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Signaling Entropy Label Capability and Entropy Readable Label-stack Depth Using OSPF
draft-ietf-ospf-mpls-elc-07

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 OSPF. These mechanisms are useful when the label advertisement is also done via OSPF. In addition, this document introduces the Non-IGP Functional Capabilities TLV for advertising OSPF router's actual non-IGP functional capabilities. ELC is one of such non-IGP functional capabilities.

Requirements Language

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].

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

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This Internet-Draft will expire on March 29, 2019.

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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 OSPF

[I-D.ietf-ospf-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 OSPF. This mechanism is useful when the label advertisement is also done via OSPF.

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 [RFC7770].

3. Non-OSPF Functional Capabilities TLV

This document defines the Router Non-IGP Functional Capabilities TLV with TLV type code of TBD1 within the body of the OSPF Router Information LSA. An OSPF router advertising an OSPF RI LSA MAY include the Router Non-IGP Functional Capabilities TLV. If included, it MUST be included in the first instance of the LSA. Additionally, the TLV MUST reflect the advertising OSPF router's actual non-IGP functional capabilities in the flooding scope of the containing OSPF RI LSA.

The format of the Router Non-OSPF Functional Capabilities TLV is as follows:

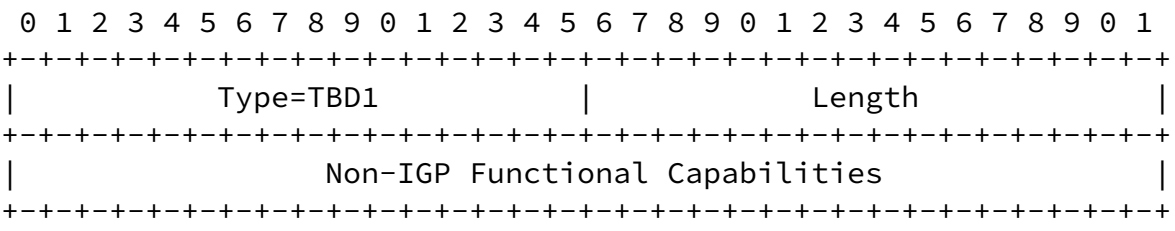

Figure 1: Non-OSPF Functional Capabilities TLV Format

Type: TBD1.

Length: Indicates the length of the value portion in octets and will be a multiple of 4 octets dependent on the number of

capabilities advertised. Initially, the length will be 4, denoting 4 octets of Non-IGP Functional Capabilities Bits as defined in [I-D.ietf-isis-mpls-elc].

Value: contains the Non-IGP Functional Capabilities Bits as defined in [I-D.ietf-isis-mpls-elc].

The Non-IGP Functional Capabilities TLV MAY be followed by optional TLVs that further specify a non-OSPF functional capability. In contrast to the OSPF Router Functional Capabilities TLV, the non-OSPF functional capabilities advertised in this TLV have no impact on the OSPF protocol operation. The specifications for non-IGP functional capabilities advertised in this TLV MUST describe protocol behavior and address backwards compatibility.

4. Advertising ELC Using OSPF

One bit of the Non-IGP Functional Capability Bits for is used to indicate the ELC.

Assignment of a Non-IGP Functional Capability Bit for the ELC is defined in [I-D.ietf-isis-mpls-elc].

If a router has multiple line cards, the router MUST NOT announce the ELC [RFC6790] unless all of its linecards are capable of processing ELs.

How to apply the ELC advertisement to the inter-area, inter-AS and inter-protocol scenarios is outside the scope of this document.

5. Advertising ERLD Using OSPF

A new MSD-type of the Node MSD sub-TLV [I-D.ietf-isis-segment-routing-msd], called ERLD is defined to advertise the ERLD of a given router. The scope of the advertisement depends on the application.

Assignment of a MSD-Type for ERLD is defined in [I-D.ietf-isis-mpls-elc].

If a router has multiple linecards with different capabilities of reading the maximum label stack deepth, the router MUST advertise the smallest one.

6. Acknowledgements

The authors would like to thank Yimin Shen, George Swallow, Acee Lindem, Les Ginsberg, Ketan Talaulikar, Jeff Tantsura , Bruno Decraene and Carlos Pignataro for their valuable comments.

7. IANA Considerations

This document requests IANA to allocate one TLV type from the OSPF RI TLVs registry for the Non-IGP Functional CapabilitiesTLV.

8. Security Considerations

The security considerations as described in [RFC7770] is applicable to this document. This document does not introduce any new security risk.

9. References

9.1. Normative References

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9.2. Informative References

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