Network Working Group
Internet-Draft
Intended status: Informational
Expires: August 22, 2013

M. Boucadair
C. Jacquenet
France Telecom
February 18, 2013

Large scale Measurement of Access network Performance (LMAP): Requirements and Issues from a Network Provider Perspective
draft-boucadair-lmap-considerations-00

Abstract

This document raises several points related to the ongoing LMAP (Large scale Measurement of Access network Performance) effort. The goal is to contribute to define a scope for LMAP and its expected contribution.

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 http://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 August 22, 2013.

Copyright Notice

Table of Contents

1. Introduction 3
2. Discussion 4
2.1. Service-Specific Measurement 4
2.2. Distorting Measurement Results 5
2.3. On the Impact of Policies 5
2.4. Classes of Service 5
2.5. Pending Questions 6
3. Security Considerations 7
4. IANA Considerations 7
5. Acknowledgments 7
6. Informative References 7
Authors' Addresses 8

1. Introduction

Service Assurance & Fulfilment is a critical component in the service management environment. Within ISP organizations, dedicated organizational and functional structures are implemented to efficiently monitor and assess the overall quality of deployed services and also the service quality as perceived by end-users.

As such, appropriate actions can be taken to solve encountered problems and put any disrupted service back to normal operation. Various tools (e.g., probes, reporting tools, etc.) are deployed to continuously provide feedback on the status of running services and notify managers about operational issues.

For the sake of efficient day-to-day operations, an ISP should implement the Service Fulfilment functions that are responsible for checking if the services delivered to the users are consistent with what has been subscribed and possibly negotiated. These functions may also be used as inputs to Service Assurance related functions.

The ISP should be able to continuously (preferably in real-time) measure and control the level of quality associated to the services delivered to its customers. Indeed, network anomalies such as node outage, link failures, routing disruption and the subsequent overall service performance degradation should be dynamically reported to appropriate management structures (like a Network Operations Center).

Ideally, any issue should be solved (or at least detected and handled as quick as possible) before receiving the complaints from customers. Improvement of current practices should be investigated to enhance the quality of experience as perceived by end-users and also to speed up repair processes whenever a network or service anomaly is detected.

Within this context, the introduction of a high level of automation in the global service delivery and operation chains is promising. This does not mean zero-fault networking: automation is rather meant to optimize communication between the different actors of the service delivery chain and also to guarantee the overall consistency between the different management tools.

Customers should have the ability to check the fulfilment of the Connectivity Provisioning Profile (CPP, [I-D.boucadair-connectivity-provisioning-profile]) they have subscribed to (and possibly negotiated with the service provider). They could thus evaluate how the Service Provider has delivered the service as a function of what has been defined in the service agreement. Customer- or service-specific indicators and related

performance metrics should be accessed by customers so that they can appreciate the level of quality associated to the services they have subscribed to. These data should be updated on a regular basis to adequately reflect the actual status of any service. These indicators (including a combination thereof) should be described and listed in the agreement (see Section 2.13 of [I-D.boucadair-connectivity-provisioning-profile]).

The Large scale Measurement of Access network Performance (LMAP) effort can be defined as a tool supported by the Service Assurance functional block provided to customers to assess whether the services they have subscribed comply with what has been defined in the service level agreement (including the technical parameters exposed in a CPP template, for example).

As discussed in [I-D.boucadair-connectivity-provisioning-profile], performance metrics are not the only relevant indicators to characterize the connectivity service delivered to the customer; other important technical clauses (e.g., reachability scope, traffic conformance, availability, etc.) need also to be taken into account.

Providing customers with tools that can help them better characterize the level of quality associated to the delivery of any service (or a combination thereof) they have subscribed to is likely to enhance their overall quality of experience. As a consequence, such tools would also optimize the overall efficiency of service operation (e.g., by reducing the number of calls placed to online support whenever a problem is pro-actively reported to the customer).

This document discusses several questions to be considered when designing such tools.

This document makes use of the terms defined in [I-D.morton-ippm-lmap-path].

2. Discussion

2.1. Service-Specific Measurement

Various service offerings (e.g., IPTV, VoD, Internet, VoIP, etc.) can be delivered to the same customer. All these services rely upon devices that are involved the forwarding of the corresponding service-specific traffic.

These services are not restricted to the basic IP connectivity service but also include advanced features. The technical clauses that document the IP connectivity service component of these services

may vary one from the other (e.g., a global reachability can be provided for the Internet service while IP connectivity service is restricted to the first SBE/DBE (Session Border Element/Data Border Element) for VoIP services.

Furthermore, some of these services may be delivered over dedicated "virtual" channels (e.g., distinct VCs or addresses can be used for each service).

Assessing whether the delivered service complies with what has been subscribed by the customer or not suggests that measurement actions should be specific to the communication facilities (forwarding paths, virtual channels, tunnels, etc.) used to deliver the service to the customer.

2.2. Distorting Measurement Results

Some services may rely on several components provided by distinct administrative entities. For instance, the DNS service may not be provided by the same operator that provides the IP connectivity. The level of quality associated to the delivery of a service may therefore be affected (e.g., because DNS resolution takes longer than expected) even if traffic performance clauses are honored by the network provider.

The LMAP system should be designed to accommodate such deployment scenario.

2.3. On the Impact of Policies

Issues can be experienced when a customer tries to reach a subset of destinations. These issues may not be necessarily due to performance degradation in the local network but to some policies enforced in the destination networks, at the risk of being unable to deliver the service to some networks (e.g., some government contents cannot be accessed from some networks, because of a security policy enforced by the government).

The measurement system should be designed to accommodate such contexts.

2.4. Classes of Service

Prioritization is used to deliver some services; as such, measurements should be bound to the QoS class used for a given service.

In some networks, DSCP marking inheritance mechanisms are used to

make sure customers cannot injects traffic that belongs to an unauthorized or unsupported class of service. The proposed measurement framework should be designed to handle such designs.

2.5. Pending Questions

Additional considerations should be taken into account as per the following questions:

- Q1: How to determine the measurement scope? How to characterize a measurement scope?
- Q2: Should inter-domain measurement be in the scope?
- Q3: If so, which inter-domain paths should be used to conduct measurement campaigns? Paths used for measurement may not be those used to forward service data.
- Q4: Which metrics to use? How contributing agents negotiate the metric to be used? What measurement methodology (e.g., frequency of measurement requests)? What methodology to aggregate results? What approach to follow if a metric is not returned from a given network segment? How to accommodate the use of metrics that may not be supported by all devices along the whole forwarding path?
- Q5: How measurement and testing methodology are shared between involved parties (e.g., between two service providers)? Should respective responsibilities be negotiated?
- Q6: How to ensure time synchronization?
- Q7: How can a measurement system dynamically discover the measuring entities of a single domain? Across several domains?
- Q8: How to detect a network is LMAP-compliant? How to configure a LMAP client with LMAP server information?
- Q9: How to guarantee the accuracy of collected data?
- Q10: How to control access to measurement results? How to prevent revealing measurement results to external parties?
- Q11: How to map collected data with technical clauses included in a contract/agreement (e.g., CPP)?
- Q12: Flash crowd issues: to what extent measurement traffic can impact the delivered service during a crisis (e.g., an overload situation in some regions of the LMAP domain, where a LMAP domain is an administrative entity that is composed of LMAP-capable nodes operated by a single structure)?
- Q13: How to make sure that the entities involved in measurement do not dramatically affect the accuracy of the measurement (as per Heisenberg principle)? Which procedure to apply to control the reliability of LMAP agents?
- Q14: How to make sure measurement data is not impacted by the home network itself or the machine embedding the measurement agent?

Q15: How can a network provider instruct a LMAP agent to hold its requests to prevent network congestion situations (e.g., to avoid link overload)?
Q16: How to make sure measurement data accurately reflect the network performance and not the policies enforced in that network?
Q17: The LMAP system can be used to assess the level of delivered connectivity service to customers? The system can be embedded in robots enabled in the access segment to emulate the behavior of connected device. How LMAP can accommodate such deployment use case?
Q18: To what extent conducting a set of measurement actions at T0 will reelect the actual traffic performance to be experienced when invoking the subscribed service?
Q19: How path diversity impacts measurements?
Q20: How the system is designed to ensure topology hiding?

3. Security Considerations

TBC.

4. IANA Considerations

This document does not require any action from IANA.

5. Acknowledgments

TBC.

6. Informative References

[I-D.boucadair-connectivity-provisioning-profile]
Boucadair, M., Jacquenet, C., and N. Wang, "IP/MPLS Connectivity Provisioning Profile", draft-boucadair-connectivity-provisioning-profile-02 (work in progress), September 2012.

[I-D.morton-ippm-lmap-path]
Bagnulo, M., Burbridge, T., Crawford, S., Eardley, P., and A. Morton, "A Reference Path and Measurement Points for LMAP", draft-morton-ippm-lmap-path-00 (work in progress), January 2013.

Authors' Addresses

Mohamed Boucadair
France Telecom
Rennes, 35000
France

Email: mohamed.boucadair@orange.com

Christian Jacquenet
France Telecom
Rennes, 35000
France

Email: christian.jacquenet@orange.com