

RoEduNet

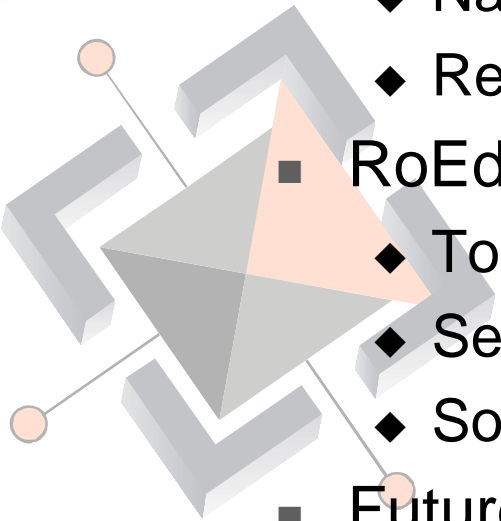


Photonic Network for Research and Education

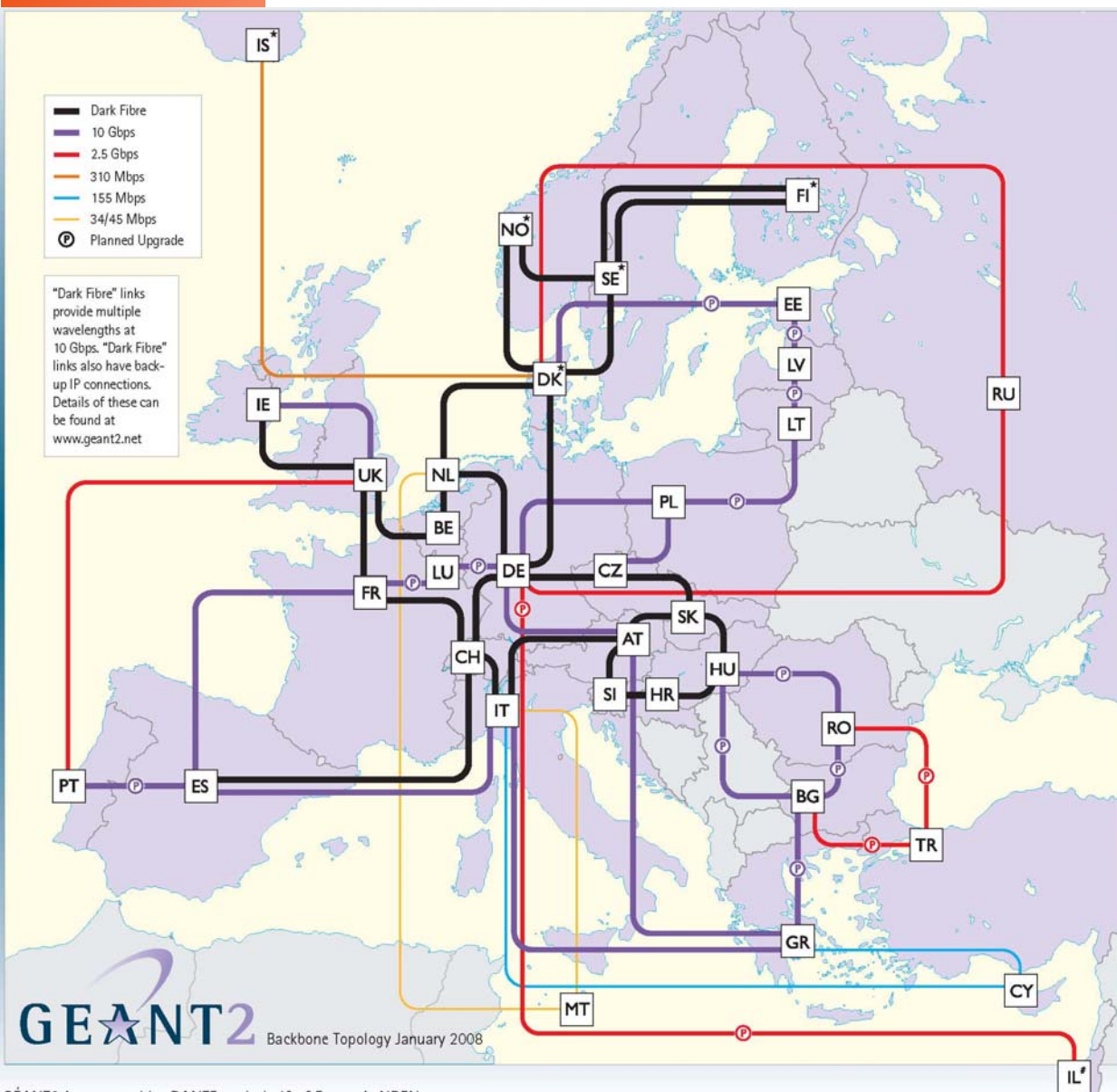
Octavian Rusu

Agenda

- GEANT network and RoEduNet
 - ◆ Connectivity of the Romanian NREN
- RoEduNet – Network Topology
 - ◆ National Level Topology
 - ◆ Regional Level Topology
- RoEduNet2 – Photonic Network
 - ◆ Topology
 - ◆ Services
 - ◆ Solutions
- Future plans



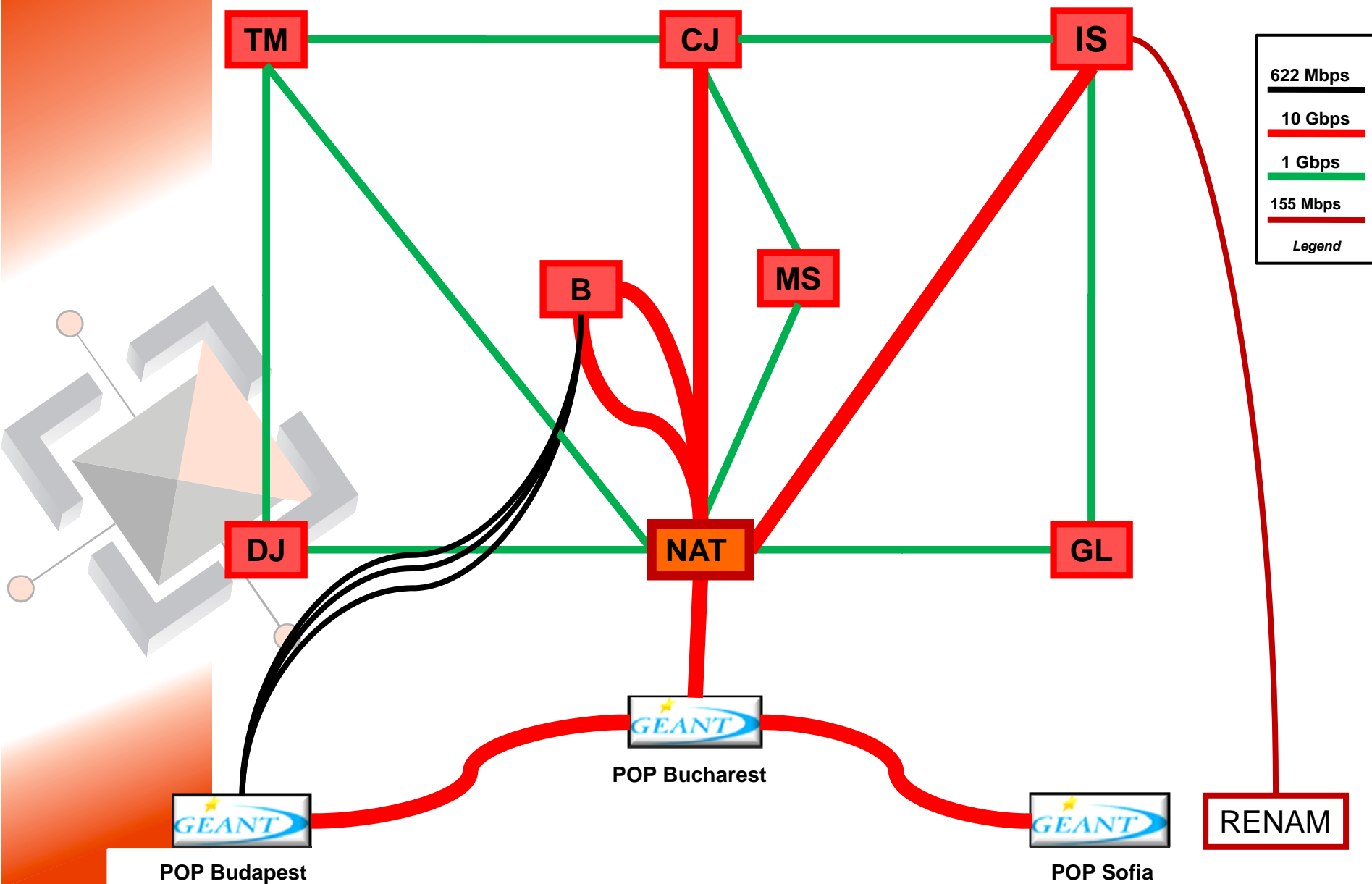
RoEduNet in GEANT



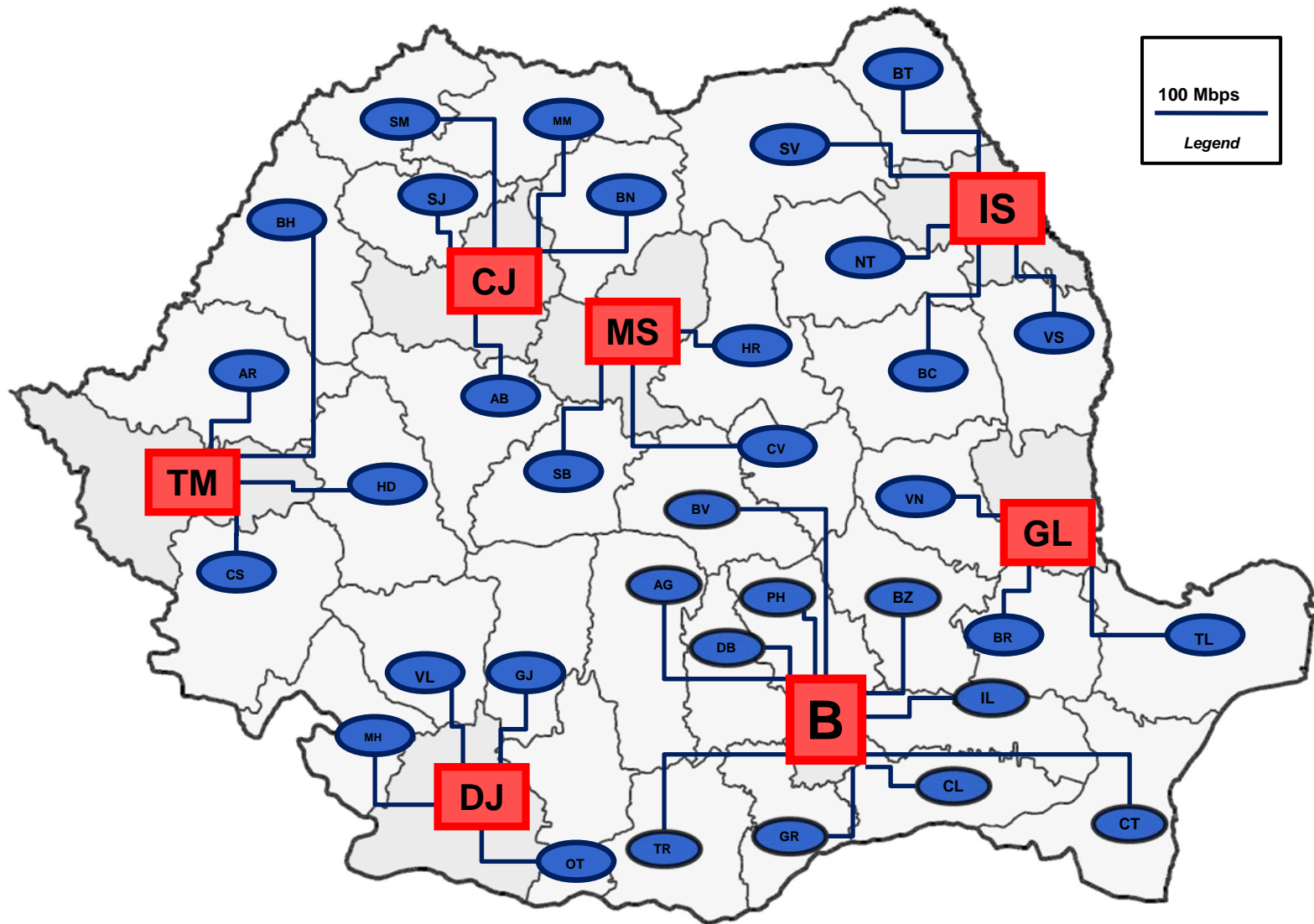
- Connectivity
 - ◆ To GEANT POP in Bucharest
 - ◆ 10 Gbps to GEANT POP (August 1st 2008) – 6 m optical patch cord
 - ◆ Resilience for Bucharest POP available since August 21
 - ◆ Backup 3xSTM4 (to be uninstalled)

- Solution for EE – lambda (not in the DF cloud)

RoEduNet National Level Topology



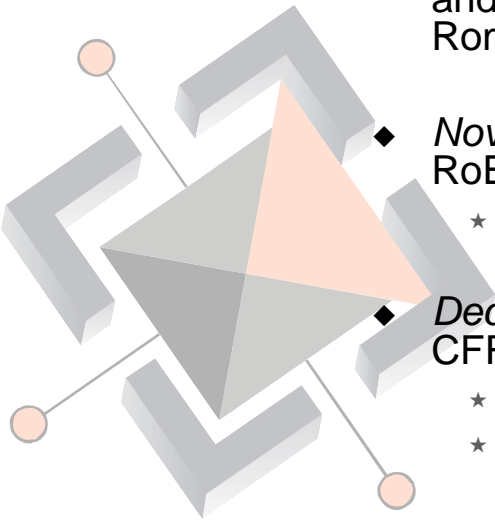
RoEduNet Regional Level Topology



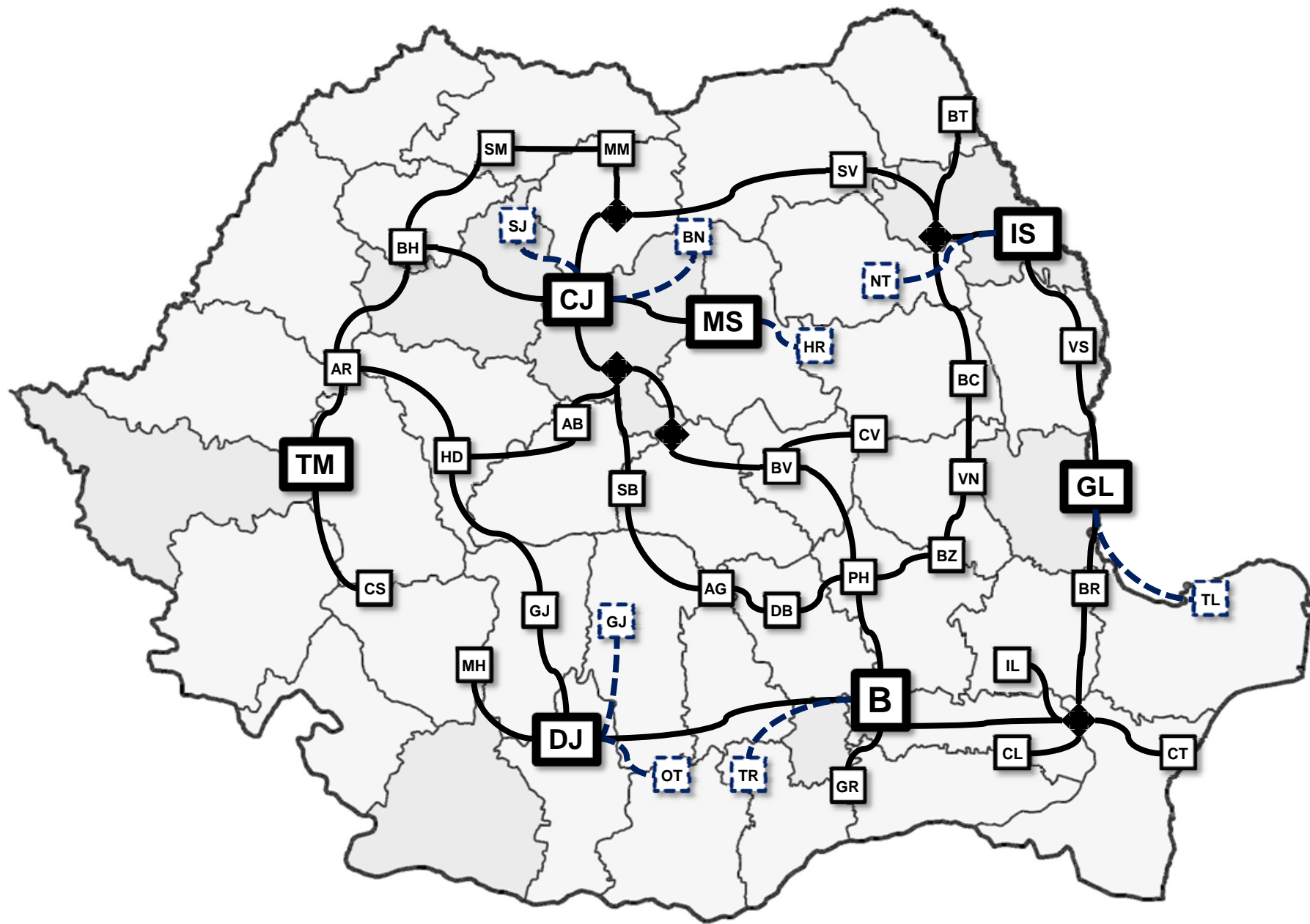
RoEduNet2

- RoEduNet2 = DF based national infrastructure for 10 years
 - ◆ Access to one DF pair on the national network of “Telecomunicatii CFR”
 - ◆ Access to high capacity circuits based on DWDM technology and to a scalable optical network to provide necessary circuits for the national network for about 10 years

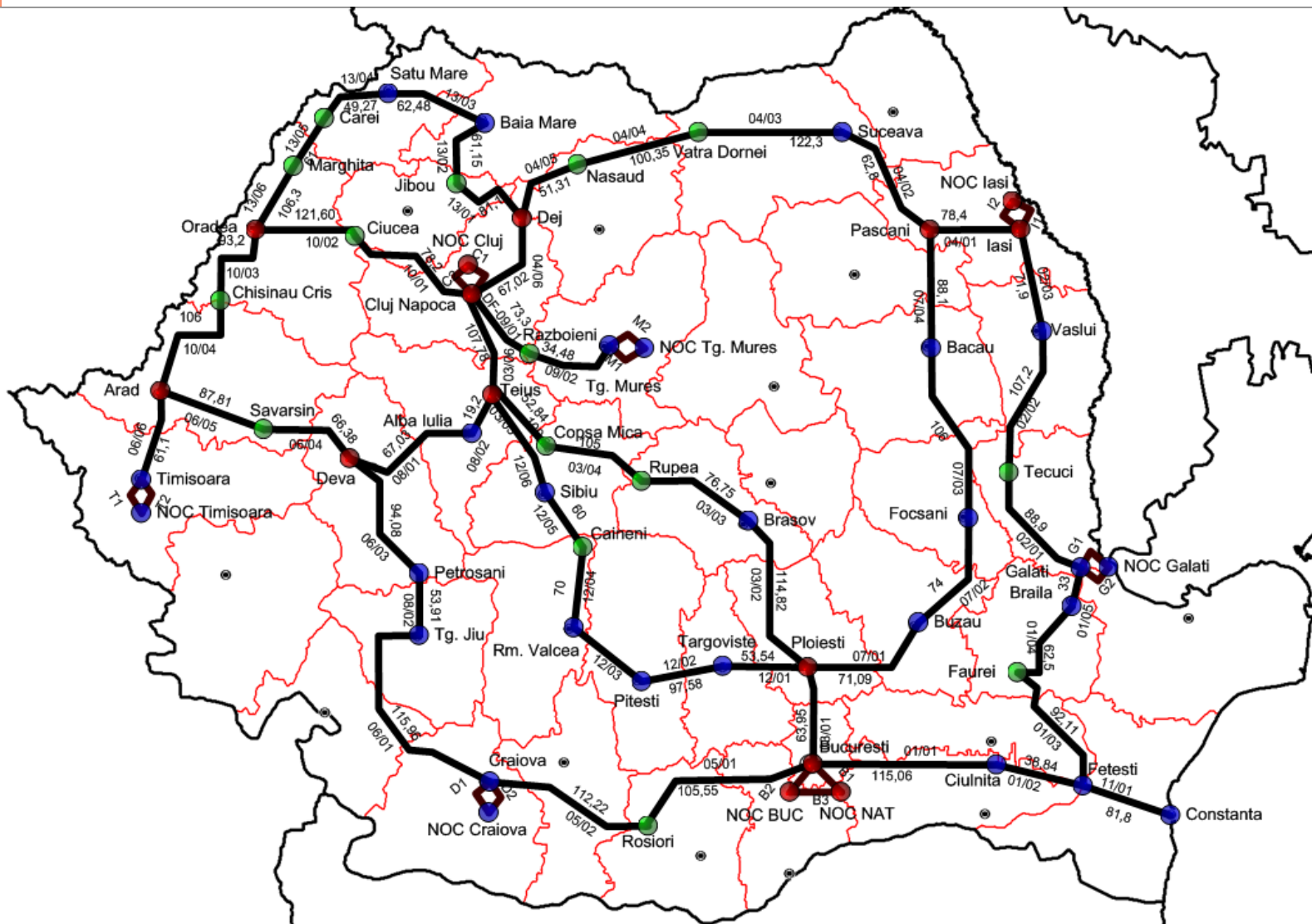
- Major milestones of the project
 - ◆ *March 2006* – bilateral accord between the Ministry of Education and Research and the Ministry of Transport has been signed – one pair of DF to be used for Romanian NREN
 - ◆ *November 2006* - the feasibility study for the network has been finished by RoEduNet
 - ★ DWDM technology to be used
 - ◆ *December 2006* – bilateral contract between RoEduNet and “Telecomunicatii CFR” has been concluded
 - ★ Access to more about 4800 km of DF
 - ★ RoEduNet will provide necessary equipments to light up the fibre (DWDM equipments)
 - ◆ Q1/2007 – IP equipments installed in RoEduNet sites to support the new capacities to be provided by the photonic network
 - ◆ *July 2008* – contract signed for optical equipments – 56 locations
 - ★ Installation to be done by November 2008



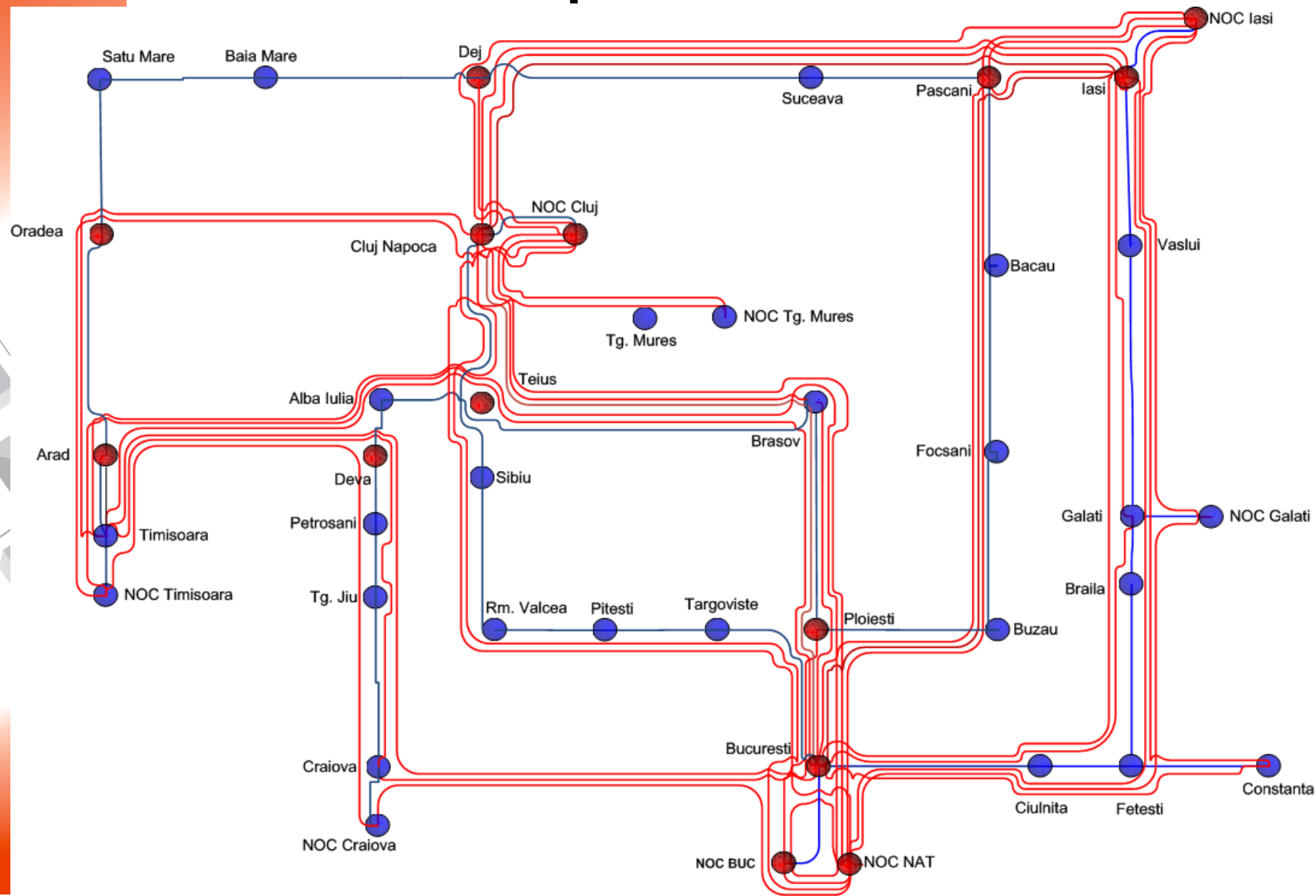
RoEduNet2 – Planned architecture



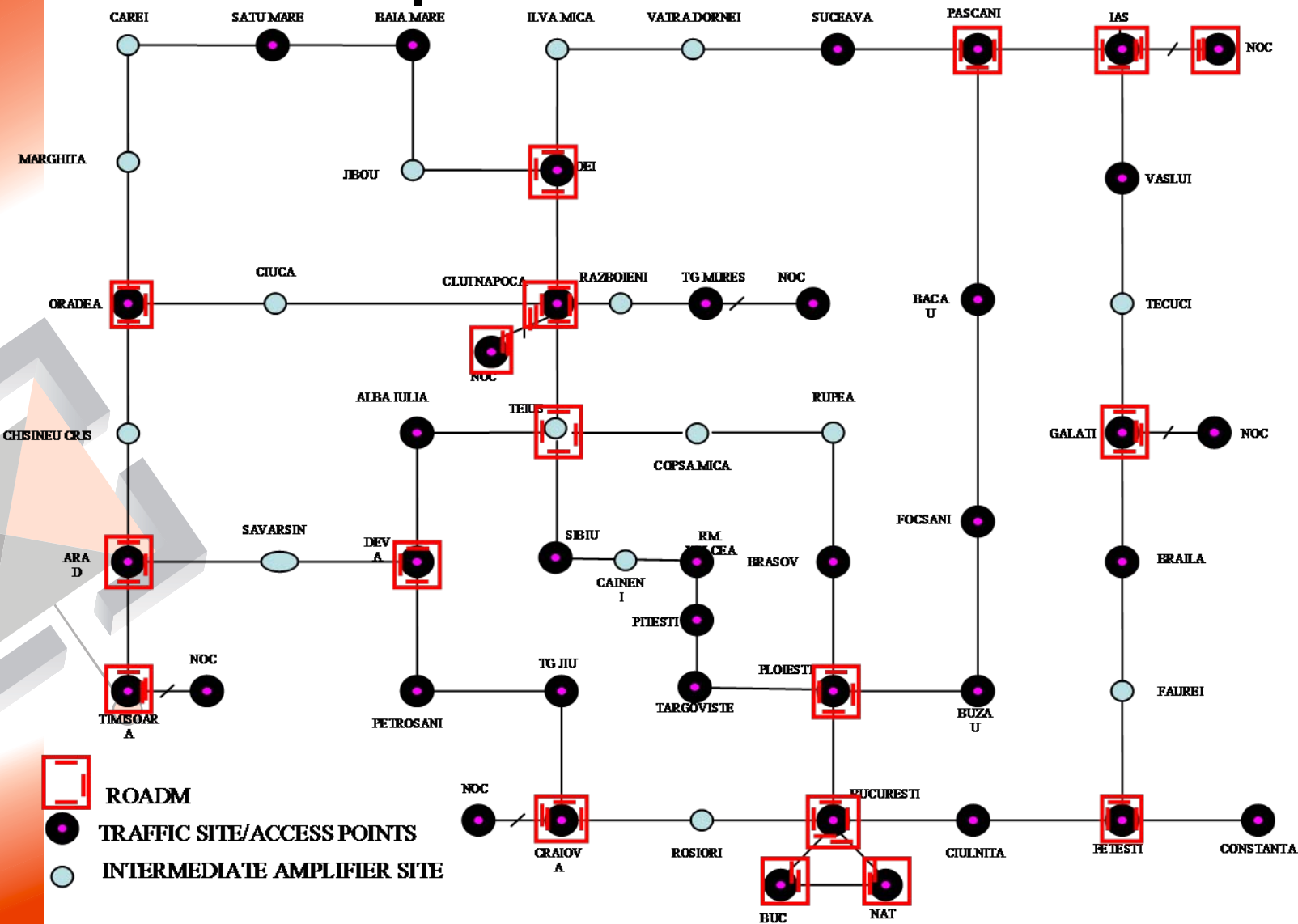
RoEduNet2 – DWDM for the 1st Phase Q4/2008



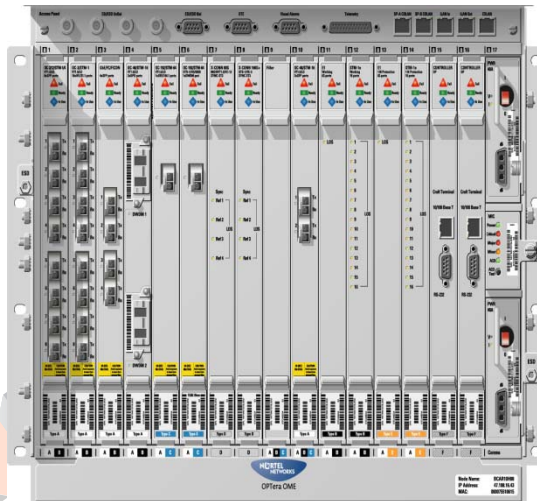
RoEduNet2 – Lambdas for the 1st Phase Operational Q4/2008



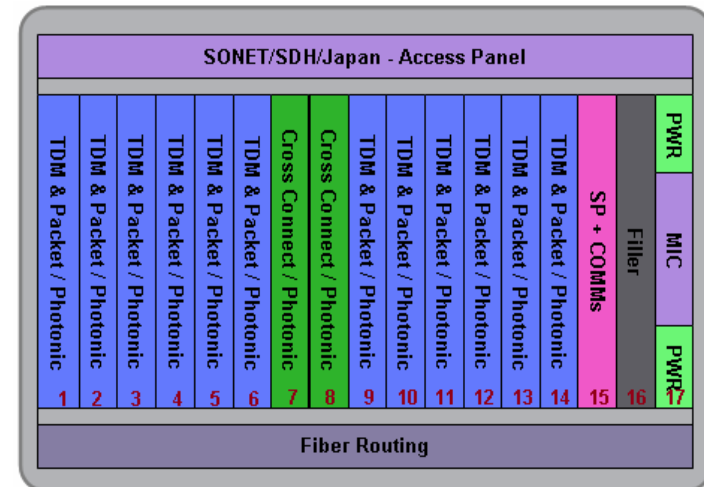
RoEduNet2 – Sites for the 1st Phase Operational Q4/2008



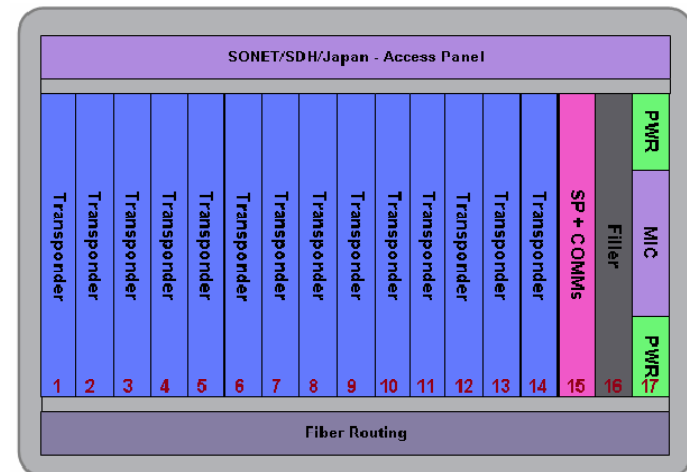
RoEduNet2 – ROADM for the 1st Phase



■ OME 6500BB

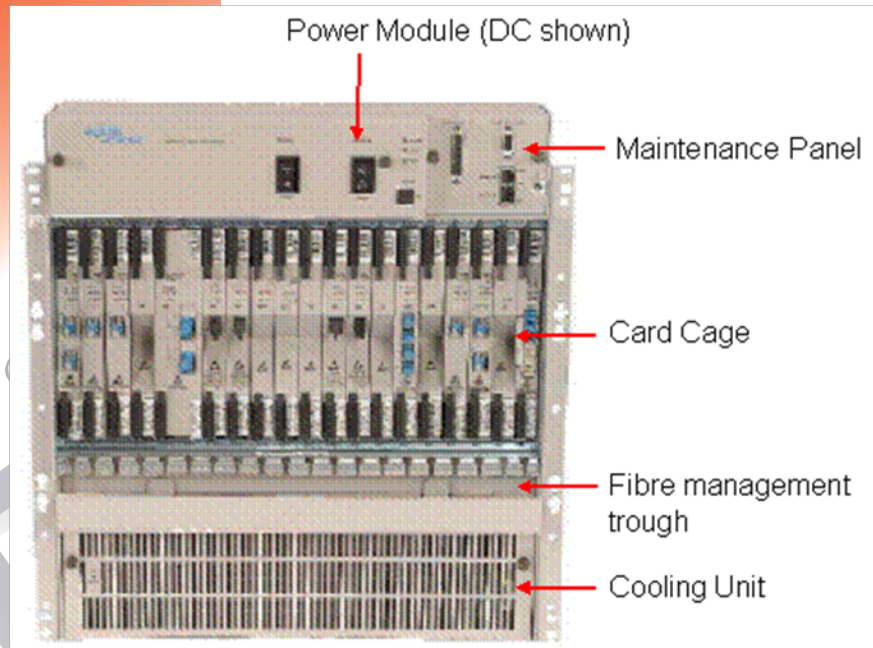


■ OME 6500 Shelf Layout

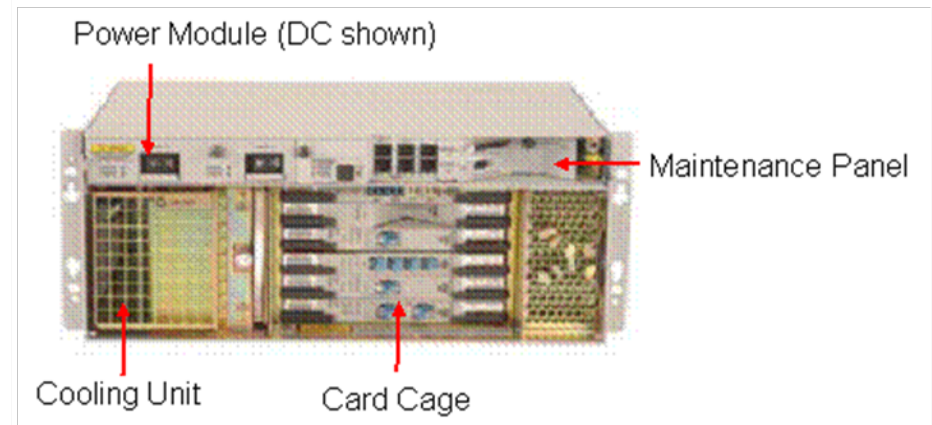


■ OME 6500 BB Shelf Layout

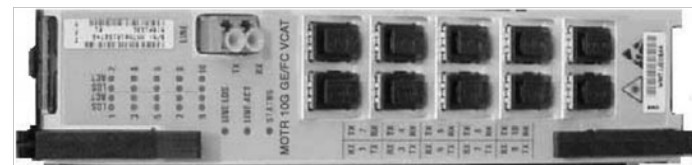
RoEduNet2 – OADM for the 1st Phase



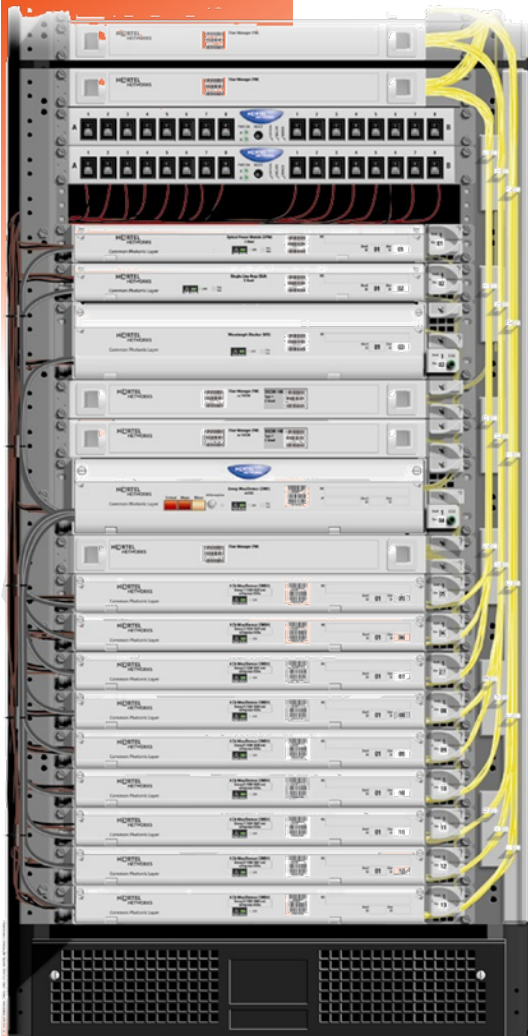
■ OM5200 shelf layout



■ OM5100 shelf layout



RoEduNet2 – Photonic Site



- Main advantages of the solution:
 - ◆ Separate Common Photonic Layer – CPL
 - ◆ ROADM enabled solution:
 - ★ Reconfigurable lambda path
 - ◆ Electronic compensation of dispersion for ROADM sites
 - ★ Automatic lambda reconfiguration paths
 - ★ Moving any lambda within the network as long as the total length does not exceed 1500 km
 - ★ Lambda on demand available – could be offered as service
 - ◆ Resilience for each location (except for one NOC – tackle for a solution)

RoEduNet2 – Numbers – for the 1st Phase

- Dark Fiber
 - ◆ Total length: 4238.8 km
 - ◆ Number of segments: 46
- Sites:
 - ◆ In the premises of Telecomunicatii CFR: 48
 - ◆ RoEduNet: 8 – redundant connections to the sites of Telecomunicatii CFR
- Type of sites:
 - ◆ ROADM: 18
 - ◆ ADM: 23
 - ◆ Amplifiers: 15
- Lambdas:
 - ◆ 10G = 19
 - ◆ 8 x 1G = 41

Future Plans - Infrastructure

- Install the local loop (metro fiber from the site of Telecomunicatii CFR to RoEduNet POPs) for all cities where Optical circuits are installed
 - ◆ 18 cities in Q4/2009 – Q1/2009
 - ◆ 15 cities in Q2 – Q4/2009
- Complete the network with CDWM technology for stub POPs – to be upgraded to DWDM later
- Upgrade the metropolitan area network in Bucharest to 10 Gbps resilient on each MetroPOP (15)
- Upgrade the data centers in each NOC to reach conformity with international standards
 - ◆ At least 30 min on battery
 - ◆ At least 10 hours on power generator
 - ◆ Conformity with international standards
- Install new POPs – no necessary in the county capitals – for the sites where there are high demand for network traffic: planned POP at Magurele

Future Plans - Services

- HelpDesk 24x24, 7/7
 - ◆ started – working hours available 5/7
- Integrated monitoring services (NMS) and SLA monitor to be finished and integrated with TTS
- CSIRT – process started (www.csirt.ro) – to be accredited mid 2009 (in contact with TERENA CSIRT-TF)
- Security threads probes to be installed and countermeasures to be taken automatically - integrated with GEANT plans
- QoS – solutions from GEANT to be integrated (PERT)
 - ◆ Lambda on demand to be made available for the connected institutions

Conclusions

- DANTE POP in Bucharest installed in the National NOC premises
- 10 Gbps connection to GEANT with standard resilience (two links) in production
- 10 Gbps connectivity available for 3 NOCs: Bucharest, Iasi and Cluj Napoca
- 88% of RoEduNet2 national infrastructure to be finished in november 2008
 - ◆ IP equipments installed and operational
 - ◆ Photonic equipments ordered – process of installation started – to be finished in Q4/2008
 - ◆ Resilient local loops contracted for main sites (Bucharest, Galati, Iasi, Tg. Mures, Cluj Napoca, Timisoara and Craiova)
 - ◆ State of the art optical technologies based solution (CPL, ECD, ROADM)

Photonic Network for Research and Education

