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Signaling Entropy Label Capability Using OSPF
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Abstract

Multi Protocol Label Switching (MPLS) has defined a mechanism to load balance traffic flows using Entropy Labels (EL). An ingress LSR cannot insert ELs for packets going into a given tunnel unless an egress LSR has indicated via signaling that it can process ELs on that tunnel. This draft defines a mechanism to signal that capability using OSPF. This mechanism is useful when the label advertisement is also done via OSPF.

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](#)].

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Internet-Draft

Signalling ELC using OSPF

October 2016

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[1.](#) Introduction

Multi Protocol Label Switching (MPLS) has defined a method in [\[RFC6790\]](#) to load balance traffic flows using Entropy Labels (EL). An ingress LSR cannot insert ELs for packets going into a given tunnel unless an egress LSR has indicated that it can process ELs on that tunnel. [\[RFC6790\]](#) defines the signaling of this capability (a.k.a., Entropy Label Capability - ELC) via 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 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., SPRING-MPLS [[I-D.ietf-spring-segment-routing-mpls](#)]), it would be useful for ingress LSRs to know each LSR's capability of

reading the maximum label stack depth. This capability, referred to as Readable Label Depth Capability (RLDC) can be used by ingress LSRs to determine whether it's necessary to insert an EL for a given 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](#)]. Of course, even it has been determined that it's necessary to insert an EL for a given LSP tunnel, if the egress LSR of that LSP tunnel has not yet indicated that it can process ELs for that tunnel, the ingress LSR MUST NOT include an entropy label for that tunnel as well.

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-OSPF Functional Capabilities TLV for advertisement in the OSPF Router Information LSA. An OSPF router advertising an OSPF RI LSA MAY include the Router Non-OSPF 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-OSPF 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:

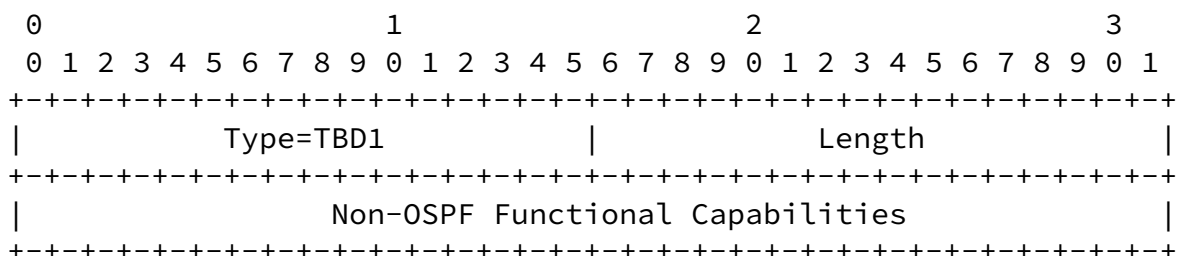


Figure 1: Non-OSPF Functional Capabilities TLV Format

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-OSPF functional capability bits.

Value: A variable-length sequence of capability bits rounded to a multiple of 4 octets padded with undefined bits. Initially, there are 4 octets of capability bits. Bits are numbered left to right starting with the most significant bit being bit 0.

The Non-OSPF 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-OSPF functional capabilities advertised in this TLV MUST describe protocol behavior and address backwards compatibility.

[4.](#) Advertising ELC Using OSPF

One bit of the Non-OSPF Functional Capability Bits is to be assigned by the IANA for the ELC. If a router has multiple linecards, the router MUST NOT announce the ELC unless all of its linecards are capable of processing ELs.

[5.](#) Advertising RLDC Using OSPF

A new TLV within the body of the OSPF RI LSA, called RLDC TLV is defined to advertise the capability of the router to read the maximum label stack depth. As showed in Figure 2, it is formatted as described in [Section 2.3 of \[RFC7770\]](#) with a Type code to be assigned by IANA and a Length of one. The Value field is set to the maximum readable label stack depth in the range between 1 to 255. The scope of the advertisement depends on the application but it is RECOMMENDED that it SHOULD be domain-wide. If a router has multiple linecards with different capabilities of reading the maximum label stack depth, the router MUST advertise the smallest one in the RLDC TLV. This TLV is applicable to both OSPFv2 and OSPFv3.

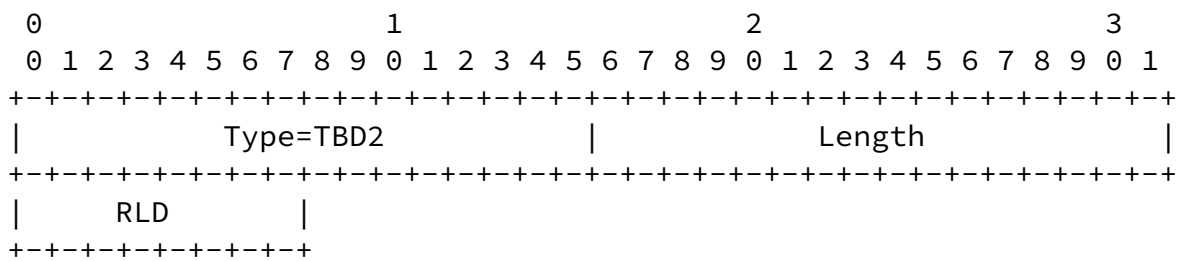


Figure 2: RLDC TLV Format

6. Usage and Applicability

The ELC is used by ingress LSRs to determine whether an EL could be inserted into a given LSP tunnel. The RLDC is used by ingress LSRs to determine whether it's necessary to insert an EL for a given LSP tunnel in the case where there has already been at least one EL in the label stack. This document only describes how to signal the ELC and RLDC using OSPF. As for how to apply those capabilities when inserting EL(s) into LSP tunnel(s), it's outside the scope of this

document and accordingly would be described in [\[I-D.ietf-mpls-spring-entropy-label\]](#).

7. Acknowledgements

The authors would like to thank Yimin Shen, George Swallow, Acee Lindem and Carlos Pignataro for their valuable comments.

8. IANA Considerations

This document requests IANA to allocate one TLV type from the OSPF RI TLVs registry for the Non-OSPF Functional Capabilities TLV. Furthermore, this document requests IANA to create a subregistry for "Non-OSPF Functional Capability Bits" within the "Open Shortest Path First v2 (OSPFv2) Parameters" registry. This subregistry is comprised of the fields Bit Number, Capability Name, and Reference. Initially, one bit is requested to be assigned for the ELC. All Non-OSPF Functional Capability TLV additions are to be assigned through IETF Review [[RFC5226](#)].

This document also requests IANA to allocate one TLV type from the OSPF RI TLVs registry for the RLDC TLV.

9. Security Considerations

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

10. References

10.1. Normative References

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