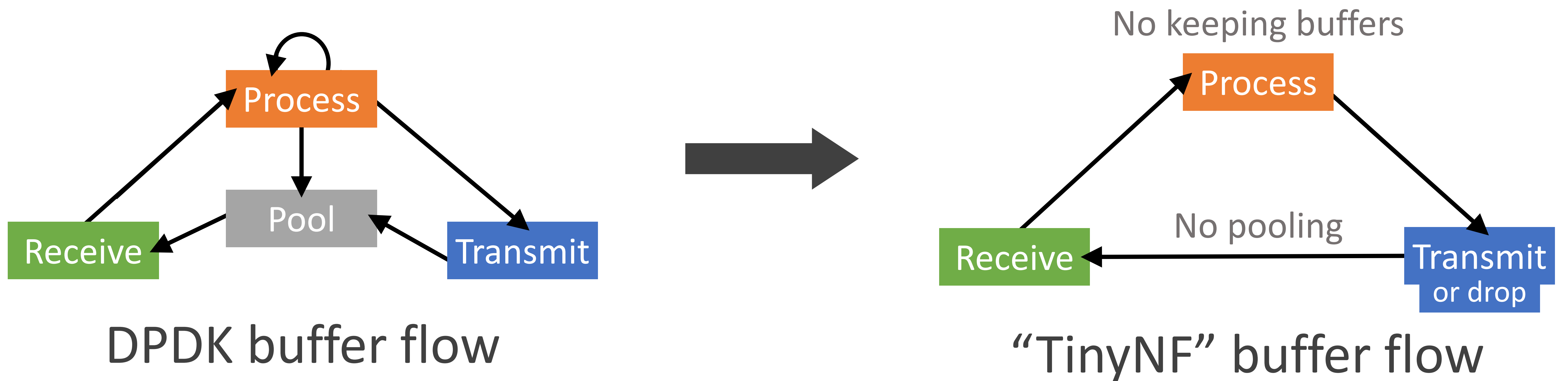


A Simpler and Faster NIC Driver Model for Network Functions

Solal Pirelli,
George Candea



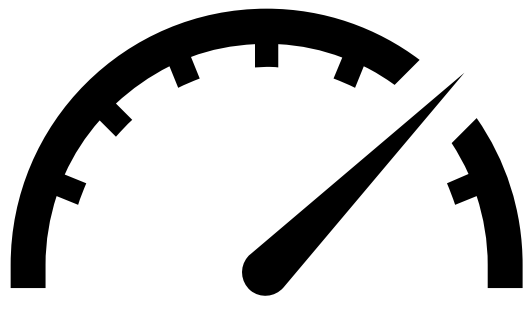
Core networking can be fast, simple, and verified,
by simplifying the driver model



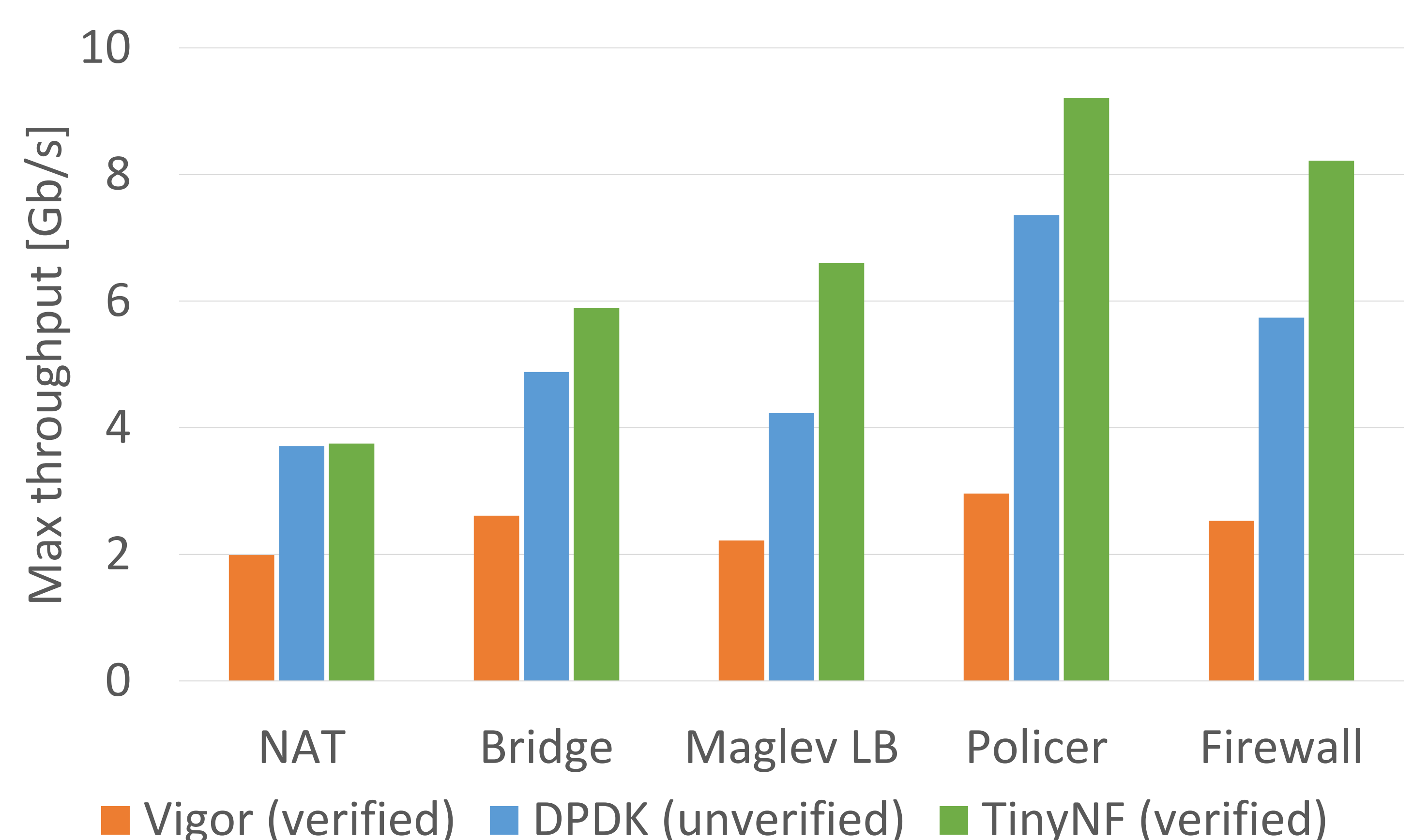
Core network functions operate packet-by-packet: bridging, routing, NAT...
DPDK-style frameworks are too generic for these functions

Removing unnecessary flexibility leads to:

- Fewer failure cases
- Fewer instructions
- Fewer cache misses

 1.25x tput of unverified driver
2.60x tput of verified driver
Same latency

 1/8th verification time
Exponentially fewer paths



Open questions:

- Could new hardware features help?
- Could new abstractions pick a model automatically?
- In what other ways can we trade flexibility for performance?
- How widely applicable is this model in real-world deployments?

OSDI '20 paper, video, code: dslab.epfl.ch/research/tinyinf