

# SEELight

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

Yannis Mitsos  
Head of NOC – GRNET  
ymitsos at grnet.gr



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

# Background

---

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

# SEELight goal - objectives

---

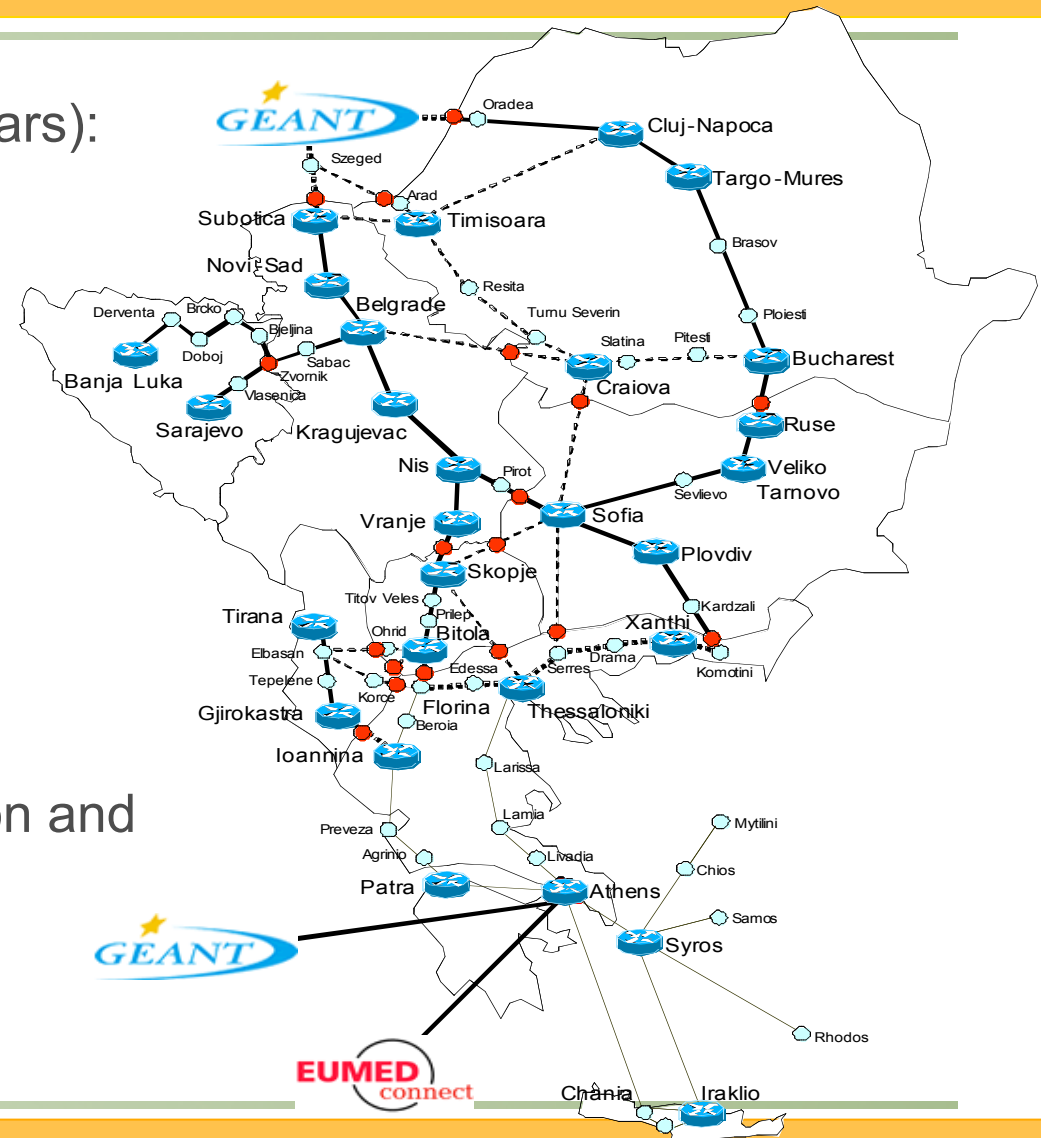
- **Main goal**

- 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.
- the deployment of a SEE regional lambda networking facility (redundant optical ring);
- the purchasing of new and/or upgrading of existing networking equipment;
- Establishment of a collaborative environment for the network operations that will foster development cooperation on all levels.

# SEELight overview

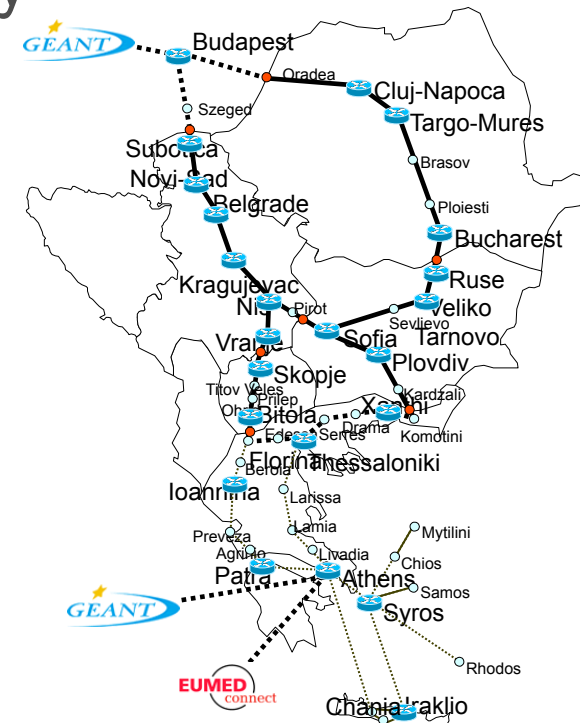
Main cost categories of the project (3 years):

- the long-term leasing of fiber,
- the maintenance of the fiber,
- the equipment acquisition
- and then:
  - planning/design,
  - technical assistance
  - 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

---

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

# Current state of affairs

---

- Serbia:

- Project management tender has been successfully conducted,
- Dark fibre procurement is currently an on-going process, recently offers were evaluated,
- Strategy: instead of deploying a “transit” network, we decided to aim higher and assist the local NREN deploying a dense national network,
- An RFI for the optical equipment has been conducted,

- Bulgaria:

- Project management tender has been successfully conducted,
- Dark fibre procurement is currently an on-going process, procurement notice to be published soon,
- 3 cross border links are requested,

# Extended topology

- Requested footprint
  - Core links,
  - Access links,
  - Border links (not crossing them though) to all neighboring countries (quite many) but Montenegro,
  - 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)	<b>Use of Raman pumps</b> 40Gbps coherent TPs
4	40x10G	No	Available (DQPSK)	NDA is required	<b>Use of Raman pumps</b> 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	<b>Yes</b>	2011 (coherent)	2012 (coherent)	
9	40x any combination of 2.5G/4G/10G/40G	<b>Yes</b>	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)	<b>Use of Raman pumps</b>
11	Fulfills 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 seem 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

---

- Tradeoff at the EoL traffic matrix formulation
  - Go for many 10G lambdas ->increase in administration complexity BUT stable/economical solution
  - 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
- OSNCP scheme implementation is a widely available feature
- 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



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