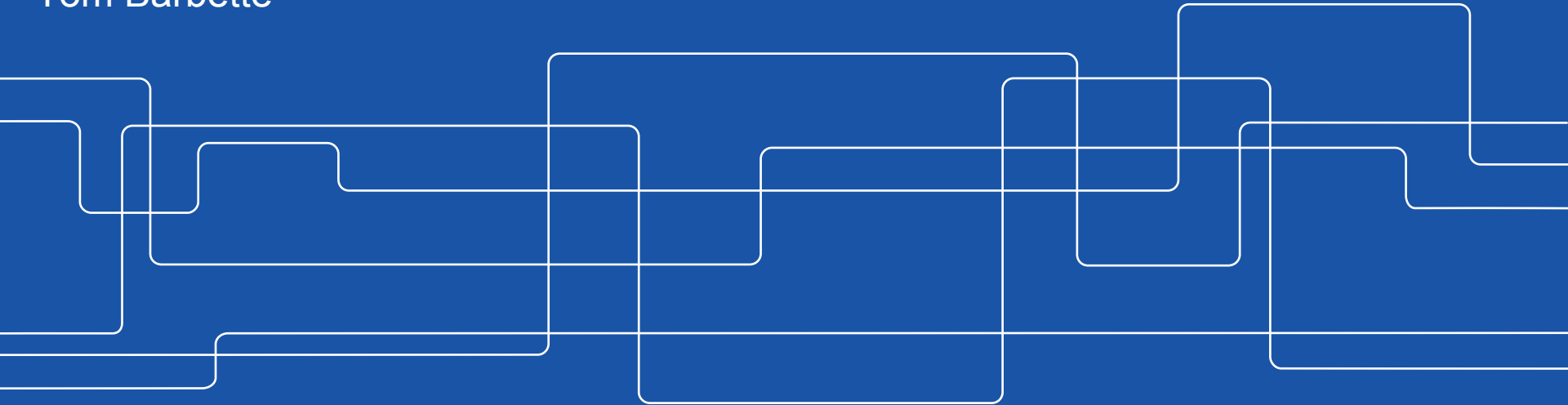




Project 4

Development of a multi-threaded NAT

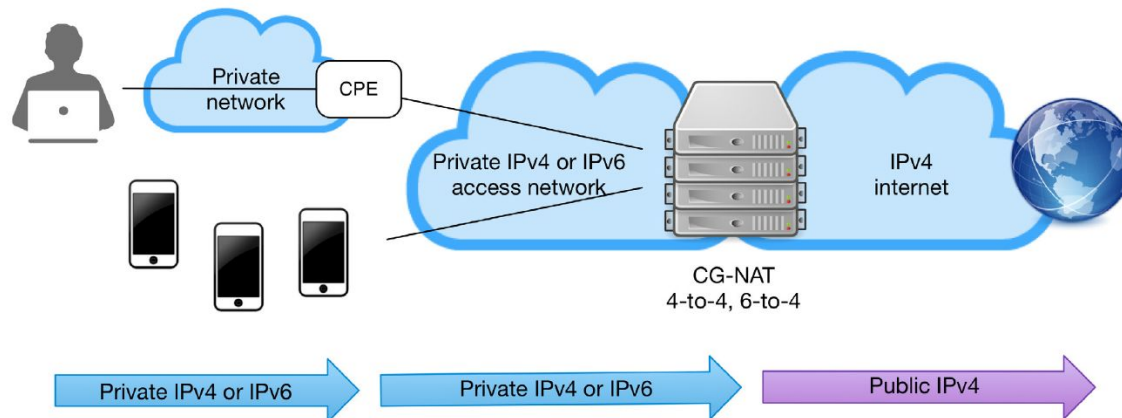
Tom Barbette





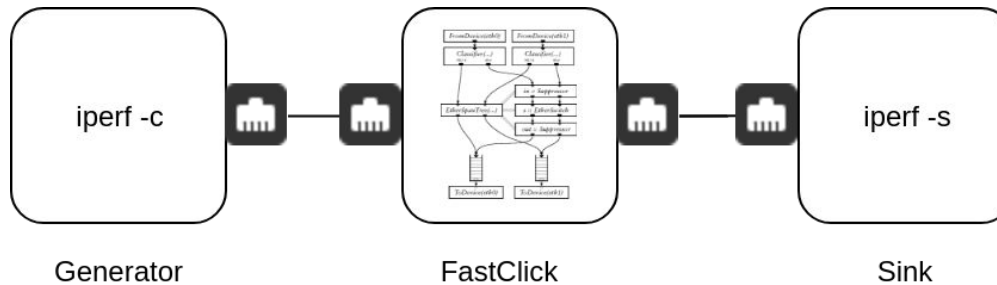
NAT in Internet Service Providers

- Not enough IPv4 addresses !



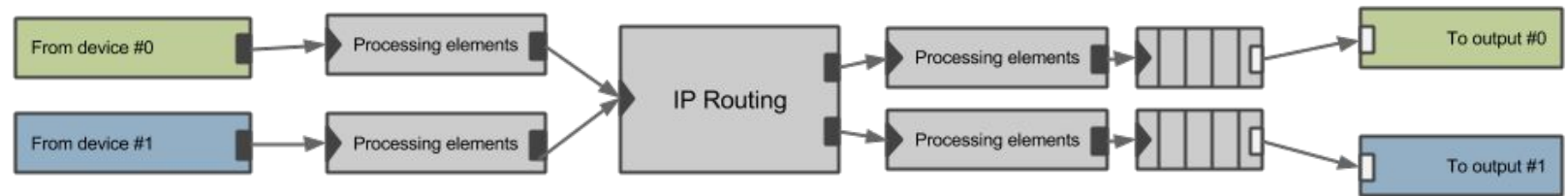
Testbed Deployment

- DPDK for fast packet I/O
- Iperf test case



- UDP test case
- Others as you see fit

FastClick

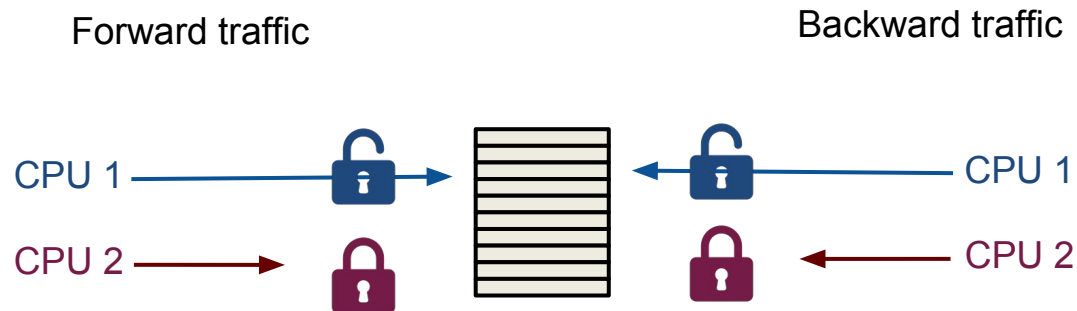


Task 1 : Single-core evaluation

- Limit of FastClick's NAT ?
 - According to the amount of flows
 - The flow size ? The packet length ?
- Measure
 - Throughput
 - Latency
 - Tail latency
- Profiling
 - What takes time in this NAT ? Why is it "slow" ?

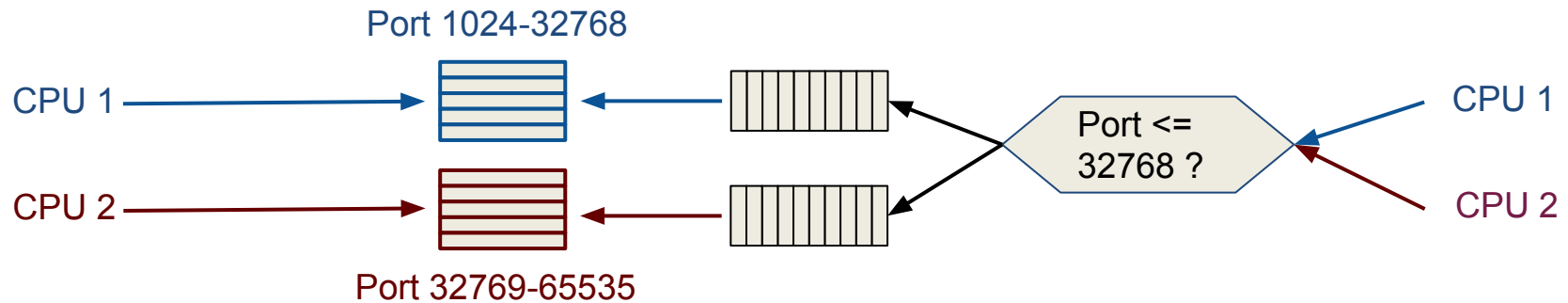
Task 2 : Multi-threaded NAT : Lock

- Try and measure 3 given methods
 - Locked flow table



Task 2 : Multi-threaded NAT : Duplication

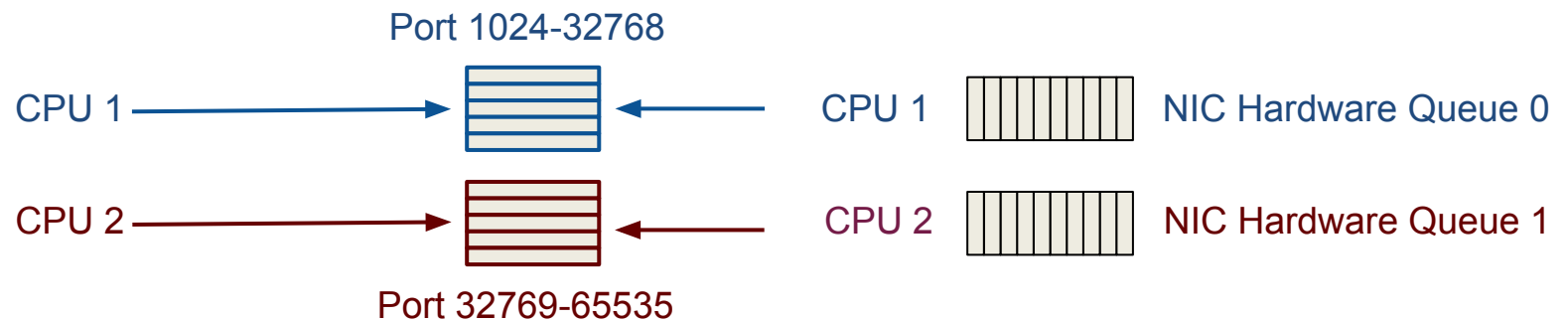
- Try and measure 3 given methods
 - Duplicated per-core, with software dispatching





Task 2 : Multi-threaded NAT : Hardware-assisted duplication

- Try and measure 3 given methods
 - Duplicated per-core, with hardware dispatching





Task 3

- Literature review
- Implement one or more method given by the literature review
- Final comparison of the methods
- Final conclusion
 - A definitive guide to NAT scaling



Ressources

- Click paper
 - Kohler, Eddie, et al. "The Click modular router." ACM Transactions on Computer Systems (TOCS) 18.3 (2000): 263-297.
- FastClick paper
 - Barbette, Tom, Cyril Soldani, and Laurent Mathy. "Fast userspace packet processing." Architectures for Networking and Communications Systems (ANCS), 2015 ACM/IEEE Symposium on. IEEE, 2015.
- Data-structures for multi-processing
 - Chapter 4 of Barbette, Tom. Architecture for programmable network infrastructure. Diss. Université de Liège, Liège, Belgique, 2018.
- FastClick tutorial on GitHub
- FastClick community (issues in GitHub)



Questions ?