Enabling Grids for E-science in Europe

GRNET Strategic Viewpoint on electronic Infrastructures: Research Networks and Grids

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G R N E T – Mission Statement

Enabling Grids for E-science in Europe

- Provide high-quality international and national networking services to the Greek academic & research institutions and to the public and private sector to support their research and educational activities.

- Promote and disseminate the use of ICT in the public and private sector towards an *e*Government, *e*Learning and *e*Business environment.

G R N E T – Mission Statement

Enabling Grids for E-science in Europe

To support the eEurope Action Plan

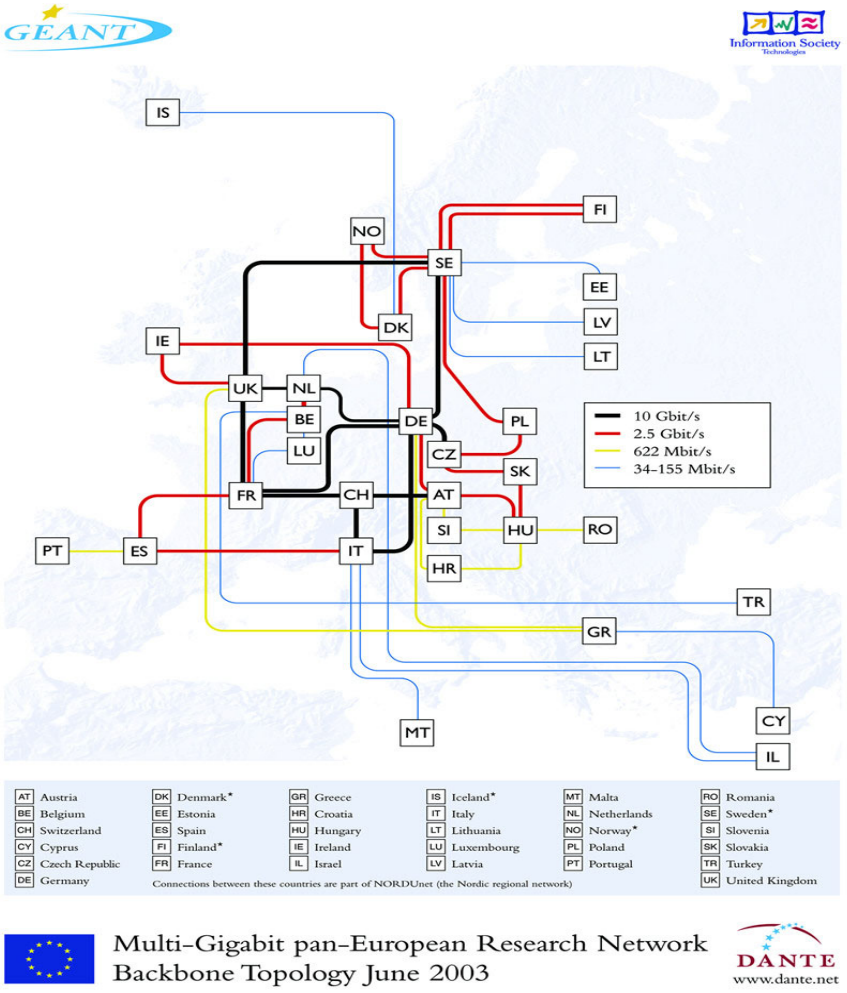
eEurope 2002

- Provide a cheaper, a faster and a more secure internet
- Stimulate the use of the internet
- Invest in people and skills

eEurope 2005

- Provide services, applications & content
  - interactive public services on-line (e-government, e-learning, e-health)
  - dynamic e-business environment
  - digital inclusiveness
- Enable infrastructure
  - promotion of broadband access
  - trust & confidence in cyberspace

- Pan-European coverage (32 Countries/NRENs)
- Connectivity up to 10 Gb/s
- Linking more than 3100 Universities
- Total 200 MEuro over 4 years (80 MEuro from EU)
- Peer connectivity to North America and Japan
- Extending Mediterranean, Asia Pacific, Latin America, Russia, Balkans, Central Asia.



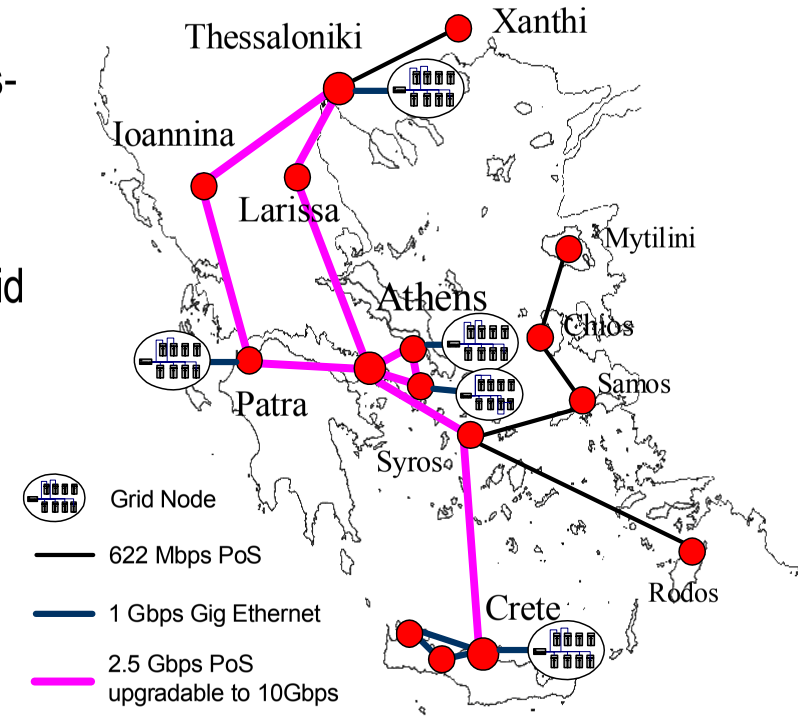
GRID Activities

Enabling Grids for E-science in Europe

- Initiator of Hellas Grid Task Force (http://www.hellasgrid.gr)
  - Setting the basic guidelines for national, regional and EC activities
- Participant in CERN led EGEE FP6 project (http://www.cern.ch/egee)
  - Creating and deploying Grid technologies for e-Science applications throughout the European Research Area
- South East European GRID (SEE GRID) (http://www.see-grid.org)
  - Albania, Bosnia-Herzegovina, Bulgaria, Croatia, FYROM, Greece, Hungary, Romania, Serbia-Montenegro, Turkey + CERN

HellasGrid Task Force

- **Task Force** is composed of 27 Representatives of all major research and academic institutes working on Grids-**eScience** of Greece
- Main application users: High Energy Physics, Bio-informatics, Meteorology, Astronomy, Computer scientists-Virtual Collaboration Environments
- Final version of the **Strategy Document** published in November 2003
- Infrastructure support projects for building the national Grid and **Operation Centers** are on the way



The EGEE Project

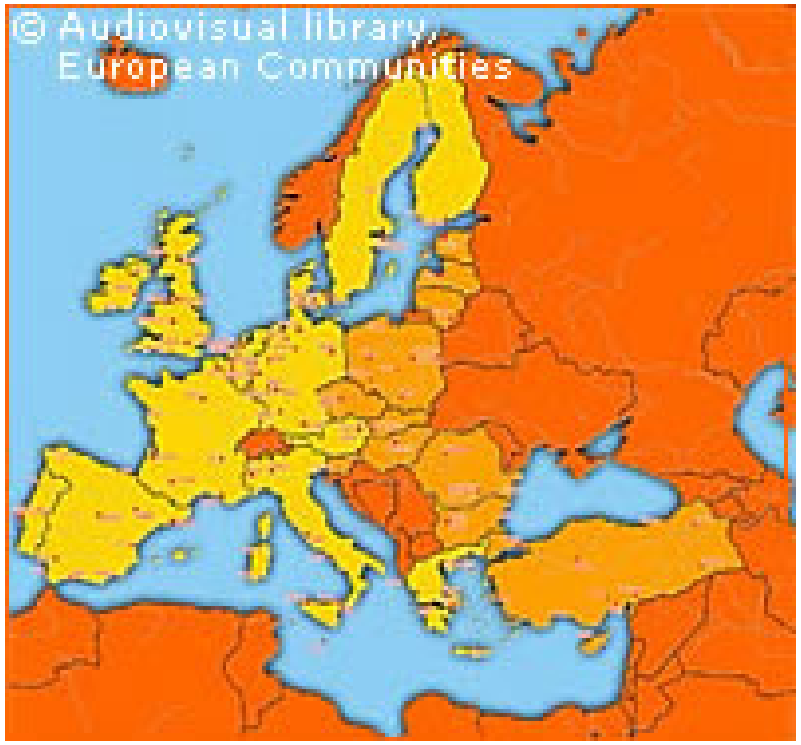
Enabling Grids for E-science in Europe

- Hierarchical structure with pan-European coverage on top of GEANT structured in federated scheme:
  - **CERN, UK, FR, I, Nordic Federation (BE, NL, SE, N, DK), DE-CH, South-West Federati5on (ES, PT), Central-East Federation (PL, HU, CZ, AU, SI), South-East Federation (GR, BG, CY, IL, RO)**
- 31,5 M€ awarded for a production-quality distributed Grid operation scheme
- Closely coupled with National Grid Initiatives and GEANT-NRENs
- Initial Applications: HEP, Bio-informatics, Generic Applications VOs (Virtual Organizations)

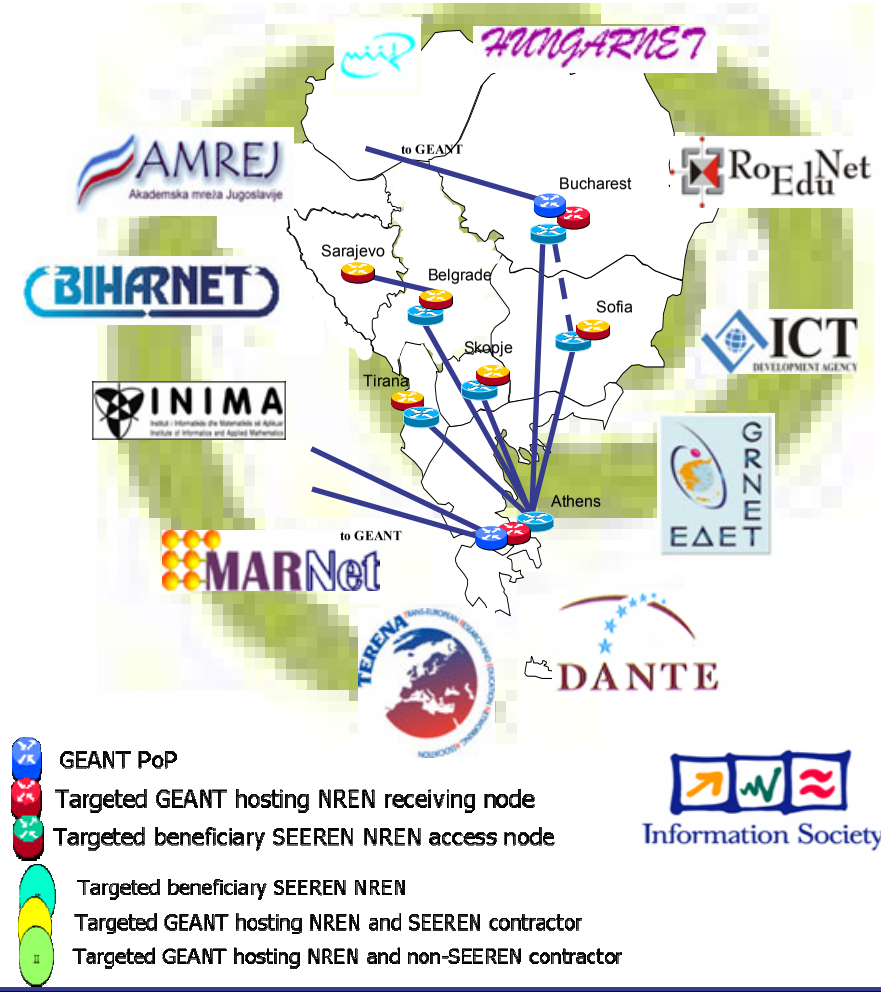
Activities in South-East Europe

Enabling Grids for E-science in Europe

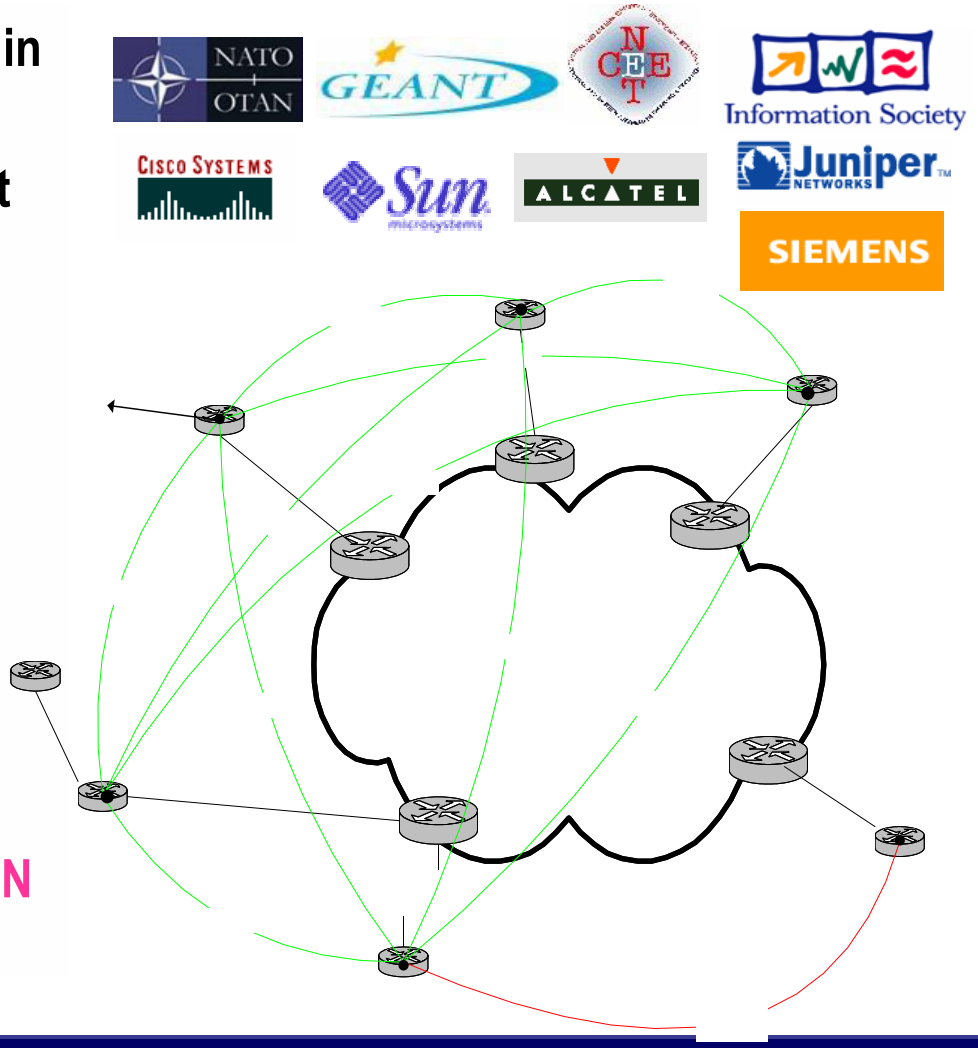
- The vision... **'ease the digital divide in SE Europe'.**
- Help the promotion of the scientific and educational cooperation between EU MS and SEE
- Act as an enabler for dissemination and development of the next generation of Internet technologies in SEE states that are on course to joining the EU.
- Contribute to the reconstruction and stabilisation of the region.

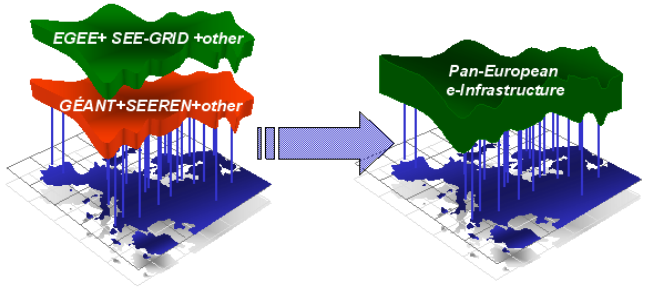


- Extend the ERA to all SEE by establishing a functional networking environment for research & education, linking NRENs of **Albania, Bosnia-Herzegovina, Bulgaria, FYROM, Greece, Hungary, Romania, Serbia-Montenegro**.
- Provide the regional NRENs with access (2 - 34 Mbps) to major GÉANT PoPs in the area.
- Establish stable networking operation, and interoperability with GÉANT

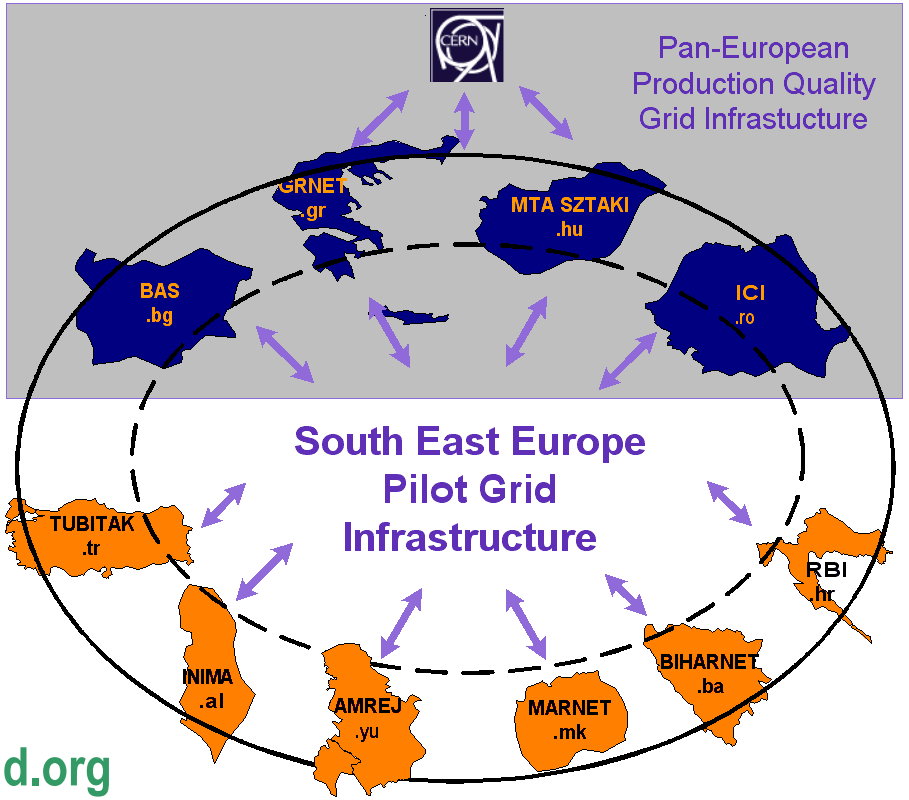


- Active relations with organizations involved in SEE (UNDP, NATO, CEENet, etc).
- Around 1,4 m€ pulled together with excellent prospects to double the original budget in complementary (sub)-projects.
- Negotiated a lower fee for connectivity from around 2.5m € to 1m € (mission impossible).
- Network operational in October 2003.
- SEEREN training workshops (co-)organized, aimed at providing the SEEREN NRENs with technical know-how and common vision.
- A MAJOR STEP TOWARDS PEACEFUL COEXISTENCE (Sarajevo – Belgrade SEEREN link)





- Aims to provide specific support actions to pave the way for the participation of the SEE to the pan-European and worldwide Grid initiatives.
- Creates a human network in the area of Grids, eScience and eInfrastructures in SE Europe.
- Integrates incubating and existing National Grid Initiatives in all SEE-GRID states.
- Migrates and tests Grid middleware components, APIs and applications developed by pan-European Grid efforts (e.g. EGEE, etc) in the regional infrastructure.
- Creates a pilot-Grid infrastructure to expand & support the ERA in the region.



www.see-grid.org

Global Terabit Research & Education Network – GTREN

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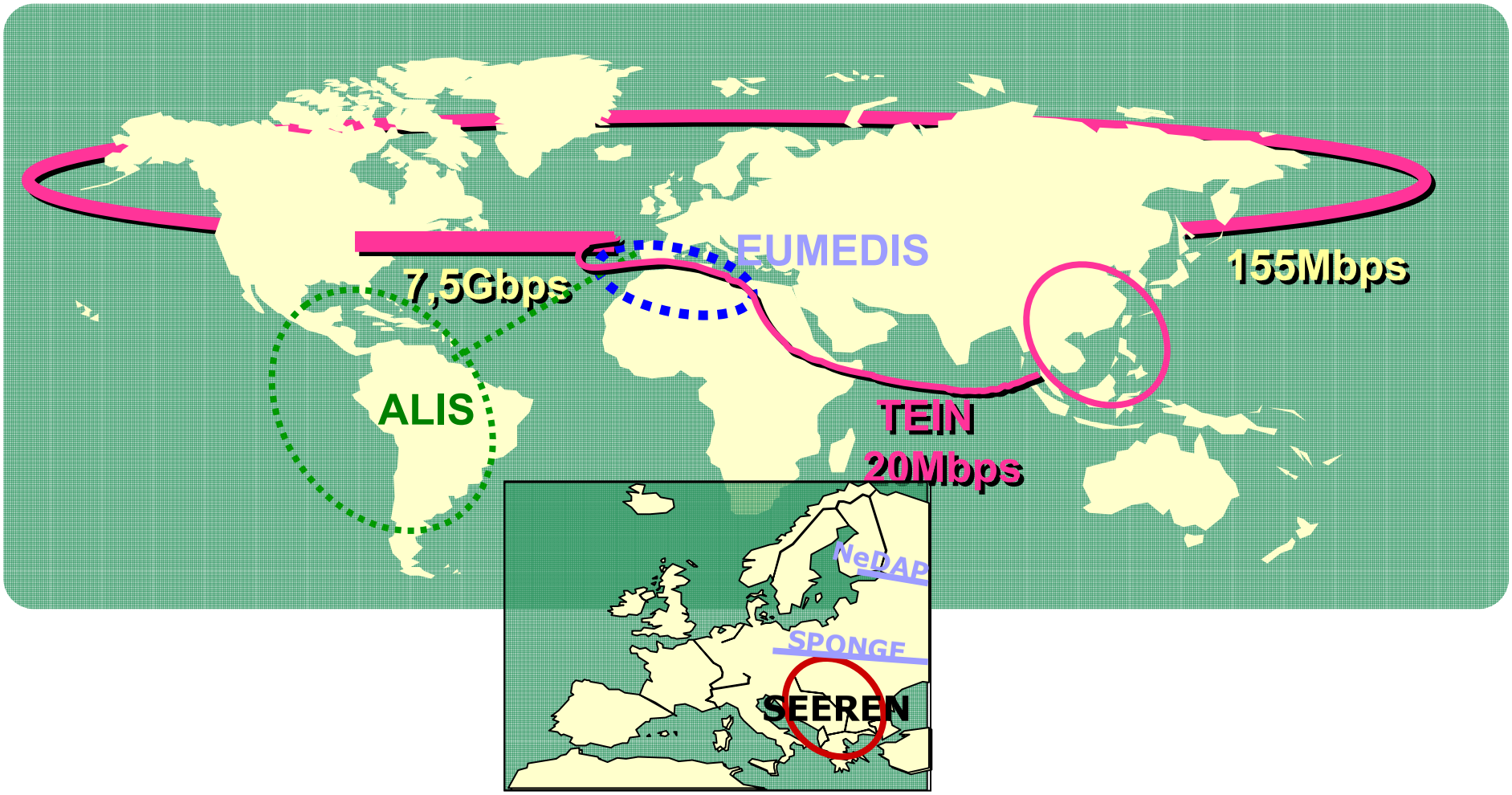

WCIT - Scientific Forum on Grid Services, Athens, May 18th, 2004 Summary & Conclusions

Enabling Grids for E-science in Europe

- Identify user communities (Virtual Organizations - VOs), raise awareness, probe for National & EC funding instruments, draft National & EU strategies
- Develop sharing mentality among VOs, specify operational policies - AUPs
- Accelerate eInfrastructure deployment & research: LAN-NREN-GEANT-GTREN (e2e provisioning, multi-domain QoS – B^2); National Grid Initiatives, production quality Grid proof of concept (Grid Operations Centers)
- Adopt & develop open architectures - WSRM and toolkits for SLA formulation & monitoring, AAA architectures, protocol specification etc. → Standards, Grid economic models, regulation?
- Support Open S/W – M/W development, certification and customization (OMII)
- Need Global cooperation (US, Europe, Japan)
- Ease the digital divide, explore integration of diverse platforms, e.g. part-time "scavenging" and full-time Grids – HPC
- Need industrial – commercial support (liaison); prerequisite: open, well defined standards
- Grid computing is creating IT & Business value; early adopters gain advantage
- eScience a leading enabler of Grid computing

WCIT - Scientific Forum on Grid Services, Athens, May 18th, 2004
GRID Technology: Pros & Cons

Enabling Grids for E-science in Europe

- Pros:
  - **Scalability**
  - Low CAPEX – ease of Digital Divides
  - Machine autonomy
  - **Reliability**
  - **Geographic globalization** via broadband optical networks
  - Proliferation of Virtual Collaborative Applications and Data Centers (from teaching & research to data mining, rendering & simulations in entertainment, engineering, life sciences, financial services, e-government, Earth Observing Systems …)
  - **Open Source S/W – M/W, Open Architecture**
  - Prospect of unifying distributed environment processing & management via the Web Services Reference Framework
  - Endorsement by major IT vendors: IBM, Intel, HP, SUN, CA, Oracle; Globus Alliance, …
  - Growing experience of eScience users
  - Priority of Public funding for research & proofs of concept (e.g. EU, UK, Nordic Countries …)
- Cons:
  - **Not considered a mature solution**
  - Early standardization stage
  - **Security concerns**
  - Sharing inhibition of users
  - Accounting problem, new economic model
  - Lack of enabled applications and success stories
- Religious Statements:
  - **Bill St. Arnauld:** *The computer is no longer the network; everything is the network*
  - **Tony Blair:** *The Grid will enable access to computing resources & applications in the same way that the Web enabled access to information*
  - **Carl Kesselman***: Focus on enterprise Grids is potentially dangerous if Vendors use that fact that they are living behind a firewall to make shortcuts that they may regret later. Issues of policy, negotiation, provisions and other cross- organizational aspects can't be ignored.*