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# RSVP-TE Extentions to Exchange MPLS-TP Tunnel Numbers draft-zhang-ccamp-mpls-tp-rsvpte-ext-tunnel-num-00

#### Abstract

The MPLS Transport Profile (MPLS-TP) identifiers document [I-D.ietf-mpls-tp-identifiers] introduce two tunnel numbers, A1-Tunnel\_Num and Z9-Tunnel\_Num, which allow a compact format for Maintenance Entity Point Identifier (MEP\_ID). For 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, which means that the two MEP nodes need to pre-store each other's MEP\_IDs.

The specification of setting up co-routed bidirectional LSP is described in the document [RFC3473], which does not introduce the locally configured tunnel number on the tunnel endpoint. This document defines the Connection object to exchange the tunnel numbers.

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#### 1. Introduction

The MPLS Transport Profile (MPLS-TP) identifiers document [I-D.ietf-mpls-tp-identifiers] introduce two tunnel numbers, A1-Tunnel\_Num and Z9-Tunnel\_Num, which are locally assigned and allow a compact format for Maintenance Entity Point Identifier (MEP\_ID). For a co-routed bidirectional LSP, the format of A1-MEP\_ID is A1-Node\_ID::A1-Tunnel\_Num::LSP\_Num, and the format of Z9-MEP\_ID is Z9-Node\_ID::Z9-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. Hence, the two MEP nodes must pre-store each other's MEP-IDs before sending the CV packets.

Although the exchange of MEP\_IDs can be accomplished by Network Management System (NMS) if it is deployed, it is still complex when the LSPs cross different adiminstration domains, which needs the cooperation of NMSs. So when the LSPs are set up by control plane, Resource ReserVation Protocol Traffic Engnieering (RSVP-TE) signaling 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 introduce the locally configured tunnel number on the tunnel endpoint. This document defines the Connection object to exchange the tunnel numbers.

## 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].

# Operation

MPLS-TP co-routed bidirectional LSPs can be deloyed 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 with Connection object inserted in LSP1's Path message , the following modes may happend.

Modes 1: L bit is set, and the Z9-Tunnel\_Num is designated in the "Destination Tunnel Num" field. If the Z9 node finds that this

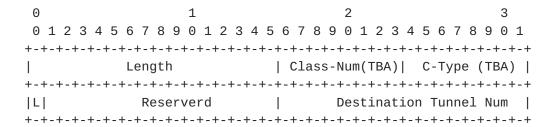
tunnel number is occupied, or it can not be used because of some local policies, a PathErr message must be sent with "Unavailable tunnel number" error. Otherwise, the designated tunnel number must be adopted, and the Connection object may be inserted in the Resv message without any change.

Modes 2: L bit is not set, and 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 object must be inserted in the Resv message without any change; if 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 object that must be inserted in the Resv message.

Each mode has its own pros and cons and how to determine the right mode for a specific network mainly 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 mode 1. The second mode 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.

### 4. Connection Object

The format of Connection Object (Class-Num of the form 11bbbbbb with value = TBA, C-Type = TBA) is as follow:



Connection Object

L

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

If the bit is not set, the peer endpoint firstly tries to use the recommended tunnel number; it can use any other unoccupied tunnnel 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.
- If the L bit is not set, this field can be empty or filled by the recommended value.

The Connection object may appear in Path or Resv message, and a midpoint that does not support this object is required to pass it on unaltered, as indicated by the C-Num and the rules defined in [RFC2205].

#### 5. IANA Considerations

TBD.

# 6. Security Considerations

TBD.

# 7. Acknowledgement

This document was prepared based on the discussion with George Swallow, valuable comments and input was also received from Venkatesan Mahalingam and Muliu Tao.

#### 8. References

# 8.1. Normative references

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- [RFC2205] Braden, B., Zhang, L., Berson, S., Herzog, S., and S.
   Jamin, "Resource ReSerVation Protocol (RSVP) -- Version 1
   Functional Specification", RFC 2205, September 1997.
- [RFC3473] Berger, L., "Generalized Multi-Protocol Label Switching (GMPLS) Signaling Resource Reservation Protocol-Traffic Engineering (RSVP-TE) Extensions", <u>RFC 3473</u>, January 2003.

#### 8.2. Informative References

# [I-D.ietf-mpls-tp-cc-cv-rdi]

Allan, D., Swallow, G., and J. Drake, "Proactive Connectivity Verification, Continuity Check and Remote Defect indication for MPLS Transport Profile", <a href="mailto:draft-ietf-mpls-tp-cc-cv-rdi-06">draft-ietf-mpls-tp-cc-cv-rdi-06</a> (work in progress), August 2011.

# [I-D.ietf-mpls-tp-identifiers]

Bocci, M., Swallow, G., and E. Gray, "MPLS-TP Identifiers", <u>draft-ietf-mpls-tp-identifiers-07</u> (work in progress), July 2011.

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