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MPLS-TP Identifiers Following ITU-T Conventions
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Abstract

This document specifies an extension to the identifiers to be used in the Transport Profile of Multiprotocol Label Switching (MPLS-TP). Identifiers that follow IP/MPLS conventions have already been defined. This memo augments that set of identifiers for MPLS-TP management and OAM functions to include identifier information in a format typically used by the ITU-T.

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1. Introduction

This document augments the initial set of identifiers to be used in the Transport Profile of Multiprotocol Label Switching (MPLS-TP) specified in RFC 6370 [RFC6370].

RFC 6370 [RFC6370] defines a set of MPLS-TP transport and management entity identifiers to support bidirectional (co-routed and associated) point-to-point MPLS-TP LSPs, including PWs and Sections which follow the IP/MPLS conventions.

This document specifies an alternative way to uniquely identify an operator/service provider based on ITU-T conventions and specifies how this operator/service provider identifier can be used to make the existing set of MPLS-TP transport and management entity identifiers, defined by RFC 6370 [RFC6370], globally unique.

This document solely defines those identifiers. Their use and possible protocols extensions to carry them is out of scope in this document.

In this document, we follow the notational convention laid out in RFC 6370 [RFC6370].

1.1. Terminology

CC: Country Code

ICC: ITU-T Carrier Code

ITU-T: International Telecommunication Union Telecommunication Standardization Sector

LSP: Label Switched Path

MEG: Maintenance Entity Group

MEP: Maintenance Entity Group End Point

MPLS: Multi-Protocol Label Switching

PW: Pseudowire

TSB: (ITU-T) Telecommunication Standardization Bureau

UMC: Unique MEG ID Code

1.2. Requirements notation

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 [RFC2119].

2. Uniquely Identifying an Operator - the ICC_Operator_ID

In RFC 6370 [RFC6370] an operator is uniquely identified by the Global_ID which is based on the AS number of the operator. The ITU-T however traditionally identifies operators/service providers based on the ITU-T Carrier Code (ICC) as specified in [M1400].

The ITU-T Telecommunication Standardization Bureau (TSB) maintains a list of assigned ICCs [ICC-list]. Note that ICCs can be assigned to both, ITU-T members as well as non-members, all of which are referenced at [ICC-list]. The national regulatory authorities act as an intermediary between the ITU/TSB and operators/service providers. Amongst the things that the national authorities are responsible for in the process of assigning an ICC is to ensure that the Carrier Codes are unique within their country.

The ICC itself is a string of one to six characters, each character being either alphabetic (i.e. A-Z) or numeric (i.e. 0-9). Alphabetic characters in the ICC SHOULD be represented with upper case letters.

Global uniqueness is assured by concatenating the ICC with a Country Code (CC). The Country Code (alpha-2) is a string of two alphabetic characters represented with upper case letters (i.e., A-Z). The Country Code format is defined in ISO 3166-1 [ISO3166-1]. Together, the CC and the ICC form the ICC_Operator_ID as CC::ICC.

3. Use of the ICC_Operator_ID

The ICC_Operator_ID is used as a replacement for the Global_ID as specified in RFC 6370 [RFC6370], i.e. its purpose is to provide a globally unique context for other MPLS-TP identifiers.

As an example, an Interface Identifier (IF_ID) in RFC 6370 [RFC6370] is specified as the concatenation of the Node_ID (a unique 32-bit value assigned by the operator) and the Interface Number (IF_Num, a 32-bit unsigned integer assigned by the operator that is unique within the scope of a Node_ID). To make this IF_ID globally unique the Global_ID is prefixed. This memo specifies the ICC_Operator_ID as an alternative format which, just like the Global_ID, is prefixed

to the IF_ID. Using the notation from RFC 6370 [RFC6370]:

Global_ID::Node_ID::IF_Num

is functionally equivalent to:

ICC_Operator_ID::Node_ID::IF_Num

The same substitution procedure applies to all identifiers specified in RFC 6370 [RFC6370] except for the other alternatives mentioned in this document.

4. ICC_Operator_ID-based MEG Identifiers

The ITU-T format of MEG_IDs for MPLS-TP Sections, LSPs and Pseudowires is based on the globally unique ICC_Operator_ID. In this case, the MEG_ID is a string of up to 15 characters. It consists of three subfields: the Country Code (as described in Section 2), the ICC (as described in Section 2) which together form the ICC_Operator_ID, followed by a Unique MEG ID Code (UMC).

The resulting MEG_ID therefore looks like the following:

CC:ICC:UMC

To avoid the potential for a short (i.e. less than 6 Character) ICC code in combination with a UMC not being unique the UMC MUST start with a special character that is not allowed in the ICC such as the "/" character. A side effect of this is that the MEG_ID can be decomposed into its individual components by a receiver.

The UMC MUST be unique within the organization identified by the combination of CC and ICC.

The ICC_Operator_ID-based MEG_ID may be applied equally to a single MPLS-TP Section, LSP or Pseudowire.

5. ICC_Operator_ID-based MEP Identifiers

ICC_Operator_ID-based MEP_IDs for MPLS-TP LSPs and Pseudowires are formed by appending a 16-bit index to the MEG_ID defined in Section 4 above. Within the context of a particular MEG, we call the identifier associated with a MEP the MEP Index (MEP_Index). The MEP_Index is administratively assigned. It is encoded as a 16-bit unsigned integer and MUST be unique within the MEG. An ICC_Operator_ID-based MEP_ID is structured as:

MEG_ID::MEP_Index

An ICC_Operator_ID-based MEP ID is globally unique by construction given the ICC_Operator_ID-based MEG_ID's global uniqueness.

6. Security Considerations

This document extends an existing information model and, as such, does in itself not introduce new security concerns. But, as mentioned in the security considerations section of the document that is being augmented, protocol specifications that describe use of this information model may introduce security risks and concerns about authentication of participants. For this reason, these protocol specifications need to describe security and authentication concerns that may be raised by the particular mechanisms defined and how those concerns may be addressed.

7. IANA Considerations

There are no IANA actions resulting from this document.

8. References

8.1. Normative References

[ISO3166-1] "Codes for the representation of names of countries and their subdivisions -- Part 1: Country codes", ISO 3166-1.

[M1400] "Designations for interconnections among operators' networks", ITU-T Recommendation M.1400, July 2006, <http://www.itu.int/rec/T-REC-M.1400-200607-I/en>.

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

[RFC6370] Bocci, M., Swallow, G., and E. Gray, "MPLS Transport Profile (MPLS-TP) Identifiers", RFC 6370, September 2011.

8.2. Informative References

[ICC-list] "List of ITU Carrier Codes (ICCs)", <http://www.itu.int/oth/T0201>.

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