Implementing a Libfabric provider for DPDK

Summer student 2017

Mohammad Hassan Zahraee
Supervisor: Niko Neufeld

What did he say?
Libfabric what?!!!
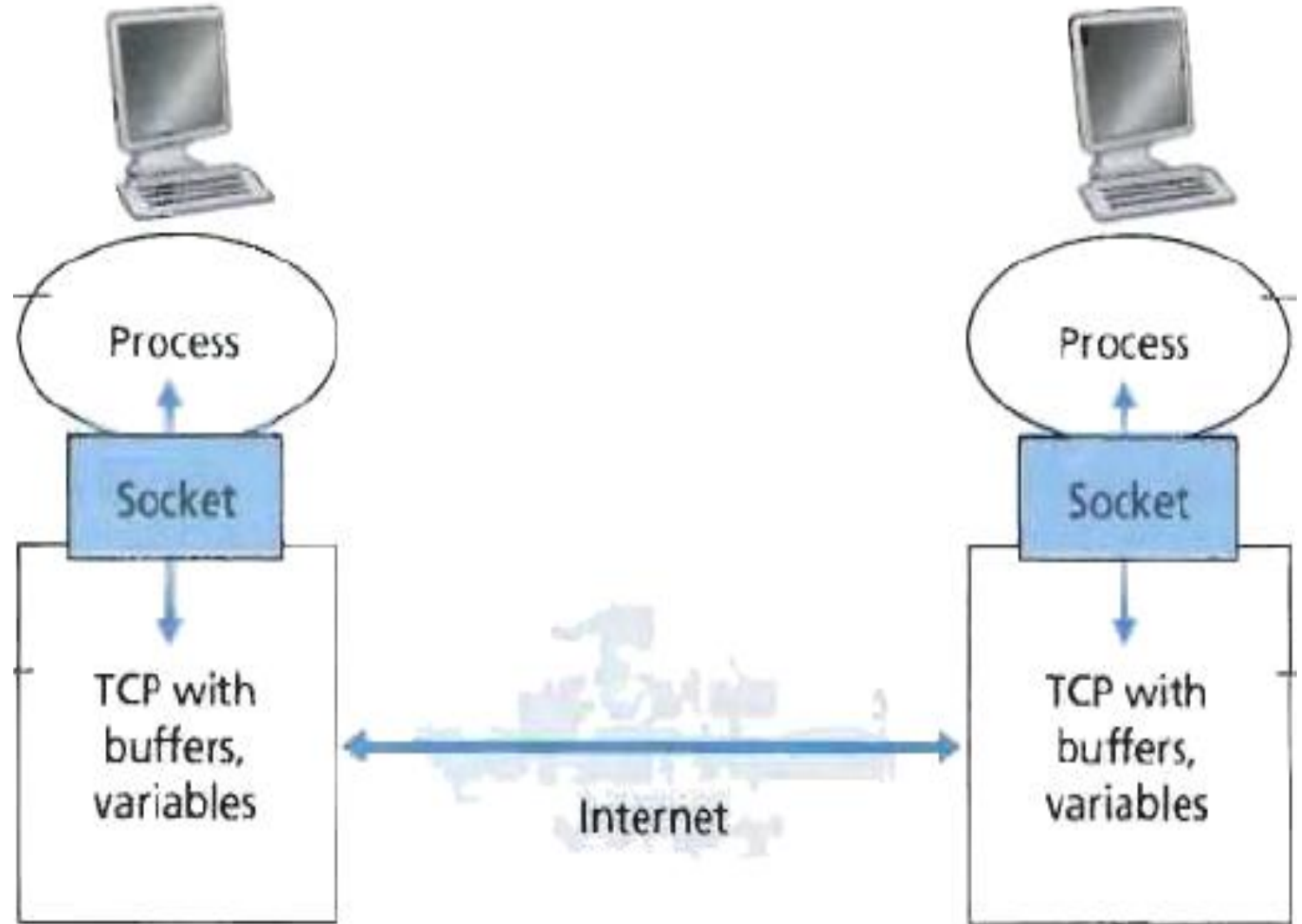
Who has done
Network/Socket programming?

Network (Socket) programming

{ Socket API }

Network (Socket) Programing?

- **API for network programing**

- **local inter-process communication**

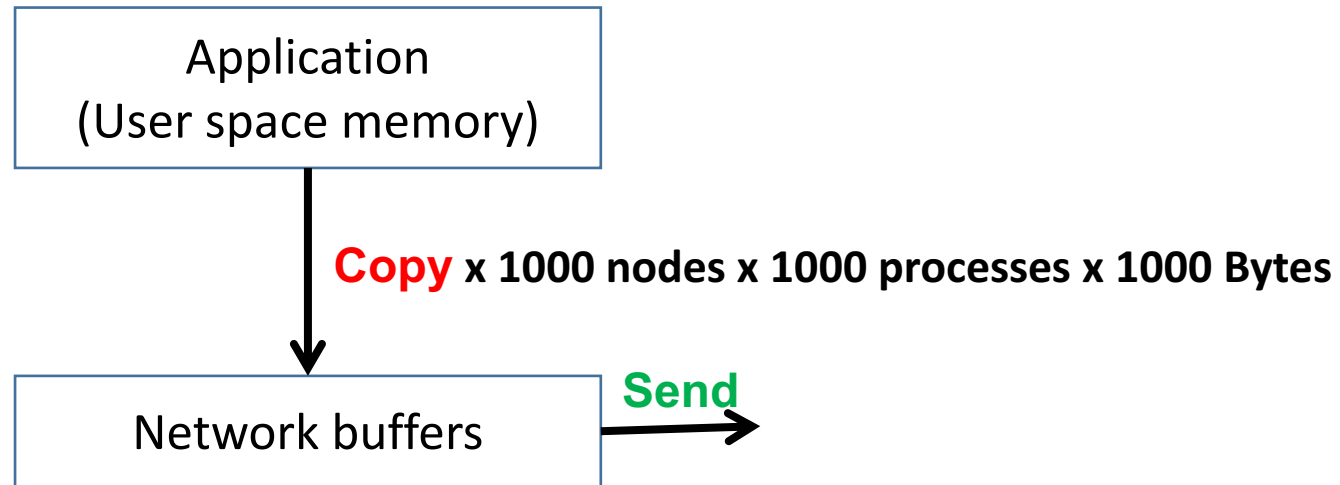- **Over TCP/UDP and IP → OS TCP/IP stack**

- **Advantages:**

  1. Wide OS support

  2. Works on majority of networking hardware

  3. **Easy**
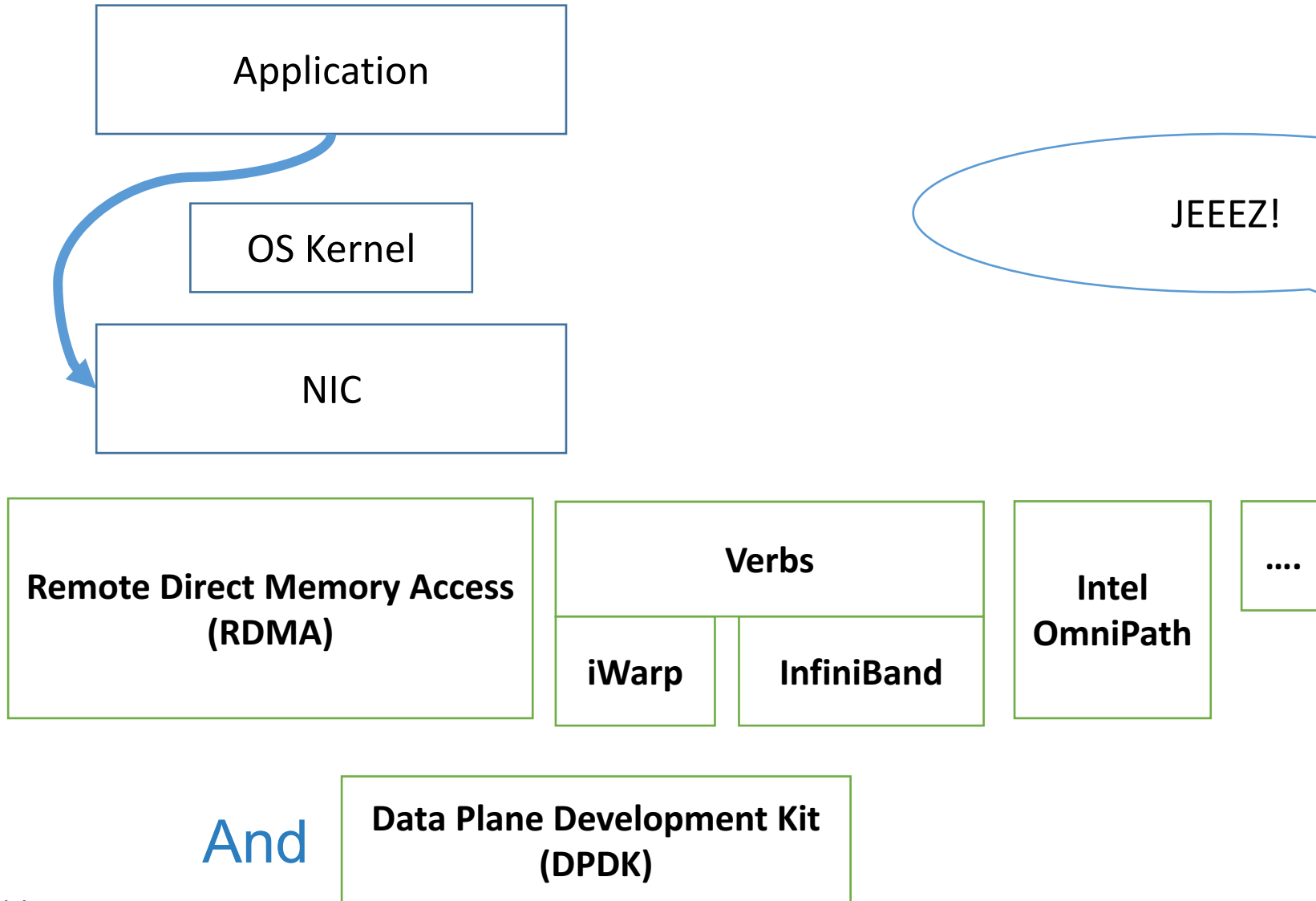
Disadvantages of Sockets

In High Performance Computing

- **Memory copy**

```
┌──────────────────────────┐
│       Application        │
│   (User space memory)    │
└──────────────────────────┘
              │
              │  Copy x 1000 nodes x 1000 processes x 1000 Bytes
              ▼
┌──────────────────────────┐      Send
│     Network buffers      │ ────────►
└──────────────────────────┘
```

- **Stream of bytes VS. Messages**

    → **loops in program to convert from stream to messages**

Solution

Application

OS Kernel

NIC

Remote Direct Memory Access (RDMA)

Verbs

iWarp

InfiniBand

Intel OmniPath

....

And

Data Plane Development Kit (DPDK)

JEEEZ!

CERN openlab
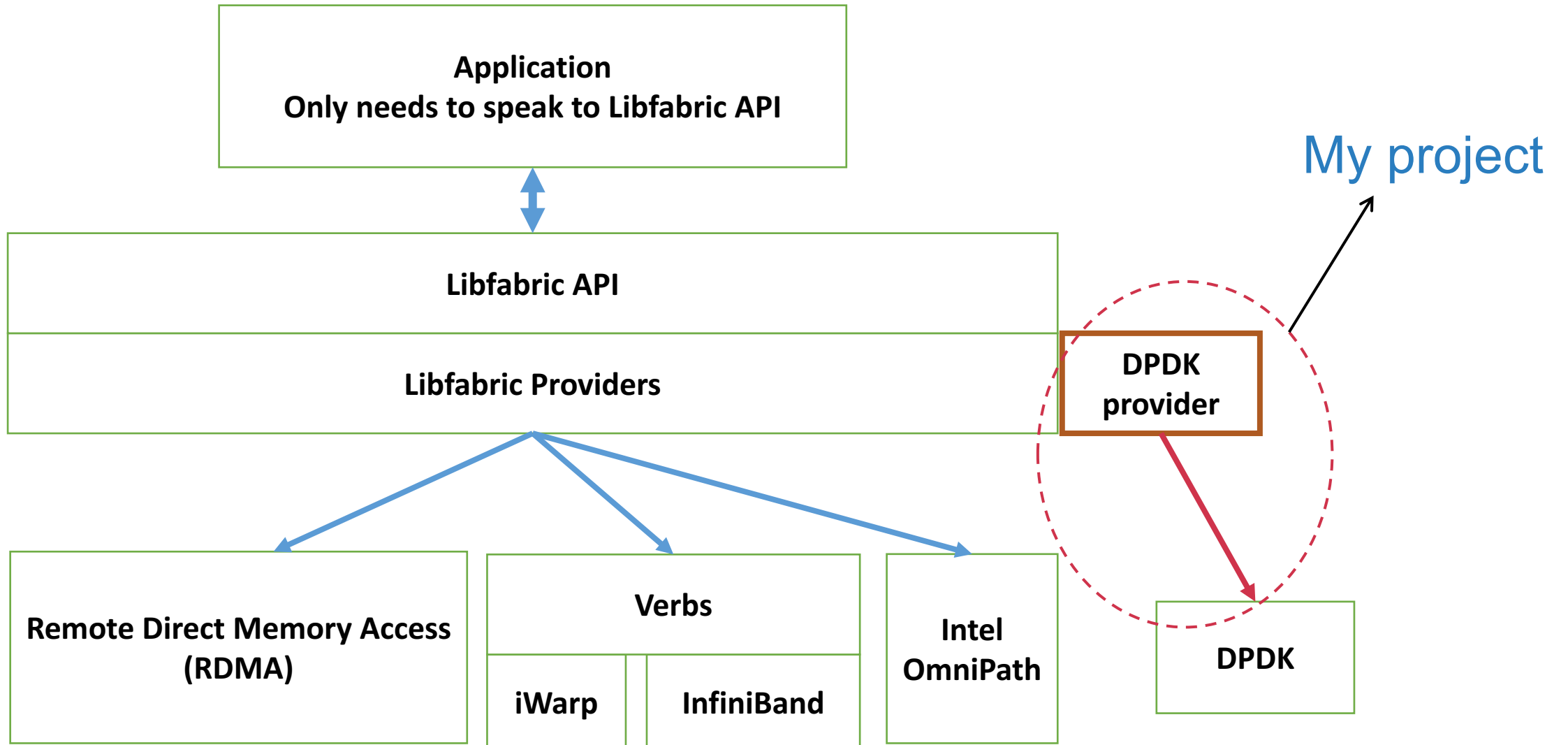
Improving solution

Approach & Progress

1. **Read documents**

2. **Setup environment**

    1. Run Libfabric and DPDK and monitor using wireshark

    2. Test DPDK on virtual machine (Possible to progress without access to NIC's with DPDK support)

3. Implement a proof of concept Libfabric provider for DPDK

    1. Autotools (build system)

    2. Reverse engineer an existing provider e.g. UDP & Mellanox (Depends on external libraries)

    3. Write the code for DPDK provider

4. Future work

    1. Improving proof of concept implementation to an optimized one

QUESTIONS?

m.h.z@cern.ch

What I have learned

- **Summer in Geneva ROCKS! especially jumping into river!**

- **Learning C is even more fun**

& lots of tools to do it 21s centuary style!

- **Love to learn more low level programing**

mixing it with my other interests (Security)

- **Data planes are also programed in SDNs!**

And people at LHCb team are inspiring!

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