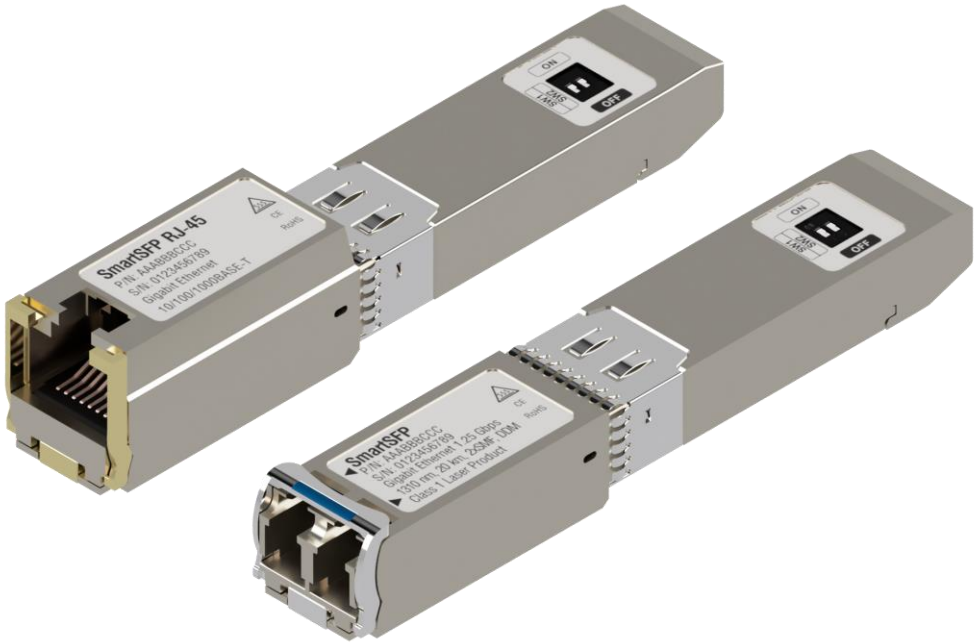
PlumSpace

Skolkovo Technopark

Smart SFP

Introduction



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22.07.2021

Company overview

- Privately held, established in 2013
- Member of Skolkovo – High-tech research and development park
- 40+ employers
- Moscow – HQ, Management, Sales, Support
- Saint Petersburg – R&D and manufacturing
- London, UK – International sales office
- Hamburg, Germany – International warehouse
- Sales channels – System Integrators, VAR, OEM
- Target markets – Europe, US, Canada, Asia

Portfolio

Smart SFP

Smart NIC

Agenda

- What is Smart SFP?
- Problems to solve
- Why Smart SFP?
- Architecture
- Products overview
- Summary

What is Smart SFP

Smart SFP

Regular SFP transceiver

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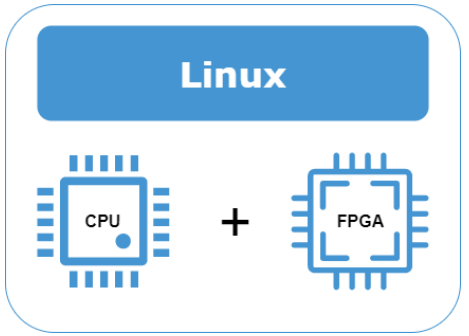


Computing system

Problem to solve

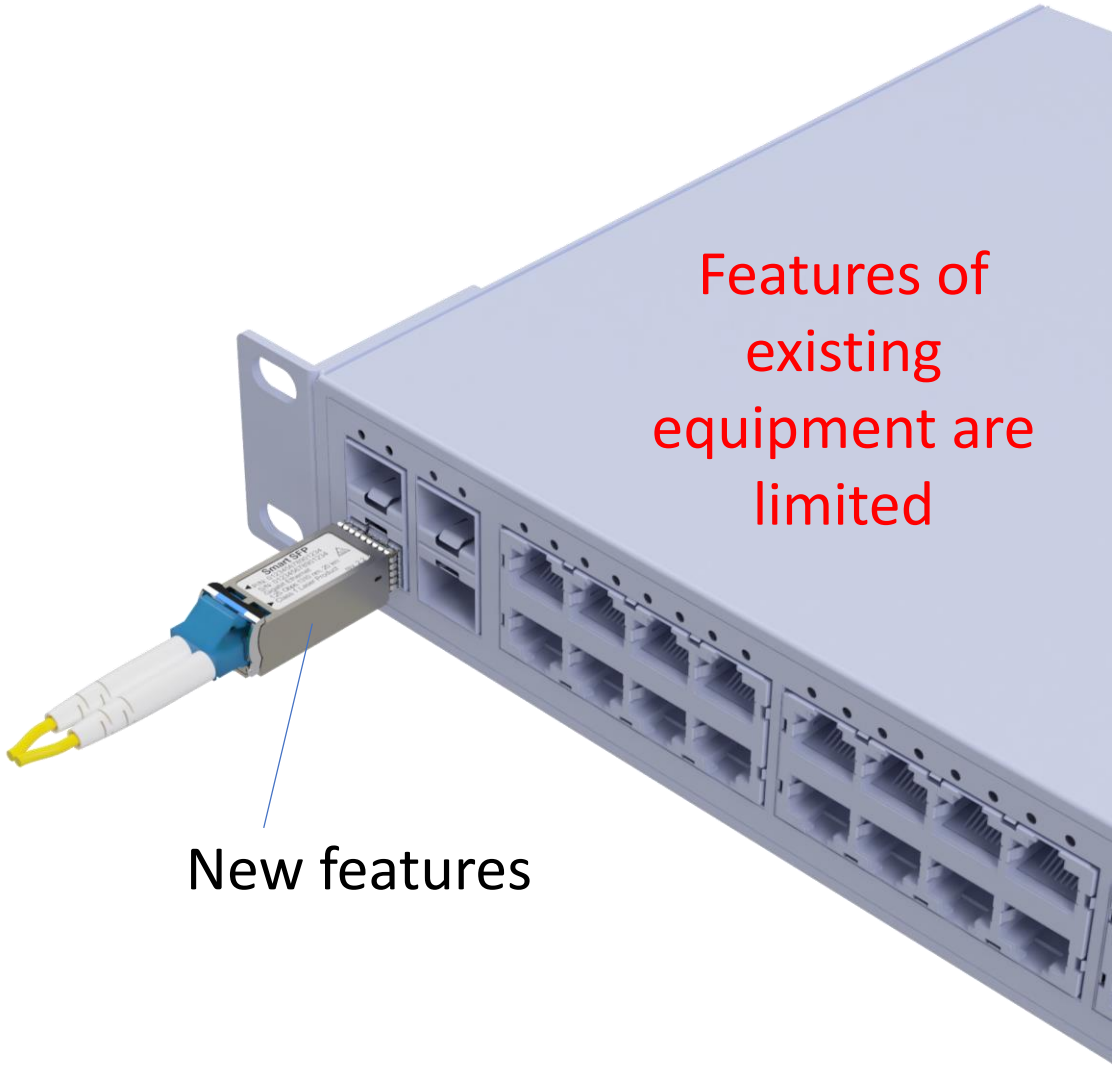
Extension of the existing equipment features

Technologies and protocols

- Monitoring and measurement
- OTDR
- Precision network time server
- Tunneling

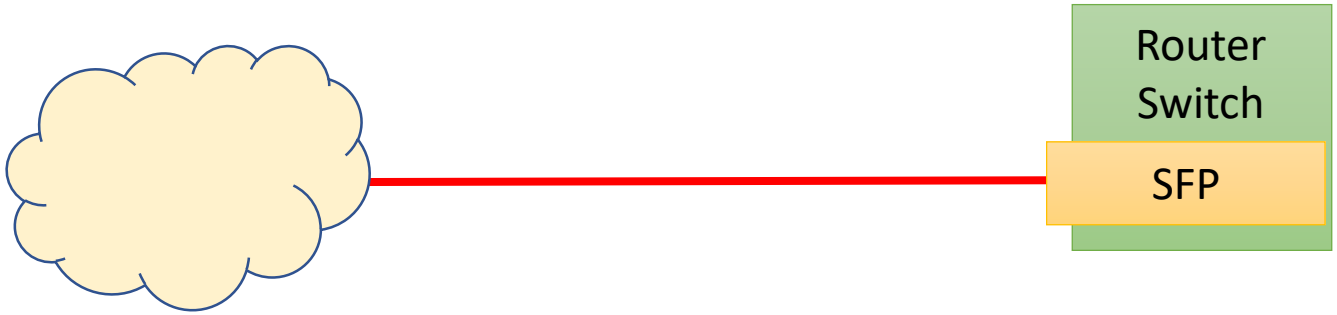
Addition data processing

- DPDK
- P4

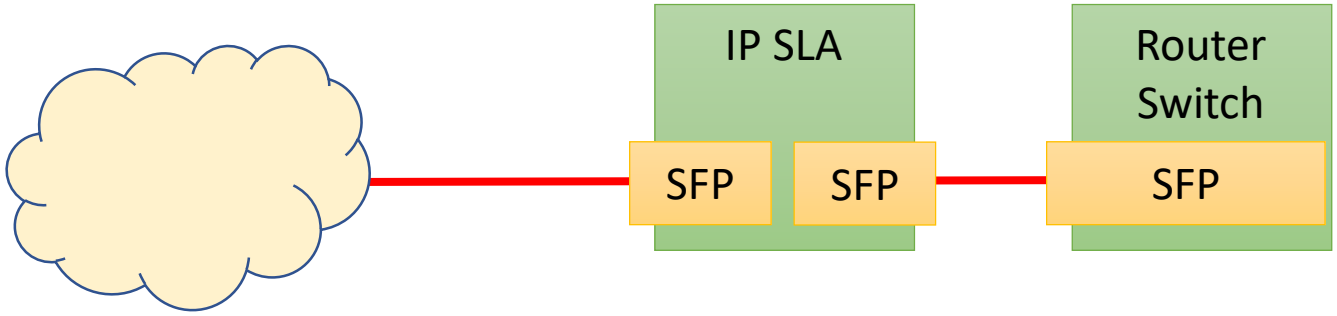


Why Smart SFP?

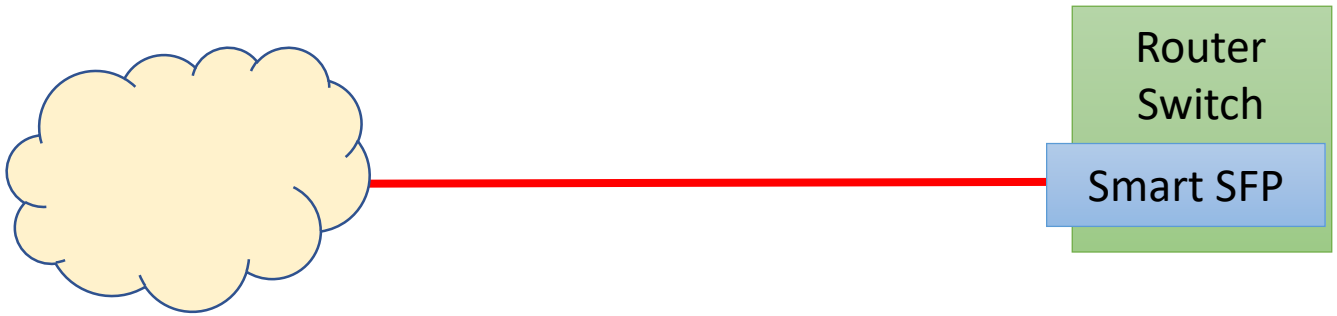
Existing scheme



Traditional feature extension approach



Smart SFP feature extension approach



Why Smart SFP?

Technical and economical reasons:

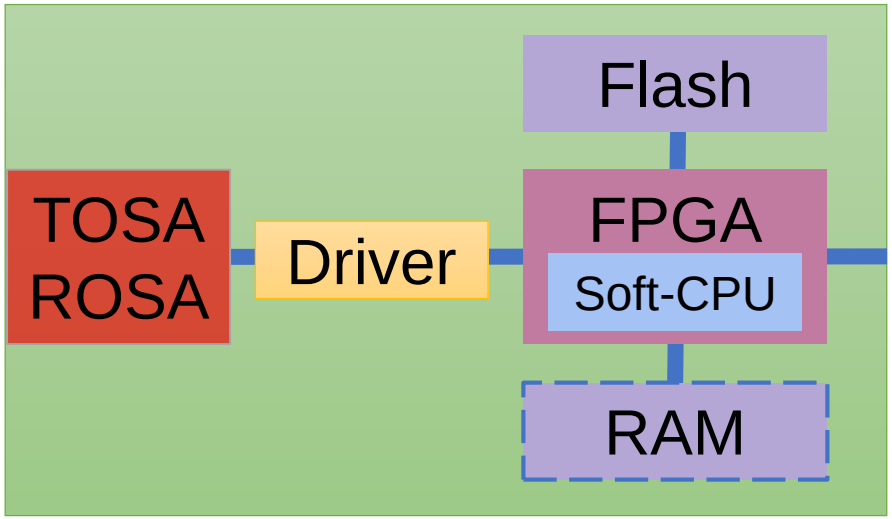
- Cheaper than standalone device, there are no unnecessary ports/features which increase the price
- Cheaper than changing the existing device to the new model
- Cheaper than activating new features in the existing device
- Very small possibility of custom feature development for the existing devices
- No free space in the rack

Administrative reasons:

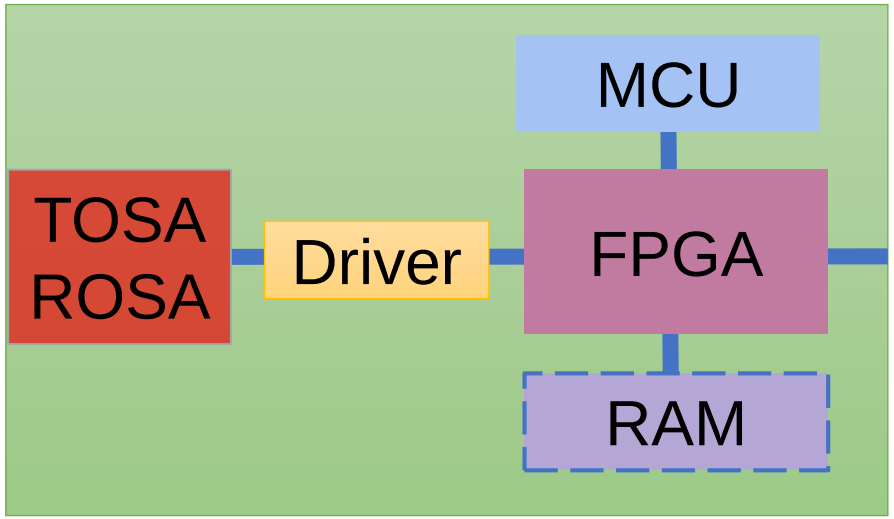
- No additional agreement needed to connect to electricity, cable infrastructure, rack place
- Allows to use simplified procurement procedure – buy as SFP not as SLA probe
- Allows to perform procedures as upgrade of existed device instead of purchase a new one
- Allows not to certify existing devices

”Classic” Smart SFP architecture

FPGA and Soft-CPU



FPGA and MCU



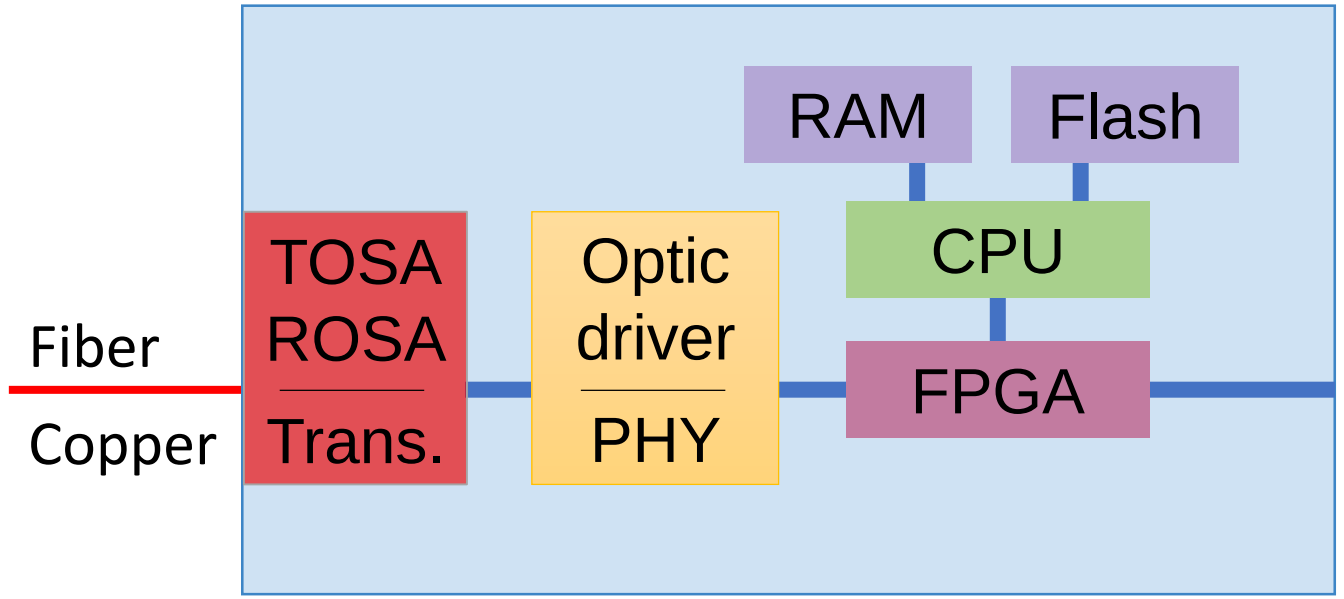
Limitations of Soft-CPU and MCU:

- Low performance
- Lack of standard software
- Software development and debugging are complicated
- Integration of customer’s software aren’t possible

Smart SFP architecture – Hardware

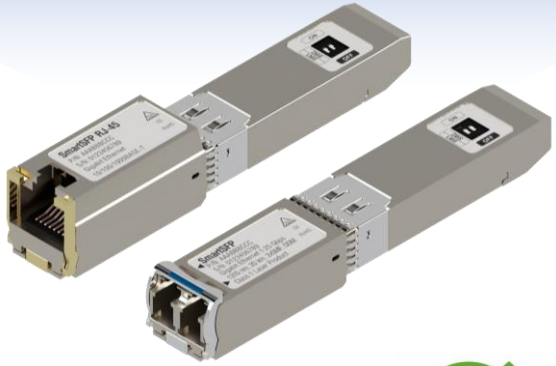
Complete computing system:

- ARM CPU
- RAM
- Flash
- FPGA



Features:

- Linerate 1G/10G
- Dual fiber – 1310 nm
- Single fiber – 1310/1550 nm, 1270/1330 nm
- CWDM (optional)
- Up to 20 km (LX), optional up to 80 km (EX, ZX)
- RJ-45, 10/100/1000BASE-T, 2.5G/5G/10GBASE-T
- Digital Diagnostics Monitoring (DDM)
- MSA compliant
- Multi-vendor compatibility (brand-equivalent P/N, EEPROM IDs)



RoHS compliant

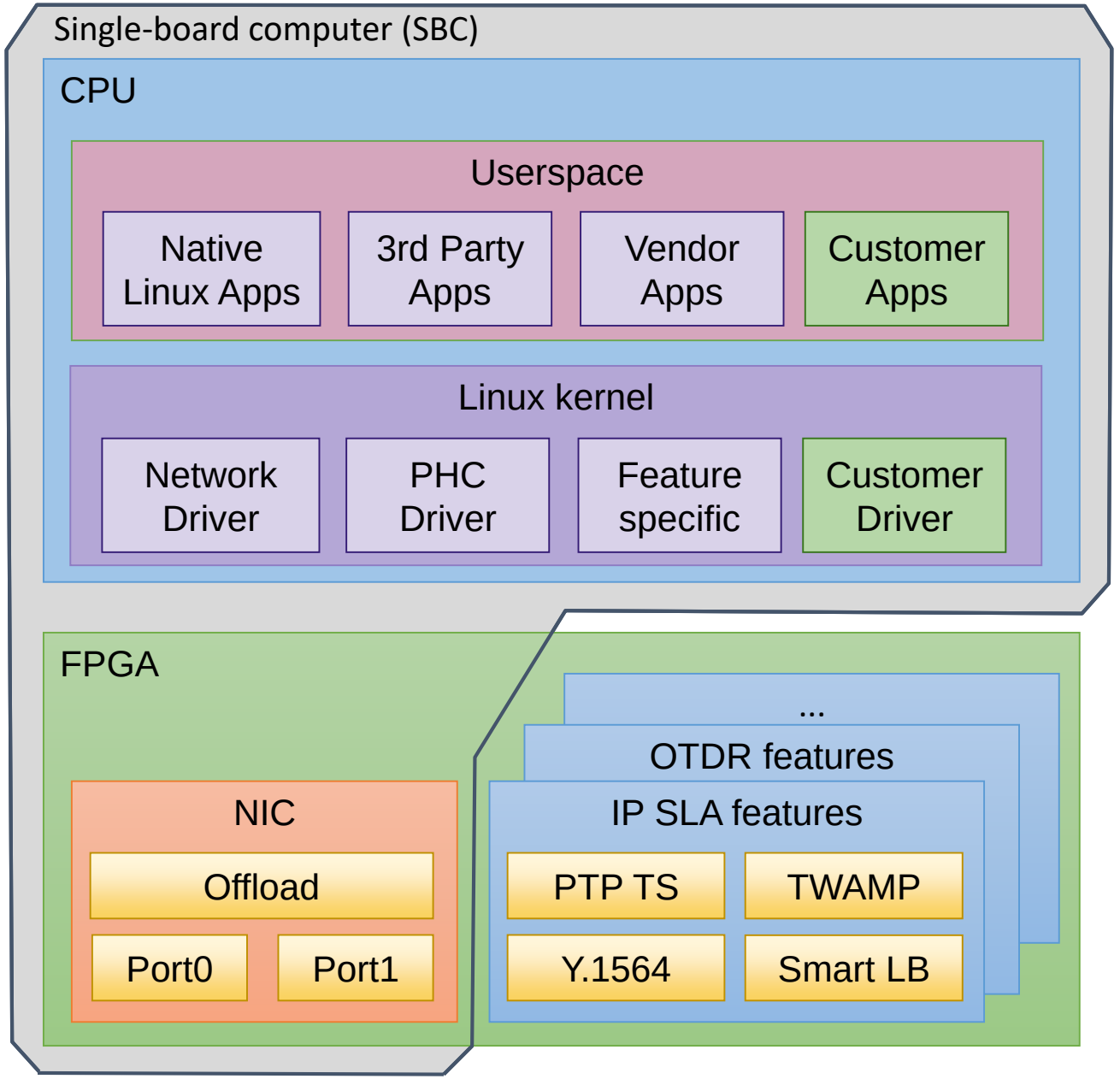
CE

Smart SFP architecture – Software

- Standard Debian OS
- Linux kernel 5.x

Advantages of using Linux:

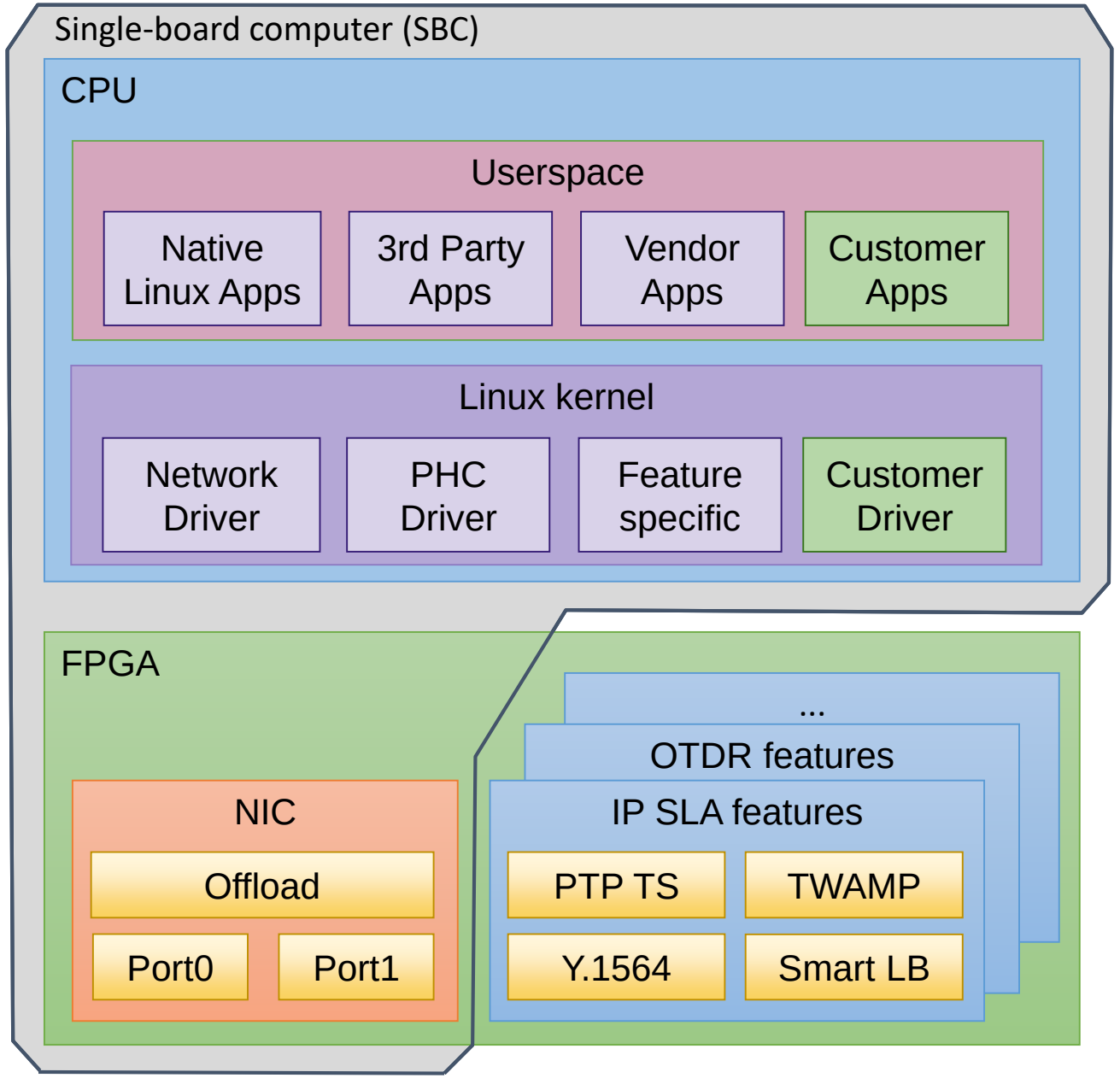
- Short Time to Market
- A lot of standard software
- A lot of network protocols support
- Manage through standard utilities
- High speed of software development
- Share codebase with other projects
- Easy to integrate customer's software



Smart SFP architecture – FPGA

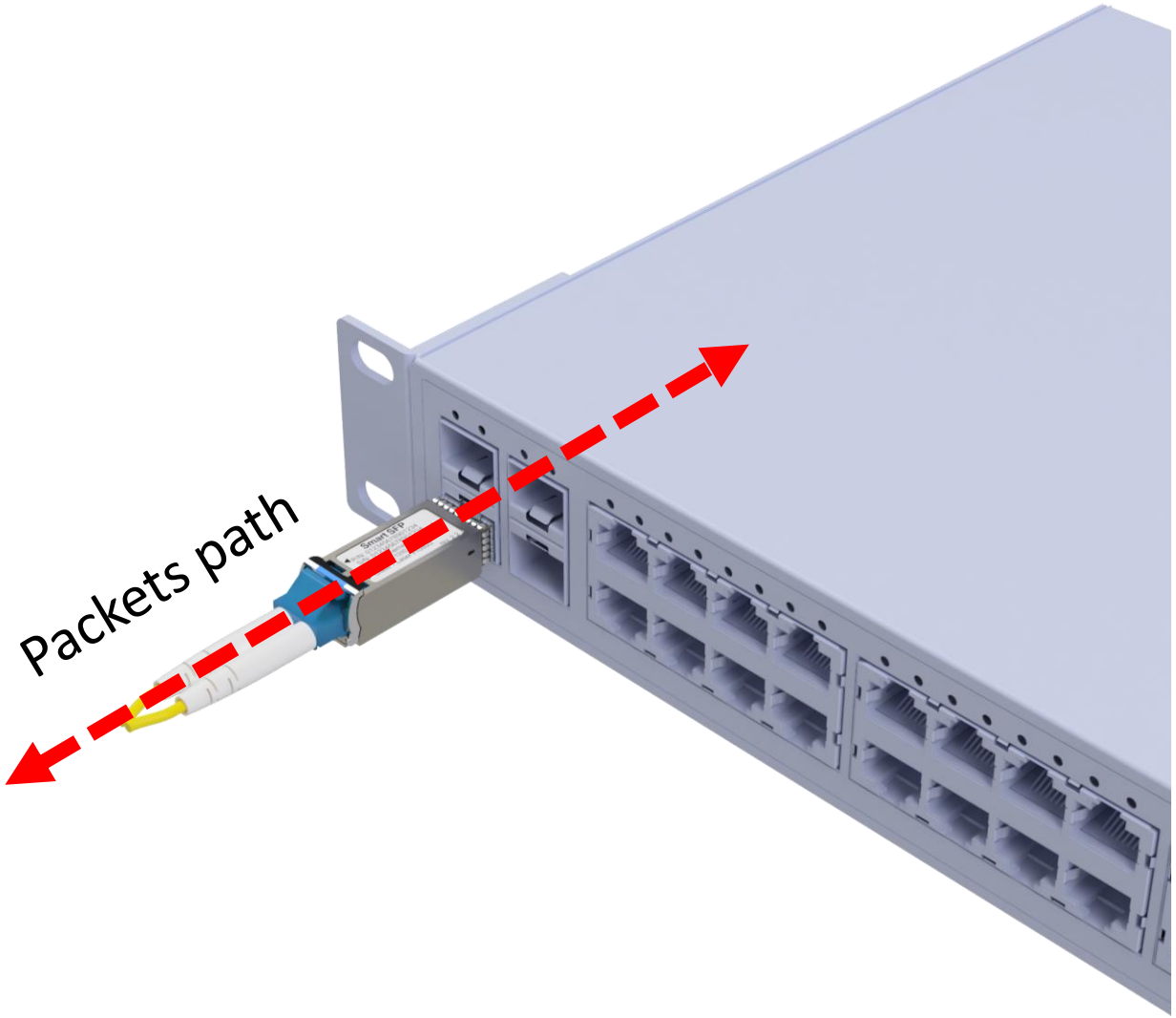
Features:

- Wire-speed traffic processing
- Offload: HW timestamping, PTP HW Clock, UDP/TCP offload
- IP SLA: BW, loss, delay, jitter
- Statistics: RMON, NetFlow, IPFIX
- Microburst analyzer
- Streaming telemetry
- Packet capture
- Tunneling MPLS, VXLAN
- OTDR
- Switching, QoS, filtering
- P4

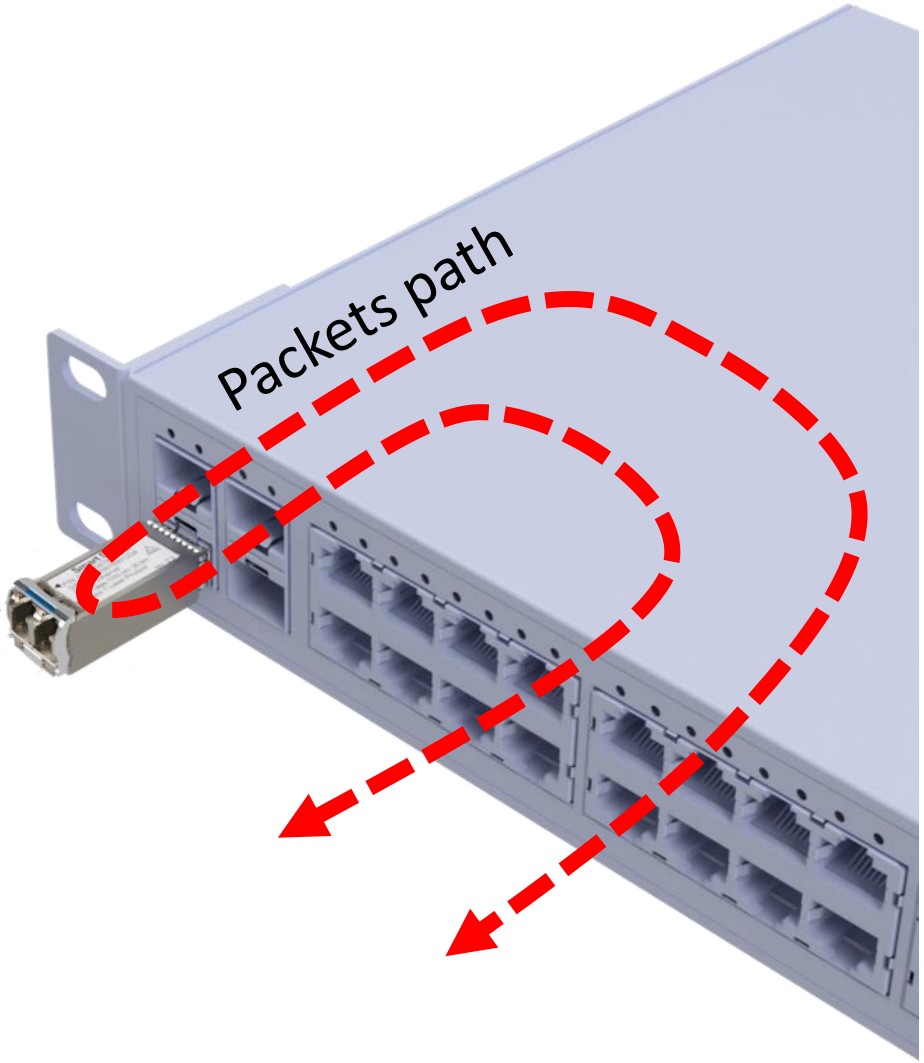


Installation

1. In-line
(Bump-in-the-wire, BITW)



2. Out-of-line
(Smart SFP-on-a-Stick)



Management

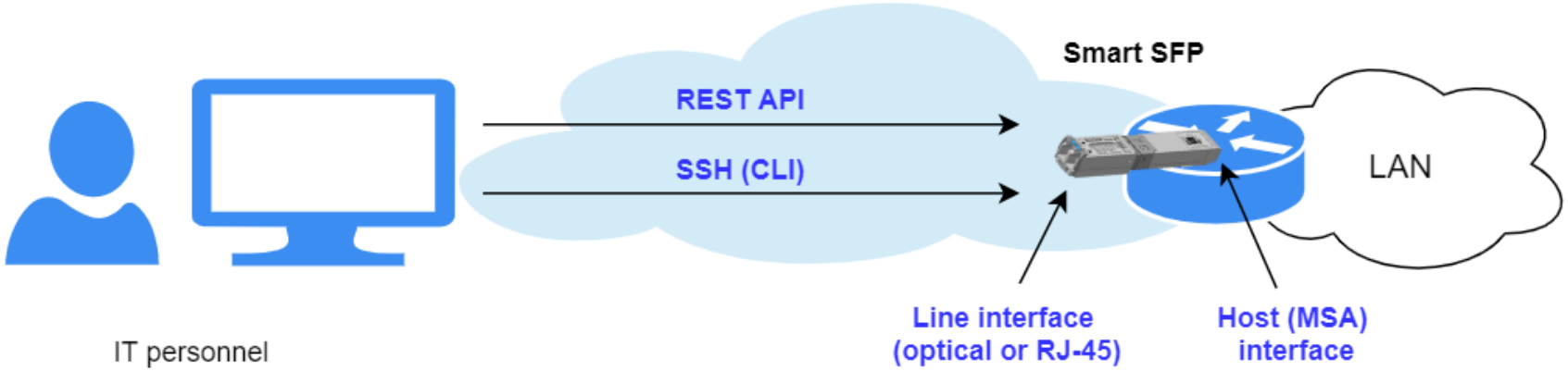
Management:

- Remotely by IP address via Line and Host interfaces
- SSH and REST API
- Standard Linux shell and configuration utilities (ip, ifconfig, ethtool, …)

```
**************************************************************************
                        Welcome to Smart SFP!
**************************************************************************
admin@smart-sfp:~$ ip address
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
2: gbe0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc pfifo_fast state DOWN group default qlen 1000
    link/ether 00:21:ce:44:00:b2 brd ff:ff:ff:ff:ff:ff
    inet 192.168.1.1/24 brd 192.168.1.255 scope global gbe0
       valid_lft forever preferred_lft forever
3: gbe1: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc pfifo_fast state DOWN group default qlen 1000
    link/ether 00:21:ce:44:00:b3 brd ff:ff:ff:ff:ff:ff
    inet 192.168.2.1/24 brd 192.168.2.255 scope global gbe1
       valid_lft forever preferred_lft forever
admin@smart-sfp:~$
```

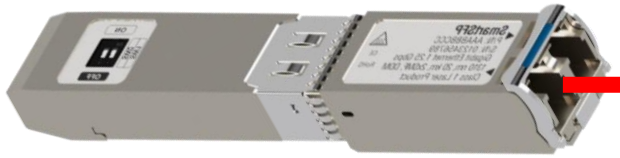
Software installation and update:

- Remote software upgrade
- Use apt-get <…> or dpkg <…> to install additional software
- Complete system recovery – auto and manual (DIP switches)



Power consumption

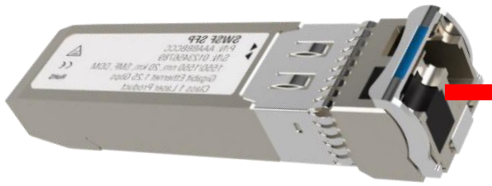
Smart SFP



20 km

Power consumption is similar

Regular SFP



100-120 km

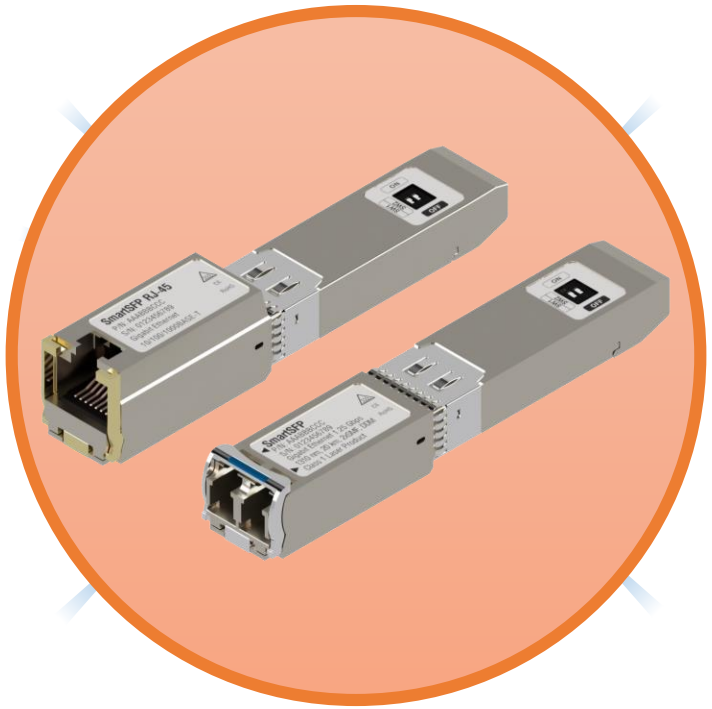
Products overview

IP SLA probe

Smart Loopback

TAP
Packet broker

OTDR



SW IP SLA

Dying gasp

DPI

Precision time
server

Router
VPN-gateway

NID

Summary

Regular SFP

- ✓ Transmits packets

Smart SFP

- ✓ Transmits packets

- ✓ Acts as IP SLA probe for network monitoring
- ✓ Allows to perform network activation tests
- ✓ Helps with network troubleshooting
- ✓ Detects and measures distance to the break point of the optical cable