

**RSVP-TE Extensions to Exchange MPLS-TP LSP Identifiers
draft-zhang-ccamp-mpls-tp-rsvpte-ext-tunnel-num-01**

Abstract

The MPLS Transport Profile (MPLS-TP) identifiers document [[RFC6370](#)] specifies a initial set of identifiers, such as local assigned tunnel number and Global_ID, which can be used to form Maintenance Entity Point Identifier (MEP_ID). As to some Operation, Administration and Maintenance (OAM) functions, such as Connectivity Verification (CV) [[I-D.ietf-mpls-tp-cc-cv-rdi](#)], source MEP_ID must be inserted in the OAM packets, so that the peer endpoint can compare the received and expected MEP_IDs to judge whether there is a mismatch [[RFC6371](#)], which means that the two MEP nodes need to pre-store each other's MEP_IDs.

This document defines the signaling extensions to exchange the Label Switched Path (LSP) identifiers.

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1. Introduction

The MPLS Transport Profile (MPLS-TP) identifiers document [[RFC6370](#)] specifies a initial set of identifiers, such as local assigned tunnel number (Tunnel_Num) and Global_ID, which can be used to form Maintenance Entity Point Identifier (MEP_ID). The MPLS-TP LSP_MEP_ID is Node_ID::Tunnel_Num::LSP_Num, and in situations where global uniqueness is required, this becomes: Global_ID::Node_ID::Tunnel_Num::LSP_Num. In order to realize some Operation, Administration and Maintenance (OAM) functions, such as Connectivity Verification (CV) [[I-D.ietf-mpls-tp-cc-cv-rdi](#)], source MEP-ID MUST be inserted in the OAM packets, in this way the peer endpoint can compare the received and expected MEP-IDs to judge whether there is a mismatch [[RFC6371](#)]. Hence, the two MEP nodes must pre-store each other's MEP-IDs before sending the CV packets.

Obviously, the exchange of MEP_IDs can be accomplished by the Network Management System (NMS), but it is complex when the LSPs cross different administration domains, which involves the cooperation of NMSs. When the LSPs are set up by control plane, Resource Reservation Protocol Traffic Engineering (RSVP-TE) messages will be more suitable to realize the exchange of MEP_IDs.

The specification of setting up co-routed bidirectional LSP is described in the document [[RFC3473](#)], which does not specify the Global_ID and locally configured Z9-Tunnel_Num. Similarly, for associated bidirectional LSP [[I-D.ietf-ccamp-mpls-tp-rsvp-te-ext-associated-lsp](#)], the Global_ID may also be useful. This document defines the signaling extensions to exchange the LSP identifiers.

2. Conventions used in this document

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. Operation

3.1. Co-routed Bidirectional LSP

MPLS-TP co-routed bidirectional LSPs can be deployed across one or more administration domains, and NMS may exist in some administration domains, which knows the tunnel spaces of every node in it's responsible domain. Consider that LSP1 is initialized at A1 node, and the "L" bit of the Attributes Flags TLV [[RFC5420](#)] may be set in

the outgoing Path message. If the "L" bit is set, the Connection TLV MUST be carried and Global_ID TLV is optional in the LSP_ATTRIBUTES object.

A "L" bit is defined in the Connection TLV. When it is set, the Z9-Tunnel_Num is designated in the "Destination Tunnel Num" field. If the Z9 node finds that this tunnel number is occupied, or it can not be used because of some local policies, an error MUST be generated "Notify error/ unavailable tunnel number". Otherwise, the designated tunnel number must be adopted, and the Connection TLV may be inserted in the Resv message without any change. In case the "L" bit is not set, a recommended Z9-Tunnel_Num may be filled in the "Destination Tunnel Num" field. If the Z9 node finds that the recommended value can be used, the Connection TLV must be inserted in the Resv message without any change; else the recommended value can not be used or the "Destination Tunnel Num" field is empty, a new tunnel number will be allocated and filled into the Connection TLV that must be inserted in the Resv message. While, that the "L" bit is set or not depends on the operators' preference. For example, for the operators who are used to operate traditional transport network and familiar with the Transport-Centric operational model may prefer "L" bit set. That the "L" bit is not set is more suitable for the operators who are familiar with the operation and maintenance of IP/MPLS network, or the MPLS-TP LSPs cross multiple administration domains.

The Global_ID TLV is needed to be carried if the LSP is across different administrative domains, which can be inserted in the outgoing Path message at A1 node or added by the transit Autonomous System Border Router (ASBR) node that is in the same domain as A1 node, and the value is A1's Global_ID. Z9's Global_ID should be inserted in the Resv message at Z9 node or any other Label Switched Routers (LSRs) that in the same domain as Z9, and the value is Z9's Global_ID.

3.2. Associated Bidirectional LSP

MPLS-TP associated bidirectional LSPs may also be deployed across one or more administration domains, and the Global_ID is needed to keep the MEP_ID globally unique. Consider that the forward LSP is initialized at A1 node and the backward LSP is initialized at Z9 node, the "L" bit of the Attributes Flags TLV may be set in each other's outgoing Path messages. When the "L" bit is set, the Global_ID TLV with the value set to A1/Z9's Global_ID is optional in the LSP_ATTRIBUTES object and can be inserted in the outgoing Path message at A1/Z9 node or added by the transit Autonomous System Border Router (ASBR) node that is in the same domain as A1/Z9 node. If this TLV is present in Resv message, it can be ignored.

4. RSVP-TE Extensions

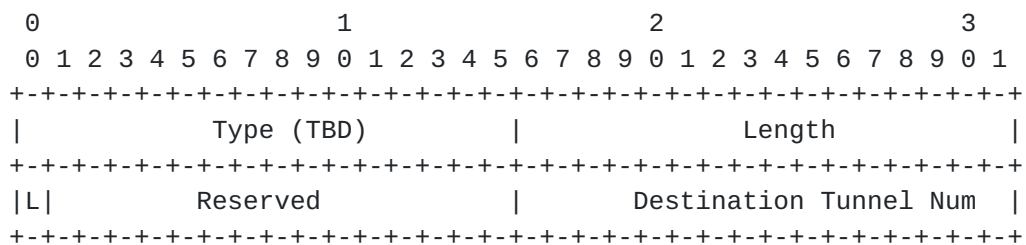
4.1. LSP Attribute Flags

The LSP Attribute Flags TLV is defined in [[RFC5420](#)], and this document introduces a new flag:

One bit ("L", IANA to assign): "LSP identifier indication" is allocated in the LSP Attributes Flags TLV to be used in the LSP_ATTRIBUTES object. If the "L" bit is set, it is indicating that A1/Z9 node needs to know each other's LSP identifier.

4.2. Connection TLV

The Connection TLV is carried in the LSP_ATTRIBUTES object with the following format:



Connection TLV

L

The L bit is set if the initiating node enforces the peer endpoint to configure the value carried in the field of "Destination Tunnel Num".

If the bit is not set, the peer endpoint firstly tries to use the recommended tunnel number; it can use any other unoccupied tunnel numbers when the recommended tunnel number is unavailable.

Reserverd

Must be set to 0 on transmit and ignored on receive.

Destination Tunnel Num

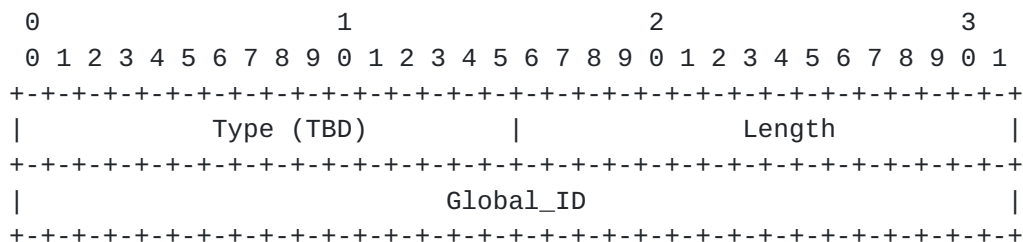
If the L bit is set, it indicates that the peer endpoint must configure the value carried in this field.

Else the L bit is not set, this field can be empty or filled by the recommended value.

The Connection TLV may appear in Path or Resv message of co-routed **bidirectional** LSP.

4.3. Global_ID TLV

The Global_ID TLV is carried in the LSP_ATTRIBUTES object with the following format:



Global_ID TLV

This TLV can be used for co-routed or associated bidirectional LSP. For co-routed bidirectional LSP, it can appear in Path or Resv message. As to associated bidirectional LSP, it can only appear in the Path message, and will be ignored in the Resv message.

5. IANA Considerations

One bit ("LSP identifier indication") needs to be allocated in the LSP Attributes Flags Registry.

This document specifies two new TLVs to be carried in the LSP_ATTRIBUTES objects in Path and Resv messages: the Connection TLV and Global_ID TLV.

For the existing error code "Notify error" (value 25), one new Error value: "Unavailable tunnel number" needs to be assigned.

6. Security Considerations

This document adds a new flag to the Attributes Flags TLV and introduce two new TLVs in the LSP_ATTRIBUTES objects. It does not introduce any new direct security issues, and the reader is referred to the security considerations expressed in [[RFC2205](#)] and [[RFC5420](#)].

For a more comprehensive discussion on GMPLS security please see the Security Framework for MPLS and GMPLS Networks [[RFC5920](#)].

7. Acknowledgement

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