Internet Engineering Task Force (IETF)
Request for Comments: 8258
Category: Standards Track
ISSN: 2070-1721

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October 2017

Generalized SCSI: A Generic Structure for Interface Switching Capability Descriptor (ISCD) Switching Capability Specific Information (SCSI)

Abstract

This document defines a generic information structure for information carried in routing protocol Interface Switching Capability Descriptor (ISCD) Switching Capability Specific Information (SCSI) fields. This "Generalized SCSI" can be used with routing protocols that define GMPLS ISCDs and any specific technology. This document does not modify any existing technology-specific formats and is defined for use in conjunction with new GMPLS Switching Capability types. The context for this document is Generalized MPLS, and the reader is expected to be familiar with the GMPLS architecture and associated protocol standards.

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/rfc8258.

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1. Introduction

The context for this document is Generalized MPLS, and the reader is expected to be familiar with the GMPLS architecture, associated terminology, and protocol standards: notably, but not limited to, [RFC3945], [RFC4202], [RFC4203] and [RFC5307].

The Interface Switching Capability Descriptor (ISCD) [RFC4202] allows routing protocols such as OSPF and ISIS to carry technology-specific information in the Switching Capability-specific information field, see [RFC4203] and [RFC5307]. The format of an SCSI field is dictated by the specific technology being represented as indicated by the ISCD Switching Capability field. Existing Switching Capabilities are managed by IANA in the "Switching Types" registry <http://www.iana.org/assignments/gmpls-sig-parameters> and the related "IANA-GMPLS-TC-MIB" definitions.

[RFC7138] introduced a "sub-TLV" structure to its technology-specific SCSI field. The sub-TLV-based approach allows for greater flexibility in the structure, ordering, and ability to support extensions of the SC-specific format. This Sub-TLV approach is also used in [RFC7688].

This document generalizes this approach and defines a new generalized SCSI field format for use by future specific technologies and Switching Capability types. The generalized SCSI carries SCSI-TLVs that may be defined within the scope of a specific technology or shared across multiple technologies (e.g., [AVAIL-EXT]). This document also establishes a registry for SCSI-TLV definitions that may be shared across multiple technologies.

2. Terminology

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.

The reader is expected to be familiar with GMPLS terminology (e.g., as found in [RFC3945]) as well as the terminology used in [RFC4202], [RFC4203], and [RFC5307].

3. Generalized SCSI Formats

The Generalized SCSI is composed of zero or more variable-length TLV fields each of which is called an "SCSI-TLV". There are no specific size restrictions on these SCSI-TLVs. Size and other formatting restrictions may be imposed by the routing protocol ISCD field (refer to [RFC4203] and [RFC5307]). Please refer to [RFC3630] for the treatment of malformed Link TLVs.

The SCSI-TLV format is:

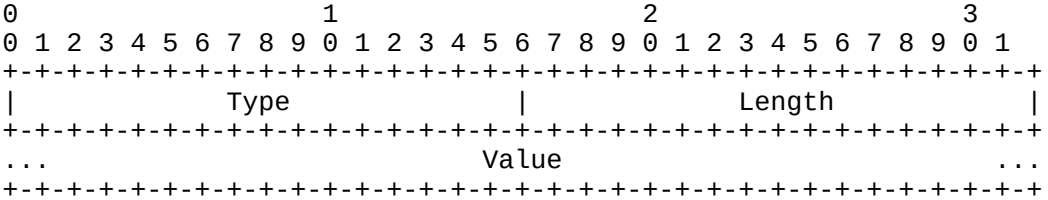

Figure 1: TLV Format

Type (2 octets):
This field indicates the type and structure of the information contained in the Value field.

Length (2 octets):
This field MUST be set to the size, in octets (bytes), of the Value field. The value of the field MUST be zero or divisible by 4. Note that this implies that the Value field can be omitted or contain padding.

Value (variable):
A variable-length field, formatted according to the definition indicated by value of the Type field. This field can be omitted for certain types.

4. Procedures

The ISCD can include a Generalized SCSI when advertising technologies whose Switching Capability definition references this document. The corollary of this is that the Generalized SCSI MUST NOT be used for ISCDs of technologies whose Switching Capability definition do not reference this document.

The Generalized SCSI MAY contain a sequence of zero or more SCSI-TLVs. Sub-TLV parsing (format) errors MUST be treated as a malformed ISCD. SCSI-TLVs MUST be processed in the order received and, if re-originated, ordering MUST be preserved. Unknown SCSI-TLVs MUST be ignored and transparently processed, i.e., re-originated when appropriate. Processing related to multiple SCSI-TLVs of the same type may be further refined based on the definition on the type.

5. Security Considerations

This document does not introduce any security issue beyond those discussed in [RFC4203] and [RFC5307]. As discussed there, the information carried in ISCDs is not used for Shortest Path First (SPF) computation or normal routing, and the extensions here defined do not have a direct effect on IP routing. Tampering with GMPLS Traffic Engineering (TE) Link State Advertisements (LSAs) may have an effect on the underlying transport network. Mechanisms such as those described in [RFC2154] and [RFC5304] to protect the transmission of this information are suggested.

6. IANA Considerations

This document defines a new SCSI-TLV that is carried in the SCSI field of the ISCDs defined in [RFC4203] and [RFC5307]. The SCSI-TLV includes a 16-bit type identifier (the Type field). The same Type field values are applicable to the new SCSI-TLV.

IANA has created and will maintain a new registry, the "Generalized SCSI (Switching Capability Specific Information) TLV Types" registry under the "Generalized Multi-Protocol Label Switching (GMPLS) Signaling Parameters" registry.

The initial contents of this registry are as follows:

Value	SCSI-TLV	Switching Type	Reference
0	Reserved		[RFC8258]
1-65535	Unassigned	(value list)	

New allocation requests to this registry must indicate the value or values to be used in the Switching Type column.

The registry should be established with registration policies of "Specification Required", see [RFC8126].

7. References

7.1. Normative References

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7.2. Informative References

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[RFC5304] Li, T. and R. Atkinson, "IS-IS Cryptographic Authentication", RFC 5304, DOI 10.17487/RFC5304, October 2008, <https://www.rfc-editor.org/info/rfc5304>.

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[RFC7688] Lee, Y., Ed. and G. Bernstein, Ed., "GMPLS OSPF Enhancement for Signal and Network Element Compatibility for Wavelength Switched Optical Networks", RFC 7688, DOI 10.17487/RFC7688, November 2015, <https://www.rfc-editor.org/info/rfc7688>.

[RFC8126] Cotton, M., Leiba, B., and T. Narten, "Guidelines for Writing an IANA Considerations Section in RFCs", BCP 26, RFC 8126, DOI 10.17487/RFC8126, June 2017, <https://www.rfc-editor.org/info/rfc8126>.

Acknowledgments

The authors would like to thank Adrian Farrel and Julien Meuric for the careful review and suggestions. Thomas Heide Clausen provided useful comments as part of the Routing Directorate review.

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