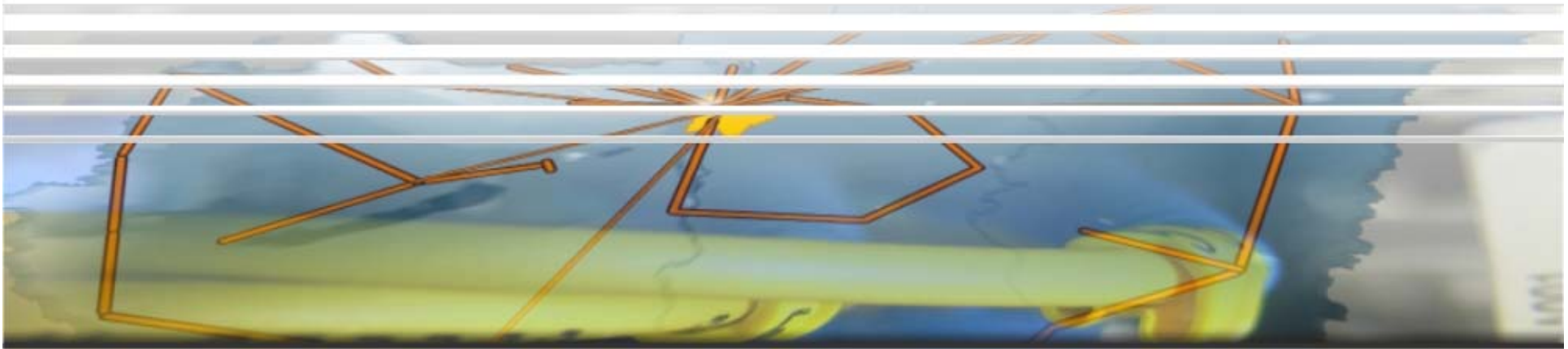


# eInfrastructure development by using Structural Funds



*Practical experiences and  
lessons to learn*

e-IRG Workshop, Budapest  
4-5 April, 2011

**Tamás Máray**

NIIF Institute

The Hungarian NREN



# Short history of eInfrastructure development in Hungary

	Europe	Hungary
1980-85	<i>First experiments</i>	<i>Awareness, learning</i>
1985-90	EARN	IIF
1990-95	EuropaNET	NIIF
1995-2000	TEN (34, 155)	HBONE
2000-2005	GÉANT	HPC & grid
2005-2010	GÉANT+	HBONE+

# International relations

- Organizations:

TERENA



DANTE



GÉANT PC



e-IRG



ERAB



ISOC



- Networks:

GÉANT



INTERNET2



TEIN



EUMED



CLARA



- Projects:

GN3



EGEE FEDERICA



EMI



6DEPLOY



SEE-GRID



# Funding of the developments

- 1986 – 2003
  - support from central, governmental budget (typically yearly battles for funds)
- 2004 – 2006
  - The period of the 1<sup>st</sup> National Development Plan (based on EU Structural Funds) NFT1 – **unsuccess from eInfr. point of view!** ☹️  
(eInfr. goals did not fit to operational programs, traditional resources exhausted -> difficult period)
- 2007 – 2011 (2013)
  - The 2<sup>nd</sup> National Development Plan (“New Hungary Development Plan”) ÚMFT – **success!** 😊  
(but difficult, too...)

# ÚMFT - “New Hungary Development Plan”

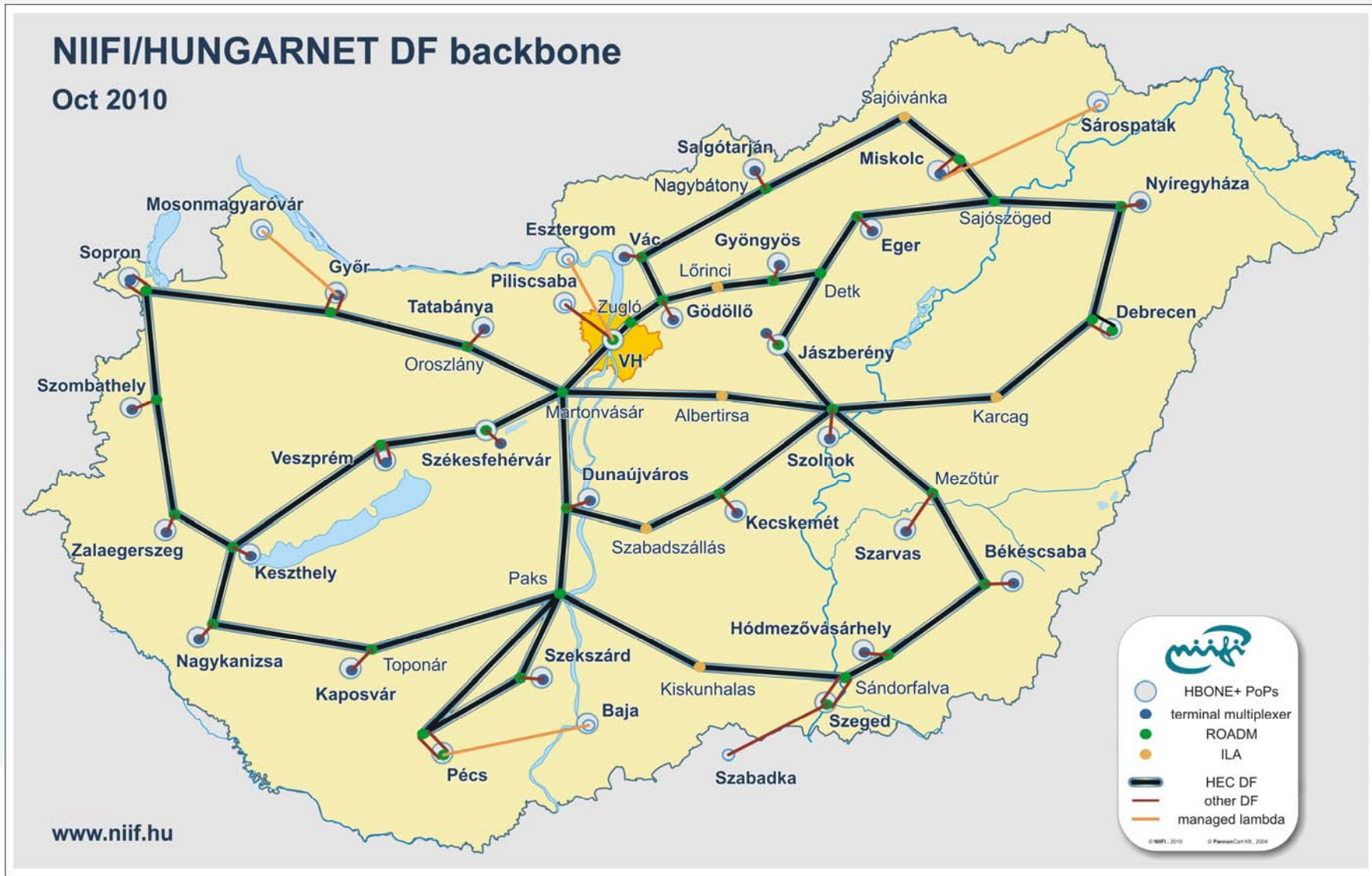
- Operational Programs that finally provided support for eInfrastructure development:
  - TIOP – Social Infrastructure OP
  - KMOP – Central Hungary OP
  - TAMOP – Social Renewal OP
- Total ÚMFT funding for NIIF development projects (2009-2011): ~HUF 4.7b (~EUR 18m)
- Challenge:
  - Unbalanced nature of OPs <-> building balanced infrastructure
    - convergence regions vs. central region
- ÚMFT project funding experience: **extremely buerocratic and slow** (which makes planning and designing very difficult in a quickly changing technological environment)

## (Despite) What we could achieve

- Complete renewal of the **NREN backbone**
- Complete renewal of the national **HPC infrastructure**
- Establishing a distributed, national **storage infrastructure**
- Complete renewal of the federal academic **AAI infrastructure**
- Complete renewal of the academic **videoconferencing infrastructure**
- Introduction of **several new services** based upon and benefiting from the new eInfrastructure elements



# HBONE+, new optical backbone



# HBONE+ the new, optical backbone

- Cooperation with the Hungarian Electricity Company (fiber owner)
- ~3000 km of fibre
- 80  $\lambda$ /link
- 40 Gbps/ $\lambda$
- 100 Gbps/ $\lambda$  capable network design (first experiments planned in Q3 2011)
- Device vendors: Alcatel (DWDM), Cisco (IP)
- Hybrid infrastructure and services



# New HPC infrastructure

- 4 powerful supercomputers
- Various architectures (cluster, fat-node cluster, SMP/ccNUMA)
- Latest technology
- Distributed across Hungary (Budapest, Debrecen, Pecs, Szeged)
- ~50Tflops of total computational power
- Nearly 20 Tbyte of total memory
- Over 1 Pbyte of storage
- Direct optical links between the resources
- Joining to PRACE...

## And many more new services...

- HD videoconferencing and streaming
- Videotorium (advanced, academic video archive)
- Storage and archiving service
- EduID (federated national AAI)
- NIIF Cloud
- New grid services
- Sophisticated CRM
- etc.

# Conclusions

- Using resources of Structural Funds has essential importance for eInfrastructure development in less developed member states
- Advanced Research Infrastructures play key role in enhancing cohesion within Europe
- It is extremely important that FPs continue supporting European level RIs (GEANT, PRACE, etc.)
- The idea of the Common Strategic Framework (CSF) is very welcome!
- High expectations on the new, joint EU innovation funding mechanisms
- It would be promising and beneficial (but not easy...) to force member states to spend a certain amount of Structural Funds on eInfrastructures



**Thank you!**