Reporting IP Performance Metrics to Users
draft-ietf-ippm-reporting-01.txt

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IETF 67, IPPM WG, San Diego, 2006-11-07
Motivation

PING (or owping, etc.) print results at the end. The results are not standard, so not comparable across tools. We may develop many frameworks, but end-user tools will still print results at the end. By providing a standard option for the results, we can make them comparable across tools.
Aim of this document

- Small set of metrics: the more numbers, the more confusing it is
- Robust: don’t change much when measurements don’t change much
- Easy to understand: aimed at users; each metric must have immediate intuitive qualitative meaning (what does it mean for this to be larger?)
- Orthogonal: a consequence of desire for small—any redundancy increases the size of the set
- Relevant: who needs them otherwise?
- Easy to compute: “online calculation” (single pass over data with $O(1)$ of memory)
Scope

- short-term network measurements (seconds or at most minutes)
- aimed at real-time display of such measurements
- (Possible extension of the scope might be longer-term measurements, if we can agree on it. Would almost certainly need network availability: exclude the time the network was down from the calculation. Not the focus.)
The reportable set

1. delay
2. loss
3. jitter
4. duplication
5. reordering
Delay

- median of all delays in the sample
- delay of lost packets is $+\infty$
- (if more than half of packets are lost, delay is $+\infty$)
Loss

• fraction of packets that did not arrive intact within a given number of seconds (timeout value)

• expressed as a percentage

• human is waiting $\rightarrow$ timeout is short (by default, 2 seconds)
Jitter

- interquartile spread of delay
- (finite iff loss < 25%)
- (defined iff loss < 75%)
- falls within IPDV framework
- robust
- widely used by statisticians
Duplication

• fraction of packets for which more than a single copy of the packet was received

• same timeout as in the definition of loss

• expressed in percentage points

• (not actually defined by the IPPM yet)
Reordering

- out-of-sequence metric
- single number, just like all other metrics
- metric the most dependent on the sample source: send slower, and reordering disappears
Sample source

One of:

- one-way active measurement
- round-trip measurement
- passive measurement

Preferences:

- one-way over round-trip if clocks are synchronized
- round-trip permissible when clocks are not synchronized
- no preference between active and passive measurements
One-Way Active Measurement Default Parameters

- default duration: ~10 seconds
- default sending schedule: Poisson stream
- default sending rate: 10 packets/second on average
- default sample size: 100 packets
- default packet size: the minimum necessary for the measurement
  - was suggested to fix a small value
- characterization: source IP, destination IP, time, type of packets
Round-Trip Active Measurement Default Parameters

• same as one-way
Passive Measurement Applicability

- sometimes measurements are collected incidentally to the use
- use case: a VoIP phone might display network statistics
- use whatever data it is natural to use
  - IP telephony application or a networked game would use data it sends anyway
  - link performance analysis would use all packets on the link
- same default duration (10 seconds)
- sliding window (so recent data are quickly reflected in the display)
New in -01

Added sample source code.