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CESNET DEVELOPMENTS IN OPTICAL NETWORKING

CZECHLIGHT FAMILY & MORE

Michal Krsek

CESNET

1st GRP, 2019
La Jolla

NREN

- Network for local researchers and universities
- Link to international activities (GEANT, GLIF)

Services and Applications

- UltraGRID, Grids and Clouds, Storage

Optical research

- CzechLight family devices
- Remote sensing

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CZECHLIGHT FAMILY

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CZECHLIGHT DEVICES

Started in 2004

Principles

- Research and development untill prototype
- Then license design to third party subjects
- Use of them in our infrastructure

Device types

- EDFA amplifiers, photonic switches, V-MUXes, fixed-grid legacy ROADMs, WSSes

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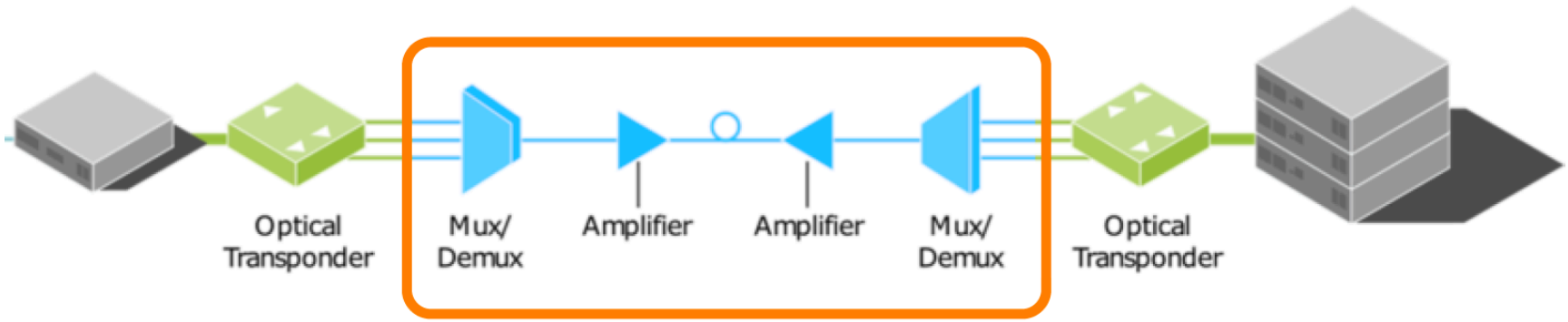
OPEN OPTICAL LINE SYSTEM

SDN ROADMs

- Dynamic “optical cross connect“
- SDN managed
- 1U “pizza boxes“
- Up to 8-degree ROADM



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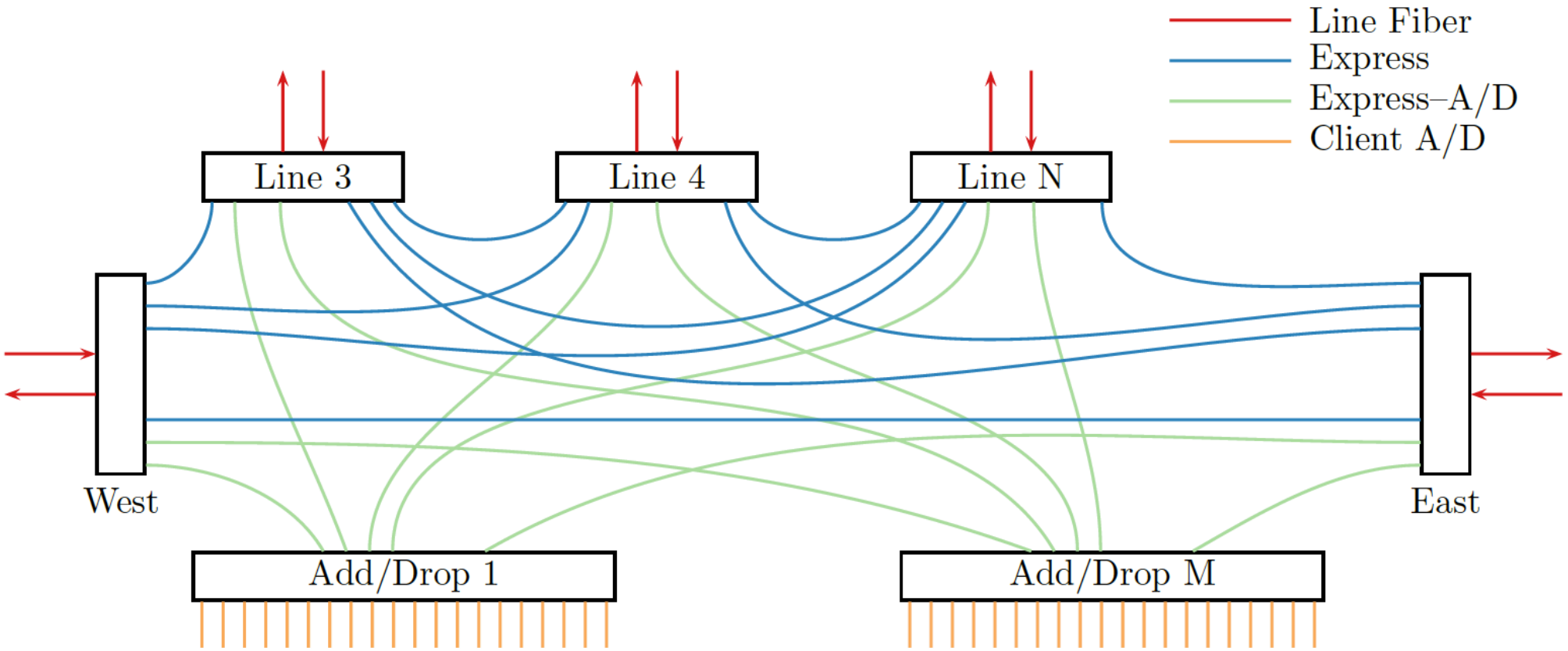
SCHEMATICS



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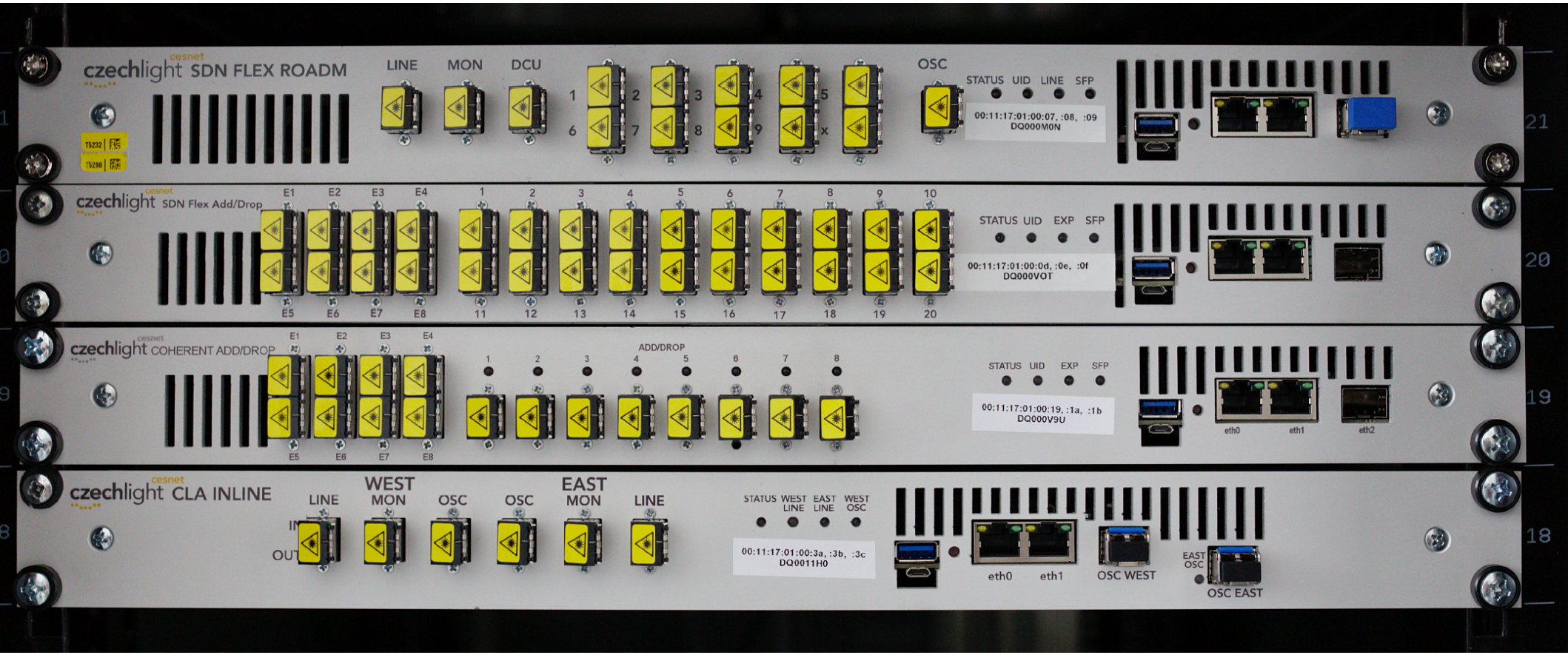
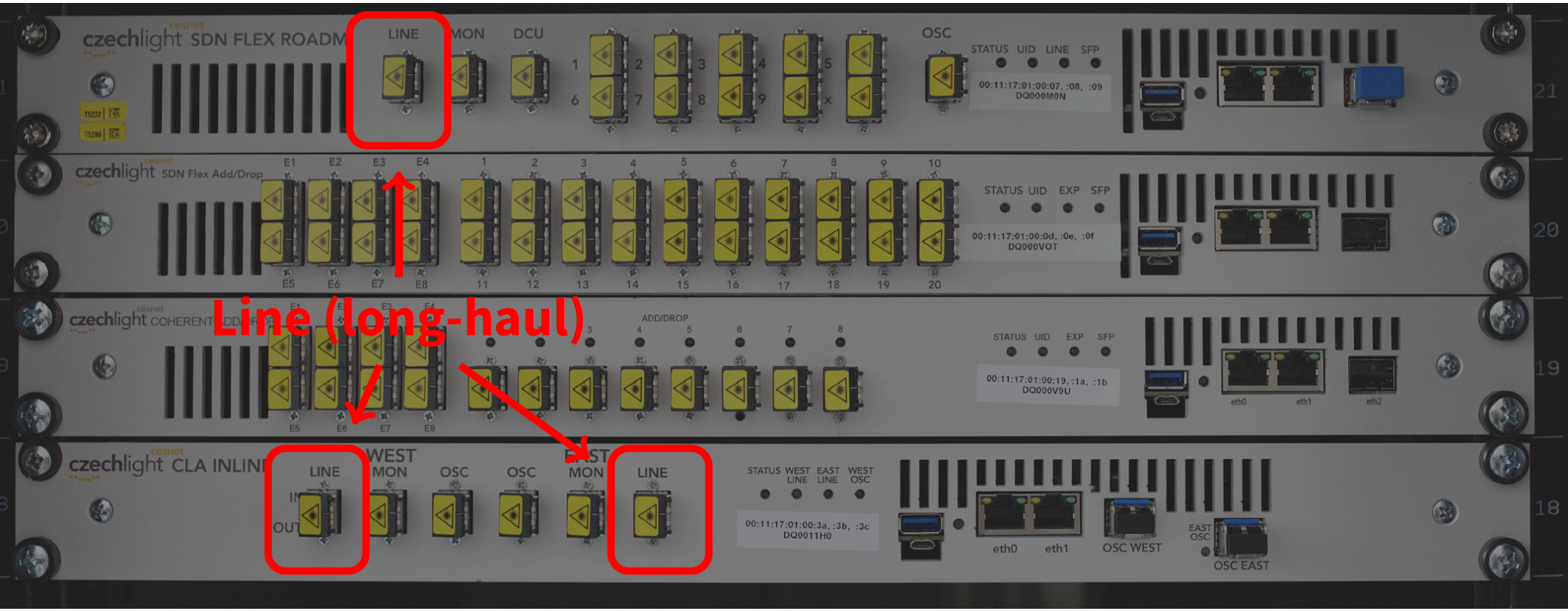
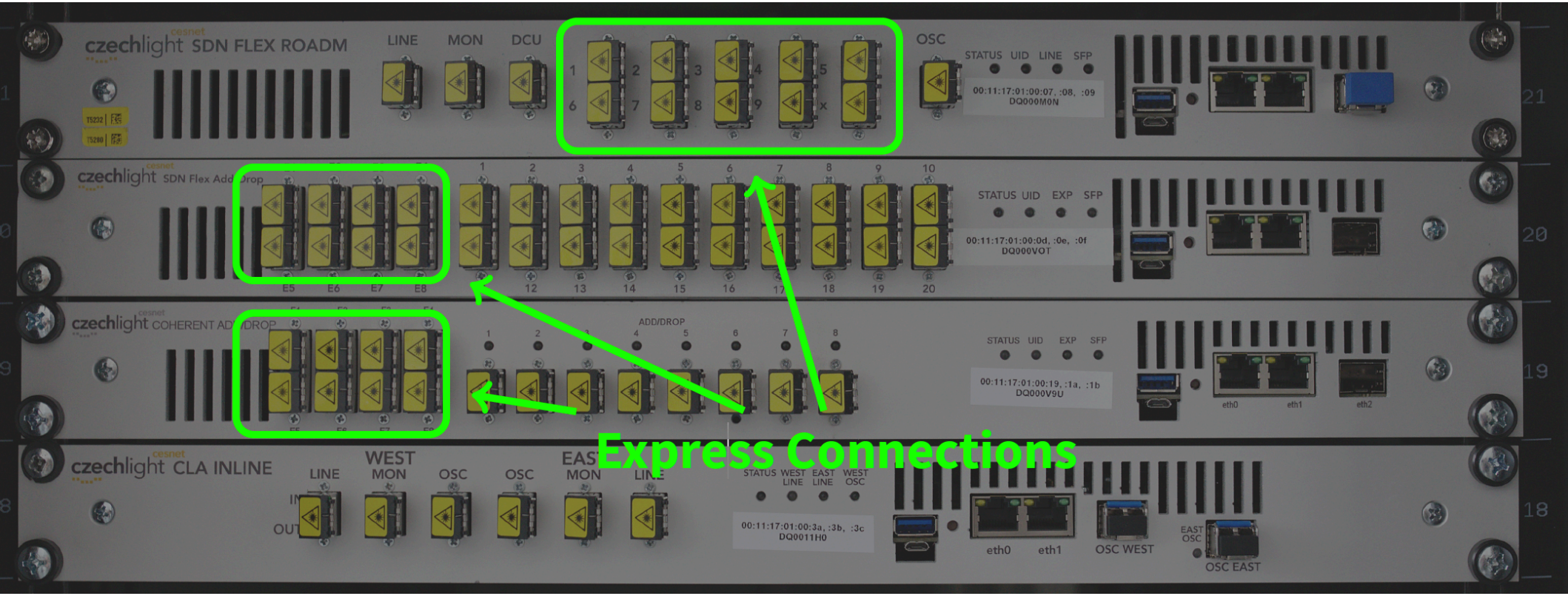

czechlight cesnet SDN FLEX ROADM
LINE
MON
DCU
OSC
STATUS UID LINE SFP
00:11:17:01:00:07, :08, :09
DQ000M0N
czechlight cesnet SDN Flex Add/Drop
STATUS UID EXP SFP
00:11:17:01:00:0d, :0e, :0f
DQ000VOT
czechlight cesnet COHERENT ADD/DROP
ADD/DROP
STATUS UID EXP SFP
00:11:17:01:00:19, :1a, :1b
DQ000V9U
eth0
eth1
eth2
czechlight cesnet CLA INLINE
WEST
EAST
LINE
MON
OSC
OSC
MON
LINE
STATUS WEST LINE EAST LINE WEST OSC
00:11:17:01:00:3a, :3b, :3c
DQ0011H0
eth0
eth1
OSC WEST
EAST OSC
OSC EAST

LONG HAUL INTERFACES



EXPRESS CONNECTIONS



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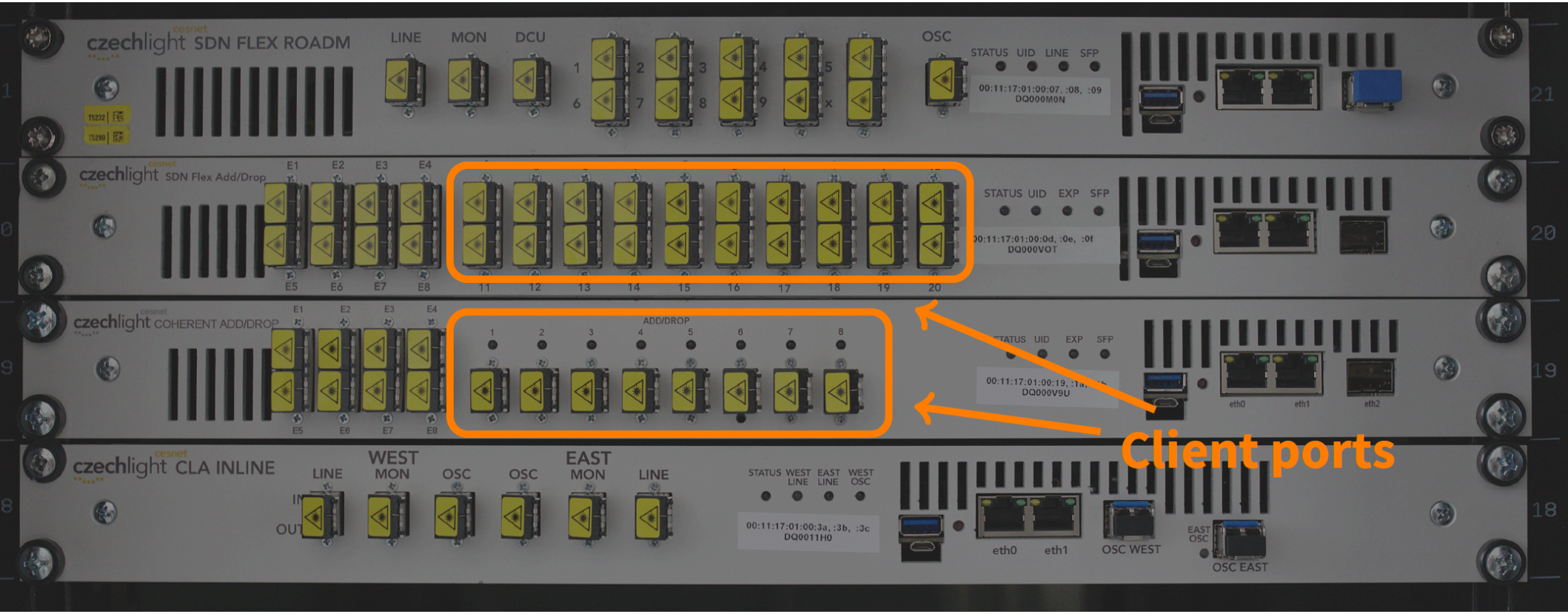
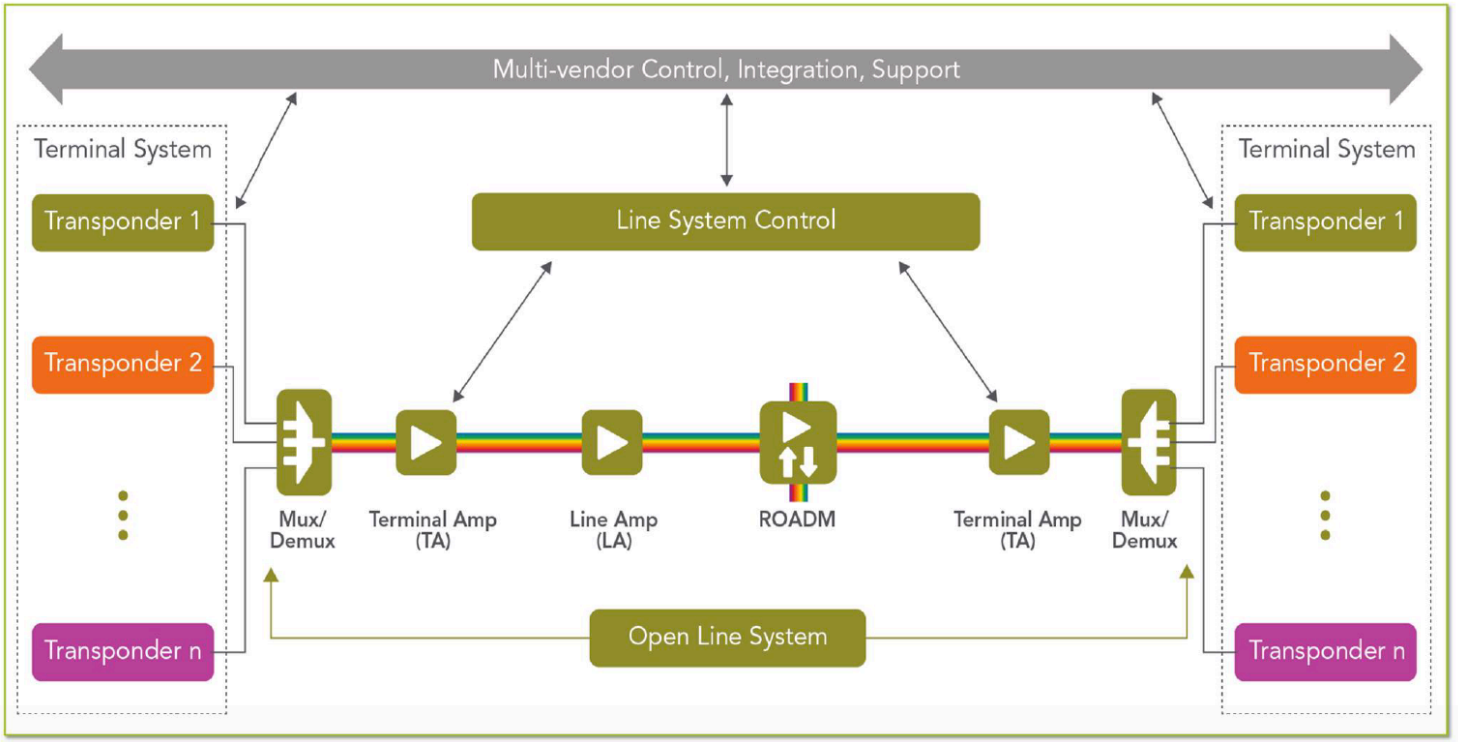
CLIENT PORTS



SDN Operation & Management

- Everything is remotely configurable
- Native Alien Wavelengths
- Telemetry, performance monitoring



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MANAGEMENT INTERFACE

Configuration

- NETCONF control
- YANG data model
  - Able to adapt to one of current models

  (OpenROADM, OpenConfig, TIP OpenDevice, T-API, IETF TE-topology, IETF CCAMP impairment-aware)
- Interactive CLI
  - SSH
  - microUSB port

STATUS OF THE PROJECT

- **Prototypes are ready to play with**
  - On loan from CESNET
  - Partners from around the Globe are welcome
- **Integration with management platforms**
  - ODTN
  - T-API control
  - TIP OOPT GNPy

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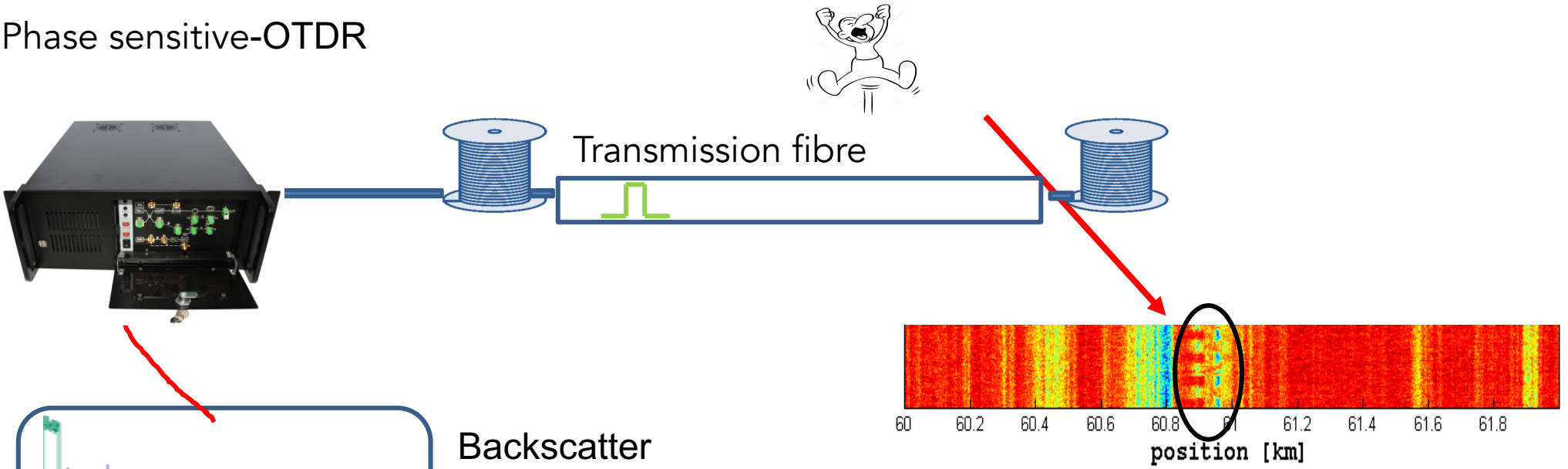
REMOTE SENSING

PRINCIPLES

Phase sensitive-OTDR



Backscatter is measured while pulse propagates

Based on signal intensity change localisation of event is possible in order of tens of meters

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