Assignment of an Associated Channel Type for Packet Transport Network Applications
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Abstract

The Transport Profile of Multi-Protocol Label Switching (MPLS-TP) is a packet-based transport technology based on the MPLS Traffic Engineering (MPLS-TE) and Pseudowire (PW) data plane architectures applicable in various deployment environments.

This document describes the allocation of an Associated Channel Type to support ITU-T defined functions for packet transport network (PTN) applications, such as Operations, Administration and Maintenance (OAM), and applicable to MPLS-TP Pseudowires (PWs), Label Switched Paths (LSPs), Sub-path Maintenance Elements (SPMEs) and Sections.

This document is intended to become a product of a joint Internet Engineering Task Force (IETF) / International Telecommunications Union Telecommunication Standardization Sector (ITU-T) effort to include an MPLS Transport Profile within the IETF MPLS and PWE3 architectures to support the capabilities and functionalities of a packet transport network as defined by the ITU-T.

Status of this Memo

This Internet-Draft is submitted to IETF in full conformance with the provisions of BCP 78 and BCP 79.

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1. Introduction


A subset of MPLS-TP is also applicable to ITU-T-defined packet transport networks (PTN), where the transport network operational model is deemed attractive.

When MPLS-TP is deployed in PTN environment, application specific mechanisms (e.g., OAM) are required to allow service providers retaining the same operational experience in the MPLS-TP network as they had in their existing Synchronous Optical Network/Synchronous Digital Hierarchy (SONET/SDH) and Optical Transport Network (OTN) networks.

When MPLS-TP is deployed in other environments, e.g. in a Packet Switched Network (PSN), application specific mechanisms (e.g., OAM) are required to allow service providers retaining the same operational experience in the MPLS-TP network as they had in their existing IP and MPLS networks.

The standard MPLS-TP toolkit has to serve the interests of both communities of users.

The roadmap for OAM toolset standardization does not meet the market needs of some PTN operators and therefore, for the sake of satisfying market needs, development of PTN application specific functions within ITU-T will allow ITU-T to satisfy the immediate needs expressed at the June 2010 Study Group 15 meeting recognizing that it is very important for ITU-T and IETF to provide timely solutions to maintain support for the MPLS-TP agreements.
Allocation of one Associated Channel Type value will allow ITU-T to develop the tools required to address the unique needs of PTN application and will make more efficient use of the resources of both organizations while providing a mechanism to prevent the accidental interconnection between PTN and PSN application specific tools. The use of this code point fully complies with the framework and architecture for MPLS-TP.

This document describes the allocation of an Associated Channel Type to support ITU-T defined functions for packet transport network applications, such as Operations, Administration and Maintenance (OAM), and applicable to MPLS-TP Pseudowires (PWs), Label Switched Paths (LSPs), Sub-path Maintenance Elements (SPMEs) and Sections.

This document is intended to become a product of a joint Internet Engineering Task Force (IETF) / International Telecommunication Union Telecommunication Standardization Sector (ITU-T) effort to include an MPLS Transport Profile within the IETF MPLS and PWE3 architectures to support the capabilities and functionalities of a packet transport network as defined by the ITU-T.

1.1. PTN Application Description

In this application MPLS-TP will be used to add packet transport capability to an existing circuit switched (SDH/OTN) transport network. Note that in many such networks Ethernet technology has been deployed to address some of these needs, also that Ethernet is a primary packet transport service. The primary requirements are driven by a desire for compatibility with the existing transport network operational processes and in particular compatibility with the existing OAM mechanisms.

1.2. Support for multiple applications

Multiple applications are commonly supported from a single toolkit within the MPLS suite of protocols, with extensions that are applied to specific applications.

As a consequence, the MPLS architecture allows multiple protocols to perform the same function for different network applications; e.g.

- Three different label distribution protocols (LDP, RSVP-TE, BGP)
- Two different routing protocols (OSPF-TE and ISIS-TE)
- Three different VCCV types
For any given application, a subset of protocols are implemented; e.g.,

- LDP is used for connectionless MPLS,
- RSVP-TE is used for connection-oriented MPLS
- BGP is used with L2 and L3 VPNs

There are no MPLS architecture barriers to allowing different protocols for network operations in "PTN" and "PSN" applications while the operational requirement in these two applications domains are sufficiently distinct to justify such an approach.

2. Conventions used in this document

2.1. Terminology

- G-ACh Generalized Associate Channel
- LSP Label Switched Path
- OAM Operations, Administration and Maintenance
- OTN Optical Transport Network
- PSN Packet Switched Network
- PTN Packet Transport Network
- PW Pseudowire
- SDH Synchronous Digital Hierarchy
- SONET Synchronous Optical Network
- SPME Sub-path Maintenance Element

2.2. Definitions

This document uses the term LSP to indicate either a service LSP or a transport LSP (as defined in RFC 5921 [5]).

This document uses the terms Section and Sub Path Maintenance Element (SPME) as defined in RFC 5921 [5].
3. Usage of the Associated Channel Type allocated for PTN

The usage of the associated channel type allocated for PTN applications will fully comply with the MPLS-TP data plane architecture and framework as described in RFC 5960 [7], RFC 5586 [4], RFC 5921 [5] and draft-ietf-mpls-tp-uni-nni [6].

4. Compatibility Considerations

As described in section 5 of RFC 5586 [4], an LER, LSR or PE that are not capable to processing packets on the Associated Channel Type allocated for PTN applications discards such packets when all the MPLS or PW labels have been popped.

5. Interconnection of PTN and PSN networks

PTN and PSN networks can be interconnected together. Three scenarios for interconnection are described in this section.

5.1. PTN client over a PSN server

In this case a LSP originates and terminates in a PTN network and crosses a PSN network. The end to end PTN LSP runs as a client over the PSN network. This is illustrated in Figure 1 below.

```
----------------  ----------------  ----------------
    /           \\        /           \\        /           \\        /           \\        /           \\    \\
    | PTN A       |+++++| PSN B       |+++++| PTN C       |+++++| PSN C       |+++++| PTN D       |
    \           /        \           /        \           /        \           /        \           /        \           /
----------------  ----------------  ----------------  \\
       PTN OAM

|<-----------------------|-----------------------|-----------------------|
| PTN OAM               | PSN OAM               | PTN OAM               |
|<----------------------|<----------------------|<----------------------|
Section OAM            |Section OAM            |
|<-------                |<-------                |
```

Figure 1 Interconnection case 1) PTN client over a PSN server

5.2. PSN client over a PTN server

In this case a LSP originates and terminates in a PSN network and crosses a PTN network. The end to end PSN LSP runs as a client over the PTN network. This is illustrated in 0 below.
5.3. LSP or PW originating in a PTN network and terminating in a PSN network

In this case the PW (or LSP) originates (or terminates) in a PTN and terminates (or originates) in a PSN. The default OAM for the end to end LSP or PW is PSN. PTN OAM may be supported if the network operators mutually agree to select this option. The default option is illustrated in Figure 3 below.

Figure 3 Interconnection case 3) PTN to PSN

6. Security Considerations

The security considerations for the generalized associate channel (G-ACh) are describes in RFC 5586 [4].
7. IANA Considerations

This document requires a unique Associated Channel Type which are assigned by IANA from the Pseudowire Associated Channel Types Registry.

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8. Acknowledgments

This document was prepared using 2-Word-v2.0.template.dot.
9. References

9.1. Normative References


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