

Accelerating Snabb Programs

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Snabb

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Programmers write Lua modules that handle packets and connect them together.

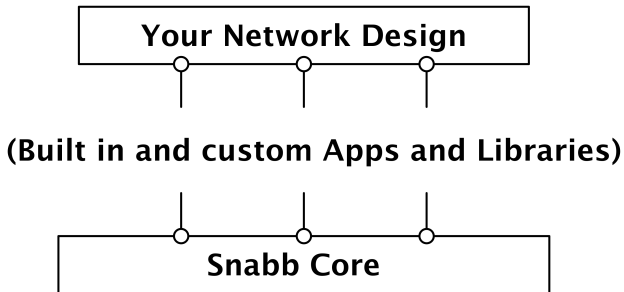
Naming conventions

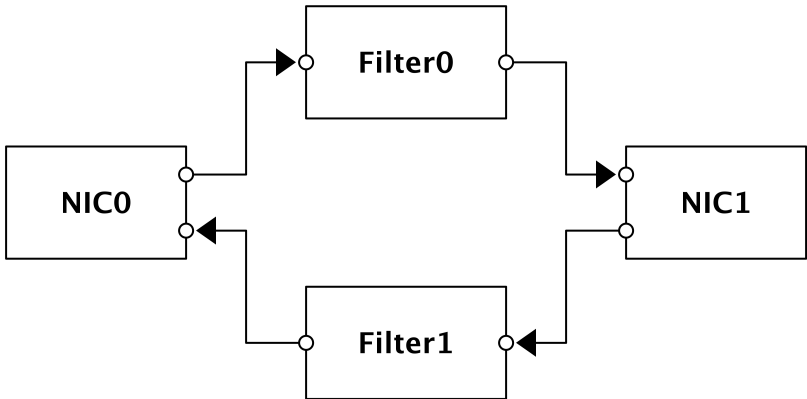
Naming conventions

- Apps (= Modules)

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- Programs (= Configs)





Snabb Core

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- initialize apps
- set up links between apps
- memory management
- main loop

Snabb API

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Apps

```
myapp:new(arg)
```

```
myapp:push()
```

```
myapp:pull()
```


Snabb API

Apps

```
myapp:new(arg)
myapp:push()
myapp:pull()
```

Programs

```
local c = config.new()
config.app(c, "app1", myapp, "params for app 1")
config.app(c, "app2", myapp, "params for app 2")
config.link(c, "app1.output -> app2.input")

engine.configure(c)
engine.main()
```

Snabb API

Apps

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myapp:new(arg)
myapp:push()
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```
engine.configure(c)
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Running

```
$ snabb run myprogram
```

DPDK

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DPDK is a set of libraries and drivers for fast packet processing.

libmoon

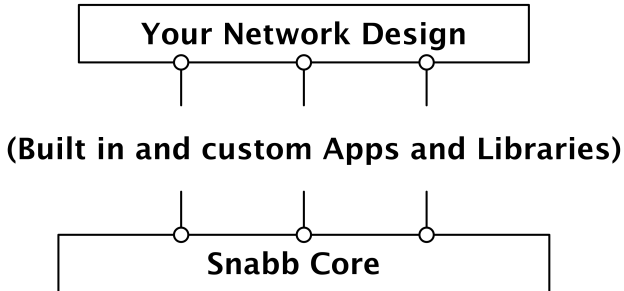
LuaJIT + DPDK = fast and flexible packet processing at speeds above 100 Gbit/s.

libmoon

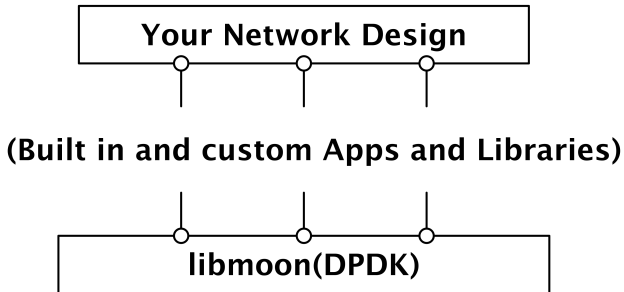
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Lua wrapper around DPDK

What we have



What we want



Solution

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Build snabb-libmoon-compat

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- Reimplement Snabb Core to call into libmoon

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- Reimplement Snabb Core to call into libmoon
- Expose DPDK devices as Snabb Apps

Caveats

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- only partial API compatibility

snabb-libmoon-compat

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- Apache 2.0 License

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- <https://fabianbonk.de/snabb-libmoon-compat/>

Performance

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Performance target was achieved

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Snabb's maximum packet rate: 14.88 Mpps (no support for faster NICs)

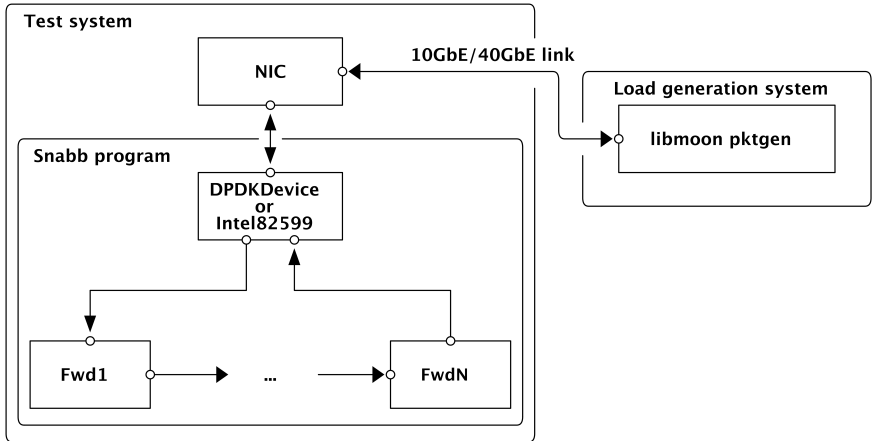
Performance

Performance target was achieved

Snabb's maximum packet rate: 14.88 Mpps (no support for faster NICs)

snabb-libmoon-compat: up to 18.65 Mpps (using 40GbE NIC)

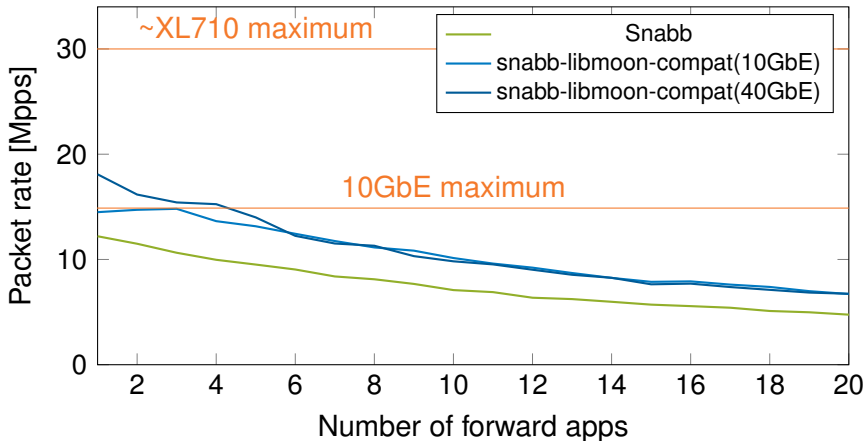
Test setup



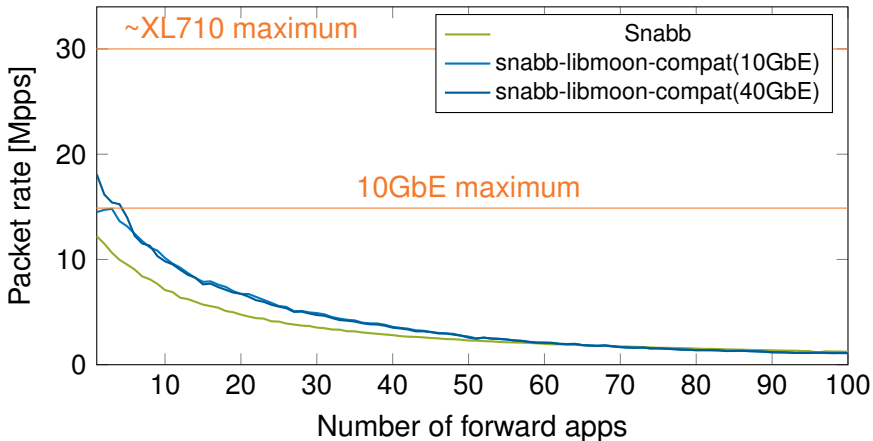
Test systems

CPU	CPU freq.	L3 cache	NIC
Intel Xeon E5-2620 v3	3.2 GHz	15 MiB	Intel XL710 Intel 82599ES
2 Intel Xeon E5-2630 v4	3.1 GHz	25 MiB	Intel XL710 Intel 82599ES
Intel i7-3770K	4.5 GHz	8 MiB	Intel 82599ES
AMD Threadripper 1950X	4.2 GHz	32 MiB	Intel 82599ES

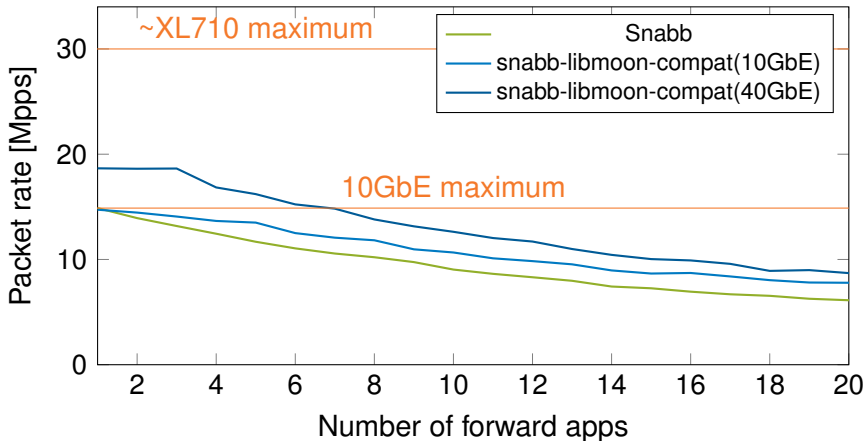
Intel Xeon E5-2620 v3 + Intel XL710/Intel 82599ES



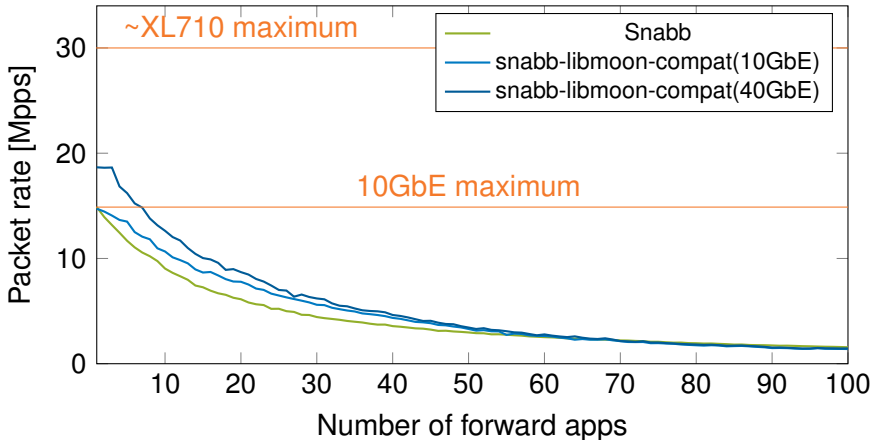
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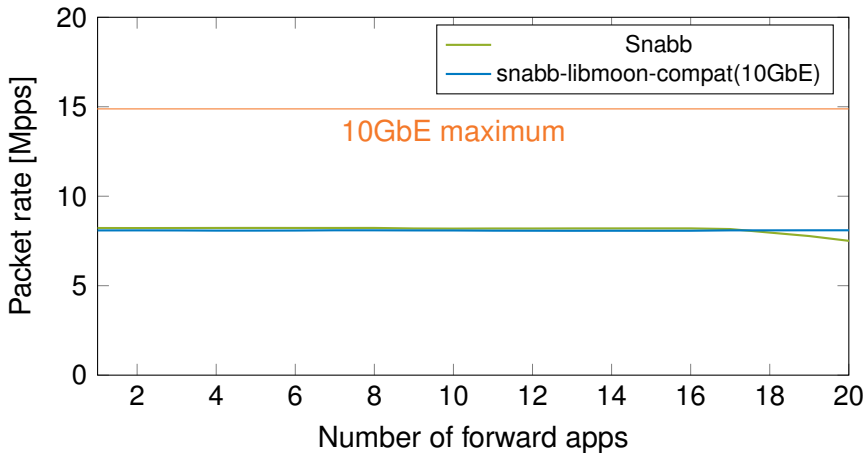
Intel Xeon E5-2630 v4 + Intel XL710/Intel 82599ES



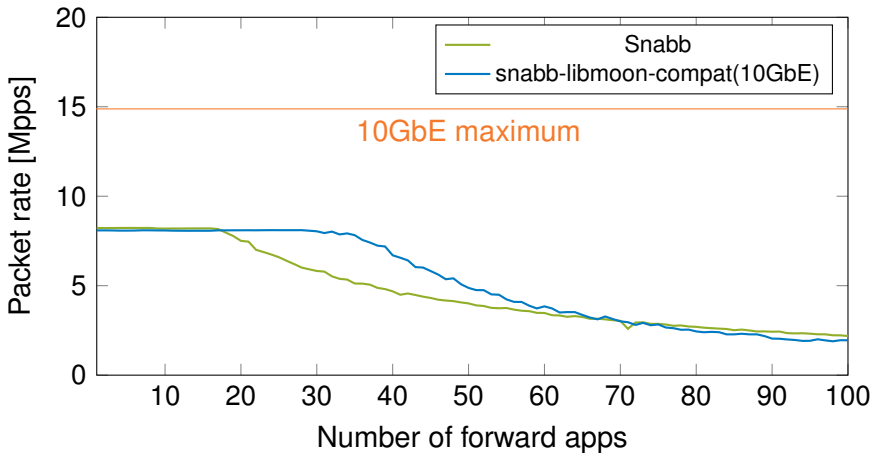
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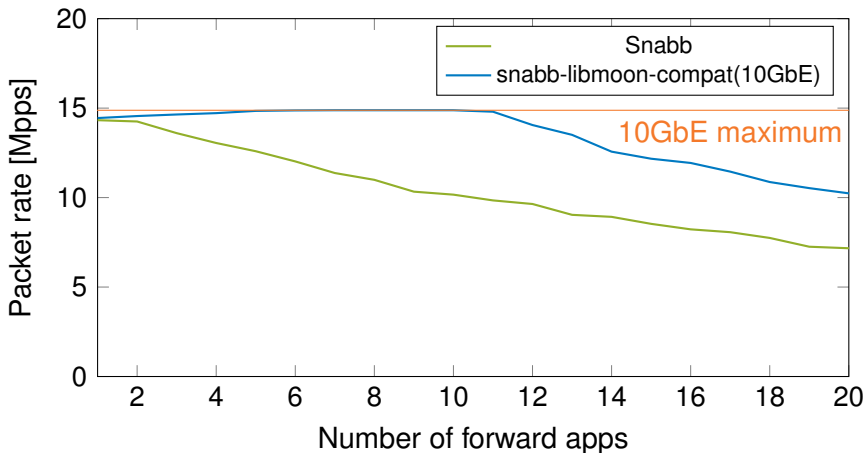
Intel i7-3770K + Intel 82599ES



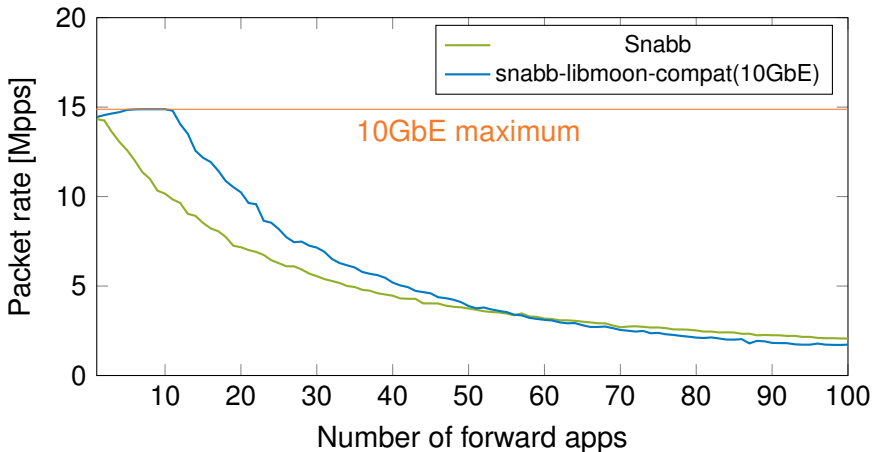
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AMD Threadripper 1950X + Intel 82599ES



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Future Development

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- automatic/manual multithreading

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- expanded API compatibility

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- automatic/manual multithreading
- expanded API compatibility
- UI improvements

Links

Questions:

- mail@fabianbonk.de
(PGP 0x04124B4CFA189C26)
- fabian.bonk@tum.de
(PGP 0x578B2D00E529403B)

Code:

- <https://github.com/Reperator/snabb-libmoon-compat>

Info & Thesis:

- <https://fabianbonk.de/snabb-libmoon-compat/>