Sampling Methodology for Packet Delay Measurements

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Motivation

- Delay estimation methodology
  - From singleton metrics, the number of singletons (sample size) needs to be defined. An estimate of the packet delay distribution of all the packets (population) can be made based on the sample distribution.
- Samples Size Definition:
  - Select beginning time T0, final time Tf and λ
  - Mean interval time between consecutive singletons is $1/\lambda$, where λ is the rate of the Pseudo-random Poisson process
  - If $1/\lambda \ll Tf - T0$, then Sample Size = $N \sim \lambda * (Tf - T0)$
- Still needs to be determined:
  - How to find the optimal λ, for a given traffic, for any traffic?
  - How to determine the min Sample Size N?
  - Is Poisson process always appropriate for generating singletons, or there is also a need for a self-similar process?

Observations

- *Minimal Sample Size N depends on Traffic Type*
- Initial simulation results:
  - Minimal Sample Size N is larger when Self-Similar network traffic is assumed than when Poison traffic on the network is assumed
- Work in Progress:
  - Dependence of N on the degree of self similarity of network traffic
  - Using of an adaptive method, dependent on the traffic type, which will tune up N as the measurements are done
- Feedback from the community