Generalized Multi-Protocol Label Switching (GMPLS) Signaling Extensions for ODU0 of Optical Transport Networks Control

draft-ke-ccamp-gmpls-odu0-00

Status of this Memo

By submitting this Internet-Draft, each author represents that any applicable patent or other IPR claims of which he or she is aware have been or will be disclosed, and any of which he or she becomes aware will be disclosed, in accordance with Section 6 of BCP 79.

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF), its areas, and its working groups. Note that other groups may also distribute working documents as Internet-Drafts.

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."

The list of current Internet-Drafts can be accessed at http://www.ietf.org/ietf/1id-abstracts.txt.

The list of Internet-Draft Shadow Directories can be accessed at http://www.ietf.org/shadow.html.

This Internet-Draft will expire on April 27, 2009.

Abstract

This document describes the extensions of GMPLS signaling to control Optical Transport Networks (OTN) including ODU0 of new optical channel data unit (ODUk) layer rate.
Table of Contents

1. Introduction ........................................ 3
2. Conventions used in this document ................... 3
3. Generalized Label Request ............................ 3
4. G.709 Traffic Parameters ............................ 3
5. ODUk Label Space .................................. 3
6. Security Considerations .............................. 5
7. IANA Considerations ................................ 5
8. Acknowledgments .................................... 5
9. References ......................................... 6
   9.1. Normative References ............................ 6
   9.2. Informative References .......................... 6
Authors' Addresses .................................... 6
Intellectual Property and Copyright Statements ............. 7
1. Introduction

As described in [ITUT-G.709], ODU1 has the lowest rate in ODUk layer. It is unreasonable that using ODU1 to carry the 1 GE signal because half of the bandwidth is wasted. Using ODU0 with an approximate bit rate of 1.2 Gbit/s to carry the 1GE signal is suitable.

Notice that OTU0 relative to ODU0 doesn’t exist, ODU0 must be multiplexed into ODU1. The process of mapping and multiplexing of ODU1 embedded with ODU0 is consistent with [ITUT-G.709]. Technology specific details of ODU0 are outside the scope of this document.

[RFC4328] extends GMPLS to support G.709 Optical Transport Networks Control. To support the application of ODU0, the extensions based on [RFC4328] are needed. The first extension defines a signal Type of ODU0 in G.709 Traffic Parameters. The second extension provides the compatible definition of ODUk Label.

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 RFC-2119.

3. Generalized Label Request

[RFC4328] extends the LSP Encoding Type, the Switching Type, and G-PID (Generalized-PID) values to accommodate G.709 Recommendation [ITUT-G.709]. Signaling of ODU0 LSP must comply with these extensions.

An additional LSP Encoding Type code-point for the G.709 Digital Path layer must be used in ODU0 LSP and an ODU0 switching (and thus LSPs) belongs to the TDM class.

4. G.709 Traffic Parameters

The G.709 traffic parameters, see [RFC4328], need to be used while signaling ODU0 LSP, A new value of signal type for ODU0 needs to be assigned.

5. ODUk Label Space

For the compatibility considerations, ODUk (k = 0, 1, 2, 3) label has
Reserved bits MUST be set to zero when sent and SHOULD be ignored when received.

The specification of the fields t0, t1, t2, and t3 self-consistently characterizes the ODUk label space. When t0 is set to zero, the meaning of t1, t2 and t3 is identical to which defined in [RFC4328].

When t0 is not set to zero, the value space for the t0, t1, t2, and t3 fields is defined as follows:

1. t0 (2-bit):
   - t0=[1..2] indicates the index of an ODU0 within an ODU1.

2. t1 (1-bit):
   - t1=1 indicates that an ODU1 which is multiplexed from ODU0 is mapped into an OTU1.
   - t1 is not significant if the ODU1 is multiplexed into an ODTUG2 or ODTUG3 (i.e., t1 value MUST be set to 0 and ignored).

3. t2 (3-bit):
   - t2=[2..5] indicates the tributary slot (t2th-1) used by the ODU1 in an ODTUG2 mapped into an ODU2 (via OPU2) and then ODU2 is mapped into an OTU2.

   The ODU1 which is described above is multiplexed from ODU0.
   - t2 is not significant if the ODU1 is mapped into an OTU1 or the ODU1 is multiplexed into an ODTUG3 (i.e., t2 value MUST be set to 0 and ignored).

4. t3 (6-bit):
- \( t3 = [2..17] \) indicates the tributary slot \((t3th-1)\) used by the ODU1 in an ODTUG3 mapped into an ODU3 (via OPU3) and then ODU3 is mapped into an OTU3.

The ODU1 which is described above is multiplexed from ODU0.

- \( t3 \) is not significant if the ODU1 is mapped into an OTU1, or the ODU1 is multiplexed into an ODTUG2 mapped into an ODU2 mapped into an OTU2 (i.e., \( t3 \) value MUST be set to 0 and ignored).

Examples:

- \( t3 = 0, t2 = 0, t1 = 1, t0 = 1 \) indicates an ODU0 multiplexed into an ODU1 mapped into an OTU1

- \( t3 = 0, t2 = 3, t1 = 0, t0 = 2 \) indicates an ODU0 multiplexed into an ODU1 in the second tributary slot of the ODTUG2 mapped into an ODU2 mapped into an OTU2

- \( t3 = 5, t2 = 0, t1 = 0, t0 = 2 \) indicates an ODU0 multiplexed into an ODU1 in the fourth tributary slot of the ODTUG3 mapped into an ODU3 mapped into an OTU3

Note that an ODUk label always has to be interpreted according to the G.709 traffic parameters defined in Section 3.

6. Security Considerations

TBD.

7. IANA Considerations

TBD.

8. Acknowledgments

TBD.

9. References
9.1. Normative References


9.2. Informative References

[ITU-T-G.709]

Authors’ Addresses

Ming Ke
ZTE Corporation
3F, R&D Building 3, ZTE Industrial Park, XiLi LiuXian Road
Nanshan District, Shenzhen 518055
P.R.China

Phone: +86 755 26773914
Email: ke.ming@zte.com.cn

Yuanlin Bao
ZTE Corporation
5F, R&D Building 3, ZTE Industrial Park, XiLi LiuXian Road
Nanshan District, Shenzhen 518055
P.R.China

Phone: +86 755 26773731
Email: bao.yuanlin@zte.com.cn
Full Copyright Statement

Copyright (C) The IETF Trust (2008).

This document is subject to the rights, licenses and restrictions contained in BCP 78, and except as set forth therein, the authors retain all their rights.

This document and the information contained herein are provided on an "AS IS" basis and THE CONTRIBUTOR, THE ORGANIZATION HE/SHE REPRESENTS OR IS SPONSORED BY (IF ANY), THE INTERNET SOCIETY, THE IETF TRUST AND THE INTERNET ENGINEERING TASK FORCE DISCLAIM ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Intellectual Property

The IETF takes no position regarding the validity or scope of any Intellectual Property Rights or other rights that might be claimed to pertain to the implementation or use of the technology described in this document or the extent to which any license under such rights might or might not be available; nor does it represent that it has made any independent effort to identify any such rights. Information on the procedures with respect to rights in RFC documents can be found in BCP 78 and BCP 79.

Copies of IPR disclosures made to the IETF Secretariat and any assurances of licenses to be made available, or the result of an attempt made to obtain a general license or permission for the use of such proprietary rights by implementers or users of this specification can be obtained from the IETF on-line IPR repository at http://www.ietf.org/ipr.

The IETF invites any interested party to bring to its attention any copyrights, patents or patent applications, or other proprietary rights that may cover technology that may be required to implement this standard. Please address the information to the IETF at ietf-ipr@ietf.org.