Internet Engineering Task Force
Internet-Draft
Intended status: Standards Track
Expires: September 27, 2019

D. Hiremagalur, Ed.
G. Grammel, Ed.
Juniper
G. Galimberti, Ed.
Cisco
R. Kunze, Ed.
Deutsche Telekom
D. Beller
Nokia

March 26, 2019

Extension to the Link Management Protocol (LMP/DWDM -rfc4209) for Dense Wavelength Division Multiplexing (DWDM) Optical Line Systems to manage the application code of optical interface parameters in DWDM application

draft-ietf-ccamp-dwdm-if-lmp-00

Abstract

This memo defines extensions to LMP(rfc4209) for managing Optical parameters associated with Wavelength Division Multiplexing (WDM) systems in accordance with the Interface Application Identifier approach defined in ITU-T Recommendation G.694.1.[ITU.G694.1] and its extensions.

Status of This Memo

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

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at https://datatracker.ietf.org/drafts/current/.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

This Internet-Draft will expire on September 27, 2019.

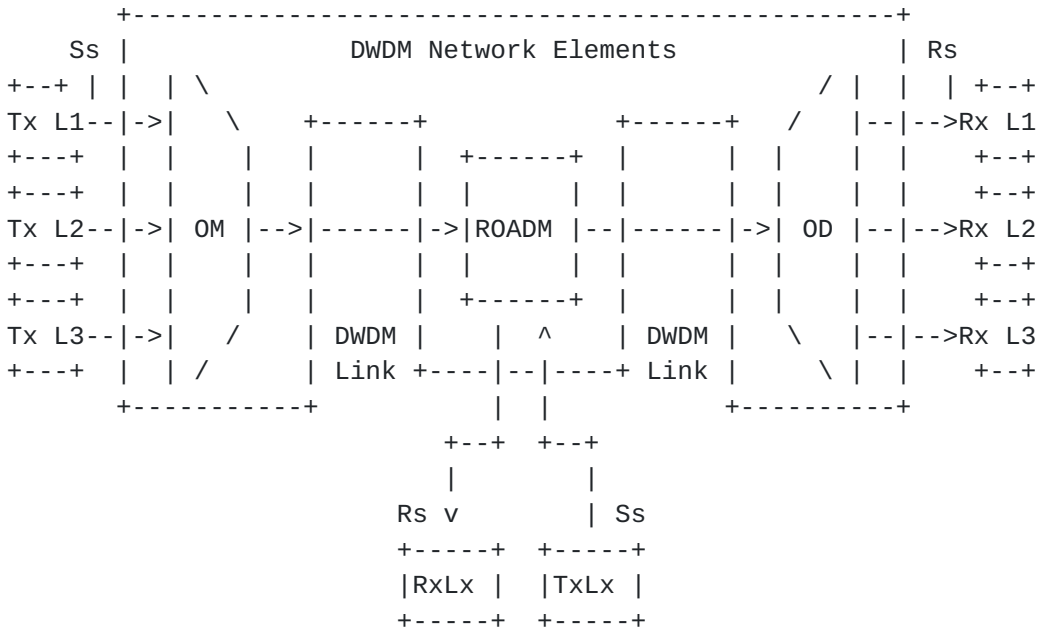
Table of Contents

1. Introduction

This extension addresses the use cases described by "draft-ietf-ccamp-dwdm-if-mng-ctrl-fwk". LMP [RFC4902] provides link property correlation capabilities that can be used between a transceiver device and an Optical Line System (OLS) device. Link property correlation is a procedure by which, intrinsic parameters and capabilities are exchanged between two ends of a link. Link property correlation as defined in RFC3591 allows either end of the link to supervise the received signal and operate within a commonly understood parameter window. Here the term 'link' refers in particular to the attachment link between OXC and OLS (see Figure 1). The relevant interface parameters are in line with "draft-dharini-ccamp-dwdm-if-yang".

2. DWDM line system

Figure 1 shows a set of reference points (Rs and Ss), for a single-channel connection between transmitter (Tx) and receiver (Rx) devices. Here the DWDM network elements in between those devices include an Optical Multiplexer (OM) and an Optical Demultiplexer (OD). In addition it may include one or more Optical Amplifiers (OA) and one or more Optical Add-Drop Multiplexers (OADM).

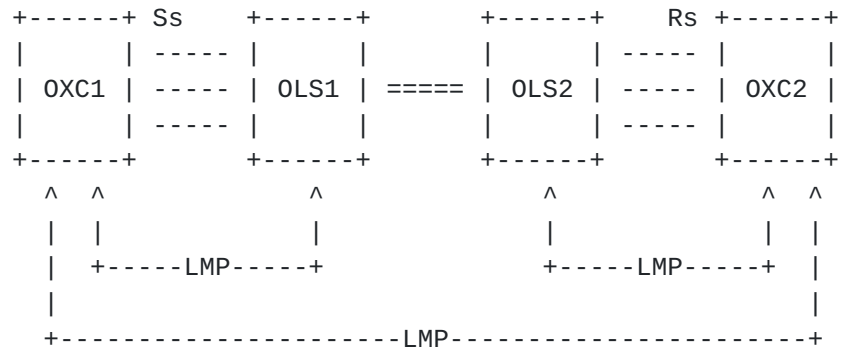


Ss = Sender reference point at the DWDM network element tributary output
Rs = Receiver reference point at the DWDM network element tributary input
Lx = Lambda x
OM = Optical Mux
OD = Optical Demux
ROADM = Reconfigurable Optical Add Drop Mux

from Fig. 5.1/G.698.2

Figure 1: Linear Single Channel approach

Figure 2 Extended LMP Model (from [RFC4209])



OXC : is an entity that contains transponders
OLS : generic optical system, it can be -
Optical Mux, Optical Demux, Optical Add
Drop Mux, Amplifier etc.
OLS to OLS : represents the Optical Multiplex section
<xref target="ITU.G709"/>
Rs/Ss : reference points in between the OXC and the OLS

Figure 2: Extended LMP Model

3. Use Cases

The use cases are described in draft-ietf-ccamp-dwdm-if-mng-ctrl-fwk

4. Extensions to LMP-WDM Protocol

This document defines extensions to [RFC4209] to allow a set of characteristic parameters, to be exchanged between a router or optical switch (e.g. OTN cross connect) and the optical line system to which it is attached. In particular, this document defines additional Data Link sub-objects to be carried in the LinkSummary message defined in [RFC4204] and [RFC6205]. The OXC and OLS systems may be managed by different Network management systems and hence may not know the capability and status of their peer. These messages and their usage are defined in subsequent sections of this document.

The following new messages are defined for the WDM extension for ITU-T G.698.2 [ITU.G698.2]/ITU-T G.698.1 [ITU.G698.1]/ ITU-T G.959.1 [ITU.G959.1]

- OCh_General (sub-object Type = TBA)
- OCh_ApplicationIdentier (sub-object Type = TBA)
- OCh_Ss (sub-object Type = TBA)
- OCh_Rs (sub-object Type = TBA)

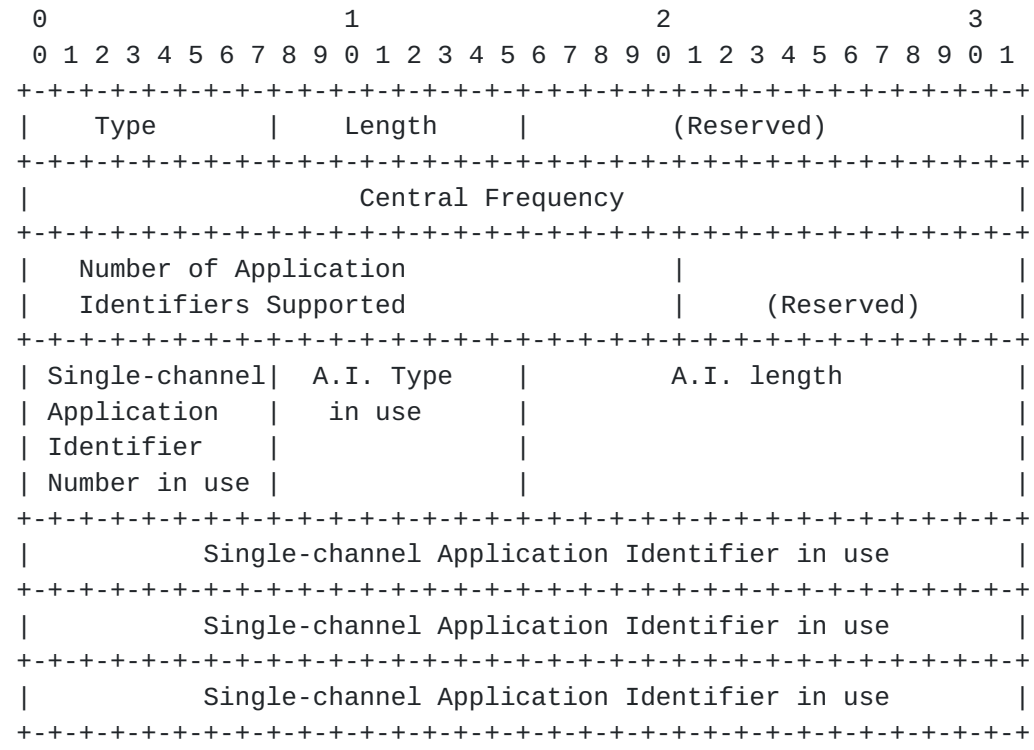
5. General Parameters - OCh_General

These are a set of general parameters as described in [G698.2] and [G.694.1]. Please refer to the "draft-galikunze-ccamp-dwdm-if-snmp-mib" and "draft-dharini-ccamp-dwdm-if-yang" for more details about these parameters and the [RFC6205] for the wavelength definition.

The general parameters are

1. Central Frequency - (Tera Hz) 4 bytes (see RFC6205 sec.3.2)
2. Number of Application Identifiers (A.I.) Supported
3. Single-channel Application Identifier in use
4. Application Identifier Type in use
5. Application Identifier in use

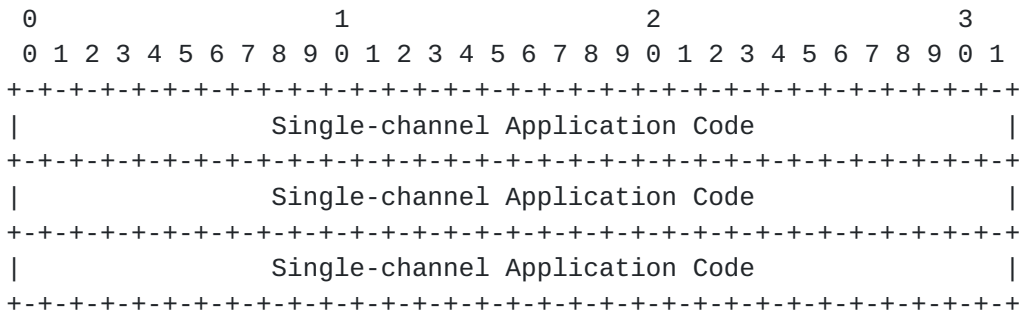
Figure 3: The format of the this sub-object (Type = TBA, Length = TBA) is as follows:



A.I. Type in use: STANDARD, PROPRIETARY

A.I. Type in use: STANDARD

Refer to G.698.2 recommendation : B-DScW-ytz(v)



A.I. Type in use: PROPRIETARY

Note: if the A.I. type = PROPRIETARY, the first 6 Octets of the Application Identifier in use are six characters of the PrintableString must contain the Hexadecimal representation of an OUI (Organizationally Unique Identifier) assigned to the vendor whose implementation generated the Application Identifier; the remaining octets of the PrintableString are unspecified.

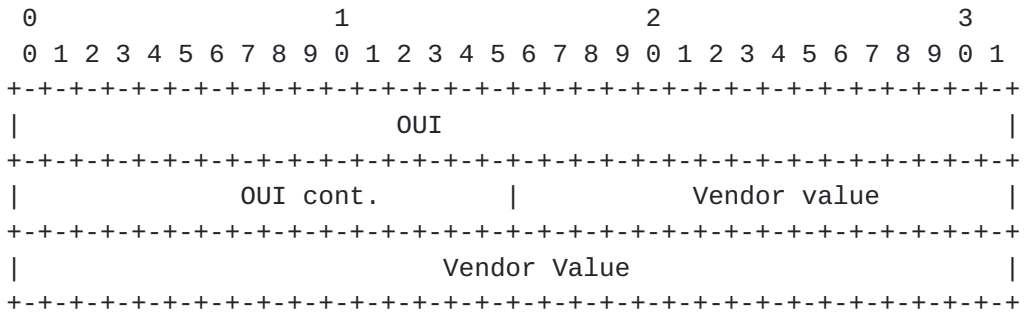


Figure 3: OCh_General

6. ApplicationIdentifier - OCh_ApplicationIdentifier

This message is to exchange the application identifiers supported as described in [G698.2]. There can be more than one Application Identifier supported by the transmitter/receiver in the OXC. The number of application identifiers supported is exchanged in the "OCh_General" message. (from [G698.1]/[G698.2]/[G959.1] and G.874.1)

The parameters are

1. Number of Application Identifiers (A.I.) Supported

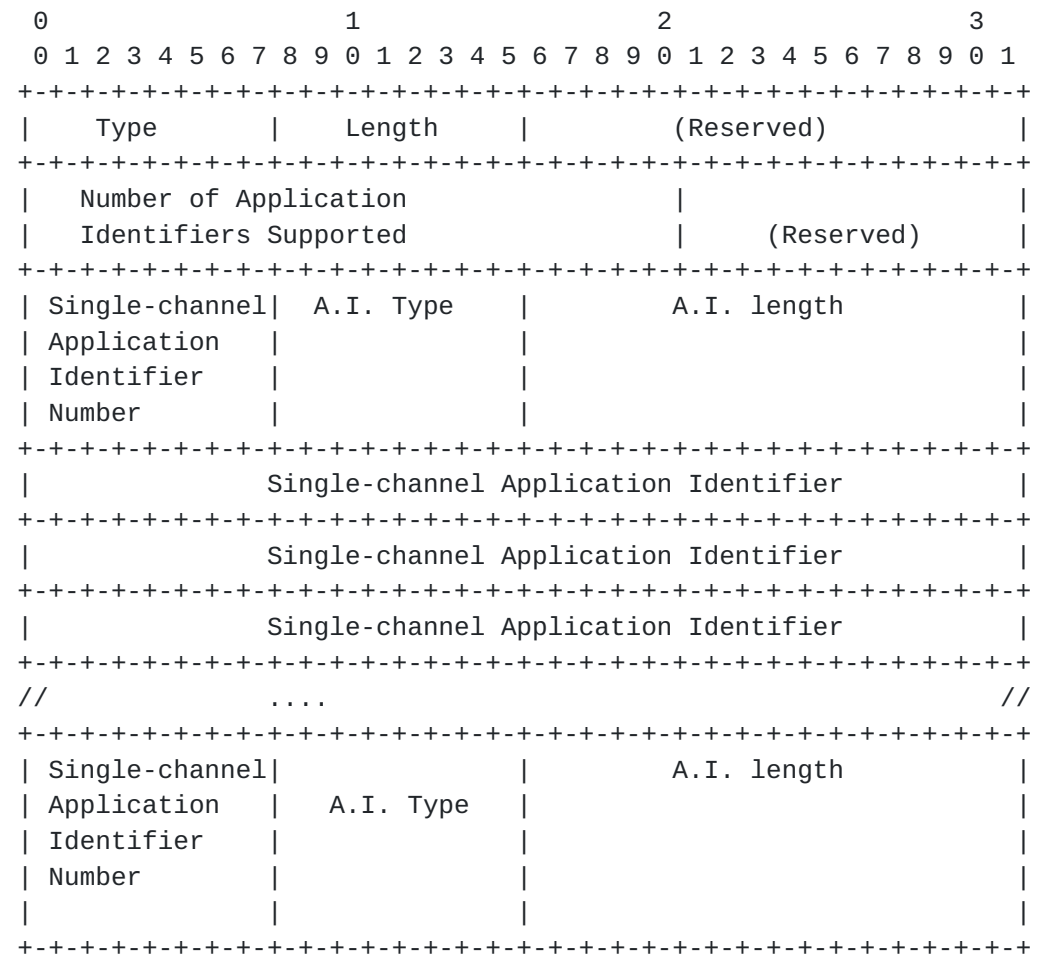
2. Single-channel application identifier Number
   uniquely identifiers this entry - 8 bits

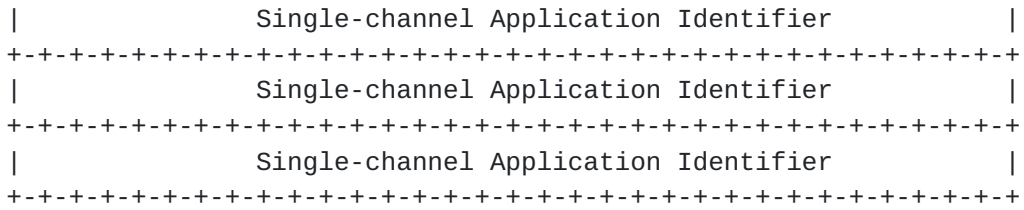
3. Application Indentifier Type (A.I.) (STANDARD/PROPRIETARY)

4. Single-channel application identifier -- 96 bits
   (from [G698.1]/[G698.2]/[G959.1]

- this parameter can have
  multiple instances as the transceiver can support multiple
  application identifiers.

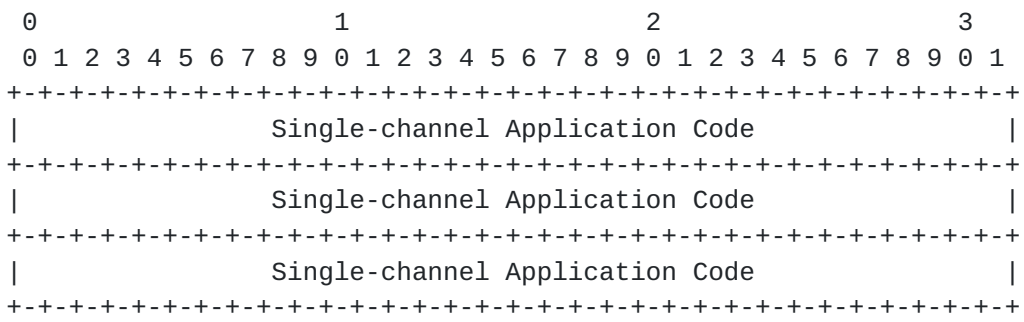
Figure 4: The format of the this sub-object (Type = TBA, Length = TBA) is as follows:





A.I. Type in use: STANDARD, PROPRIETARY

A.I. Type in use: STANDARD
Refer to G.698.2 recommendation : B-DScW-ytz(v)



A.I. Type in use: PROPRIETARY

Note: if the A.I. type = PROPRIETARY, the first 6 Octets of the Application Identifier in use are six characters of the PrintableString must contain the Hexadecimal representation of an OUI (Organizationally Unique Identifier) assigned to the vendor whose implementation generated the Application Identifier; the remaining octets of the PrintableString are unspecified.

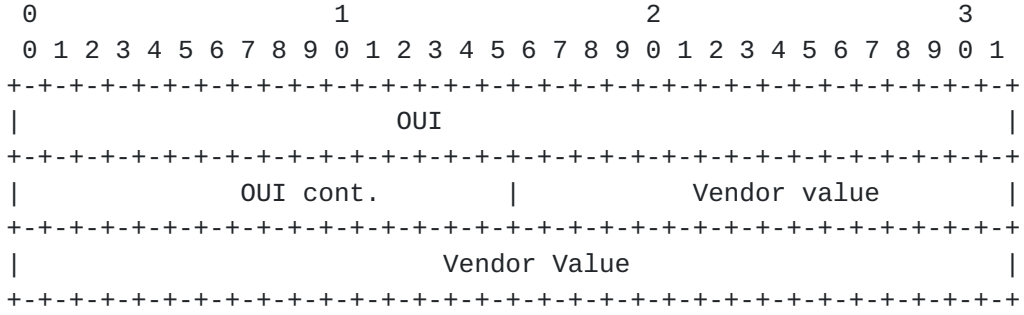


Figure 4: OCh_ApplicationIdentifier

7. OCh_Ss - OCh transmit parameters

These are the G.698.2 parameters at the Source(Ss reference points). Please refer to "draft-dharini-ccamp-dwdm-if-yang" for more details about these parameters.

1. Output power

Figure 5: The format of the OCh sub-object (Type = TBA, Length = TBA) is as follows:

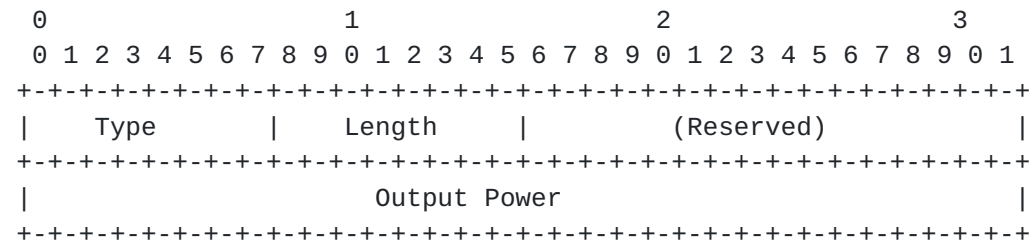


Figure 5: OCh_Ss transmit parameters

8. OCh_Rs - receive parameters

These are the G.698.2 parameters at the Sink (Rs reference points).

1. Current Input Power - (0.1dbm) 4bytes

Figure 6: The format of the OCh receive sub-object (Type = TBA, Length = TBA) is as follows:

The format of the OCh receive/OLS Sink sub-object (Type = TBA, Length = TBA) is as follows:

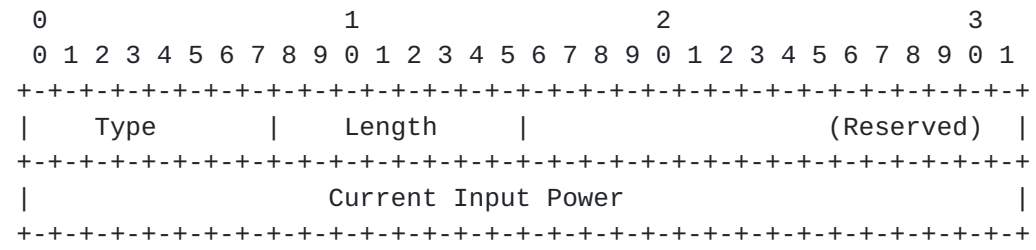


Figure 6: OCh_Rs receive parameters

9. Security Considerations

LMP message security uses IPsec, as described in [RFC4204]. This document only defines new LMP objects that are carried in existing LMP messages, similar to the LMP objects in [RFC:4209]. This document does not introduce new security considerations.

10. IANA Considerations

LMP <xref target="RFC4204"/> defines the following name spaces and the ways in which IANA can make assignments to these namespaces:

- LMP Message Type
- LMP Object Class
- LMP Object Class type (C-Type) unique within the Object Class
- LMP Sub-object Class type (Type) unique within the Object Class

This memo introduces the following new assignments:

LMP Sub-Object Class names:

under DATA_LINK Class name (as defined in <xref target="RFC4204"/>)

- OCh_General (sub-object Type = TBA)
- OCh_ApplicationIdentifier (sub-object Type = TBA)
- OCh_Ss (sub-object Type = TBA)
- OCh_Rs (sub-object Type = TBA)

11. Contributors

Arnold Mattheus
Deutsche Telekom
Darmstadt
Germany
email a.mattheus@telekom.de

John E. Drake
Juniper
1194 N Mathilda Avenue
HW-US,Pennsylvania
USA
jdrake@juniper.net

Zafar Ali
Cisco
3000 Innovation Drive
KANATA
ONTARIO K2K 3E8
zali@cisco.com

12. References

12.1. Normative References

[I-D.ietf-ccamp-dwdm-if-mng-ctrl-fwk]
Kunze, R., Grammel, G., Beller, D., Galimberti, G., and J. Meuric, "A framework for Management and Control of DWDM optical interface parameters", draft-ietf-ccamp-dwdm-if-mng-ctrl-fwk-11 (work in progress), June 2018.

[ITU.G694.1]
International Telecommunications Union, ""Spectral grids for WDM applications: DWDM frequency grid"", ITU-T Recommendation G.698.2, February 2012.

[ITU.G698.2]
International Telecommunications Union, "Amplified multichannel dense wavelength division multiplexing applications with single channel optical interfaces", ITU-T Recommendation G.698.2, November 2009.

[ITU.G709]
International Telecommunications Union, "Interface for the Optical Transport Network (OTN)", ITU-T Recommendation G.709, June 2016.

[ITU.G872] International Telecommunications Union, "Architecture of optical transport networks", ITU-T Recommendation G.872, January 2017.

[ITU.G874.1] International Telecommunications Union, "Optical transport network (OTN): Protocol-neutral management information model for the network element view", ITU-T Recommendation G.874.1, November 2016.

[RFC4054] Strand, J., Ed. and A. Chiu, Ed., "Impairments and Other Constraints on Optical Layer Routing", RFC 4054, DOI 10.17487/RFC4054, May 2005, <https://www.rfc-editor.org/info/rfc4054>.

[RFC4204] Lang, J., Ed., "Link Management Protocol (LMP)", RFC 4204, DOI 10.17487/RFC4204, October 2005, <https://www.rfc-editor.org/info/rfc4204>.

[RFC4209] Fredette, A., Ed. and J. Lang, Ed., "Link Management Protocol (LMP) for Dense Wavelength Division Multiplexing (DWDM) Optical Line Systems", RFC 4209, DOI 10.17487/RFC4209, October 2005, <https://www.rfc-editor.org/info/rfc4209>.

[RFC6205] Otani, T., Ed. and D. Li, Ed., "Generalized Labels for Lambda-Switch-Capable (LSC) Label Switching Routers", RFC 6205, DOI 10.17487/RFC6205, March 2011, <https://www.rfc-editor.org/info/rfc6205>.

12.2. Informative References

[RFC2629] Rose, M., "Writing I-Ds and RFCs using XML", RFC 2629, DOI 10.17487/RFC2629, June 1999, <https://www.rfc-editor.org/info/rfc2629>.

[RFC3410] Case, J., Mundy, R., Partain, D., and B. Stewart, "Introduction and Applicability Statements for Internet-Standard Management Framework", RFC 3410, DOI 10.17487/RFC3410, December 2002, <https://www.rfc-editor.org/info/rfc3410>.

[RFC4181] Heard, C., Ed., "Guidelines for Authors and Reviewers of MIB Documents", BCP 111, RFC 4181, DOI 10.17487/RFC4181, September 2005, <https://www.rfc-editor.org/info/rfc4181>.

Authors' Addresses

Dharini Hiremagalur (editor)
Juniper
1194 N Mathilda Avenue
Sunnyvale - 94089 California
USA

Phone: +1408
Email: dharinih@juniper.net

Gert Grammel (editor)
Juniper
Oskar-Schlemmer Str. 15
80807 Muenchen
Germany

Phone: +49 1725186386
Email: ggrammel@juniper.net

Gabriele Galimberti (editor)
Cisco
Via S. Maria Molgora, 48 c
20871 - Vimercate
Italy

Phone: +390392091462
Email: ggalimbe@cisco.com

Ruediger Kunze (editor)
Deutsche Telekom
Winterfeldtstr. 21-27
10781 Berlin
Germany

Phone: +491702275321
Email: RKunze@telekom.de

Dieter Beller
Nokia
Lorenzstrasse, 10
70435 Stuttgart
Germany

Phone: +4971182143125
Email: Dieter.Beller@nokia.com