IETF IPPM-WG Developments

Henk Uijterwaal
IPPM WG Co-Chair
RIPE NCC

IP Performance Metrics WG

Charter

The IPPM WG will develop a set of standard metrics that can be applied to the quality, performance, and reliability of Internet data delivery services. These metrics will be designed such that they can be performed by *[everybody].*

It is important that the metrics not represent a value judgment (i.e. define "good" and "bad"), but rather provide unbiased quantitative measures of performance.

Logistics

- IPPM is in the transport area
- Mailing list: ippm@ietf.org
  - Subscribe: https://www1.ietf.org/mailman/listinfo/ippm
  - Archives: http://www.ietf.org/mail-archive/web/ippm/
- Meetings: 3 times a year, at the IETF meetings
- Chairs:
  - Matt Zekauskas (Internet2)
  - Henk Uijterwaal (RIPE NCC)

Work done over the last 10 years

- Framework documents
  - General (RFC 2330)
  - Empirical Bulk Transfer Capacity Metrics (RFC 3148)
  - Defining Network Capacity (RFC 5136)

- Metrics for:
  - Connectivity (RFC 2678)
  - One-way and round trip Delay (RFC 2678 and 2681)
  - Loss (RFC 2680)
  - IP Delay Variation a.k.a. jitter (RFC 3393)
  - Packet Reordering (RFC 4737)
  - One-way Loss Pattern Sample Metrics (RFC 3357)

Work done over the last 10 years (2)

- Protocols:
  - OWAMP: One-way Active Measurement Protocol (RFC 3763 and 4656)
  - IP Performance Metrics (IPPM) metrics registry (RFC 4148)
- Network performance measurement for periodic streams (RFC 3432)

Work in progress

- TWAMP: Two-way Active Measurement Protocol
  - Round trip version of OWAMP
- Composition of metrics
- Storing traceroute data in XML

- Packet Duplication
- Reporting

Packet Duplication Metrics

- Motivation:
  - Loss metrics: packet sent but doesn't arrive
  - This is quite common
  - The opposite can happen too: packet sent, multiple copies arrive
  - Usually a network configuration error
  - No way to quantify this so-far
- Defined a metric for this

Type-P-One-Way-Packet-Duplication

- Parameters
  - SRC, DST, T
  - T_0: Time Out
- Metrics
  - Positive integer number
  - Undefined if packet is lost
- Definition
  - Number of copies of packet received by DST in the interval [T, T+T_0]
  - Only uncorrupted packets, resends of corrupted packets do not count

Statistics

- Build streams of packets
- Measure duplication for each packet
- Two ways to summarize the results:
  - Type-P-one-way-packet-duplication-average
    - This shows the number of additional packets received in a stream
  - Type-P-one-way-packet-duplication-rate
    - This shows the number of packets with any duplication in a stream
  - These two complement each-other

Statistics

			Duplication-Average	Duplication-Rate
Sent		1,2,3,4		
Received	1	1,2,3,4	0%	0%
	2	1,1,2,2,3,3,4,4	100%	100%
	3	1,1,1,2,2,2,3,3,3,4,4,4	200%	100%
	4	1,1,1,2,3,3,3,4	100%	50%
	5	1,2,3,4,1,2,3,4	100%	100%

Status of the draft

- Draft is ready to be moved to a standard
- Can be implemented

- TTM packets can be used to measure duplication
- Can be added as a feature to TTM

Reporting Draft

- Metrics for everything
- Lots of parameters one can set:
  - Packet size
  - Rate
  - Stream type
  - Measurement interval
  - …
- Settings strongly depends on what you want to know

Something you always want to know…

- How good is my connection?
  - Integrated view
  - Short period (seconds to minutes)
  - Easy to compare with other results
- Reporting 5-tuple:
  - Delay, Loss, Reordering, Duplication, Jitter
  - Measured at the same time with the same packets
  - Reported as a set of numbers

Issues

- Is this a good idea?
- Where to find the draft
  - Back on the IETF site soon!
- Comments from operators and users needed

Future of the group

- Reaching the end of our current charter
  - Is there anything else we have to do?
- *What measurements do you need in daily operations and would you like to see standardized?*
  - Need input from the community
- Some ideas:
  - SLA monitoring
  - Passive measurements
  - …

Passive Measurements

- Techniques exist to measure with packets that are already there
- Privacy is a big issue
- Statistics need to be adjusted

SLA Monitoring

- Can we use our metrics to monitor SLA's?
  - Yes, at least people do this in practice
- Do we need to standardize the method?

How to contribute?

- All suggestions welcome
  - Talk to the chairs
  - Post on the list
- Ignore the charter, we have to update it anyway
- Discussion in Dublin

Conclusion

- This group did a lot of work in the last 10 years
- What do we have to do next?
- Need community input for this, comment on the list

Questions/Discussion