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Identification of Component Links of Unnumbered Interfaces
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Abstract

This document provides a means to identify component links that are bundled within an unnumbered interface. This feature is required during Generalized Multiprotocol Label Switching (GMPLS) establishment of Label Switched Paths (LSPs) that utilize such component links. Similarly, it is useful in error reporting for such LSPs.

[0. Summary for Sub-IP Area](#)

(This section to be removed before publication as an RFC).

[0.1. Summary](#)

[0.2. Related documents](#)

See the References Sections.

[0.3. Where does it fit in the Picture of the Sub-IP Work](#)

This work is applicable to GMPLS signaling protocols.

0.4. Why is it Targeted at this WG

GMPLS is worked on by the CCAMP WG.

This is a core requirement for GMPLS signaling and reporting errors on unnumbered links. This makes it immediately in scope.

0.5. Justification

[RFC3471] and [[RFC3473](#)] define how component links of numbered bundles may be identified within the IF_ID PHOP and IF_ID ERROR_SPEC objects.

[RFC3477] defines how unnumbered links may be used in RSVP-TE.

[RFC3471] and [[RFC3473](#)] define how unnumbered links may be identified within the IF_ID PHOP and IF_ID ERROR_SPEC objects.

There is no provision for identifying component links of unnumbered bundles within the IF_ID PHOP and IF_ID ERROR_SPEC objects. This is required for completeness and to allow full functionality of GMPLS.

1. Introduction

GMPLS offers support for bundled links to presented as a single interface [RFC3471, [RFC3473](#)]. This has configuration and management benefits.

GMPLS [RFC3471, [RFC3473](#)] recognises the value of specifying interfaces both during LSP establishment for out-of-band signaling (IF_ID PHOP object), and for error reporting (IF_ID ERROR_SPEC object). This is achieved using TLVs in these objects to specify the interface identifier. Both numbered and unnumbered interfaces are supported.

Further, GMPLS [RFC3471, [RFC3473](#)] recognises the value of specifying the component link of a link bundle during LSP establishment (IF_ID PHOP object), and for error reporting (IF_ID ERROR_SPEC object). This is achieved using TLVs in these objects to specify the interface identifier and component link identifier. Numbered bundles of

component links are supported. However, no provision is made for unnumbered bundles of component links.

This document extends the TLV definitions of [\[RFC3471\]](#) to provide the means to identify component links of unnumbered bundles within the IF_ID PHOP and IF_ID ERROR_SPEC objects.

2. Terminology

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 [\[RFC2119\]](#)

3. Existing Interface Identifiers

[\[RFC3471\]](#) defines IF_ID TLVs to identify links. These TLVs are applied in [\[RFC3473\]](#) in the IF_ID PHOP Object during LSP establishment, and in the IF_ID ERROR_SPEC Object to identify the failed link which is usually the downstream link from the reporting node.

The following set of TLVs are defined in [\[RFC3471\]](#).

| Type | Length | Format | Description |
|------|--------|------------|---|
| 1 | 8 | IPv4 Addr. | IPv4 (Interface address) |
| 2 | 20 | IPv6 Addr. | IPv6 (Interface address) |
| 3 | 12 | Compound | IF_INDEX (Interface index) |
| 4 | 12 | Compound | COMPONENT_IF_DOWNSTREAM (Component interface) |
| 5 | 12 | Compound | COMPONENT_IF_UPSTREAM (Component interface) |

4. New Interface Identifiers

Two new TLVs are defined for use in the IF_ID PHOP Object and in the IF_ID ERROR_SPEC Object. Note that the Type values shown here are only suggested values - final values are TBD and to be determined by IETF consensus.

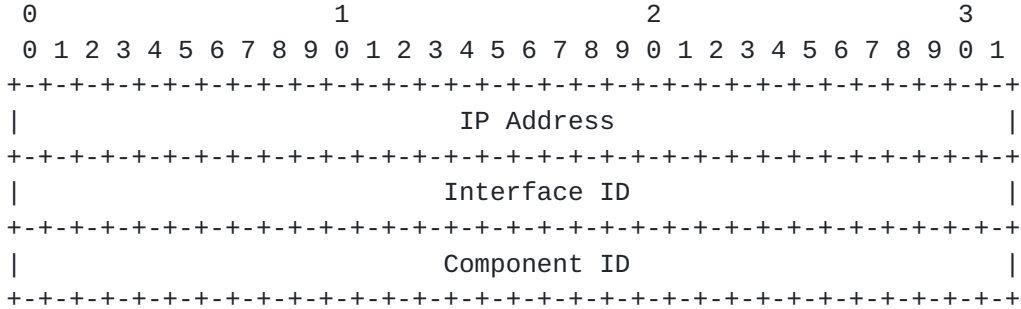
Two TLVs are provided to allow the forward and reverse paths to be separately identified.

| Type | Length | Format | Description |
|------|--------|--------|-------------|
|------|--------|--------|-------------|

- 6 16 See below UNUM_COMPONENT_IF_DOWN (Component interface)
- 7 16 See below UNUM_COMPONENT_IF_UP (Component interface)

4.1 TLV Definitions

The new TLVs have a common format as shown below.



IP Address: 32 bits

Any IP address associated with the local node.

Interface ID: 32 bits

The identifier of the unnumbered bundled link. By definition, this is unique within the scope of the node identified by the IP Address field.

Component ID: 32 bits

A component in the bundled link identified by the Interface ID. During LSP establishment, the special value 0xFFFFFFFF can be used to indicate the same label to be valid across all component links in the bundle identified by the Interface ID.

4.1 Procedures

The procedures are unmodified from [[RFC3471](#)], [[RFC3473](#)] and [[RFC3477](#)].

5. IANA Considerations

5.1 IF_ID_ERROR_SPEC TLVs

Note that the IF_ID TLV type values are not currently tracked or managed by IANA. This might be a good opportunity to move them under IANA control.

6. Security Considerations

The extensions in this document make no changes to the security provisions in [[RFC3473](#)].

7. Acknowledgments

We would like to thank the authors of [[CRANKBACK](#)] where these proposals originally appeared.

8. Intellectual Property Considerations

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9. Normative References

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.
- [RFC3471] Berger, L., Editor, "Generalized Multi-Protocol Label Switching (GMPLS) Signaling Functional Description", [RFC 3471](#), January 2003.
- [RFC3473] L. Berger, et al., "Generalized MPLS Signaling -

RSVP-TE Extensions", [RFC 3473](#), January 2003.

[RFC3477] Kompella, K., Rekhter, Y., "Signalling Unnumbered Links in RSVP-TE", [RFC 3477](#), January 2003.

10. Informational References

[CRANKBACK] A. Farrel (editor), "Crankback Signaling Extensions for MPLS Signaling", [draft-ietf-ccamp-crankback-01.txt](#) January 2004, work in progress.

11. Authors' Addresses

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