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OSPF Extensions in Support of Generalized MPLS

draft-kompella-ospf-gmpls-extensions-02.txt

1. Status of this Memo

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2. Abstract

This document specifies encoding of extensions to the OSPF routing protocol in support of Generalized Multi-Protocol Label Switching (GMPLS). The description of the extensions is specified in [GMPLS-ROUTING].

3. Summary for Sub-IP Area

3.1. Summary

This document specifies encoding of extensions to the OSPF routing protocol in support of Generalized Multi-Protocol Label Switching (GMPLS). The description of the extensions is specified in [GMPLS-ROUTING].

3.2. Where does it fit in the Picture of the Sub-IP Work

This work fits squarely in either the CCAMP or OSPF box.

3.3. Why is it Targeted at this WG

This draft is targeted at the CCAMP or the OSPF WG, because this draft specifies the extensions to the OSPF routing protocols in support of GMPLS, because GMPLS is within the scope of the CCAMP WG, and because OSPF is within the scope of the OSPF WG.

3.4. Justification

The WG should consider this document as it specifies the extensions to the OSPF routing protocols in support of GMPLS.

4. Introduction

This document specifies extensions to the OSPF routing protocol in support of carrying link state information for Generalized Multi-Protocol Label Switching (GMPLS). The set of required enhancements to OSPF are outlined in [GMPLS-ROUTING].

5. OSPF Routing Enhancements

In this section we define the enhancements to the TE properties of GMPLS TE links that can be announced in OSPF TE LSAs. The Traffic Engineering (TE) LSA, which is an opaque LSA with area flooding scope [3], has only one top-level Type/Length/Value (TLV) triplet and has one or more nested TLVs for extensibility. The top-level TLV can take one of two values (1) Router Address or (2) Link. In this document, we enhance the sub-TLVs for the Link TLV in support of GMPLS. Specifically, we add the following sub-TLVs:

1. Outgoing Interface Identifier,
2. Incoming Interface Identifier,
3. Link Protection Type,
4. Shared Risk Link Group, and
5. Interface Switching Capability Descriptor.

This brings the list of sub-TLVs of the TE Link TLV to:

Sub-TLV Type	Length	Name
1	1	Link type
2	4	Link ID
3	4	Local interface IP address
4	4	Remote interface IP address
5	4	Traffic engineering metric
6	4	Maximum bandwidth
7	4	Maximum reservable bandwidth
8	32	Unreserved bandwidth
9	4	Resource class/color
11	4	Outgoing Interface Identifier
12	4	Incoming Interface Identifier
14	4	Link Protection Type
16	variable	Shared Risk Link Group
15	variable	Interface Switching Capability Descriptor
32768-32772	-	Reserved for Cisco-specific extensions

5.1. Outgoing Interface Identifier

An Outgoing Interface Identifier is a sub-TLV of the Link TLV with type 11, length 4, and value equal to the assigned identifier.

5.2. Incoming Interface Identifier

An Incoming Interface Identifier is a sub-TLV of the Link TLV with type 12, length 4, and value equal to the assigned identifier.

5.3. Link Protection Type

The Link Protection Type is a sub-TLV of the Link TLV, with type 14, and length of four octets, the first of which is a bit vector describing the protection capabilities of the link. They are:

0x01 Extra Traffic

0x02 Unprotected

0x04 Shared

0x08 Dedicated 1:1

0x10 Dedicated 1+1

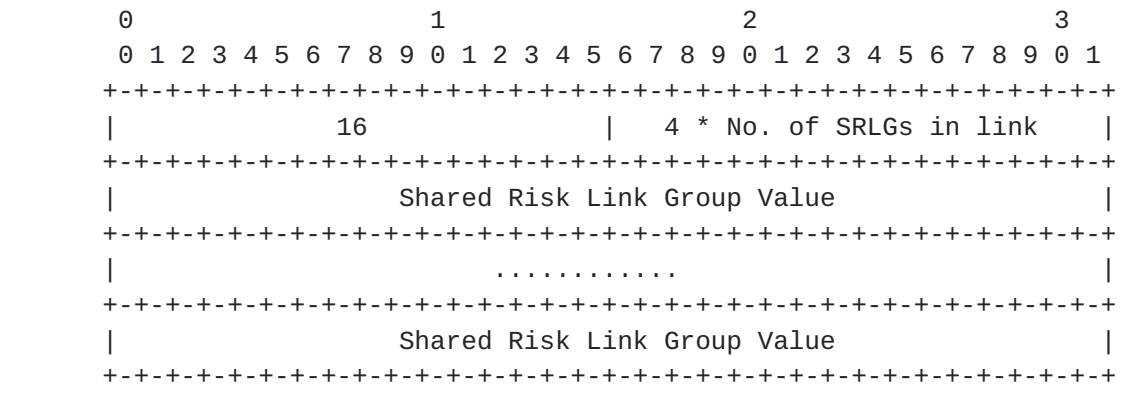
0x20 Enhanced

0x40 Reserved

0x80 Reserved

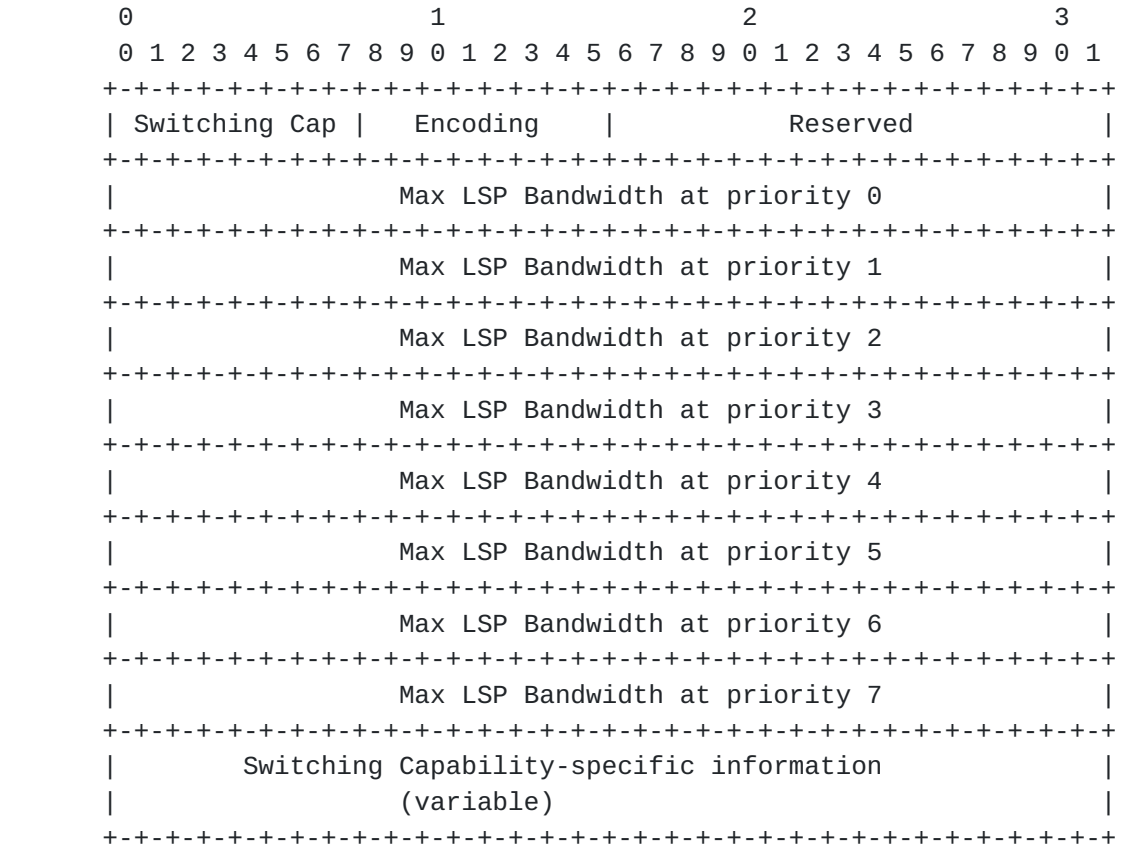
5.4. Shared Risk Link Group (SRLG)

The SRLG is a sub-TLV of the Link TLV with type 16. The length is the length of the list in octets. The value is an unordered list of 32 bit numbers that are the SRLGs that the link belongs to. The format is as shown below:



5.5. Interface Switching Capability Descriptor

The Interface Switching Capability Descriptor is a sub-TLV of the Link TLV with type 15. The length is the length of value field in octets. The format of the value field is as shown below:



The Switching Capability (Switching Cap) field contains one of the

following values:

1	Packet-Switch Capable-1 (PSC-1)
2	Packet-Switch Capable-2 (PSC-2)
3	Packet-Switch Capable-3 (PSC-3)
4	Packet-Switch Capable-4 (PSC-4)
51	Layer-2 Switch Capable (L2SC)
100	Time-Division-Multiplex Capable (TDM)
150	Lambda-Switch Capable (LSC)
200	Fiber-Switch Capable (FSC)

The Encoding field contains one of the values specified in Section 3.1.1 of [GMPLS-SIG].

Maximum LSP Bandwidth is encoded as a list of eight 4 octet fields in the IEEE floating point format, with priority 0 first and priority 7 last.

The content of the Switching Capability specific information field depends on the value of the Switching Capability field.

When the Switching Capability field is PSC-1, PSC-2, PSC-3, PSC-4, or L2SC, there is no specific information.

When the Switching Capability field is TDM, the specific information includes Minimum LSP Bandwidth, which is is encoded in a 4 octets field in the IEEE floating point format.

When the Switching Capability field is LSC, there is no specific information.

6. Security Considerations

The sub-TLVs proposed in this document does not raise any new security concerns.

7. Acknowledgements

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8. References

[OSPF-TE] Katz, D., Yeung, D., "Traffic Engineering Extensions to OSPF",
draft-katz-yeung-ospf-traffic-04.txt (work in progress)

[GMPLS-SIG] "Generalized MPLS - Signaling Functional Description", draft-ietf-mpls-generalized-signaling-04.txt (work in progress)

[GMPLS-ROUTING] "Routing Extensions in Support of Generalized MPLS", draft-many-ccamp-gmpls-routing-00.txt

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