

SEELight

Next-generation research & academic networks in South-East Europe

Yannis Mitsos
Head of NOC – GRNET
[ymitsos at grnet.gr](mailto:ymitsos@grnet.gr)



The SEELight initiative is co-funded by HiPERB/Greek Ministry of Foreign Affairs

Background

- o There was a significant digital divide in Europe which affected many countries in southeast Europe,
- o The SEEREN1&2 initiative helped in providing international connectivity to countries in the region,
- o However, longer-term, cost-effective solutions are needed in the future,
- o Recommendation to acquire dark fibre by NRENs as a way of decreasing the digital divide in a cost-effective way were identified in the SEEFIRe project,
- o There are dark-fibre deployment experiences in the region, which should be sustained and supported,
- o Southeast European countries are entering the eInfrastructures community,
- o Long-term vision: to create a southeast European fibre backbone fostering collaboration of researchers and students

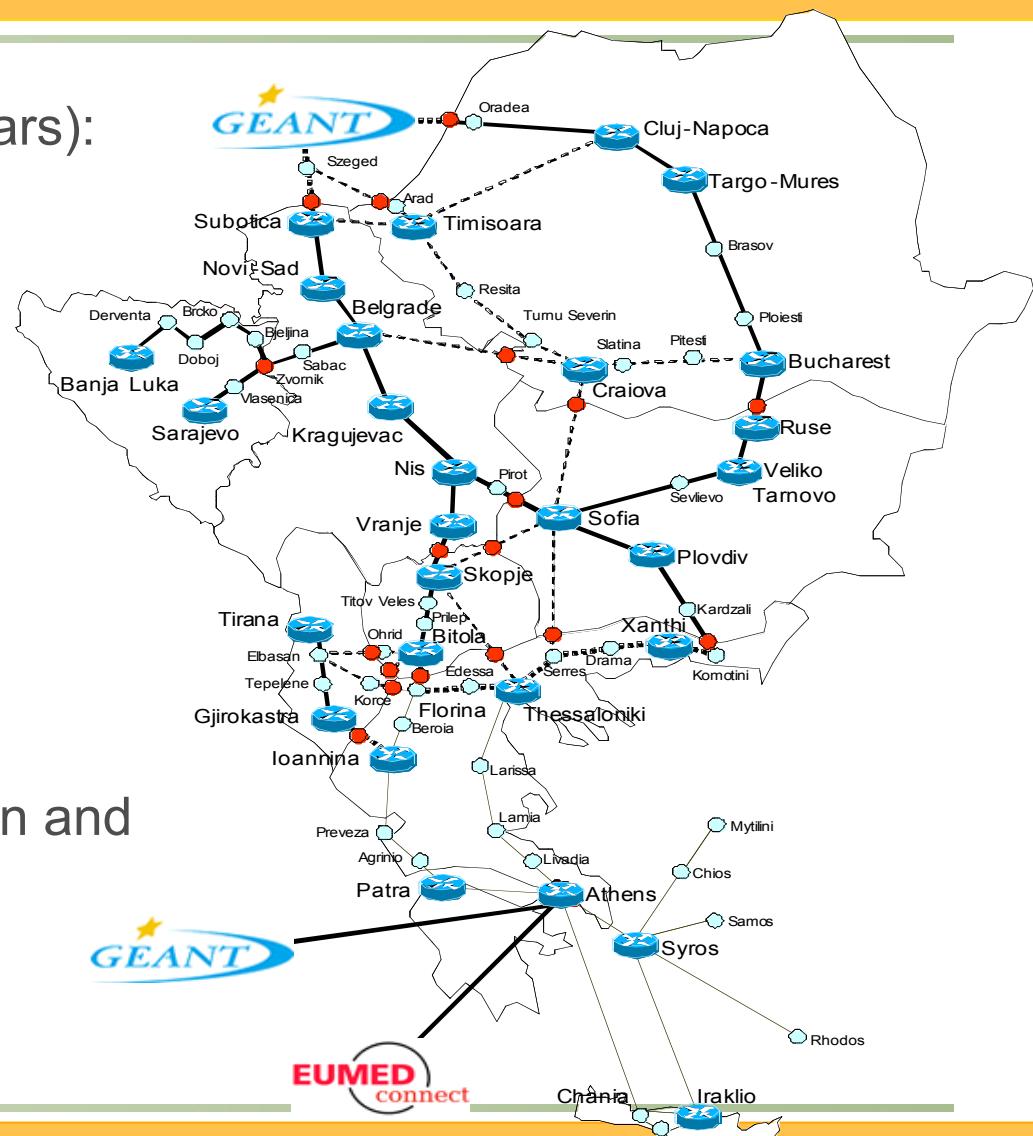
SEELight goal - objectives

- o **Main goal**
 - o materialization of the South-East European Lambda Network Facility for the regional research, academic and education communities to enable the provision of end-to-end network services to meet user demands, to serve as a testbed for development of new networks and services, and to allow the SEE research and education community to participate in international networking activities.
 - o the deployment of a SEE regional lambda networking facility (redundant optical ring);
 - o the purchasing of new and/or upgrading of existing networking equipment;
 - o Establishment of a collaborative environment for the network operations that will foster development cooperation on all levels.

SEELight overview

Main cost categories of the project (3 years):

- o the long-term leasing of fiber,
- o the maintenance of the fiber,
- o the equipment acquisition
- o and then:
- o planning/design,
- o technical assistance
- o and supervision during implementation and network operation.



Main design priorities

1. Enable quickly a Dark Fibre connection to GEANT's closest PoP in central Europe
2. Deploy 2 Fibre Rings for redundancy



Countries applied & accepted Budget

- o Initially 4 countries have managed to apply successfully:
 - o Bulgaria
 - o Serbia
 - o Romania
 - o FYROM
- o At the moment work are conducted in:
 - o Bulgaria
 - o Serbia
- o RoEduNet is currently operating a dense optical network.

Current state of affairs

- o Serbia:
 - o Project management tender has been successfully conducted,
 - o Dark fibre procurement is currently an on-going process, recently offers were evaluated,
 - o Strategy: instead of deploying a “transit” network, we decided to aim higher and assist the local NREN deploying a dense national network,
 - o An RFI for the optical equipment has been conducted,
- o Bulgaria:
 - o Project management tender has been successfully conducted,
 - o Dark fibre procurement is currently an on-going process, procurement notice to be published soon,
 - o 3 cross border links are requested,

Extended topology

- o Requested footprint
 - o Core links,
 - o Access links,
 - o Border links (not crossing them though) to all neighboring countries (quite many) but Montenegro,
 - o Almost ~4000km



RFI: Max Design Capacities/Regen/40G/100G

Company	Max capacity per link	Regen	40G	100G	Comments
1	32x10G	No	Available (ADPSK)	Mid 2011 (coherent)	
2	40x10G	No			
3	44x any combination of 10/40/100G	No	End 2010 (coherent)	Available (coherent)	Use of Raman pumps 40Gbps coherent TPs
4	40x10G	No	Available (DQPSK)	NDA is required	Use of Raman pumps Partial support of 40G
5	80x10G	No	Available (PDPSK).	100G (coherent) mid 2012.	
6	80x10G	No	Oct 2010 (DPSK). Coherent planned for 1Q2012	1Q2012 (coherent)	Partial support of 40G
7	40x10/40G	No			
8	80x10G	Yes	2011 (coherent)	2012 (coherent)	
9	40x any combination of 2.5G/4G/10G/40G	Yes	End 2010 (DPSK)	June 2011	Beograd and Subotica – regeneration for passing traffic is required
10	Rings of 80x10G/40G and 40x10/40G	No	Available (coherent)	2nd half of 11 (Coherent)	Use of Raman pumps
11	Fulfils EoL	No	Available (QPSK)	No info	

Conclusions I

- Implementation of international lambdas with only “edge” regen points is feasible
 - Raman pumps avoidance is preferable,
- 40G/100G technological direction is clear: PM-QPSK with coherent receivers (OIF Implementation agreement for 100G)
 - Performance better than 10G
 - Most companies are trying to implement it or have already implemented it
- Today it may seems early to ask for 40G/100G lambdas, however future support of 40G/100G and peaceful co-existence with 10G without redesign is key for transport network evolution
 - Could be included as “Desired” feature at the RFP specs

Conclusions II

- o Tradeoff at the EoL traffic matrix formulation
 - o Go for many 10G lambdas ->increase in administration complexity BUT stable/economical solution
 - o Go for medium number 10/40G lambdas ->decrease in administration complexity AND same/better capacity result BUT 10/40G co-existence may increase the cost
- o OSNCP scheme implementation is a widely available feature
- o Restoration features are closely tight with network reconfigurability

SEELight

Next-generation research & academic networks in South-East Europe

Yannis Mitsos
Head of NOC – GRNET
[ymitsos at grnet.gr](mailto:ymitsos@grnet.gr)



The SEELight initiative is co-funded by HiPERB/Greek Ministry of Foreign Affairs