                    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:

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|              Type             |             Length            |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
...                            Value                           ...
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```
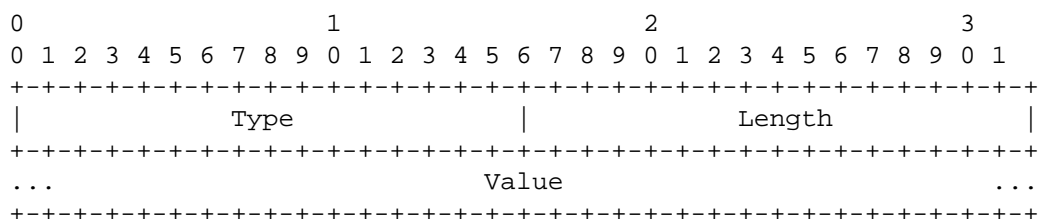
Figure 1: TLV Format

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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