CzechLight & CzechLight Amplifiers

Josef Vojtěch

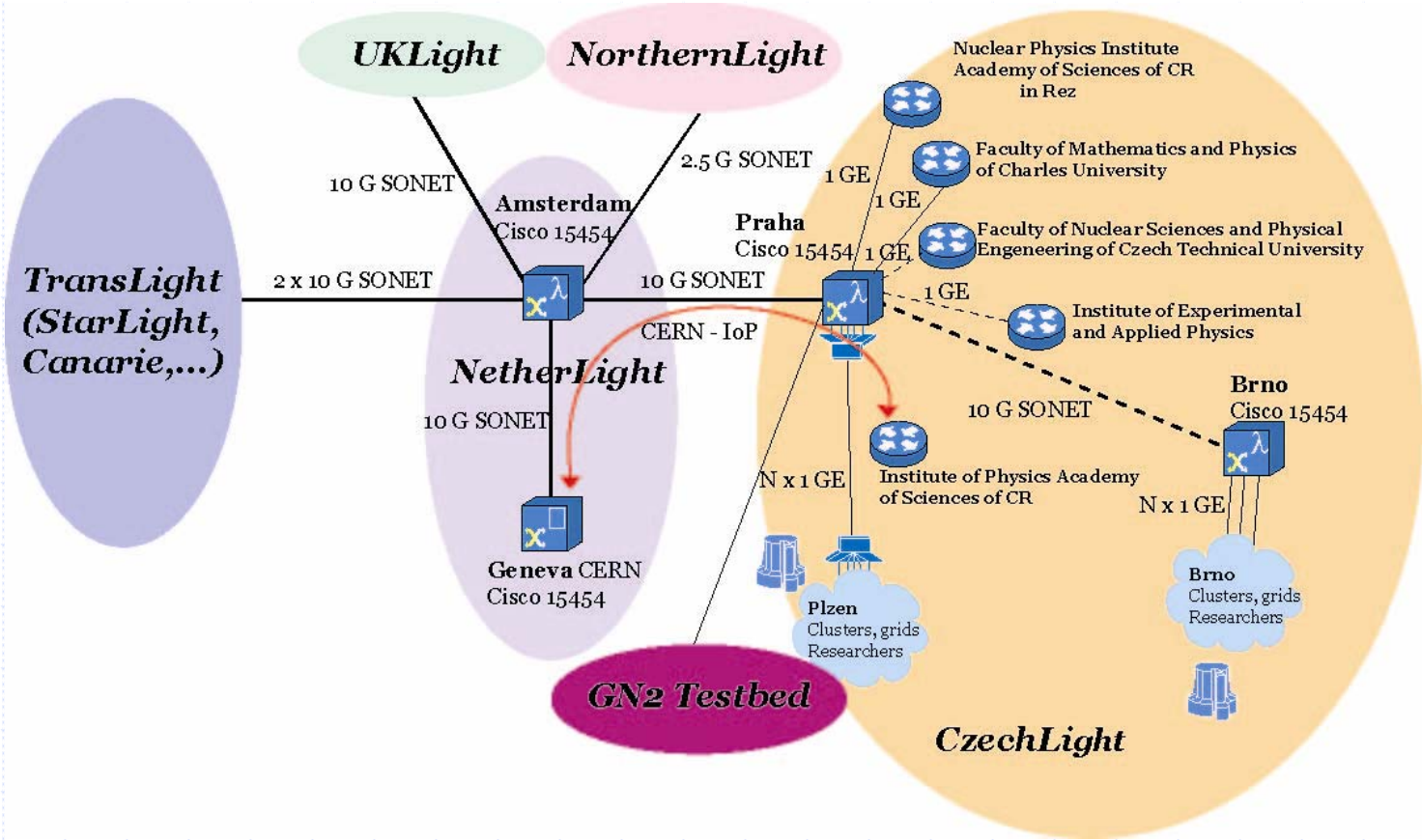
CzechLight & CzechLight Amplifiers

Outline

- CzechLight network
- CzechLight Amplifiers
  - Deployment
  - Motivations
  - Description
- Acknowledgement, Q&A

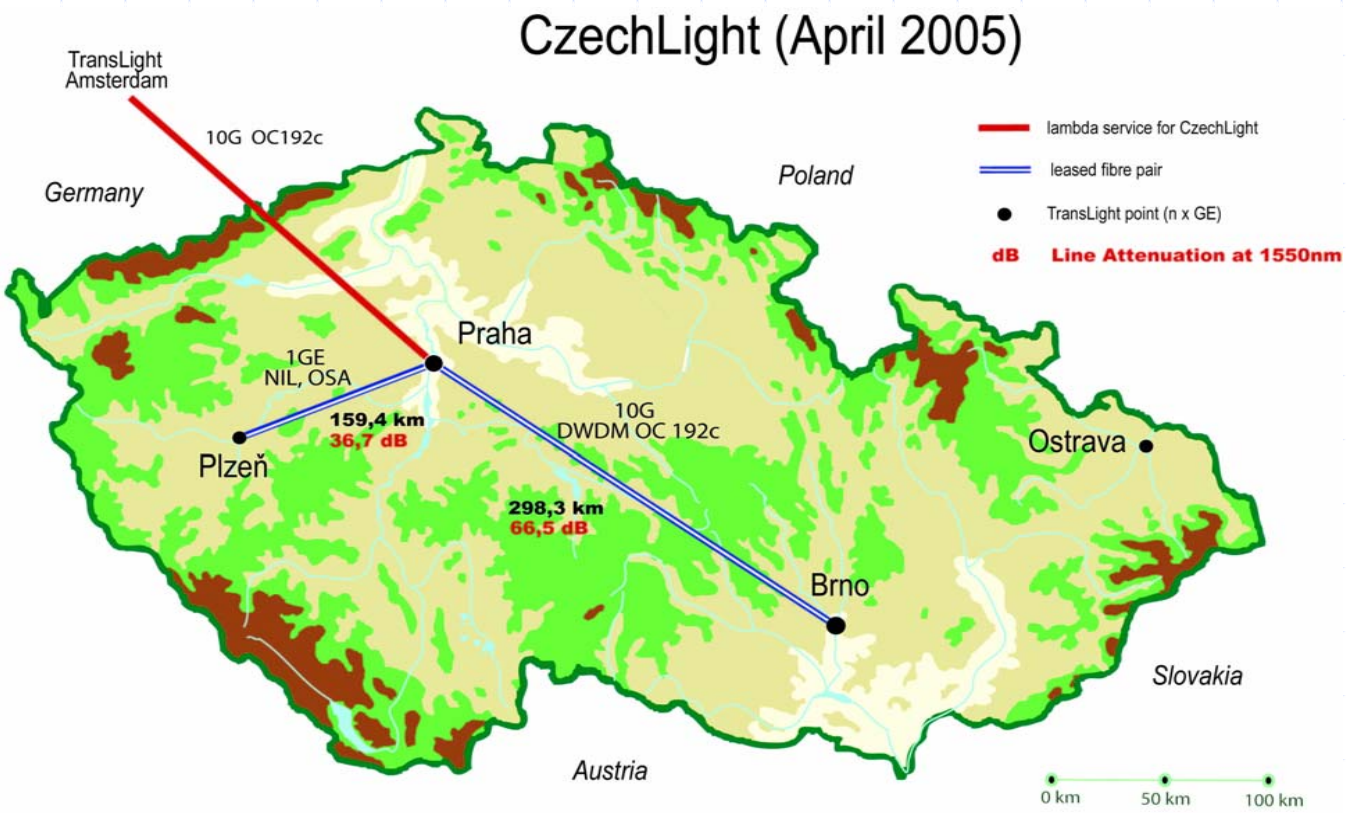
CzechLight connections

(to GLIF, to GN2 testbed and to cz premises)



CzechLight & CzechLight Amplifiers

CzechLight Map



CzechLight Intercity Connections

- Prague – Amsterdam lambda (GLIF facility), first mile in Prague on dark fibre, OC-192c transmission, grey 1550nm
- Prague – Plzeň, dark fibre, 159.4 km, 36.7 dB

  NIL, OSA w/ CLA, GE since May 2004
- Prague – Brno, dark fibre, 298.3 km, 66,5 dB, including 257.3 km of G.655 fibre

  NIL GE since May 2004

  DWDM OC-192c NIL test - unacceptable error rate

  1*inline CLA, OC-192c since Mar 2005

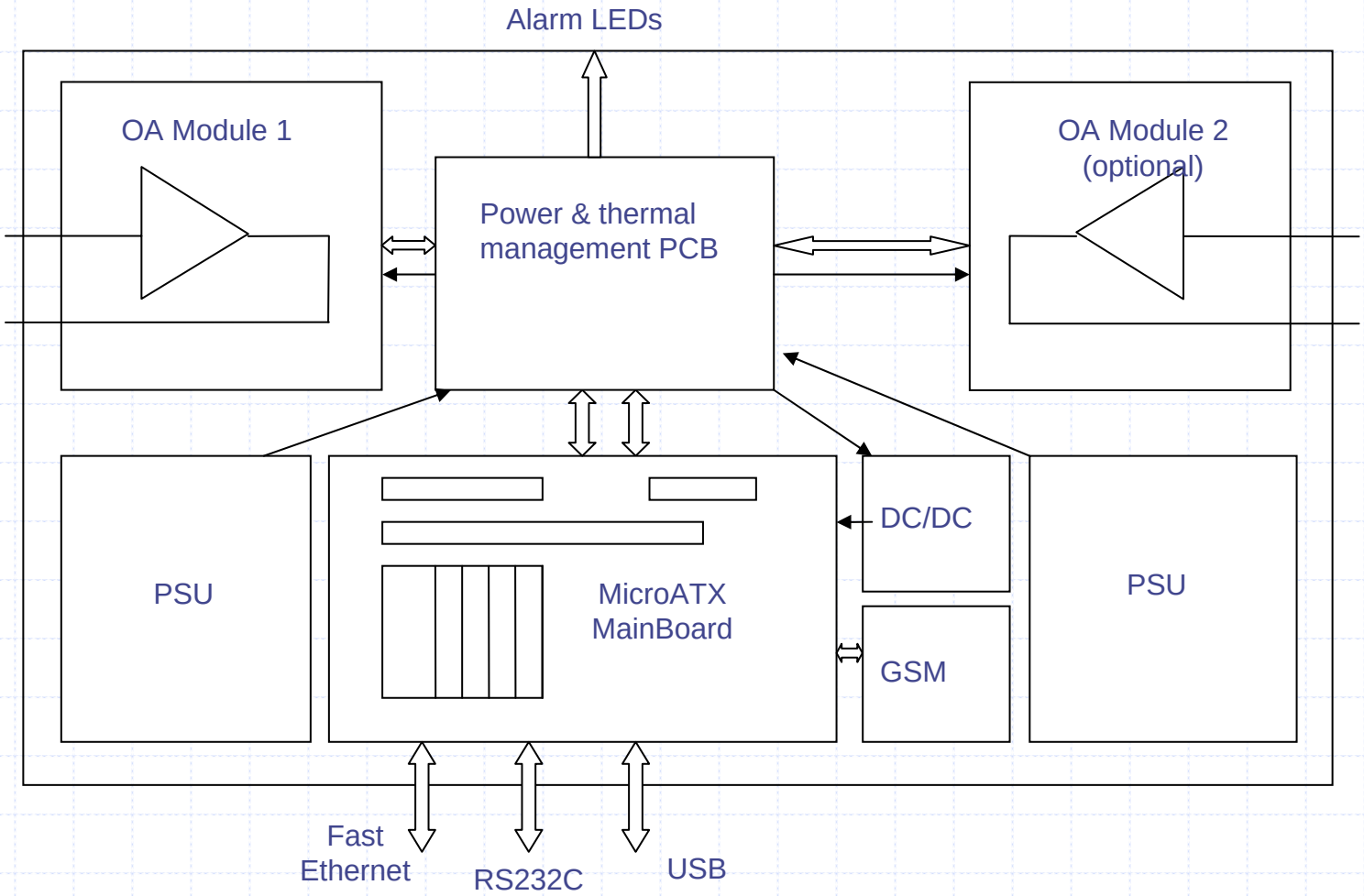
CzechLight Amplifiers Deployment Cont.

- Prague – Hradec Kralove (productional CESNET2 network)
  - 150.4 km of G.652, 35.7 dB@1550nm
  - NIL, OSA w/ CLA, GE
  - Experimental since Dec 2004, fully productional Mar 2005
- NIL laboratory G.652 fibre spools, 1550 nm, CLA
  - 225 km GE OSA
  - 300 km GE
  - 325 km GE (+Raman)

Motivations - Why CzechLight Amplifiers?

- Lack of optical equipment suitable for NRENs
- Commercial OA need customer modifications (very expensive)
- Optical kit composed from commercially available elements and modules
- Common and reliable elements + reliable design => cost effectivity & reliability & possibility of development

CzechLight Amplifiers Architecture



CzechLight & CzechLight Amplifiers

Used OA Modules

- Customer based
- EDFA 2iv1 (suitable for OSA, inline with CD compensation)
  - preamplifier: in <-40,-30> dBm, gain 35 dB, out max + 5 dBm
  - booster: in <-5,5> dBm, gain 19 dB, out max + 19 dBm
- EDFA inline
  - in <-40,-20> dBm, gain 35 dB, out max + 10 dBm
- EDFA hi-power booster
  - in <-10,10> dBm, gain 27 dB, out max + 27 dBm

CzechLight & CzechLight Amplifiers

CLA Power & Health Management

- Redundant PSU from industry leading vendor
  - Input voltage: 90-264V AC, 47-63 Hz
  - Over voltage, over temperature, short circuit protection
  - Telco -48V DC PSU in progress
- DC voltages, fan speeds, temperature are monitored

CzechLight & CzechLight Amplifiers

CLA Industrial PC

- Standard micro ATX MB w/ low power & fanless CPU
- Runs on flash disc (no vibration sensitive rotational parts)
- Powered from DC/DC converter (in case of PC failure amplifiers stays on)
- Interfaces: RS232, FastEthernet, USB, I2C

CzechLight & CzechLight Amplifiers

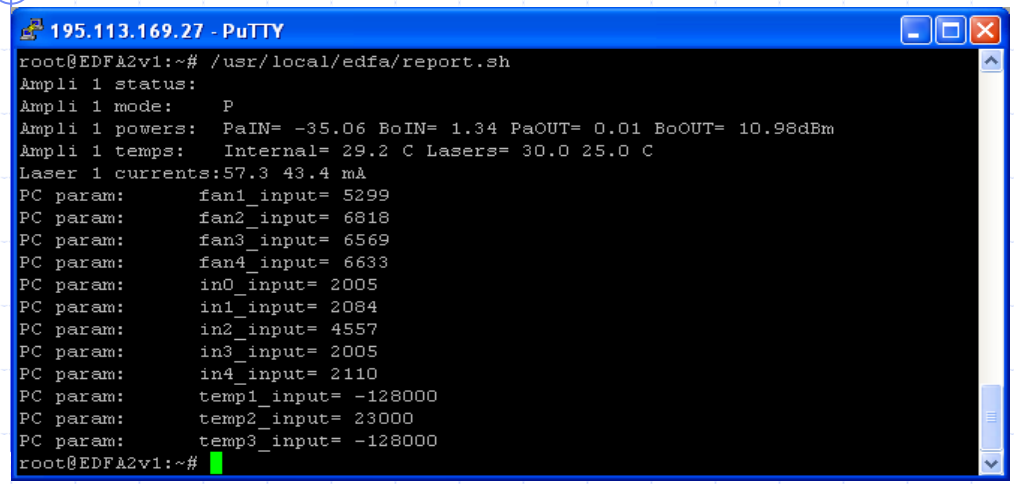
CLA Management

- Based on Linux
- Possible interfaces
  - Wired: Console*, LAN*
  - Wireless: GSM*, Wi-Fi, BlueTooth
- Tools
  - CLI via ssh*, SNMP
  - Critical warnings are sent via e-mail*, SNMP Trap
  - Net-SNMP package - for future development

* Actually used

CzechLight & CzechLight Amplifiers

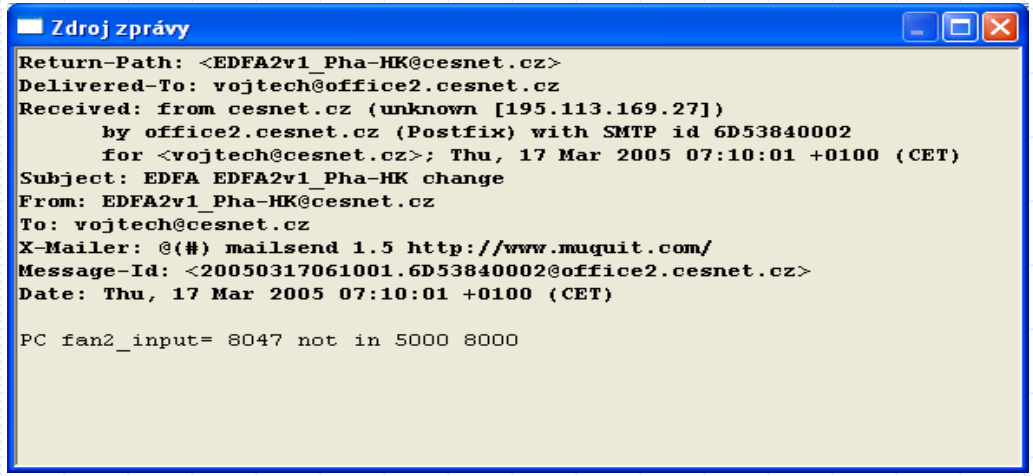
CLA Screenshot



CLA - complete status report

CLA – warning:

fan 2 speed out of range



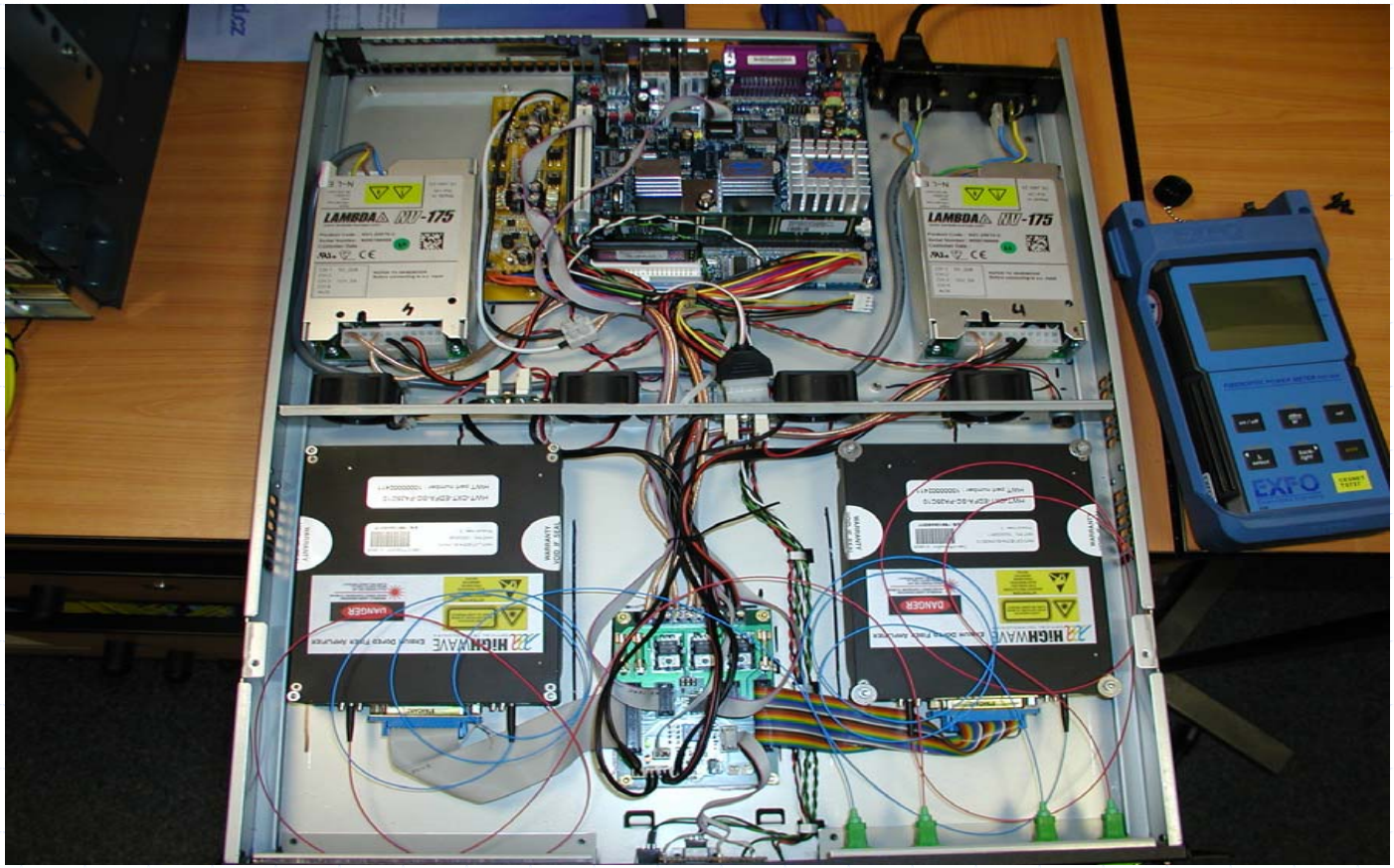
CzechLight & CzechLight Amplifiers

CLA Forthcoming

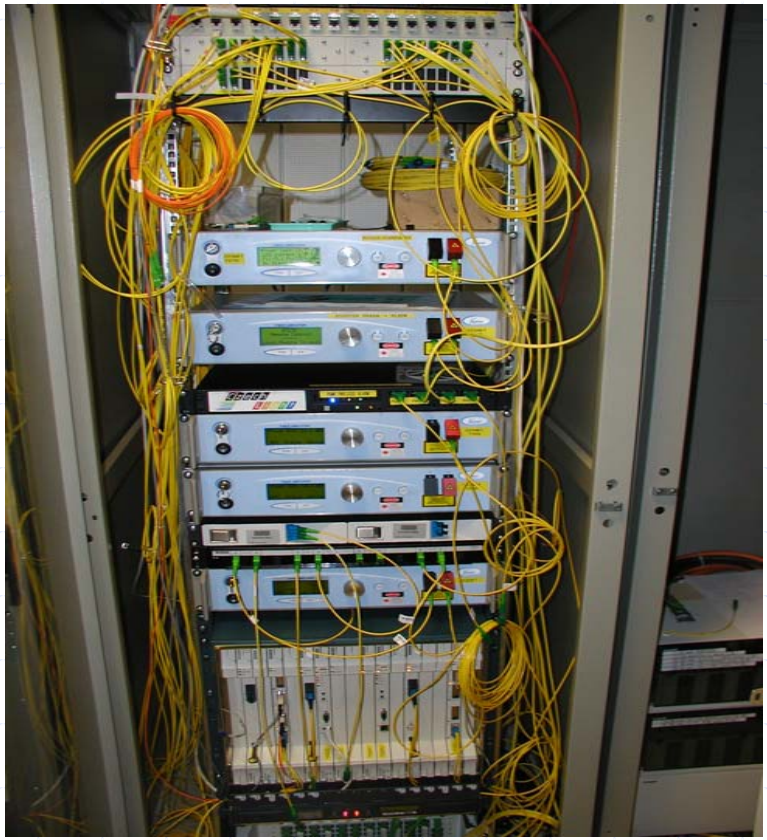
- Semiconductor amplifiers (amplification & wavelength and RZ/NRZ conversion)
- Raman fibre amplifiers (ultra long spans)
- True broadband (100 nm) amplifiers for MAN

CzechLight & CzechLight Amplifiers

CLA 2inline - Testing



CLA 2in1 - CESNET2 Network Deployment



Acknowledgement

- Lada Altmanová,
- Miroslav Karásek,
- Martin Míchal,
- Jan Radil,
- Stanislav Šíma

CzechLight & CzechLight Amplifiers

Q & A