Network throughput *test*:
An alternative approach to simulation

y.ma@riken.jp

Date

Outline

* Motivation

* Simulation tools on the market

* Our approach (inspired by Iosif)

* Summary

Motivation

✤ Determine a feasible network configuration for trigger-less DAQ: O2@CERN, E50, Heavy Ion @J-PARC

✤ Protocol: TCP/IP, InfiniBand, OmniPath

✤ Hardware topology: SuperEPN vs. plain layout

Simulation tools on the market

- ✤ GNS3:

  - ✤ A emulator to provide a playground to practice Cisco router configuration and commands

  - ✤ Not suitable for throughput/load balance test

- ✤ OMNet++:

  - ✤ A frame work for discrete event simulation

  - ✤ Sophisticated models from user can be integrated to produce simulation results

  - ✤ It may take months to simulate a few seconds real data taking[1]
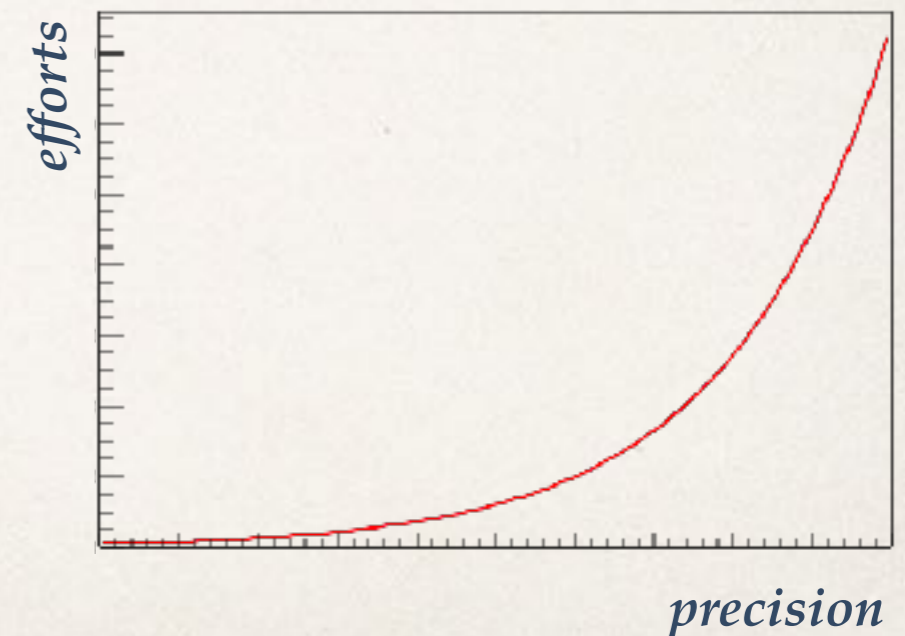
Pros and Cons of simulation

✤ Pros

  ✤ *"free of cost"* to explore new ideas (but not *"free of time"*!)

  ✤ Emphasis on the large area, complex structured enterprise network layout including several routers

✤ Cons

  ✤ How sophisticated is enough?

  ✤ A relatively straightforward task for us

Our approach (inspired by Iosif)

✤ Measure a set of key performance parameters and carry out "simulation" based on that;

✤ Scalability issue (data collision & network speed) between text bench and real setup: 4 sets of FLP vs. 400 FLP; directly measure # of nodes vs collision curve and make a fitting;

✤ Only have ethernet at hands

Our approach (inspired by Iosif)

✤ Detector *PDF* + FLP PCI *PDF* + LAN *PDF*(ethernet NIC, data frame collision) + EPN PCI *PDF* + data processing *PDF*
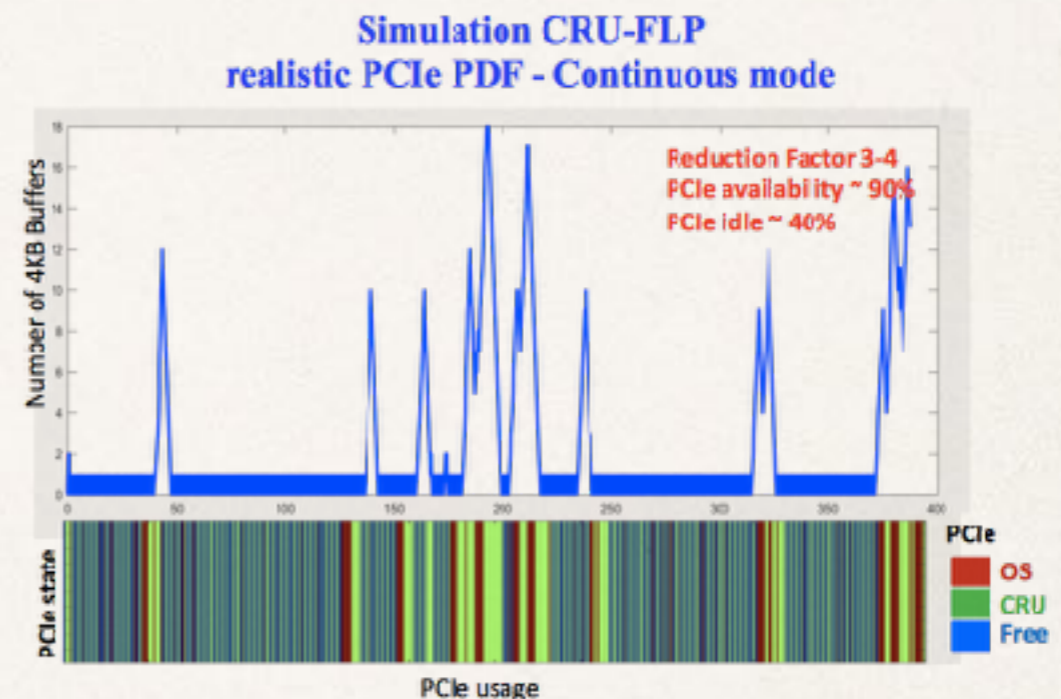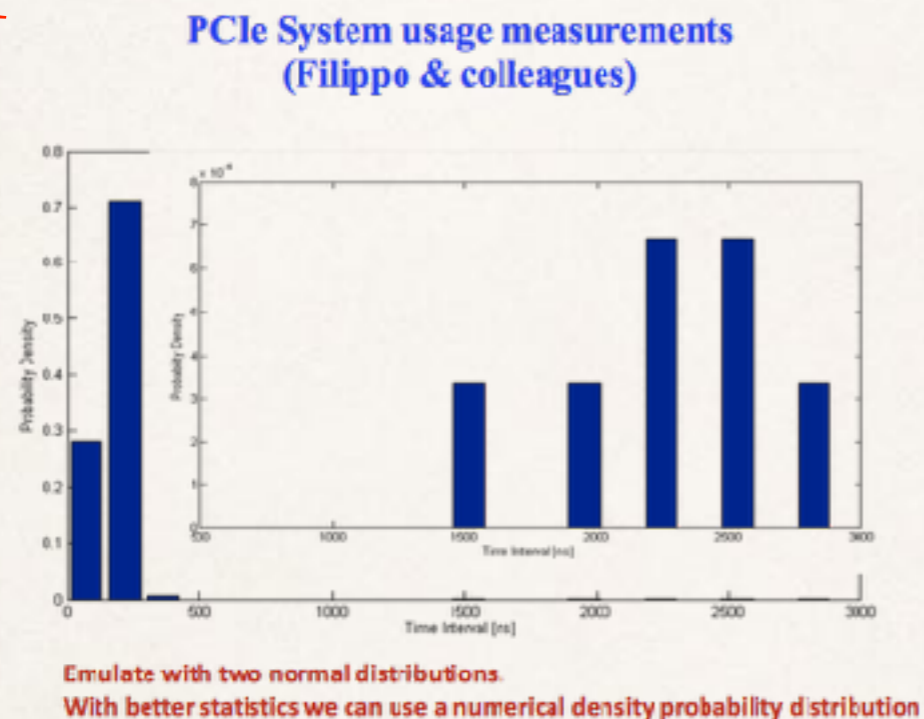
How did exactly Filippo obtain this PDF?

Our approach (inspired by Iosif)

✤ Setup:

    ✤ Hardware:

        ✤ 10Gbx4(Intel X710), 50Gbx2(MT27700 ConnectX)

        ✤ direct cable connection (W/O switch)

        ✤ check performance with 10Gbps switch

    ✤ Software: compiled C code from scratch

✤ Analysis:

    ✤ ROOT for data analysis

Summary

✤ We will carry out some "measurements" with different conditions

✤ Try to find effective degree of freedom for our task

✤ Follow Filippo's result as an example