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LSP Attribute in ERO
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Abstract

LSP attributes can be specified or recorded for whole path, but they cannot be specified as part of an Explicit Route Object (ERO). This document extend the semantic for RSVP ERO object with a new subobject to carry LSP attributes.

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1. Introduction

Generalized MPLS (GMPLS) Traffic Engineering (TE) Label Switched Paths (LSPs) can be route-constrained by making use of the Explicit Route (ERO) object and related sub-objects as defined in [[RFC3209](#)], [[RFC3473](#)], [[RFC3477](#)], [[RFC4873](#)], [[RFC4874](#)], [[RFC5520](#)] and [[RFC5553](#)]. This document introduce a new ERO subobject to carry LSP_ATTRIBUTES defined in [[RFC5420](#)] within the EXPLICIT_ROUTE.

1.1. Contributing Authors

1.2. 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](#).

2. Recording Attributes Per LSP

2.1. Requirements

LSP attribute defined [[RFC5420](#)] should be expressed in ERO and SERO objects.

2.2. ERO LSP Attribute Subobject

The ERO LSP Attributes subobject may be carried in the ERO or SERO object if they are present. The subobject uses the standard format of an ERO subobject.

The length is variable and content MUST be the same as for the LSP_ATTRIBUTE object with Attributes TLVs.

The ERO LSP attribute subobject is defined as follows:

```

      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
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|L|   Type   |      Length   |      Reserved      |R|
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|
//                               Attributes TLVs                               //
|
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+

```

See [[RFC3209](#)] for a description of L parameters. The attributes TLV are encoded as defined in [[RFC5420](#)] [section 3](#).

Type x TBD by IANA.

Length The Length contains the total length of the subobject in bytes, including the Type and Length fields. The Length MUST be always divisible by 4.

Reserved Reserved, must be set to 0 when the subobject is inserted in the ERO, MUST NOT be changed when a node process the ERO and must be ignored on the node addressed by the preceding ERO subobjects

R This bit reflects the LSP_REQUIRED_ATTRIBUTE and LSP_ATTRIBUTE semantic. When set indicates required LSP attributes to be processed by the node, when cleared the LSP attributes are not required as described in [Section 2.3](#).

Attributes TLVs as defined in [\[RFC5420\] section 3](#).

2.3. Procedures

As described in [\[RFC3209\]](#) and [\[RFC3473\]](#) the ERO is managed as a list where each hop information starts with a subobject identifying an abstract node or link. The LSP attribute subobject must be appended after the existing subobjects defined in [\[RFC3209\]](#), [\[RFC3473\]](#), [\[RFC3477\]](#), [\[RFC4873\]](#), [\[RFC4874\]](#), [\[RFC5520\]](#) and [\[RFC5553\]](#). Several LSP attribute subobject MAY be present.

If a node is processing an LSP attribute subobject and does not support handling of the subobject it will behave as described in [\[RFC3209\]](#) when an unrecognized ERO subobject is encountered. This node will return a PathErr with error code "Routing Error" and error value "Bad EXPLICIT_ROUTE object" with the EXPLICIT_ROUTE object included, truncated (on the left) to the offending unrecognized subobject.

When the R bit is set a node MUST examine the attribute TLV present in the subobject following the rules described in [\[RFC5420\] section 5.2](#). When the R bit is not set a node MUST examine the attribute TLV present in the subobject following the rules described in [\[RFC5420\] section 4.2](#). If more than one ERO LSP attribute subobject having the R bit set is present, only the first one MUST be processed and the others SHOULD be ignored. If more than one ERO LSP attribute subject having the R bit cleared is present, only the first one MUST be processed and the others SHOULD be ignored.

3. IANA Considerations

3.1. LSP Attribute ERO subobject

IANA is requested to make the following subobject allocations from the "EXPLICIT_ROUTE Subobject Type" registry.

Sub-object type TBA

Name LSP attribute

Reference This document

3.2. Existing LSP Attribute TLVs

IANA is request to add the following information for each TLV in the RSVP TLV type identifier registry.

- o Whether allowed on LSP attribute ERO subobject

The existing registry is modified for existing TLVs.

3.2.1. Attribute Flags

The new TLV type definition is as follow

- o TLV Type = 1
- o TLV Name = Attribute Flags TLV
- o Allowed on LSP_ATTRIBUTES object
- o Allowed on LSP_REQUIRED_ATTRIBUTES object
- o Allowed on LSP attribute ERO subobject

3.2.2. Service ID TLV

The new TLV type definition is as follow

- o TLV Type = 2
- o TLV Name = Attribute Flags TLV
- o Allowed on LSP_ATTRIBUTES object

- o Not allowed on LSP_REQUIRED_ATTRIBUTES object
- o ? on LSP attribute ERO subobject

4. Security Considerations

None.

5. Acknowledgments

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6. Normative References

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