Dynamic Forwarding Table Management for High-speed GPU-based Software Routers

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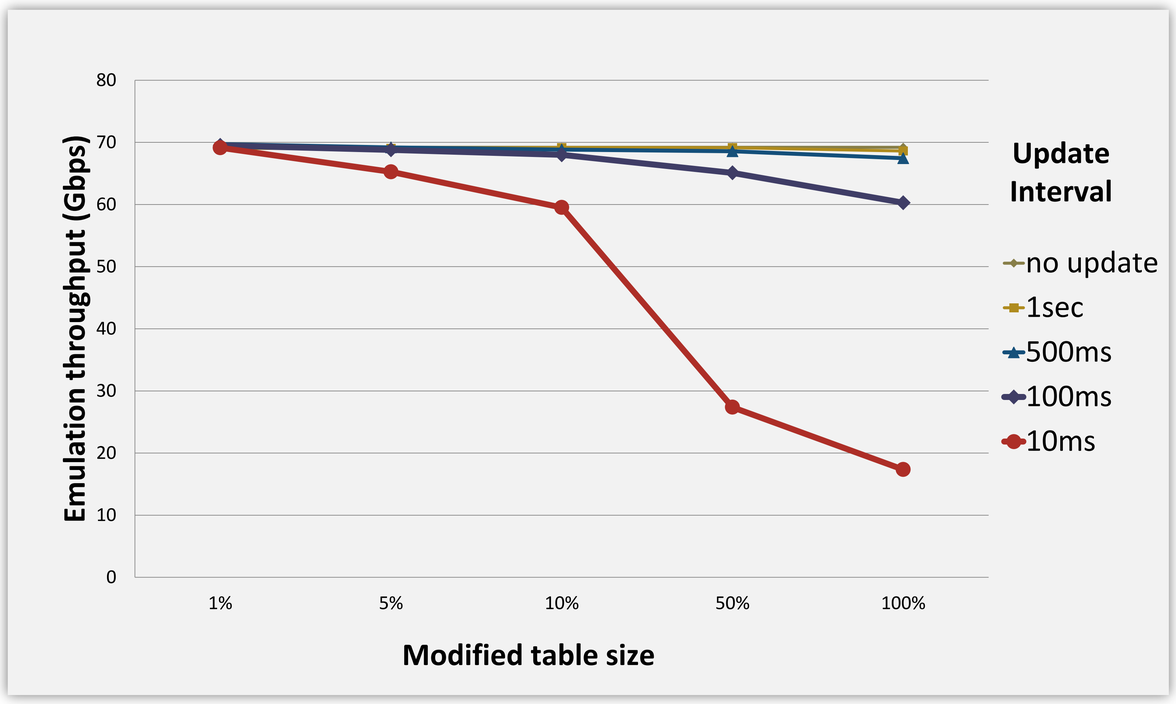
Motivation

➔ Software routers are gaining momentum
- in favor of extensibility & flexibility in network packet processing.

➔ PacketShader achieves 40Gbps. [SIGCOMM '10]
- Currently the fastest software router (data-plane speed 40Gbps on a single x86 machine)
- Next step: *control-plane integration*

➔ Will PacketShader keep up?
- Bursting routing table updates (50-150 times/sec)
- Large routing & forwarding tables (more than 320,000 entries and a few hundreds MB)
- Updating forwarding tables in GPU similar to FIB updates in high-end routers

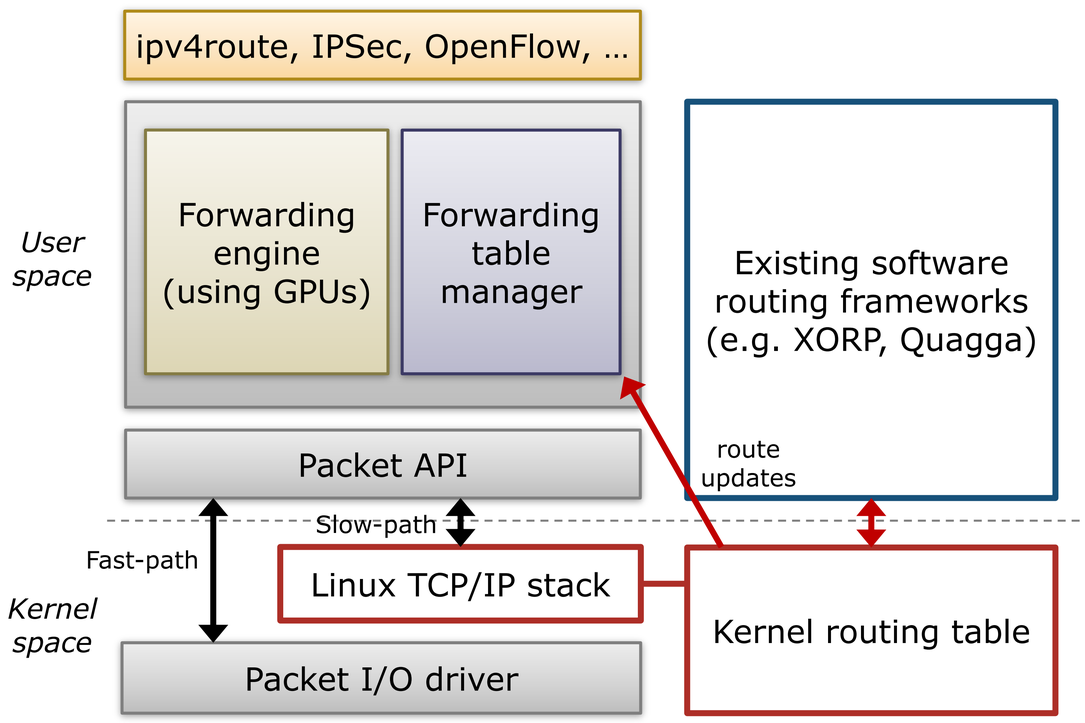
▼ **Updating cost of the forwarding table in PacketShader**



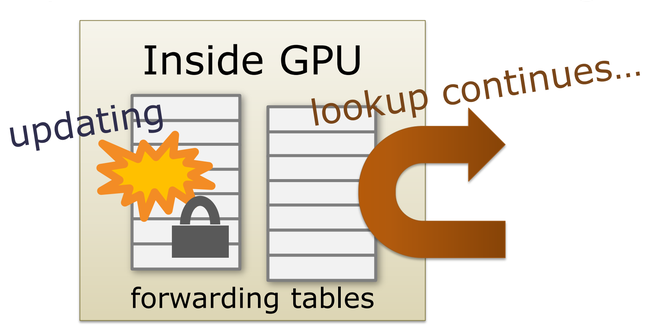
Our key insight on GPU-based software routers:
"Bursty routing table updates hurt the performance of GPU-based software routers"

Design & Ideas

➔ Software Architecture



➔ Idea #1: Double-buffering
- Modern GPUs have enough memory (1.5GB for GTX480) to store multiple instances of the forwarding table.



➔ Idea #2: Incremental FIB updates
- They reduce bandwidth and update time.
- The data structure for forwarding table is critical.
- We are considering a few known methods. ([Gupta98], [Basu05], [Zhao10], [Liu10])

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