MoonGen

Packet Generator & Latency Measurement

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Chair for Network Architectures and Services

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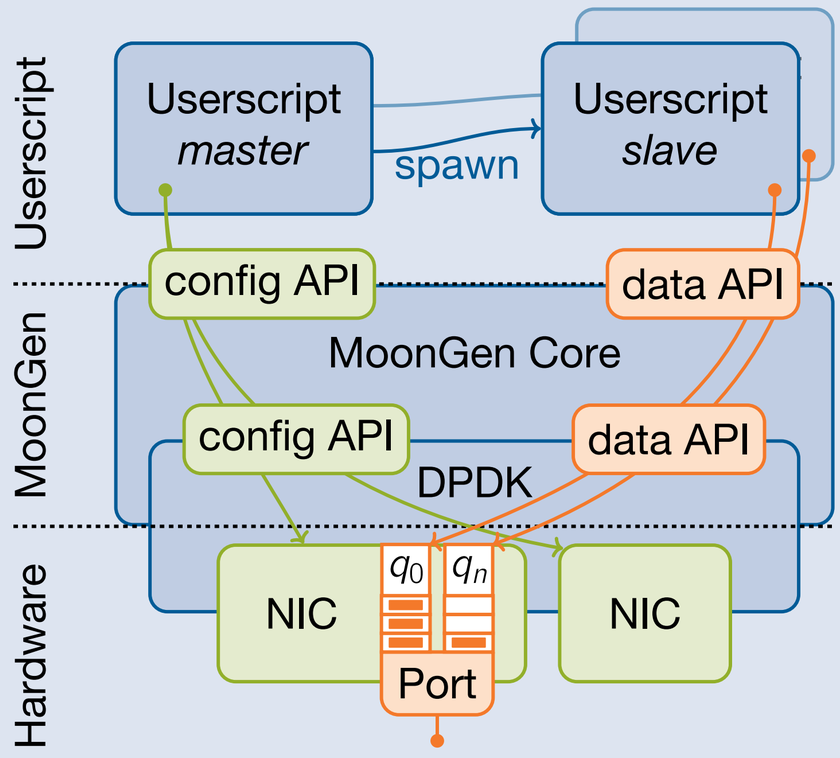
Features & Architecture

MoonGen is a *scriptable high-speed packet generator* built on a Intel's Data Plane Development Kit (DPDK) as backend offering a wide range of features:

- **Speed:** $\geq$10 Gbit/s with minimal sized packets using a single CPU core
- **Flexibility:** Configuration & packet crafting in user-controlled Lua scripts
- **Efficiency:** Code optimization to generate fast scripts using LuaJIT
- **Precision:** *Sub-μsec delay measurements* on Intel 10 Gbit NICs
- **Parallelization:** *Multi-core support* for rates beyond 10 Gbit/s

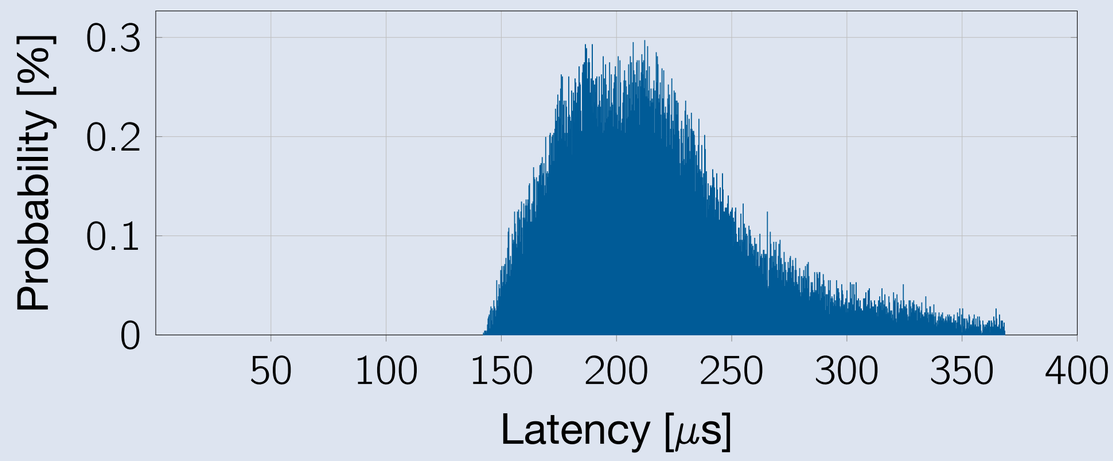


MoonGen's architecture

Latency Measurement Feature

- MoonGen reuses hardware features originally designed for the Precision Time Protocol (PTP)
- Timestamping happens in hardware shortly before/after sending/receiving
- Precision of $\pm$ 3.2 ns on Intel X540 10 Gbit NICs
- Limitations: Packets must look like PTP packets: only UDP and PTP layer 2 packets are supported

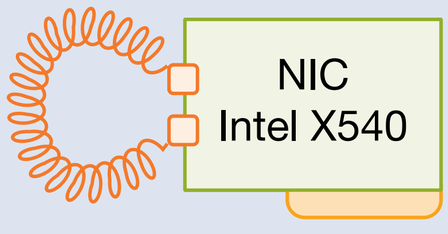
Latency Measurement Example



Latency distribution of traffic forwarded through a VM running on top of Open vSwitch at a load of 322k packets/s.

Latency Measurement Demo

- Cable length determination through time-of-flight
- Demo setup uses an unaltered Intel X540 dual port NIC



More Information

Additional information and source code of MoonGen is available at:

https://github.com/emmericp/MoonGen

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