



The Greek Grid Initiative: Hellas Grid Task Force

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Presentation Outline

- Background
- The Hellas Grid Task Force
 - Motives, Organisation, Objectives
 - The Hellas Grid Strategy document
- The role of the Greek NREN -GRNET
- Conclusions

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Background (I)

- **Grid-enabled infrastructures are promising because:**
 - Relatively (to supercomputers) **inexpensive** in building and operating (PCs, Open source OS & middleware) – economies of scale
 - **Expandable - scalable** over high speed networks
 - Provide access to **different resources** (CPUs, Storage, Bandwidth, Sensors, etc.)
 - Can serve **multiple disciplines** / applications (first eScience)
 - Promote scientific **collaboration culture** (Virtual Organisations)
 - Hide resources heterogeneity and complexity
 - Enable **equal opportunities** and global participation
 - Access to **other administrative** domains' resources through a minimal local infrastructure (though policy issues unresolved)
 - But still a long way to go...

Background (II)

- **At the end of 2002:**
 - There was **no national body** to coordinate Grid activities in Greece, as this was the case with National Research Networks (NRENs)
 - Grid-enabled eScience applications are the optimum way of **exploiting the broadband** (underutilized) research networks
 - GRNET was already providing **research networking infrastructure services** to the Research and Academic Community
 - The National Programme for the Information Society did not foresee a "**Grid-area**" or call for Proposals
 - EU intended to **invest heavily** in Grid-enabled eInfrastructures (FP6 Research Infrastructures 1st call → EGEE) – but not for national infrastructure support
 - The **Greek EU Presidency** was approaching
- **GRNET (the Greek NREN) took the initiative to propose to the corresponding ministries the formation of Hellas Grid Task Force**
 - Note: The expansion of NRENs activities (public bodies) from research networking to Grid-enabled eInfrastructures makes it easy to differentiate from plain Internet Service Providers that might claim unfair competition and justify public funding for research

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Hellas Grid Task Force Motives

- Grids: key for the development of National and Global research collaboration in the Information Society
- e-Europe 2002 και 2005 initiatives and 6th Framework Programme
 - 2002: “Grid computing” 2005: “World Wide Grid”
 - National representation in FP6 EU projects →EGEE
- Need for strategic planning and coordination of Grid activities in the national programme for the Information Society
 - For Research and Education
 - At National and Regional level
 - In combination with the Greek EU presidency →1st eInfrastructure meeting took place in June 2003 www.einfrastructures.org

Hellas Grid - Organisation

- Formed by the Secretary for the Information Society, Ministry of Economy and Finance www.hellasgrid.gr
 - First meeting in December 2002 – Task Force ratified in January 2003
- Main group (Task Force) - unfunded
 - 28 Members from the Academic and Research Community– (Deans, Research Centres Directors, Professors) – political body (decision making)
 - President: Secretary for the Information Society
 - Vice-president: GRNET Chairman of the Board
- Scientific Committee - funded
 - 11 Members (experts in broadband networking, middleware and eScience applications) – technical body (preparing recommendations)

Hellasgrid - Members

- **National Research and Education Network**

- GRNET – Coordinator www.grnet.gr

- **Universities**

- Aristotle University of Thessaloniki – www.auth.gr
- National Technical University of Athens www.ntua.gr
- Athens University of Business www.aueb.gr
- University of Athens www.uoa.gr
- University of the Aegean www.aegean.gr
- University of Ioannina www.uoi.gr
- University of Crete www.uoc.gr
- University of Macedonia www.uom.gr
- University of Patras www.upatras.gr
- University of Pireus www.unipi.gr

- **Research Centres**

- National Meteorology Service www.emy.gr
- National Observatory of Athens www.noa.gr
- Research Centre Demokritos www.demokritos.gr
- Computer Technology Institute www.cti.gr
- Institute of Computer Science – FORTH www.ics-forth.gr
- Institute of Accelerator Systems and Applications www.iasa.gr

Hellas Grid Objectives

- **National representation and participation in EU activities**
- **Development of a National Strategy and coordination of Grid activities**
 - Initial emphasis on Research and Academic communities - eScience
 - Requirements gathering – questionnaires
 - Review state of the art and future trends
 - Propose plan for Grid solutions development:
 - National infrastructure and services
 - Investigate adoption of Grid technologies in other areas (eBusiness, eGovernment)
- **Document all the above in the Hellas Grid Strategy Document**

Hellas Grid Preparation Project Structure

- Work Packages –WPs:
 - WP1 – Review of national projects and other project initiatives
 - WP2 – Communities' requirements capture and analysis
 - WP3 – Review state of the art and available solutions
 - WP4 – Proposed plan for the development of Grid infrastructures and services
 - WP5 – Prepare proposals for integration in the National Programme for the Information Society
 - WP6 – Dissemination – Training – National Representation

Timeline (I)

- First meeting: 18/12/2002
- Task Force Decision: 22/1/2003 (initially for 1 year)
 - Labor funding only for the Scientific Committee
 - Travel and other funding foreseen
- First Year:
 - 9 Scientific Committee meetings
 - 6 Plenary meetings (Task Force + Scientific Committee)
- Draft version of strategy document: June 2003
- Signature of Hellas Grid MoU: October 2003
- Final version of strategy document : November 2003
 - The document was given for translation...
- Hellas Grid Workshop: 16th December 2003
 - Presentation of Hellas Grid Strategy Document:
 - Open consultation with Greek community
- Submission of Hellas Grid Proposal: December 2003
- Hellas Grid Task Force was extended until 31/12/2004

Timeline (II)

- WP1 – Review of national projects and other project initiatives
 - June 2003
- WP2 – Communities' requirements capture and analysis
 - March 2003
- WP3 – Review state of the art and available solutions
 - September 2003
- WP4 – Proposed plan for the development of Grid infrastructures and services
 - Strategy Document: November 2003 (Greek) – December 2003 (English)
- WP5 – Prepare proposals for integration in the National Programme for the Information Society
 - December 2003
- WP6 – Dissemination – Training – National Representation
 - European Data Grid (www.eu-edg.org) training: 15-16 Δεκεμβρίου 2003
 - Hellas Grid Workshop: 16 Δεκεμβρίου 2003
 - World Conference on Information Technology (WCIT) - Scientific Forum on Grid Services – www.worldcongress2004.org, www.hellasgrid.gr/wcit

Timeline (III)

- 1st semester 2004
 - Update of strategy document
 - WCIT – Scientific Forum on Grid Services, May 2004
 - EGEE 1st Induction Course – Athens, May 2004
 - Inauguration of GRNET Grid Pilot Node (64 CPUs, 10 TB SAN, 10 TB Tape Library)
 - Hellas Grid project signature delayed
- 2nd semester 2004 (planned)
 - Signature of Hellas Grid project (in October)
 - Procurement of 6 64-dual CPU clusters, 50 TB Tape Library, 4 Access Grid Nodes
 - 2nd induction course - 1st advance course

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Strategy Document Structure

1. Grid technologies and use models
2. The strategic importance of Grid technologies worldwide
3. The Greek status and development perspectives
4. The role of the Government and intervention plan
5. Proposal for the National infrastructure and policy framework
6. Outlook - Conclusions

Strategy Document– Exec summary

- The new environment of electronic infrastructures- eInfrastructures
- Objectives and Applications of eInfrastructures
- Grid technology features
- Grids for Research and Academia
- The Hellas Grid initiative
- EU and regional initiatives – The role of Greece at a regional- (SEE) and EU-level
- Recommendations (to the Ministry)

Strategy Doc – Ch. 1

- **Grid Technologies & Use Models**
 - Definition
 - Grid Generations (Metacenters-Globus2-OGSA), Grid vs PowerGrid
 - Type of Grids
 - Computational, Data, Services/ Grids vs Clusters / Grids & Human Networks
 - Grid Architecture
 - Use models
 - Hierarchical vs P2P, Dedicated vs Desktop, PowerGrid analogies
 - Basic Requirements
 - Reliability-High Availability, Broadband Networking, Security, Mobility, Scheduling & Optimum Resource Brokering

Strategy Doc – Ch. 2

- **The strategic importance of Grid technologies worldwide**
 - **For the scientific community - eScience**
 - Collaborative environment (equal opportunities and broad participation)
 - Economies of scale
 - Multi-disciplinary (HEP, Bio-informatics, Computational Chemistry, Astronomy, Climate, etc.)
 - **For business- eBusiness-eIndustry**
 - Initially Resource Providers (H/W, S/W reselling, Data Centers services), Gradually users as well (Intra Grids – among business branches), ultimately Grid Service Providers
 - Applications (Drug research, Aeronautics, Media, Data Repositories-Mining)
 - **For government services - eGovernment**
 - Exploitation of distributed infrastructures (distributed storage and data mining)
 - Applications: Tax, Social Security, Army DBs, Demographic)
 - **For the citizen**
 - Civil protection (e.g. extreme weather conditions), eHealth - HealthGrid, other (Use of Access Grid)

Strategy Doc – Ch. 3

- **The Greek status and development perspectives**
 - **Global Initiatives with Greek participation**
 - **eScience**
 - Pilot FP5 projects (Crossgrid, Gridlab, GRIA κ.α.)
 - Production or Pilot FP6 projects (FP6 EGEE, SEE-GRID)
 - **Greek Initiatives**
 - Local Infrastructures
 - Broadband Task Force www.broad-band.gr
 - Open Source Task Force www.open-source.gr
 - **Hellas Grid Task Force** www.hellasgrid.gr
 - **Hellasgrid Questionnaire review**
 - Type of required resources: CPU-Intensive applications, Execution Time > 24h, n*GB storage requirements
 - Current infrastructure, M/W and apps status: 15-20 small clusters over Greece (8-32 nodes), up to 0,5TB storage, Broad MPI use- little experience with Grid platforms (Globus, Condor, etc.), Local Area Networks: 100Mbps Ethernet
 - Infrastructure upgrades needed: A pilot infrastructure of 700 nodes needed!
 - **Greece can become the Grid centre for South East Europe!**
 - **(EGEE-SEE-GRID)**

Strategy Doc – ch. 4

- **The role of the Government and intervention plan**
- **Strategic planning examples in other European countries**
 - **UK eScience:** ~170M Euro 2001-2003!! Similar amounts for 2004-2007!
 - **INFN-Grid Italy:** ~30 MEuro 1999-2002!! >30MEuro 2003-2006
 - **Virtual Lab eScience- The Netherlands:** ~55 MEuro 2003-2006!!
- **Creation of a National Framework – Support by the National programme for the Information Society (co-funded with EU structural funds)**
 - **Funding of pilot National Infrastructure (initially for eScience)**
 - **Link with European and other initiatives- EGEE**
 - **Stimulation for the development of access and sharing policies**
 - **Support for pilot eBusiness – eGovernment Grid**

Strategy Doc – ch. 5 (1/2)

- **Proposal for the National infrastructure and policy framework**
 - **Installation of pilot infrastructures to support the academic and research community (2004) - eScience**
 - **5 regional clusters** (PC cluster-storage) + **1 central Node** (existing GRNET EGEE node)
 - Creation of a **HellasGrid Management and Technical Board**
 - Creation of **Operations and Support Centres**, national **Certification Authority**, adoption of **Access Grid** for Virtual Collaboration
 - Pilot integration of a **Super Computing Centre** (HP one)
 - Exploitation of **under-utilized** infrastructure (School Network PCs, University PC-Labs)
 - Need for **users training** and **dissemination** of results – induction of new applications
 - **Gradual Integration of all research infrastructures in Hellas Grid -2006**

Strategy Doc – ch. 5 (2/2)

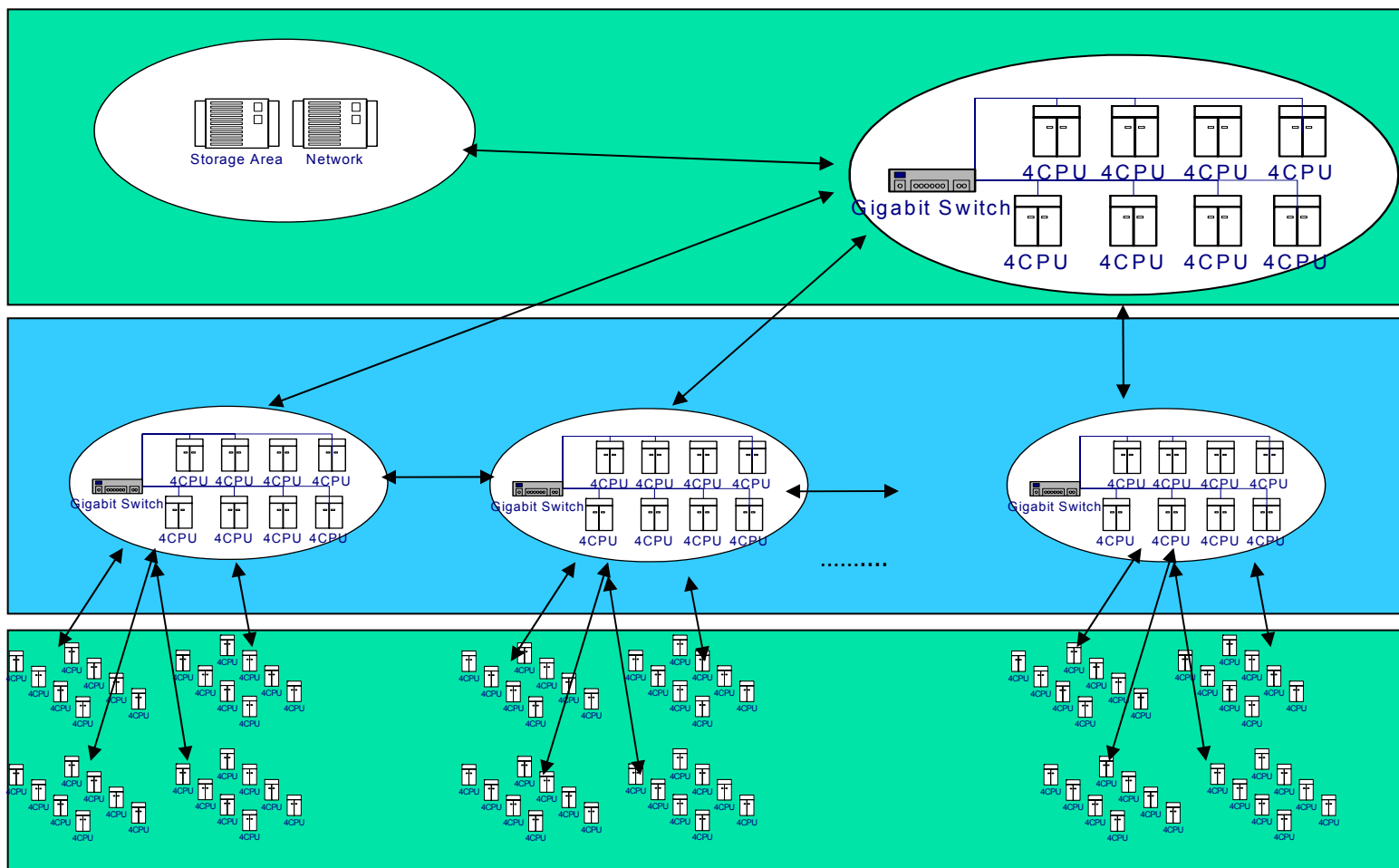
- **Proposal for the National infrastructure and policy framework**
 - **Support private initiatives for Business (2005-2006) – eBusiness**
 - Call for pilot proposals (authentication, authorization, accounting, billing, privacy preservation)
 - Internet Datacenters-ISPs → Grid Service Providers, Grid Exchanges
 - **Development of initial infrastructures and services to support eGovernment (2006-2007) – eGovernment**
 - Call for pilot proposals

Proposed National Infrastructure

**Tier 0 – Central
GRNET Node**
- Initially 64 CPUs-
10TB SAN, 10 TB
Tape Library
(existing)

**Tier 1 –
5 Regional Nodes**
(Athens (3),
Thessaloniki,
Patras,Crete)

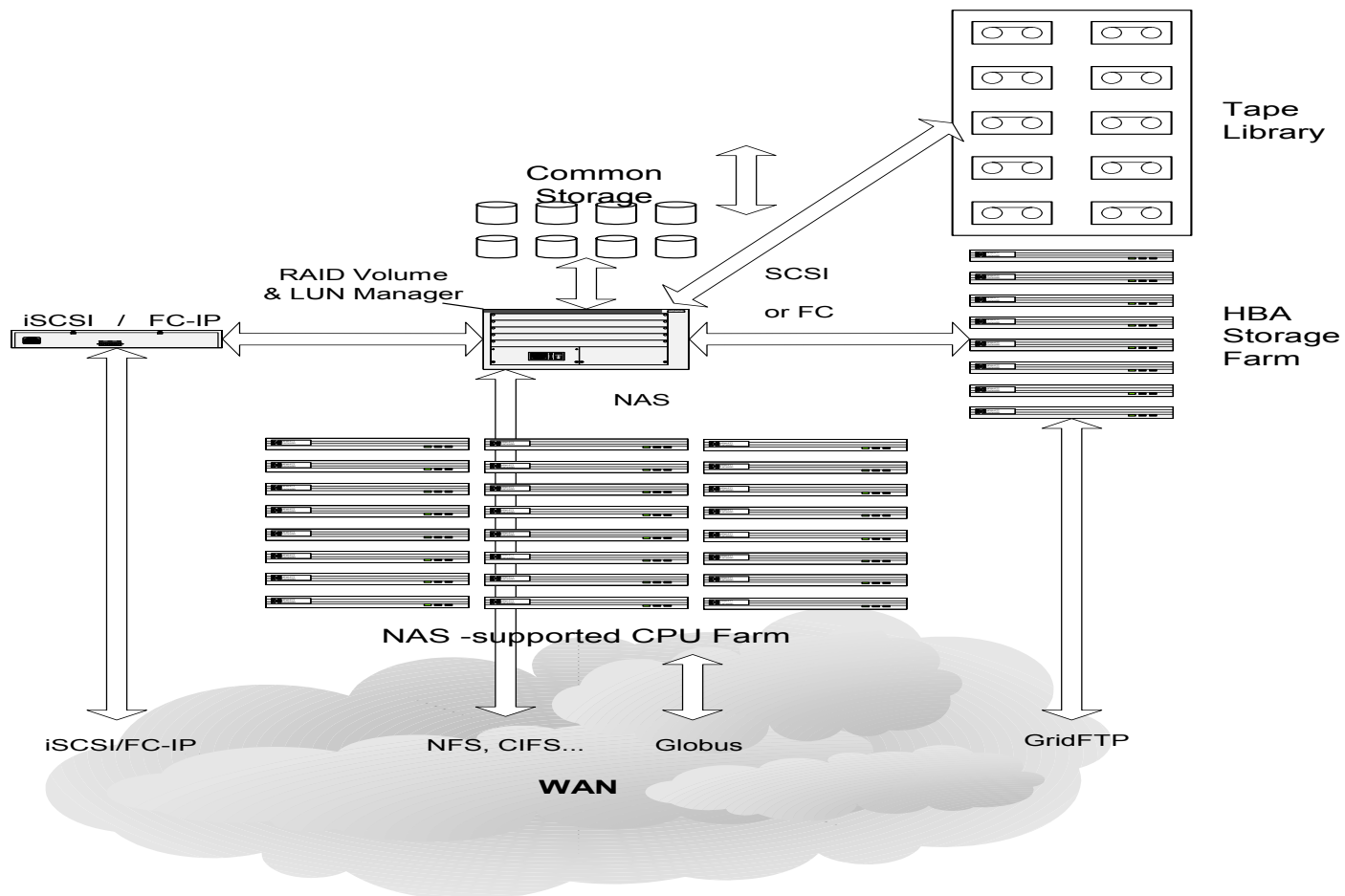
**Tier 2 – Integration
of underutilized
infrastructures**
(School Network PCs,
University PC labs, etc.)



GRNET Central Node (existing)

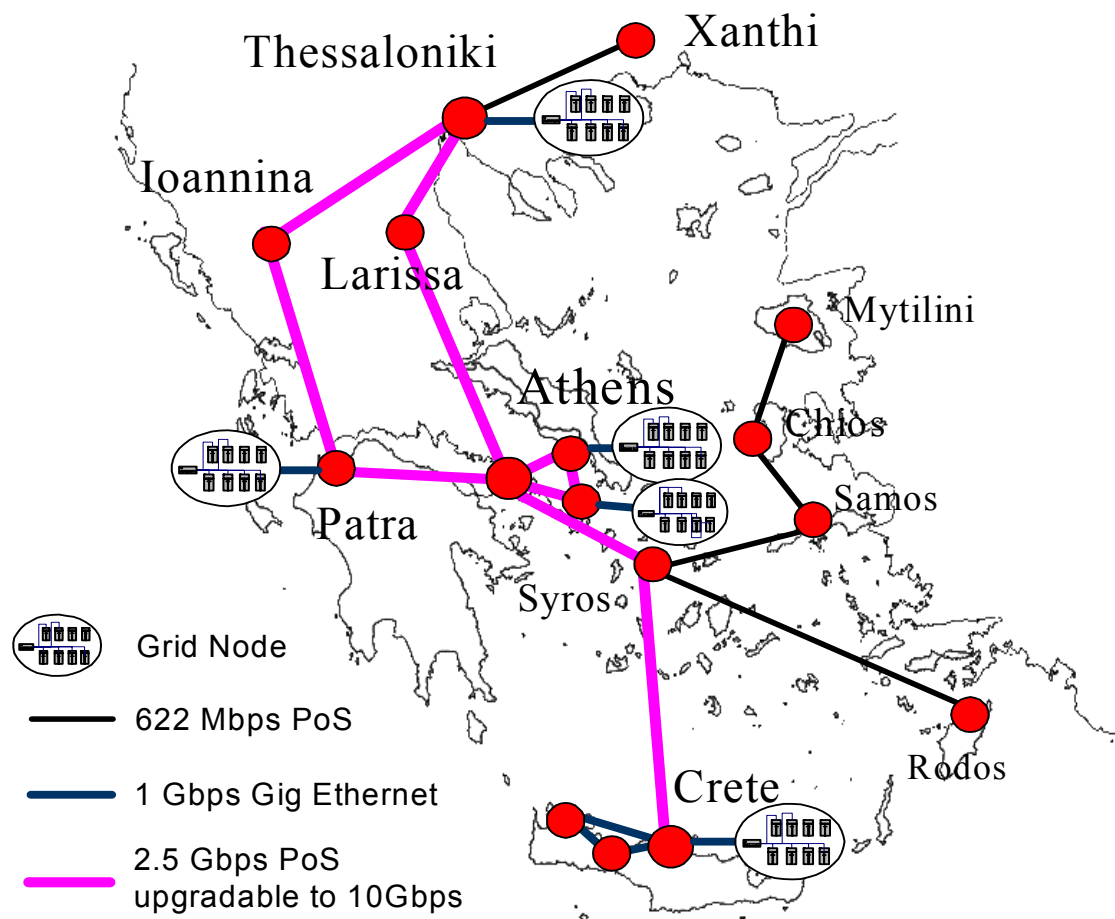
- >32 dual Xeon CPUs:
- 20 computing - 8 storage elements – 4 administration
- 10 TB SAN- Fiber Channel (FCAL)
- Tape Library 10TB
- Supports iSCSI, FCIP
- Linux Redhat 7.3 (to be upgraded to CEL)
- LCG2 M/W
- Cost ~ 500K

**Location: Athens,
Demokritos Research
Centre
Gigabit Access**



GRNET/Hellas Grid eInfrastructure

- Exploitation of GRNET broadband network
 - 2,5 Gbps backbone available
- Colocation of Grid Nodes in Research / Academic centres
- Creation of a human network
 - Scientific community – GRNET: 81 Institutes
- Use of Access Grid
 - for collaboration and management of GOCs



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The role of GRNET (1/2)

- Bonding link at National and European Level
 - Hellasgrid coordinator
 - EGEE partner – link with Hellas Grid Task Force
 - Use of Hellas Grid partners as EGEE Third Parties
 - SEE-GRID project coordinator
 - Organization of 1st eInfrastructure event in Athens www.einfrastructures.org

The role of GRNET (2/2)

- Participates in global fora – following technology evolution (iGrid2002 Virtual Ancient Olympia demo, GGFs, Supercomputing 2003-2004, iGrid2005)
- Collaboration with CERN
 - CERN Visits- Demonstration of H/W and M/W
 - Co-organization of EDG M/W Training - 15-16 December 2003
- Technology diffusion to its 81 interconnected institutes
→ *GRNET has adopted the EU eInfrastructure model and is successfully implementing it*

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Conclusions

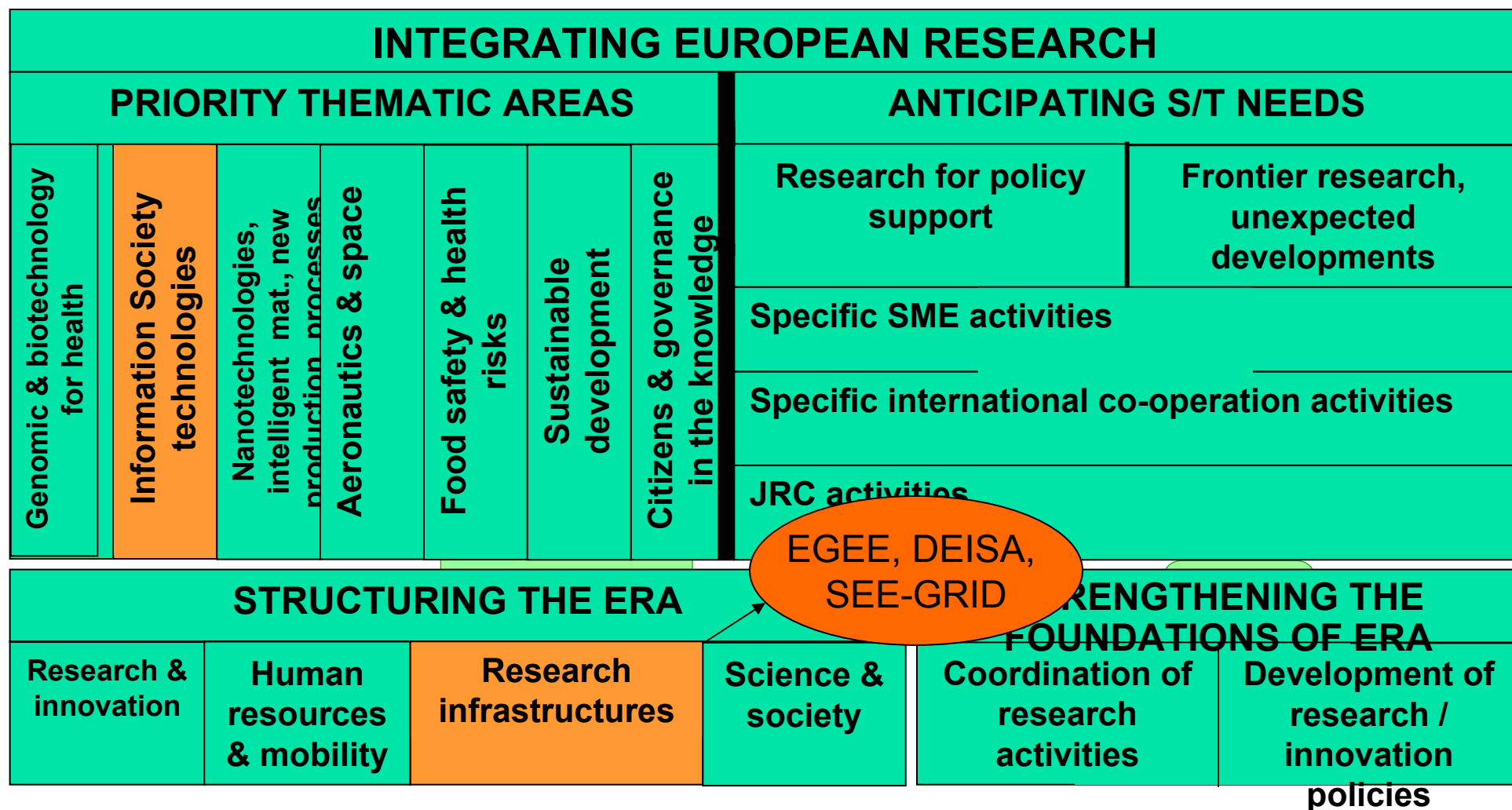
- **Greece is actively participating in European Grid initiatives!**
- **We need continuous governmental support (from the National Programme of the Information Society)**
- **We need user participation and collaboration at all levels (networking, - M/W-applications)**
- **There is eagerness for learning...**

EDG Training –Athens, December 2003



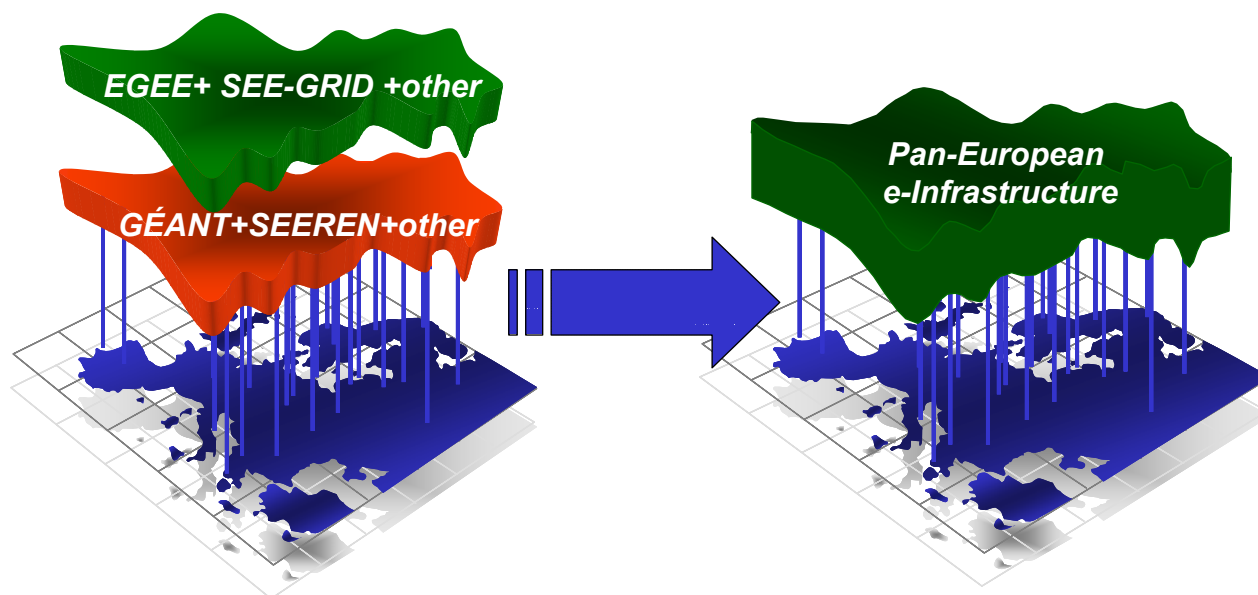
Thank you! For more information
www.hellasgrid.gr

FP6 structure



Integrated electronic Infrastructures

- Integrated networking and Grid infrastructures



The EU eInfrastructures initiative

- 1st meeting during EU Greek presidency – www.einfrastructures.org
 - Athens, 12 June 2003
 - Creation of the eInfrastructure Reflection Group (eIRG)
- 2nd meeting– Italian Presidency
 - Rome, December the 9th
 - eIRG 1st meeting 10 Δεκεμβριου
- US Cyberinfrastructure analogoys