Risks, Benefits of PFLDnet Protocols

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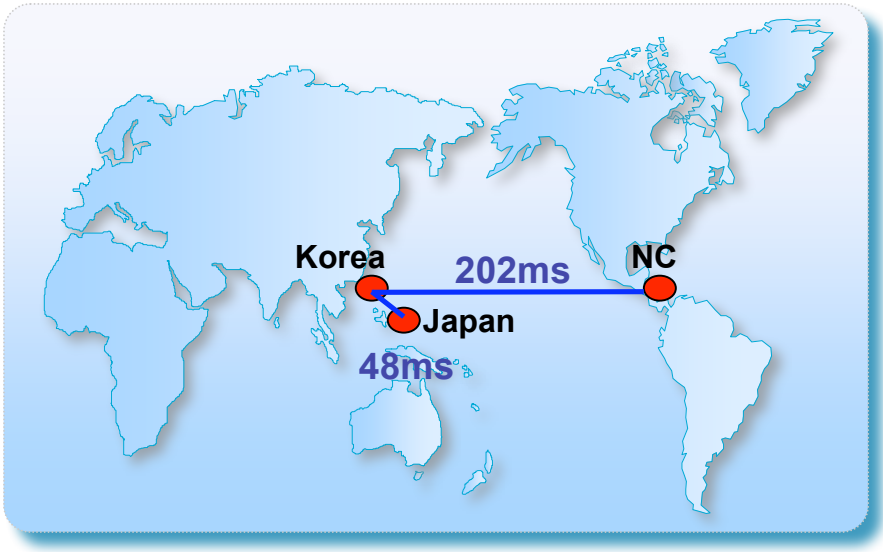
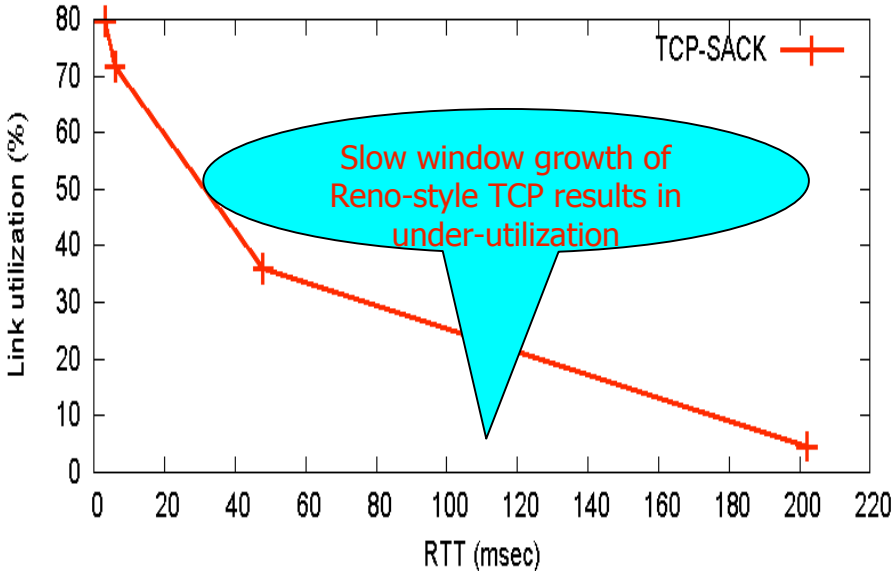
Benefits

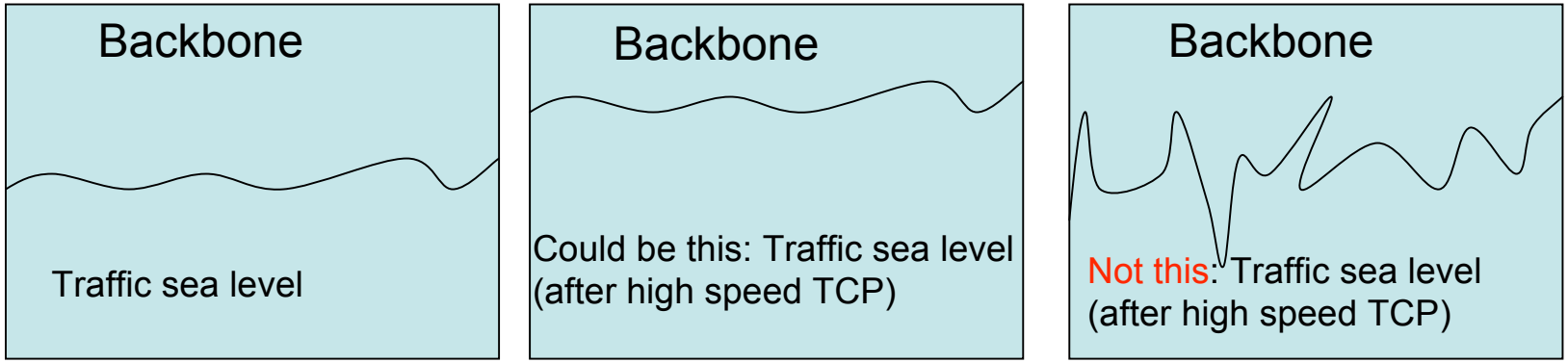




- Experiment with linux 2.6.19
- Iperf (1 TCP-SACK flow)
- 1Gbit backbone link: NC (USA) – Korea – Japan (special thanks to research team in Japan)
- When there is enough bandwidth and RTT is large, you can see the benefits in terms of throughput.

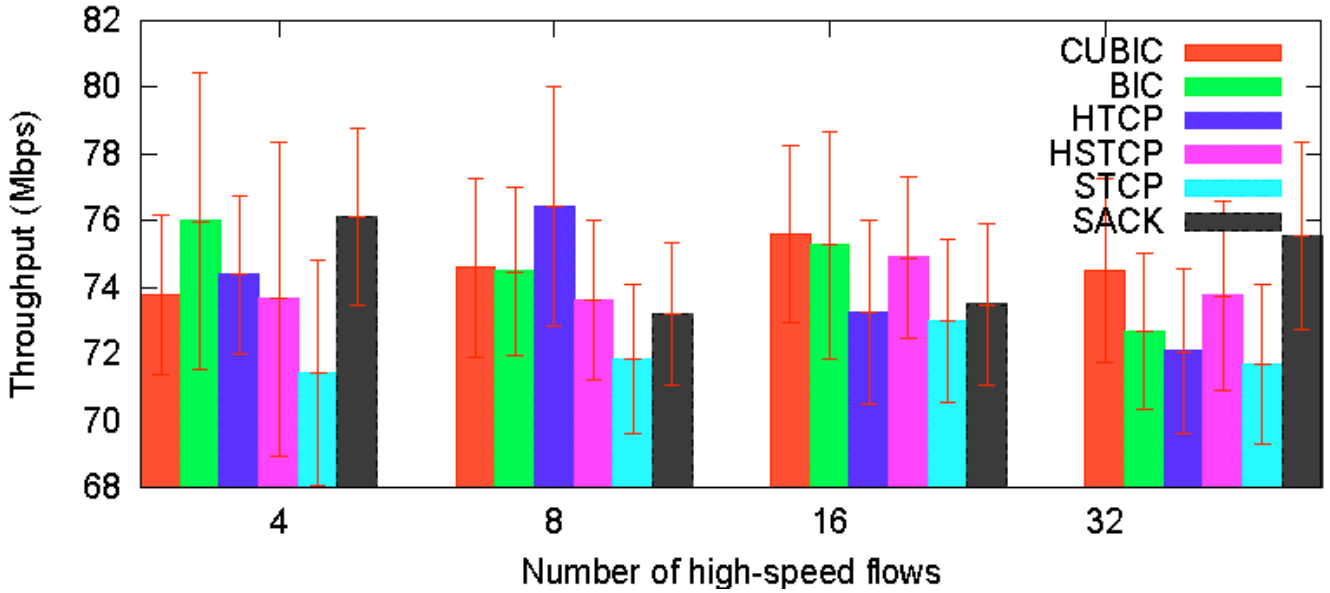
Risks

- Some arguments by A. Greenberg
  - Access: Since ISPs are rate control at the subscriber level, the impact of high speed flows is not significant. No meltdown or congestion collapse. All protocols backoff as well. So safe.
  - Backbone: Core is over-provisioned. As long as it does not create too much “instability” in the network, ISPs like more bandwidth usage.



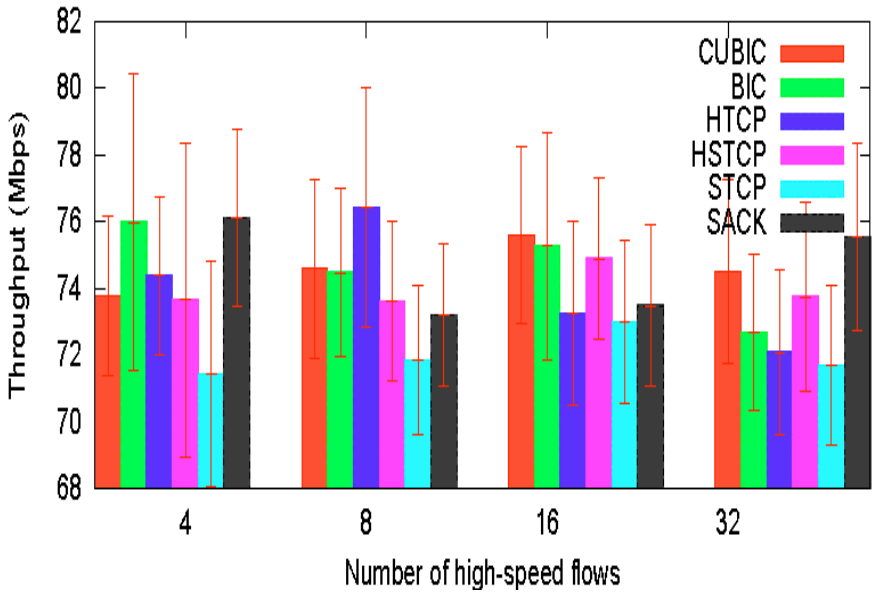
TCP fairness

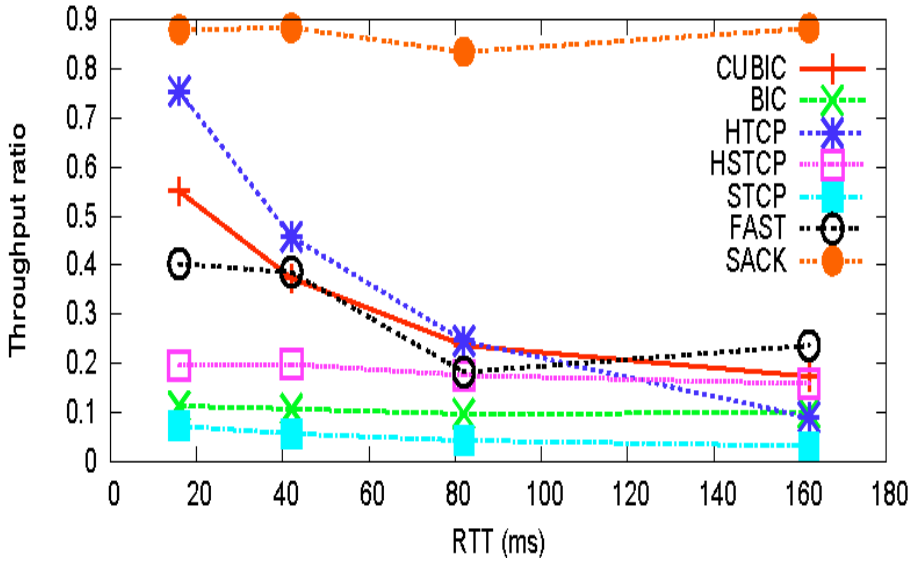
- How to measure?
  - Is it completion time? Or what average users will see as an effect of deployment?
    - Then must agree on the environments and the characteristics of “user traffic”?



TCP fairness

- Is average web traffic affected by presence of hs flows?

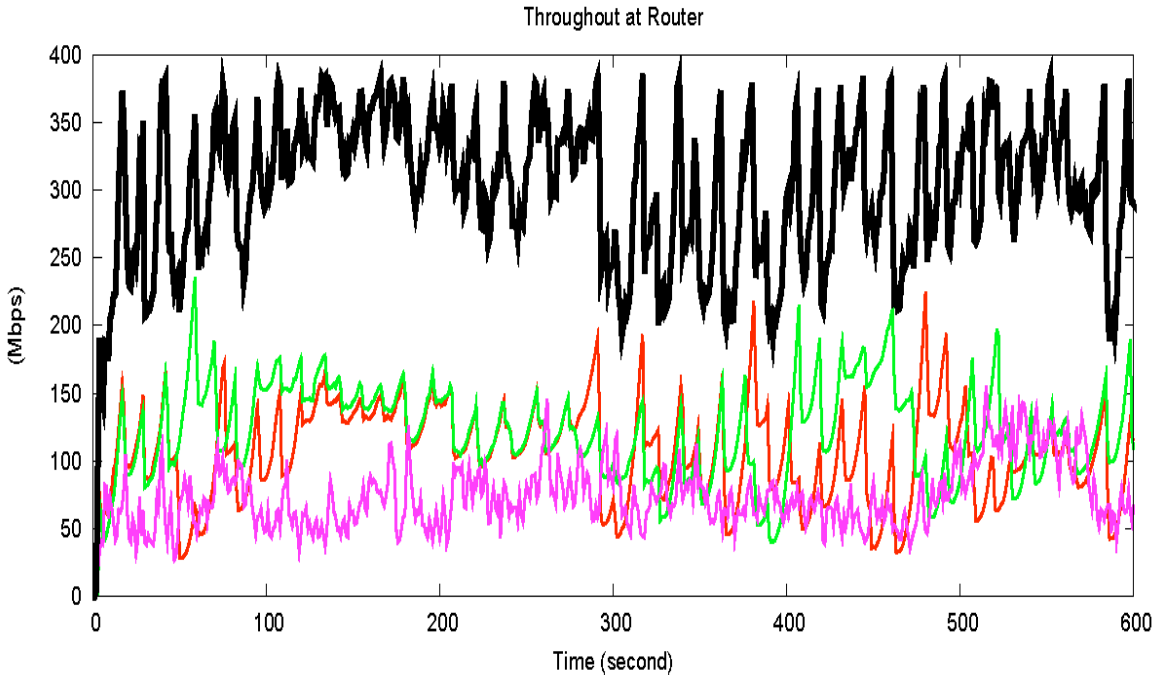


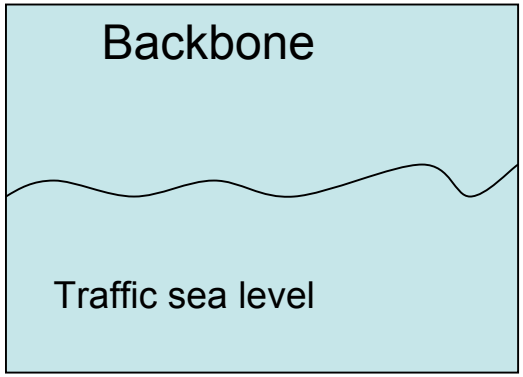


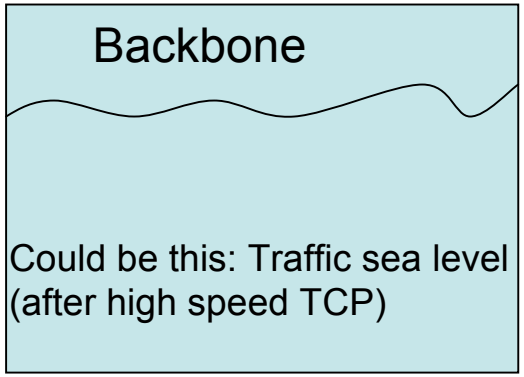
Which one should we study? Left or right?

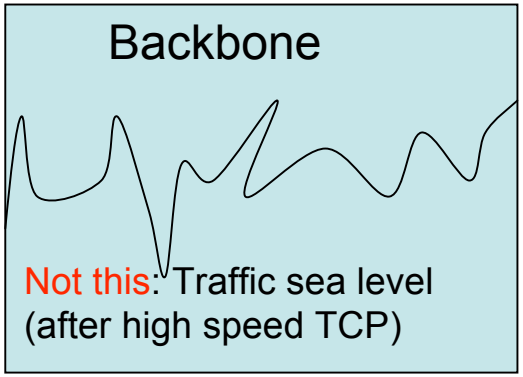
Other types of fairness

- We measure the stability of a protocol. In fact, this is not about one flow fluctuating.
- But it is about a flow's "over-adjustment" causing loss synchronization with other flows -- causing the other flows to reduce their rates at the same time.
- Thus, low utilization.
- Fig: from AG:









Real network tests

http://netsrv.csc.ncsu.edu/highspeed/exp/