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These models will be at: http://www.land.ufrj.br/workgroup/master (Brunos Home Page)
Guto´s (Augusto) statement is right, it is very difficult to obtain measures large enough to be able to infer something. Sampling one model, if you send one packet pair per unit of time, it takes 41 time units to have ONE packet pair on a high loaded network.

If one can overcome this problem, it DOES give some insights about the network.

Ana is also right, and to complement I can tell more, sometimes you can just use the old and good Poisson to get measures.
The model

- A Simple Markovian Tandem Queue network (sometimes the service time is Erlang, not Exponential).
**Bottleneck Buffer Size?**

- If there is just one router loosing most of the packets, you get the delay from that router.
- What if it is not the bottleneck?
- Answer: You are calculating the wrong buffer and have a wrong answer :).
- Is there any way to identify this miscalculation? Yes, but only if your bottleneck inflicts enough delay to be detected.
Bottleneck Buffer Size? (Part 2)

- It is not that difficult to find one example that one can really miscalculate the buffer without knowing it (due to the noise).

Notes:
- Routers:
  - (Bottleneck) Q1 = 8, C = 22.5, Medload
  - Q2 = 7, C = 440.0, Highload
  - Q3 = 9, C = 110.0, Medload
- TX = INF
Is my Packet Pair really a pair?

- How to identify if your packet pair is not a pair at all? By the left and the right parts of the tail. Sometimes it will also be hard to detect (when the noise is big).
Then, what else can we measure with this?

- There is one measure, an obvious one, that you can be sure of: The delay.
- Why not measure the delay of each lossy router?
- If you can measure the bandwidth on that link, you’ll be able to predict the amount of cross traffic.
Can we identify each lossy router on the path?

- Maybe, by assuming some distribution to each Queue one can infer how many distributions take to achieve the “All Queues” curve. If the queues insert almost the same delay, the accuracy is difficult to predict.
Can we identify each lossy router on the path? Part 2

- On the other hand, if these queues insert different maximum delays, it could be a lot more easy.

Notes:
- Highload (ro=90/110)
- Medload (ro=60/110)
- Queue1=14
- Queue2=7
- Queue3=9
- TX=INF

* Here the node 2 service is 4x faster than the others.
* The Service Distribution is Erlang 3 stages

P[Del=Delay] vs Delay
Final considerations

• Lots of considerations, and due to time constrains not all questions are here.

THANKS.