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Examples of LMAP Objects using IPPM Metrics and Protocols
draft-morton-lmap-examples-01

Abstract

In order to examine the completeness and coverage of the LMAP info and data models, we present examples expressing information from IP Performance Metric working group metrics and protocols, and the Performance Metrics Registry. The main update in the version provides a more realistic and useful example of the Cycle_ID in measurement instruction and reporting.

Requirements Language

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](#) [[RFC2119](#)].

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[1.](#) Introduction

The Large-scale Measurement of Broadband Performance (LMAP) working group has completed a Framework [[RFC7594](#)] and Use cases, and now proceeds with development of an information model [[I-D.ietf-lmap-information-model](#)] and data model.

The IETF IP Performance Metrics (IPPM) working group first created a framework for metric development in [[RFC2330](#)]. This framework has largely stood the test of time and enabled development of many fundamental metrics. It has been updated once in the area of metric composition [[RFC5835](#)], and again in several areas related to active stream measurement of modern networks with reactive properties [[RFC7312](#)]. The Working Group has developed an extensive set of Standards Track Metrics and Measurement Protocols. Among the work especially relevant to LMAP is the development of a Performance

Metrics Registry [[I-D.ietf-ippm-metric-registry](#)], and a proposal for the initial registry contents [[I-D.morton-ippm-initial-registry](#)].

This memo is organized into sections that present an example of LMAP Control and Reporting by populating the various information model

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objects for measurement Tasks and Reporting Tasks (and eventually Schedule, Event, Action, etc).

The first example is a UDP Round Trip Latency Metric.

[2.](#) Scope and Purpose

The purpose of this memo is to examine the features and capabilities of the LMAP information model [[I-D.ietf-lmap-information-model](#)] by populating the models with example data intended to enable measurement of IPPM metrics.

The scope is to create the examples for Active Metrics and their Methods of Measurement, as defined in the IPPM literature of Standards Track Metrics. Specifically, Metrics in the proposed initial contents for the Performance Metrics Registry [[I-D.ietf-ippm-metric-registry](#)] contained in [[I-D.ietf-ippm-metric-registry](#)] are the primary focus, along with existing standards track measurement protocols developed in IPPM [[RFC4656](#)] [[RFC5357](#)].

[3.](#) UDP Round Trip Latency

This draft presents information in a conceptual form. Safeguarding correct syntax is a colossal non-goal in the early drafts.

[3.1.](#) Measurement Task Capabilities

Example:

```
Measurement Capability [  
  Measurement Protocol [  
    Protocol Roles [ ]  
  ]  
  Registry URI [ ]  
  Method Roles [ ]  
]
```

so, an example would be

```
Measurement Capability [  
  TWAMP [  
    Control-Client; Session-Sender; Server; Session-Reflector;  
  ]  
  Prefix:Act_IP_UDP_Round-trip_Delay_95th-percentile_Poisson [  
    Src; Dst;  
    ... more URIs and Roles ...  
  ]  
]  
for a fully-capable MA.
```

[3.2.](#) Instruction Object

3.3.1. Definition of ma-instruction-obj

```
object {  
  ma-task-obj          ma-instruction-tasks<0..*>;  
    name:UDP_RT_Metrics_001;  
  ma-channel-obj       ma-report-channels<0..*>;  
}
```

```

        ma-schedule-obj      ma-instruction-schedules<0..*>;
        ma-suppression-obj   ma-suppression;
    } ma-instruction-obj;

```

[3.3.](#) Measurement Task

3.9.1. Definition of ma-task-obj

```

object {
    string          ma-task-name;
    task-name: UDP_RT_Metrics_001;
    uri             ma-task-registry-entries<1..*>;
    Prefix: Act_IP_UDP_Round-trip_Delay_95th-percentile_Poisson;
    Prefix: Act_IP_UDP_Round-trip_Delay_Mean_Poisson;
    [ma-option-obj  ma-task-options<0..*>];
    option-role: Src; option-meas_point: mp100;
    option-measurement_protocol: TWAMP;
    option-meas_protocol_roles: Control-Client; Session-Sender;
    option-Src_IP: xxx.xxx.xxx;
    option-Dst_IP: xxx.xxx.xxx;
    option-T0: 0; option-lambda: 1 second;
    option-Tf: 15 min; option-truncate: 30 seconds;
    [boolean        ma-task-suppress-by-default;]
    suppress: true;
    [string          ma-task-cycle-id;]
    cycle-id: Access_2016-03-21-0930;
} ma-task-obj;

```

Prefix = urn:ietf:params:performance:metric

[3.4.](#) Report

3.6.1. Definition of ma-report-obj

```
object {
    datetime          ma-report-date;
    [uuid             ma-report-agent-id;]
    [string           ma-report-group-id;]
    [ma-report-task-obj ma-report-tasks<0..*>];
    name:UDP_RT_Metrics_REPORT_001;
} ma-report-obj;
```

[3.5.](#) Report Task

3.6.2. Definition of ma-report-task-obj

```
object {
    string          ma-report-task-name;
    task-name: UDP_RT_Metrics_REPORT_001;
    [uri            ma-report-task-registry-entries<1..*>];
    Prefix: Act_IP_UDP_Round-trip_Delay_95th-percentile_Poisson;
    Prefix: Act_IP_UDP_Round-trip_Delay_Mean_Poisson;
    [ma-option-obj  ma-report-task-options<0..*>];
    option-role: Src; option-meas_point: mp100;
    option-measurement_protocol: TWAMP;
    option-meas_protocol_roles: Control-Client; Session-Sender;
    option-Src_IP: xxx.xxx.xxx;
    option-Dst_IP: xxx.xxx.xxx;
    option-T0: 0;
    option-Tf: 15 minutes;
```

```
[ma-option-obj      ma-report-task-action-options<0..*>];
[string             ma-report-task-cycle-id;]
    cycle-id: Access_2016-03-21-0930;
[string             ma-report-task-column-labels<0..*>];
    label: Mean; label: 95%-tile;
[ma-report-row-obj  ma-report-task-rows<0..*>];
    row(0): 0.25; 0.34;
} ma-report-task-obj;
```

[3.6.](#) Schedule

TBD

[4.](#) Security Considerations

The security considerations that apply to any active measurement of live paths are relevant here as well. See [[RFC4656](#)] and [[RFC5357](#)].

When considering privacy of those involved in measurement or those whose traffic is measured, the sensitive information available to potential observers is greatly reduced when using active techniques which are within this scope of work. Passive observations of user traffic for measurement purposes raise many privacy issues. We refer the reader to the privacy considerations described in the Large Scale Measurement of Broadband Performance (LMAP) Framework [[RFC7594](#)], which covers active and passive techniques.

[5.](#) IANA Considerations

This memo makes no requests of IANA.

[6.](#) Acknowledgements

The author thanks LMAP Participants for their comments.

[7.](#) References

[7.1.](#) Normative References

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), DOI 10.17487/RFC2119, March 1997, <<http://www.rfc-editor.org/info/rfc2119>>.
- [RFC2330] Paxson, V., Almes, G., Mahdavi, J., and M. Mathis, "Framework for IP Performance Metrics", [RFC 2330](#), DOI 10.17487/RFC2330, May 1998, <<http://www.rfc-editor.org/info/rfc2330>>.
- [RFC2679] Almes, G., Kalidindi, S., and M. Zekauskas, "A One-way Delay Metric for IPPM", [RFC 2679](#), DOI 10.17487/RFC2679, September 1999, <<http://www.rfc-editor.org/info/rfc2679>>.
- [RFC3432] Raisanen, V., Grotefeld, G., and A. Morton, "Network performance measurement with periodic streams", [RFC 3432](#), DOI 10.17487/RFC3432, November 2002, <<http://www.rfc-editor.org/info/rfc3432>>.
- [RFC4656] Shalunov, S., Teitelbaum, B., Karp, A., Boote, J., and M. Zekauskas, "A One-way Active Measurement Protocol (OWAMP)", [RFC 4656](#), DOI 10.17487/RFC4656, September 2006, <<http://www.rfc-editor.org/info/rfc4656>>.
- [RFC5357] Hedayat, K., Krzanowski, R., Morton, A., Yum, K., and J. Babiarz, "A Two-Way Active Measurement Protocol (TWAMP)", [RFC 5357](#), DOI 10.17487/RFC5357, October 2008, <<http://www.rfc-editor.org/info/rfc5357>>.
- [RFC5835] Morton, A., Ed. and S. Van den Berghe, Ed., "Framework for Metric Composition", [RFC 5835](#), DOI 10.17487/RFC5835, April 2010, <<http://www.rfc-editor.org/info/rfc5835>>.
- [RFC6049] Morton, A. and E. Stephan, "Spatial Composition of Metrics", [RFC 6049](#), DOI 10.17487/RFC6049, January 2011, <<http://www.rfc-editor.org/info/rfc6049>>.

- [RFC6576] Geib, R., Ed., Morton, A., Fardid, R., and A. Steinmitz,

"IP Performance Metrics (IPPM) Standard Advancement Testing", [BCP 176](#), [RFC 6576](#), DOI 10.17487/RFC6576, March 2012, <<http://www.rfc-editor.org/info/rfc6576>>.

- [RFC6703] Morton, A., Ramachandran, G., and G. Maguluri, "Reporting IP Network Performance Metrics: Different Points of View", [RFC 6703](#), DOI 10.17487/RFC6703, August 2012, <<http://www.rfc-editor.org/info/rfc6703>>.
- [RFC7312] Fabini, J. and A. Morton, "Advanced Stream and Sampling Framework for IP Performance Metrics (IPPM)", [RFC 7312](#), DOI 10.17487/RFC7312, August 2014, <<http://www.rfc-editor.org/info/rfc7312>>.

[7.2.](#) Informative References

- [EEAW] Pentikousis, K., Piri, E., Pinola, J., Fitzek, F., Nissilae, T., and I. Harjula, "Empirical Evaluation of VoIP Aggregation over a Fixed WiMAX Testbed", Proceedings of the 4th International Conference on Testbeds and research infrastructures for the development of networks and communities (TridentCom '08) <http://dl.acm.org/citation.cfm?id=1390599>, March 2008.
- [I-D.ietf-ippm-metric-registry] Bagnulo, M., Claise, B., Eardley, P., Morton, A., and A. Akhter, "Registry for Performance Metrics", [draft-ietf-ippm-metric-registry-05](#) (work in progress), October 2015.
- [I-D.ietf-lmap-information-model] Burbridge, T., Eardley, P., Bagnulo, M., and J. Schoenwaelder, "Information Model for Large-Scale Measurement Platforms (LMAP)", [draft-ietf-lmap-information-model-09](#) (work in progress), March 2016.
- [I-D.morton-ippm-initial-registry] Morton, A., Bagnulo, M., Eardley, P., and K. D'Souza, "Initial Performance Metric Registry Entries", [draft-morton-ippm-initial-registry-04](#) (work in progress), February 2016.
- [IBD] Fabini, J., Karner, W., Wallentin, L., and T. Baumgartner, "The Illusion of Being Deterministic - Application-Level Considerations on Delay in 3G HSPA Networks", Lecture Notes in Computer Science, Springer, Volume 5550, 2009, pp 301-312 , May 2009.

- [IRR] Fabini, J., Wallentin, L., and P. Reichl, "The Importance of Being Really Random: Methodological Aspects of IP-Layer 2G and 3G Network Delay Assessment", ICC'09 Proceedings of the 2009 IEEE International Conference on Communications, doi: 10.1109/ICC.2009.5199514, June 2009.
- [Mat98] Mathis, M., "Empirical Bulk Transfer Capacity", IP Performance Metrics Working Group report in Proceeding of the Forty Third Internet Engineering Task Force, Orlando, FL. <http://www.ietf.org/proceedings/98dec/slides/ippm-mathis-98dec.pdf>, December 1998.
- [RFC3148] Mathis, M. and M. Allman, "A Framework for Defining Empirical Bulk Transfer Capacity Metrics", [RFC 3148](#), DOI 10.17487/RFC3148, July 2001, <<http://www.rfc-editor.org/info/rfc3148>>.
- [RFC6808] Ciavattone, L., Geib, R., Morton, A., and M. Wieser, "Test Plan and Results Supporting Advancement of [RFC 2679](#) on the Standards Track", [RFC 6808](#), DOI 10.17487/RFC6808, December 2012, <<http://www.rfc-editor.org/info/rfc6808>>.
- [RFC6985] Morton, A., "IMIX Genome: Specification of Variable Packet Sizes for Additional Testing", [RFC 6985](#), DOI 10.17487/RFC6985, July 2013, <<http://www.rfc-editor.org/info/rfc6985>>.
- [RFC7594] Eardley, P., Morton, A., Bagnulo, M., Burbridge, T., Aitken, P., and A. Akhter, "A Framework for Large-Scale Measurement of Broadband Performance (LMAP)", [RFC 7594](#), DOI 10.17487/RFC7594, September 2015, <<http://www.rfc-editor.org/info/rfc7594>>.
- [RRC] Peraelae, P., Barbuzzi, A., Boggia, G., and K. Pentikousis, "Theory and Practice of RRC State Transitions in UMTS Networks", IEEE Globecom 2009 Workshops doi: 10.1109/GLOCOMW.2009.5360763, November 2009.
- [TSRC] Fabini, J. and M. Abmayer, "Delay Measurement Methodology Revisited: Time-slotted Randomness Cancellation", IEEE Transactions on Instrumentation and Measurement doi:10.1109/TIM.2013.2263914, October 2013.

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