Network Working Group
Internet-Draft
Intended status: Informational
Expires: August 16, 2010

L. Andersson
Ericsson
H. van Helvoort
Huawei Technologies
R. Bonica
Juniper Networks
D. Romascanu
Avaya
S. Mansfield
Ericsson
February 12, 2010

"The OAM Acronym Soup"
draft-ietf-opsawg-mpls-tp-oam-def-03.txt

Abstract

At first glance the acronym "OAM" seems to be well known and well understood. Looking at it a bit more closely reveals a set of recurring problems that are revisited time and again. This document has one primary and one secondary goal. The primary goal is to find an understanding of the acronym OAM that is useful for the MPLS Transport Profile (MPLS-TP) effort. The secondary goal is to make this understanding applicable in a wider scope.

This document is 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.

This Informational Internet-Draft is aimed at achieving IETF Consensus before publication as an RFC and will be subject to an IETF Last Call.

[RFC Editor, please remove this note before publication as an RFC and insert the correct Streams Boilerplate to indicate that the published RFC has IETF Consensus.]

Status of this Memo

This Internet-Draft is submitted to IETF in full conformance with the provisions of BCP 78 and 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 August 16, 2010.

Copyright Notice

Table of Contents

1. Introduction 4
2. OAM and O, A and M 6
2.1. OAM as a functional unit 6
2.2. The acronym broken up 6
2.2.1. O in OAM 6
2.2.2. A in OAM 6
2.2.3. M in OAM 7
3. Use of the OAM acronym MPLS-TP effort 8
4. Acronyms for the MPLS-TP effort 10
5. IANA considerations 11
6. Security considerations 12
7. Acknowledgments 13
8. References 14
8.1. Normative references 14
8.2. Informative references 14
Authors' Addresses 15

1. Introduction

The state of this work is very much "work in progress" and the discussion is ongoing. The reason to publish the draft at this stage is that some of the relevant MPLS-TP drafts are getting close to working group last call and some of the definitions in this document are needed for consistency within that group of drafts.

Comment [KL1]: Say explicity what work is this.

The acronym OAM is frequently used in the data and telecommunication industry. One would assume that something that is so widely used is very clearly defined. However a closer look reveals some points that need to be clarified.

The examples below come mainly from the first set of MPLS-TP IDs. In the IDs there were a number of examples of how the OAM acronym could be used and there were a number of ways to expand and understand the acronym e.g.:

- OAM = Operation, Administration, Maintenance
- OAM = Operations, Administration, Maintenance
- OAM = Operations, Administration, Management
- OAM = Operations and Maintenance
- OAM = Operations and Management
- O&M = Operations and Maintenance
- O&M = Operations and Management

The examples above were taken from drafts that later were corrected and aligned with what is proposed in this document.

Sometimes there is a fourth letter added to the acronym:

- OAM and P = Operations, Administration, Maintenance and Provisioning

If such an important piece of our technology is so poorly defined, or if there are dialects of the technology with different understandings of such a key concept, this will eventually cause problems.

Trying to understand the use of an acronym that is as "content-rich" as OAM reveals two levels of complexity. First, each letter in the acronym represents an integrated piece of functionality; secondly the acronym as such represents something that is more than just the sum

of its parts.

There is also the issue of how each piece of the acronym is defined. This document provides an analysis of how each piece of the acronym is defined and provides possible interpretations of the acronym. Finally the interpretation of the OAM acronym to use for the MPLS-TP effort based on the agreement reached in the JWT report [1] is provided.

The immediate target is to document the use of the OAM acronym such that it is useful for MPLS-TP. However, broader applicability of the definitions in this document may also come to light.

This document is 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.

2. OAM and O, A and M

2.1. OAM as a functional unit

Operations And Maintenance (OAM): A group of network management functions that provide network fault indication, performance information, and data and diagnosis functions. ATM OAM ITU-T I.610 [3] is an example specification that uses this expansion of the OAM acronym.

Operations, Administration, and Maintenance (OAM): A group of network management functions that provide network fault indication, fault localization, performance information, and data and diagnosis functions. Examples where this acronym is used are Clause 57 of IEEE 802.3-2008 [2] and ITU-T Y.1731 [7].

The ITU-T M.3010 [6] recommendation defines operations systems function as a function block that processes information related to the telecommunications management for the purpose of monitoring/ coordinating and/or controlling telecommunication functions including management functions (i.e. the TMN (Telecommunications Management Network) itself).

The Metro Ethernet Forum refers to OAM as the tools and utilities to install, monitor and troubleshoot a network, helping carriers run their networks more efficiently.

2.2. The acronym broken up

2.2.1. O in OAM

The O in the OAM acronym invariably stands for "Operations".

However there is some ambivalence in the definition and scope of the term "Operation".

Examples of tools related to "operations" are performance monitoring tools used for service level agreement (SLA) measurement, fault management tools used to monitor the health of nodes and links in the network, and network provisioning tools.

2.2.2. A in OAM

The A in the OAM acronym mostly stands for "Administration", though in a few cases it seems like "Accounting" is also used. For the purpose of this document it is assumed that "Administration" is the correct expansion of "A".

Examples of "administration" tools are network discovery and planning

tools.

2.2.3. M in OAM

In the list above the M in the OAM acronym stands for "Maintenance" or "Management".

Since Maintenance and Management are defined as two different activities it does not seem to be a good idea to use them interchangeably. The concept behind OAM is management, so it makes more sense to use maintenance as the expansion of the "M" in the acronym.

Examples of "maintenance" tools are implementations of connectivity check, loopback, link trace, and other tools that can be used to monitor and diagnose failures in a network or network element.

The recommendation ITU-T M.20 [4] defines maintenance as the whole of operations required for setting up and maintaining, within prescribed limits, any element involved in the setting up of a connection (see the ITU-T M.60 [5] recommendation). The purpose is to properly plan and program the maintenance operations required to establish and maintain a network.

A major aim of the concept of maintenance is to minimize both the occurrence and the impact of failures and to ensure that in case of a failure the correct actions are taken. The ITU-T documents also clearly define~~s~~ a maintenance philosophy.

3. Use of the OAM acronym in the MPLS-TP effort

In Section 4 the acronyms as they will be used in the MPLS-TP effort are listed. This section gives some background on the definitions provided.

"Mgt" will be used if an abbreviation for "Management" is needed. This draft does not define Management. It is noted, however, that an important part of management functionality relates to tools to report the state of the network.

In MPLS-TP drafts, the OAM acronym is to be used for "Operations, Administration and Maintenance", i.e. excluding provisioning.

OAM tools and protocols and the "Management space" are complementary in nature. Management focuses on FCAPS (Fault, Configuration, Accounting, Provisioning, and Security) functionality and on manager (or Network Operations Centre (NOC)) to device (or network) interaction.

From an architecture point of view OAM protocols and tools deployed in the data plane tend to be "horizontal" i.e. network element to network element while the management protocols tend to be "vertical".

There are OAM functionalities that are deployed in the management plane to support maintaining the overall network integrity and achieving the SLA. These OAM functionalities are sometimes called "Vertical OAM" or OAM&P (Operation, Administration, Maintenance, & Provisioning), in the sense that they involves higher level systems, such as element management system (EMS), network management system (NMS), and/or service management system (SMS). Examples of vertical OAM functions include hardware provisioning, software configuration, alarm notification/retrieval, performance monitoring (PM) data collection & reporting.

Note that management of horizontal OAM parameters is also part of the vertical OAM function. Regardless what specific horizontal OAM mechanisms (tools) will be deployed in the transport plane, these mechanisms (tools) need to be managed (e.g. configured and monitored) to ensure their proper functioning.

The components ~~Where each part~~ of the acronym and provisioning ~~is~~ are defined as follows:

- Operations - Operation activities are undertaken to keep the network (and the services that the network provides) up and running. It includes monitoring the network and finding problems. Ideally these problems should be found before users are affected."

- Administration - Administration activities involve keeping track of resources in the network and how they are used. It includes all the bookkeeping that is necessary to track networking resources and the network under control.

- Maintenance - Maintenance activities are focused on facilitating repairs and upgrades - for example, when equipment must be replaced, when a router needs a patch for an operating system

image, or when a new switch is added to a network. Maintenance also involves corrective and preventive measures to make the managed network run more efficiently, e.g. adjusting device configuration and parameters.

- Even though "Provisioning" is not included in this document, the following definition is provided for completeness.

  Provisioning - Provisioning activities involve configuring resources in the network to support the offered services. This

might include setting up the network so that a new customer can receive an Internet access service.

In ~~G~~general,~~ly:~~ ~~P~~provisioning is used to configure the network for providing new services, whereas OAM is used to ~~keep~~maintain the network in a state such that it continues to ~~can~~ support ~~already existing~~ services previously provisioned.

- Sometimes it is necessary to talk about the combination of functions and tools supplied by OAM and Management, it is preferred that this is spelled out as "OAM and Management". In cases where an acronym is needed O&M should be used.

4. Acronyms for the MPLS-TP effort

OAM - Operations, Administration and Maintenance

O&M - OAM ~~Operations, Administration, Maintenance~~ and Management

"Mgt" - Management

5. IANA considerations

This memo includes no request to IANA.

6. Security considerations

Security is a significant requirement of MPLS-TP. However, this informational document is intended only to provide guidance on the use of the OAM acronym, and the security concerns are, therefore, out of scope.

7. Acknowledgments

Malcolm Betts from M. C. Betts Consulting Ltd. significantly contributed to this document.

8. References

8.1. Normative references

8.2. Informative references

[1] Bryant, S. and L. Andersson, "Joint Working Team (JWT) Report on MPLS Architectural Considerations for a Transport Profile", RFC 5317, February 2009.

[2] IEEE, "Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications"", IEEE Standard 802.3, December 2008.

[3] International Telecommunication Union, "B-ISDN operation and maintenance principles and functions", ITU-T Recommendation I.610, February 1999.

[4] International Telecommunication Union, "Maintenance philosophy for telecommunication networks", ITU-T Recommendation M.20, October 1992.

[5] International Telecommunication Union, "Maintenance terminology and definitions", ITU-T Recommendation M.60, March 1993.

[6] International Telecommunication Union, "Principles for a telecommunications management network", ITU-T Recommendation M.3010, February 2000.

[7] International Telecommunication Union, "OAM functions and mechanisms for Ethernet based networks", ITU-T Recommendation Y.1731, February 2008.

Authors' Addresses

Loa Andersson
Ericsson

Email: loa.andersson@ericsson.com

Huub van Helvoort
Huawei Technologies

Email: hhelvoort@huawei.com

Ron Bonica
Juniper Networks

Email: rbonica@juniper.net

Dan Romascanu
Avaya

Email: dromasca@avaya.com

Scott Mansfield
Ericsson

Email: scott.mansfield@ericsson.com