when the label advertisement is also done via IS-IS.

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1. Introduction

[RFC6790] describes a method to load balance Multiprotocol Label Switching (MPLS) traffic flows using Entropy Labels (EL). [RFC6790] introduces the concept of Entropy Label Capability (ELC) and defines the signalings of this capability via MPLS signaling protocols. Recently, mechanisms are being defined to signal labels via link-state Interior Gateway Protocols (IGP) such as IS-IS [I-D.ietf-isis-segment-routing-extensions]. In such scenario, the signaling mechanisms defined in [RFC6790] are inadequate. This draft defines a mechanism to signal the ELC [RFC6790] using IS-IS. This mechanism is useful when the label advertisement is also done via IS-IS.

In addition, in the cases where stacked LSPs are used for whatever reasons (e.g., SR-MPLS [I-D.ietf-spring-segment-routing-mpls]), it would be useful for ingress LSRs to know each intermediate LSR's capability of reading the maximum label stack depth and performing EL-based load-balancing. This capability, referred to as Entropy

Readable Label Depth (ERLD) as defined in [I-D.ietf-mpls-spring-entropy-label] may be used by ingress LSRs to determine whether it's necessary to insert an EL for a given LSP of the stacked LSP tunnel in the case where there has already been at least one EL in the label stack [I-D.ietf-mpls-spring-entropy-label].

2. Terminology

This memo makes use of the terms defined in [RFC6790] and [RFC4971].

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119 [RFC2119].

3. Advertising ELC Using IS-IS

The IS-IS Router CAPABILITY TLV as defined in [RFC4971] is used by IS-IS routers to announce their capabilities. A new sub-TLV of this TLV, called ELC sub-TLV is defined to advertise the capability of the router to process the ELs. As shown in Figure 1, it is formatted as described in [RFC5305] with a Type code to be assigned by IANA and a Length of zero. The scope of the advertisement depends on the application. If a router has multiple linecards, the router MUST NOT advertise the ELC unless all of the linecards are capable of processing ELs.

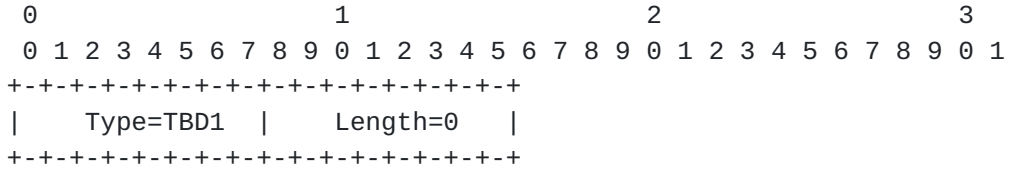

Figure 1: ELC sub-TLV Format

4. Advertising ERLD Using IS-IS

A new MSD-type of the IS-IS Node MSD sub-TLV [I-D.ietf-isis-segment-routing-msd], called ERLD is defined to advertise the ERLD of a given router . As shown in Figure 2, it is formatted as described in [I-D.ietf-isis-segment-routing-msd] with a new MSD-Type code to be assigned by IANA (the type code of 2 is desired) and the Value field is set to the ERLD in the range between 0 to 255. The scope of the advertisement depends on the application. If a router has multiple linecards with different capabilities of reading the maximum label stack deepth, the router MUST advertise the smallest one.

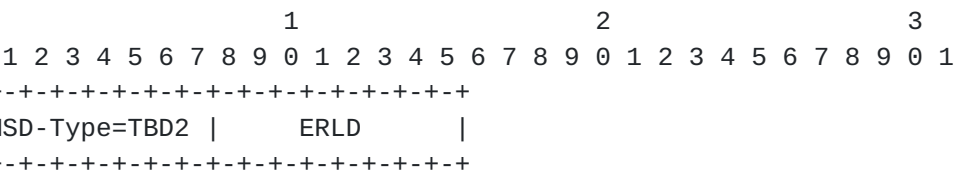

Figure 2: ERLD MSD-Type Format

5. Acknowledgements

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6. IANA Considerations

IANA is requested to allocate one sub-TLV type of the IS-IS Router Capability TLV for ELC and a MSD type (the type code of 2 is desired) from the "IGP MSD Types" registry for ERLD.

7. Security Considerations

The security considerations as described in [RFC4971] is applicable to this document. This document does not introduce any new security risk.

8. References

8.1. Normative References

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[RFC6790] Kompella, K., Drake, J., Amante, S., Henderickx, W., and L. Yong, "The Use of Entropy Labels in MPLS Forwarding", RFC 6790, DOI 10.17487/RFC6790, November 2012, <https://www.rfc-editor.org/info/rfc6790>.

8.2. Informative References

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