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L. Andersson
Ericsson
M. Betts
ZTE Corporation
H. van Helvoort
Huawei Technologies
R. Bonica
Juniper Networks
D. Romascanu
Avaya

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"The OAM Acronym Soup"
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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 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.

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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.

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 = 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.

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2. OAM and O, A and M

2.1. OAM as a functional unit

Operations, Administration, and Maintenance (OAM): A group of network management functions that provide network fault indication, performance information, and data and diagnosis functions. Examples are ATM OAM ITU-T I.610 [3] and Clause 57 of IEEE 802.3-2008 [2].

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.

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 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.

Note: the paragraphs above are so far just placeholders.

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".

Note: Examples to be provided.

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".

Note: Examples to be provided.

Administration is used to support maintenance functions, e.g. by collecting failure and performance information, continuous or on-

demand.

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.

Note: Examples to be provided.

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 document also clearly defines a maintenance philosophy.

3. Use of the OAM acronym 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 functionality and on manager (or NOC) to device (or network) interaction.

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

Where each part of the acronym and provisioning is 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.

- 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 - Operations, Administration, Maintenance and Management

"Mgt" - Management

5. IANA considerations

There are no requests for IANA allocation of code points in this document.

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

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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.

Authors' Addresses

Loa Andersson
Ericsson

Email: loa.andersson@ericsson.com

Malcolm Betts
ZTE Corporation

Email: malcolm.betts@zte.com.cn

Huub van Helvoort
Huawei Technologies

Email: hhelvoort@huawei.com

Ron Bonica
Juniper Networks

Email: rbonica@juniper.net

Dan Romascanu
Avaya

Email: dromasca@avaya.com