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RSVP-TE Extensions to Exchange MPLS-TP LSP Tunnel Numbers
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Abstract

The MPLS Transport Profile (MPLS-TP) identifiers document [RFC6370] specifies an initial set of identifiers, including the local assigned Z9-Tunnel_Num, 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) [RFC6428], 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 mis-connectivity defect [RFC6371], which means that the two MEP nodes need to pre-store each other's MEP_IDs.

This document defines the signaling extensions to communicate the local assigned Z9-Tunnel_Num to the ingress LSR (Label Switching Router) of a co-routed bidirectional LSP.

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1. Introduction

The MPLS Transport Profile (MPLS-TP) identifiers document [RFC6370] specifies a initial set of identifiers, including the local assigned Z9-Tunnel_Num, 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) [RFC6428], 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 mis-connectivity defect [RFC6371]. Hence, the two MEP nodes must pre-store each other's MEP-IDs before sending the CV packets.

When the LSPs are set up by control plane, Resource ReserVation Protocol Traffic Engineering (RSVP-TE) messages can be used to communicate the Z9-Tunnel_Num to the ingress LSR (Label Switching Router) of a co-routed bidirectional LSP. Since the LSP identifiers can be carried in an ASSOCIATION object [I-D.ietf-ccamp-assoc-ext], it is naturally to define the signaling extensions based on the ASSOCIATION object.

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

Consider that LSP1 is initialized at A1 node with an ASSOCIATION object inserted in Path message. Association Type is set to "LSP Identifiers", Association ID set to A1-Tunnel_Num, Association Source set to A1-Node_ID. Upon receipt of the Association Object, the egress node Z9 checks the Association Type field. If it is "LSP Identifiers", the ASSOCIATION object must be carried in the Resv message also. Similarly, Association Type is set to "LSP Identifiers", Association ID set to Z9-Tunnel_Num, Association Source set to Z9-Node_ID. In this way, the ingress LSR can get the Z9-Tunnel_Num, which may be used for identifying a mis-connectivity defect of the proactive CV OAM function.

If LSP1 is across different domains, A1 and Z9 nodes may need to know each other's Global_ID also. When an Extended ASSOCIATION object with Association Type "LSP Identifiers" in inserted in the initialized LSP Path message, Global Association Source is set to A1-Global_ID. Similarly, this field will be set to Z9-Global_ID in the Resv message.

4. RSVP-TE Extensions

4.1. Association Type

Within the current document, a new Association Type is defined in the ASSOCIATION object, which MAY be used with any ASSOCIATION object type. For example, the Extended ASSOCIATION object defined in [I-D.ietf-ccamp-assoc-ext] can be used when Global_ID based identification is desired.

Value	Type
5 (TBD)	LSP Identifiers (L)

4.2. Signaling Procedure

Association ID: 16 bits

For Path message, Association ID is the Tunnel_Num of the node sending out the Path message, and can be ignored by the receiver.

For Resv message, Association ID is the Tunnel_Num of the node sending out the Resv message.

Association Source: 4 or 16 bytes

Same as for IPv4 and IPv6 ASSOCIATION objects, see [RFC4872].

For Path message, Association Source is the IP address of the node sending out the Path message, and can be ignored by the receiver.

For Resv message, Association Source is the IP address of the node sending out the Resv message, and can be ignored by the receiver.

Global Association Source: 4 bytes

Same as defined in [I-D.ietf-ccamp-assoc-ext] if Extended ASSOCIATION object is used.

For Path message, Global Association Source is filled with the Global_ID of the node sending out the Path message.

For Resv message, Global Association Source is the Global_ID of the node sending out the Resv message.

Extended Association ID:

Same as defined in [I-D.ietf-ccamp-assoc-ext] if Extended ASSOCIATION object is used.

Extended Association ID is not added in the Extended ASSOCIATION object when association type signaled is "LSP Identifiers".

The rules associated with the processing of the Extended ASSOCIATION objects in RSVP message are discussed in [I-D.ietf-ccamp-assoc-ext]. It said that in the absence of Association Type-specific rules for

identifying association, the included ASSOCIATION objects MUST be identical. Since the Association Type "LSP Identifiers" used here is to carry LSP identifier, there is no need to associate Path state to Path state or Resv state to Resv state, one specific rule is added: when the Association Type is "LSP Identifiers", the ASSOCIATION object can appear in Path or Resv message across sessions or in a single session, and the values can be different.

5. IANA Considerations

IANA is requested to administer assignment of new values for namespace defined in this document and summarized in this section.

One value ("LSP Identifiers") needs to be allocated in the Association Type Registry.

6. Security Considerations

A new Association Type is defined in this document, and except this, there are no security issues about the ASSOCIATION object and Extended ASSOCIATION object are introduced here. For Association object related security issues, see the documents [RFC4872], [RFC4873], and [I-D.ietf-ccamp-assoc-ext].

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

7. Acknowledgement

This document was prepared based on the discussion with George Swallow, valuable comments and input were also received from Lou Berger, John E Drake, Jaihari Kalijanakiraman, Muliu Tao and Wenjuan He.

8. References

8.1. Normative references

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8.2. Informative References

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