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Requirements of One-way Passive Measurement for End-to-End Quality
draft-kikuchi-passive-measure-reqs-00.txt

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Abstract

This draft describes the necessary requirements to passively measure end-to-end quality and to monitor them via applicable ways. This feature is crucial for Service Providers (SPs), especially who provide transports with Service Level Agreements (SLAs).

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1. Introduction

This draft describes the necessary requirements to passively measure end-to-end quality and to monitor them via applicable ways.

Measuring end-to-end quality in passive ways is necessary for Service Providers (SPs) who provide transport to users. However, the standards do not define the measurement and monitoring of a network, which is helpful when the SPs want to know the quality of their end-to-end traffic. Therefore, measurement and monitoring standards need to be defined.

1.1. Requirements notation

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 [[RFC2119](#)].

2. Service Model

Figure 1 shows that SP X and SP Y provide a transport between user A and user B using some ISPs. Let SP X and SP Y "Transport Service Providers" (TSPs) here because they should be distinguished from the intermediate ISPs. The users construct an application over the transport. The TSPs may apply two or more routes to provide one transport.

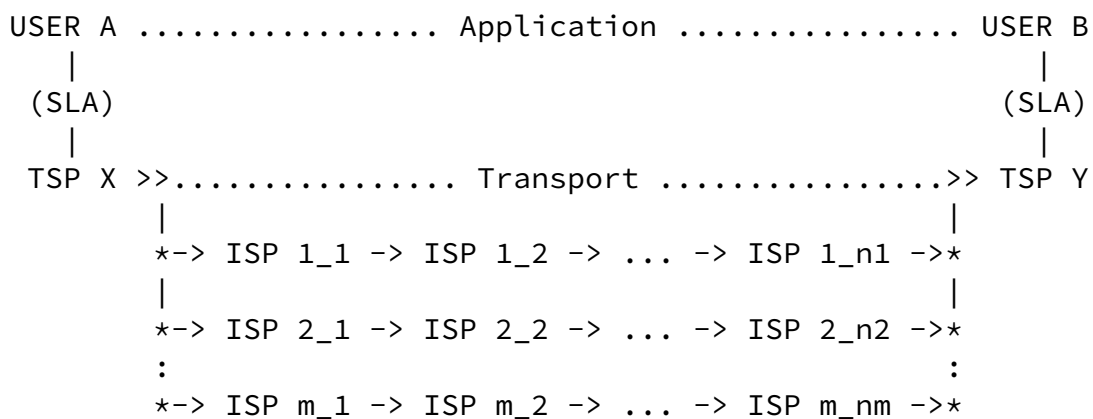


Figure 1: Service Model

The TSPs maintain reachability and some required quality of the transport of IP datagrams to users. There must be Service Level Agreements (SLAs) in the contract between the TSPs and thier users. The SLAs specify the level that the TSPs must maintain, which are sets of measurable characteristics such as total unavailable time in

a month, loss of packets and some qualities for real time applications.

3. Motivations

TSPs need to know the quality of their traffic in order to know whether the traffic is in a normal state or not. The measured quality could be important information to trace down the cause of the trouble when an application is not working properly. Without the necessary information, it is difficult for TSPs to determine whether problems come from the user, the TSPs, or the intermediate ISPs.

The quality measurement is specially required by TSPs when they have SLAs to their customers. They must be aware of the status of underlying traffic well and must report it as an evidence of quality to the users.

TSPs also need to know the quality of a transport when they have multiple paths to serve the transport. TSPs may be able to serve an appropriate transport to users by selecting a better quality path. In addition, the TSPs may be able to distribute the load of a transport to different paths.

[4.](#) Requirements

This section describes each requirement necessary to measure one-way end-to-end quality for TSPs.

The quality should be measured for transports in operation because the measured quality is used to maintain the transports to report regarding to the SLA and to select the best path. The measurement would be used not only for testing and benchmarking but also for the daily operational tool. Therefore, the requirements are from operational points of view.

[4.1.](#) Active vs. Passive

There are two ways to measure the quality of transports, one is

active and the other is passive. Active measurement uses additional probing packets to determine the quality of the transports. Passive measurement uses the traffic packets to measure quality.

From the TSPs point of view, passive measurement should be supported. Because SLAs should refer to the users' transports, the measurement should be determined passively rather than actively.

[4.2.](#) Quality Evaluation

The standard that define a passive measurement of transports must contain two elements, one is 'WHAT' type of quality the protocol measure, or 'metrics', and the other is 'HOW' the protocol evaluate the quality.

The most basic metric is to detect whether the packets in a transport are in-sequence or out-of-sequence. Measurement of types of out-of-sequence packets are also basic metrics, such as lost, duplication and reordering in a transport.

It is required to disable the measurement function for avoiding the measurement overhead in case when TSPs need not to measure the quality. See also the discussion in the [Section 4.4](#).

[4.3.](#) Getting Quality Information

The measurement mechanisms must define how to monitor the result of the quality of transports, such as SNMP [[RFC3411](#)]. The parameters used in the measurement mechanisms might be modified by TSPs' operators. Moreover, they may notify exceptional situations and illegal operations to the operators.

[4.4.](#) Overhead Consideration

Protocol designers should take into account the computing and space costs of the implementations where the standard defines the measurement and monitoring. This includes overhead of traffic transmission, which may reflect the cost of equipment introductions and operational expenses. The designers should not adopt non-scalable mechanisms and should pay particular attention to resource

consumption sensitive protocols such as mobile protocols.

We should adopt a simplified determination in some cases when both a precise complex determination and a simpler one exist. Sometimes it is sufficient for operators to show an approximate degree different from the normal operation rather than a precise state.

Not yet.

[Appendix A](#). Acknowledgements

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[6.](#) References

[6.1.](#) Normative References

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.

[6.2.](#) Informative References

- [RFC3411] Harrington, D., Presuhn, R., and B. Wijnen, "An Architecture for Describing Simple Network Management Protocol (SNMP) Management Frameworks", STD 62, [RFC 3411](#), December 2002.

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