Advancing South-East Europe into the eInfrastructure era

www.see-grid.eu

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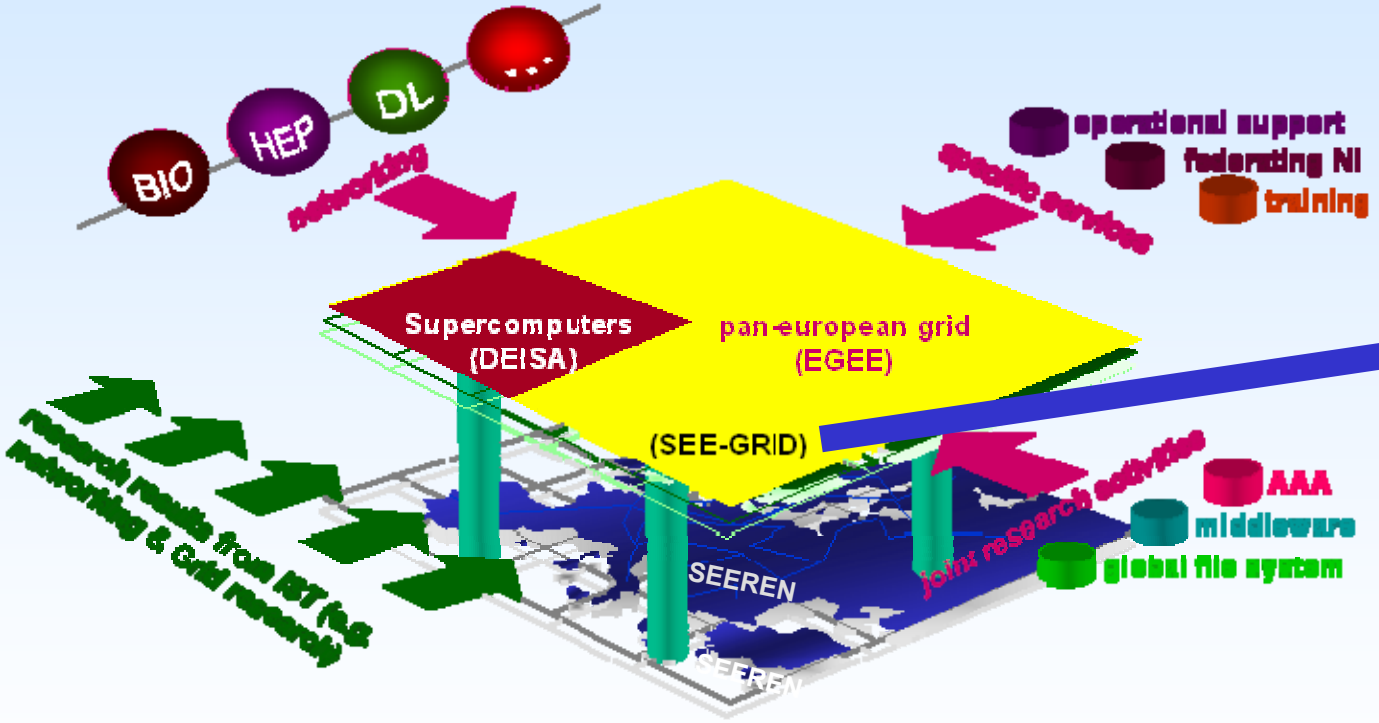
Outline

- SEE-GRID-1 project May 2004 - May 2006: results
- SEE-GRID-2 project May 2006 - May 2008:
  - Definition
  - Objectives
- Recommendations for regional initiatives

The SEE-GRID-1 initiative

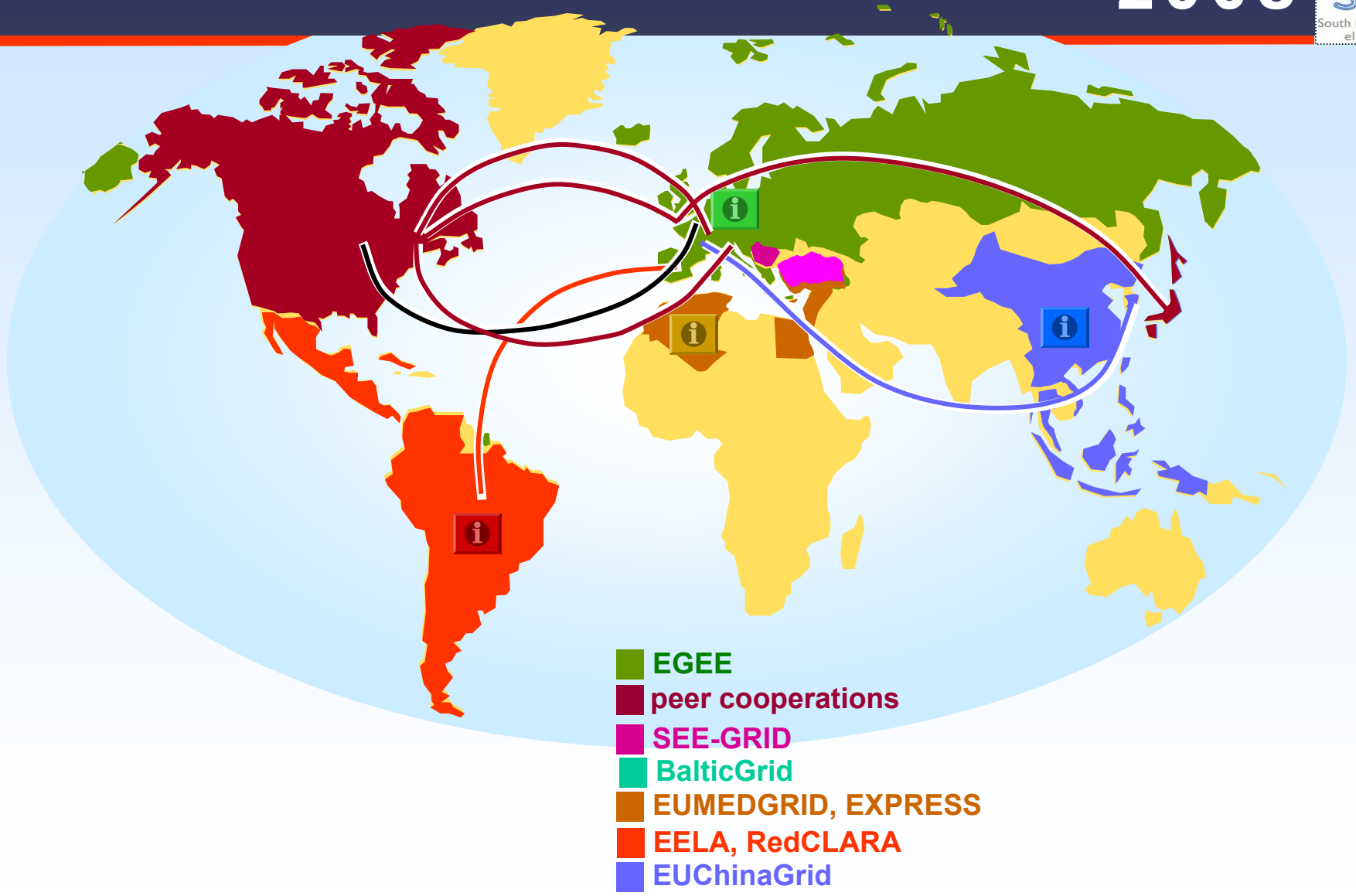
SEE-GRID
South Eastern European GRid-enabled eInfrastructure Development

Contribute to building a worldwide Infrastructure by expanding the “eInfrastructure inclusion” into South-East Europe



> http://www.see-grid.org

Grids: regional expansion 2004-2008



SEE-GRID-1 project partners: the regional dimension

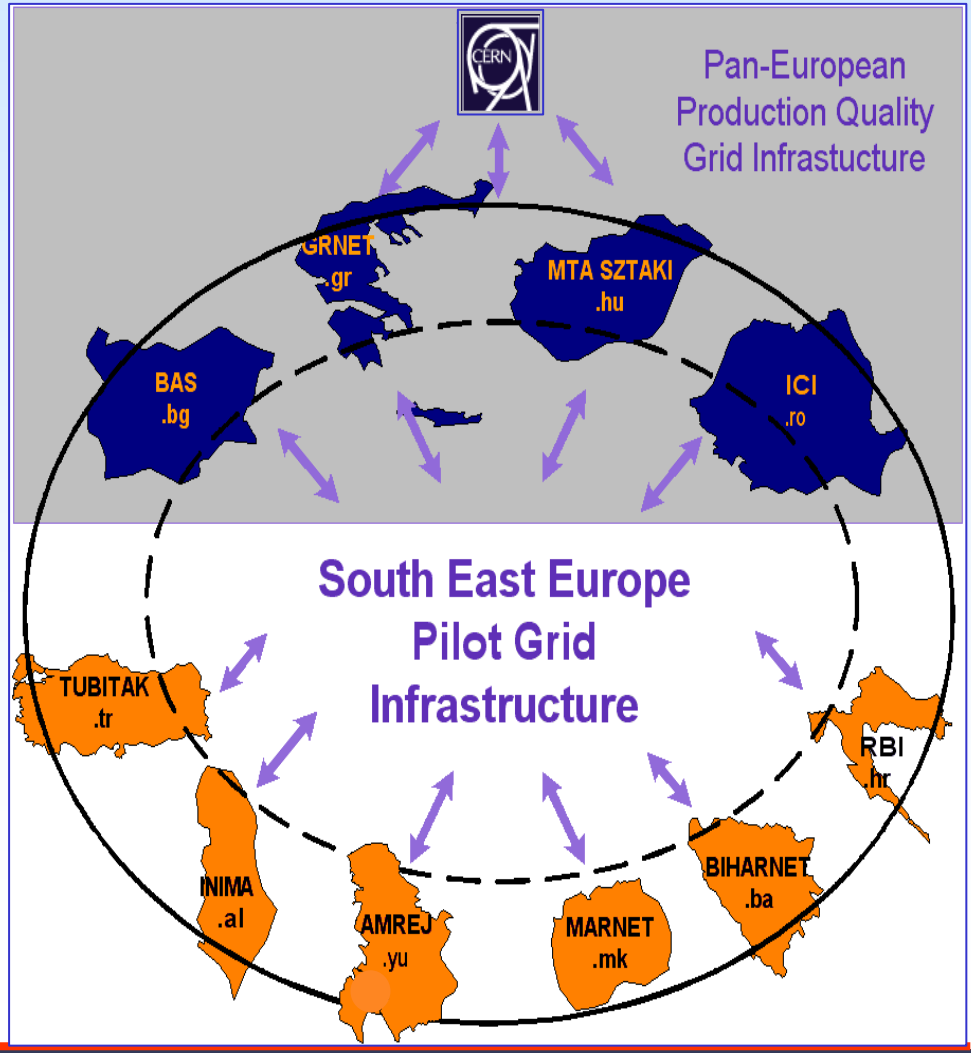
SEE-GRID
South Eastern European GRid-enabled eInfrastructure Development

Contractors

GRNET	Greece
CERN	Switzerland
SZTAKI	Hungary
IPP-BAS	Bulgaria
ICI	Romania
TUBITAK	Turkey
INIMA	Albania
BIHARNET	Bosnia-Herzegovina
UKIM	FYR of Macedonia
UOB	Serbia-Montenegro
RBI	Croatia

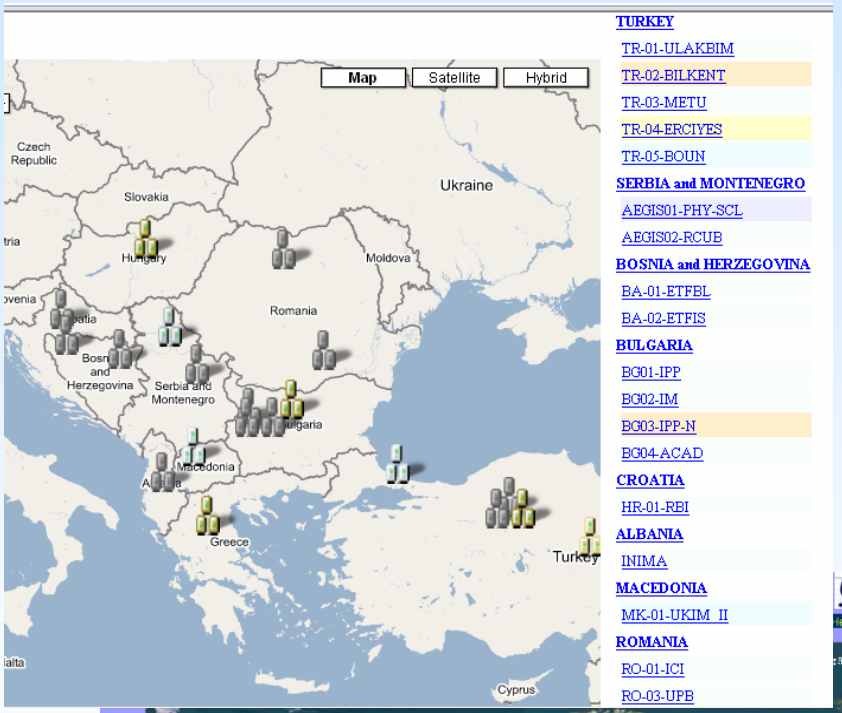
Third Parties

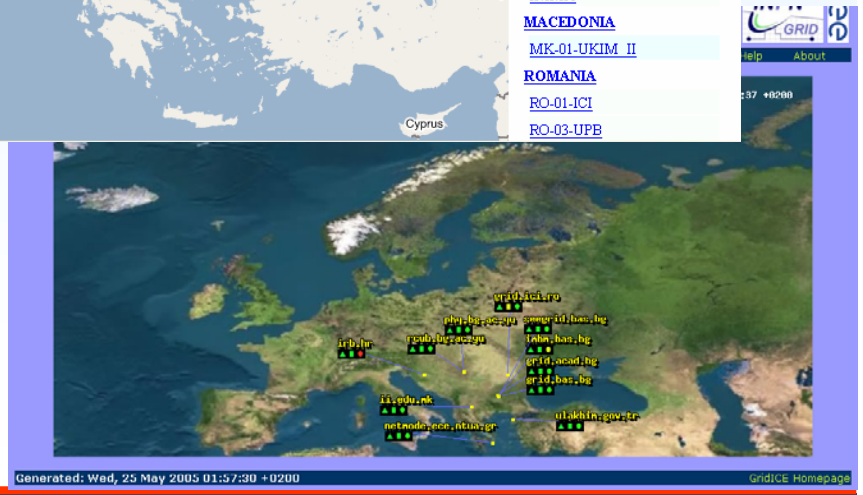
18 universities / research centres



SEE-GRID-1 key results: infrastructure

- Large, distributed infrastructure spanning all countries:
  - Including EGEE-SEE sites, without GR and HU: 30 sites, 450 CPUs
  - 150 CPUs in 20 non-EGEE-SEE sites
- LCG-2 MW on Scientific Linux
- Support the SEE-GRID Virtual Organization
- Interconnection of SEE sites by *P-GRADE portal*
- Catch-all SEE-GRID CA operational
- Overlap with EGEE production
- Operations centre management solutions deployed: a number of monitoring tools, helpdesk, sites database, etc…

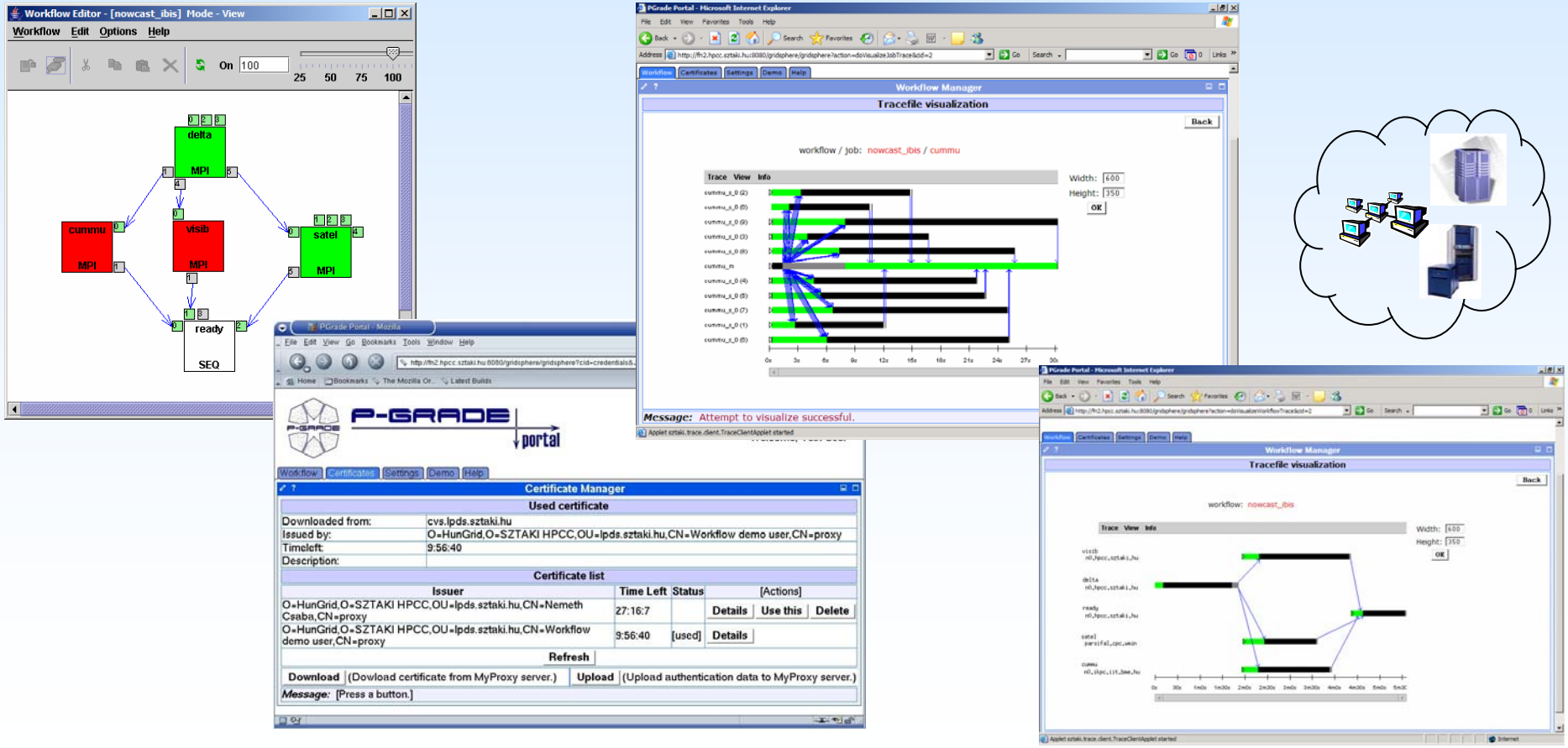




P-GRADE Grid Portal

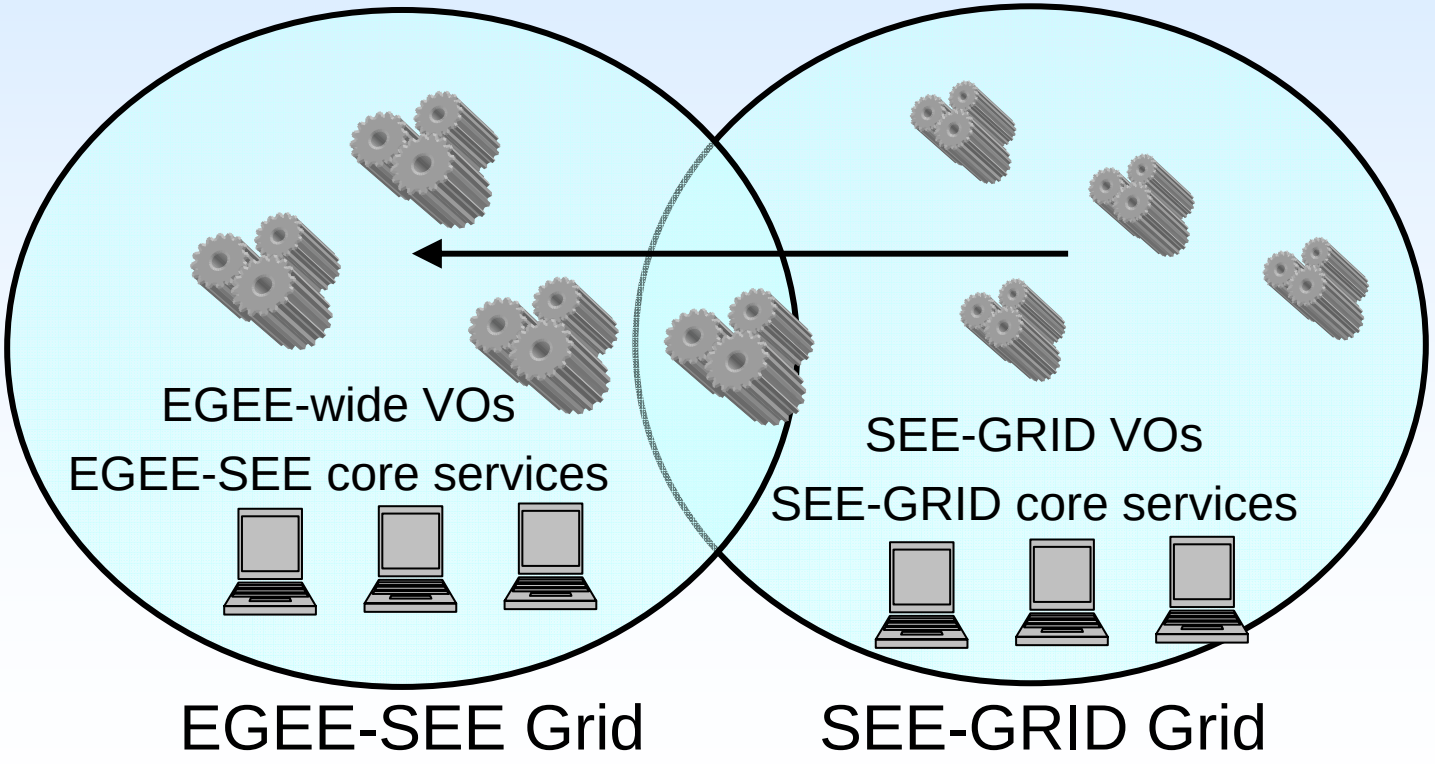
SEE-GRID
South Eastern European GRid-enabled eInfrastructure Development

WORKFLOW DESIGN → CERTIFICATE MANAGEMENT → PERFORMANCE ANALYSIS → EXECUTION ON THE GRID



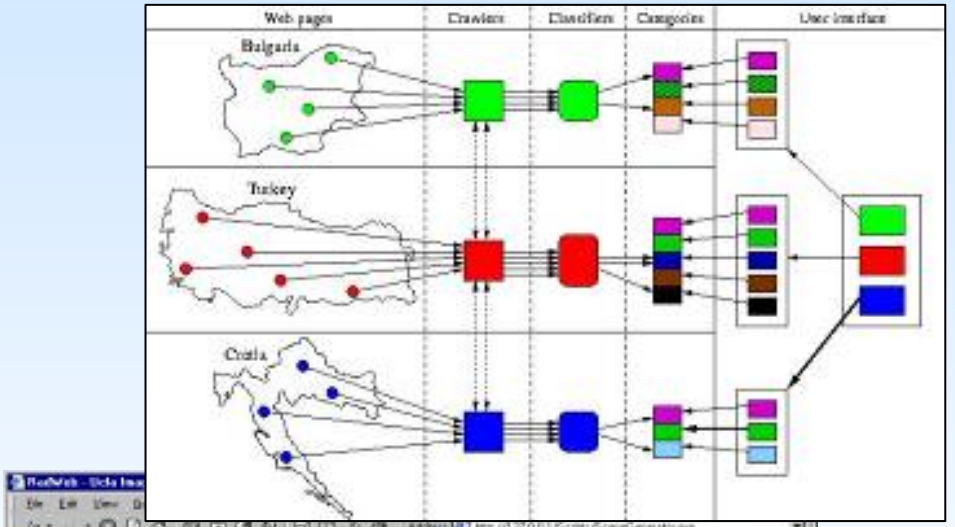
SEE-GRID and EGEE

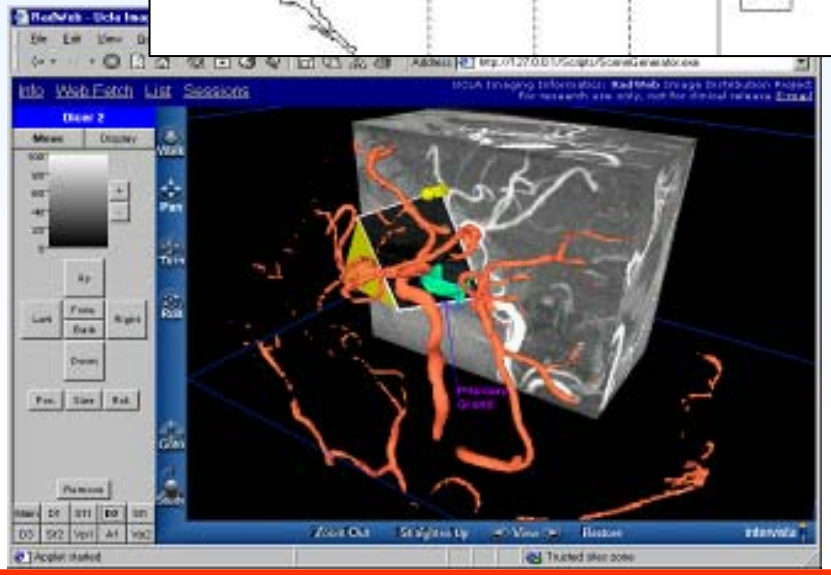
- Infrastructure overlapping and complementing to EGEE
- SEE-GRID open to new “fresher” sites
- SEE-GRID open to new applications



SEE-GRID-1 key results: applications

- 2 regional grid applications developed:
  - Search Engine for South-East Europe (SE4SEE) for Grid-aided web-crawling & data indexing.
  - Volumetric Image Visualization Environment (VIVE) for medical images and other static or time-dependent scalar and vector 3D fields
  - Both have been extensively tested and used in the SEE-GRID infrastructure
- EGEE applications are deployed on the sites which have been included in EGEE-SEE ROC and thus support these VOs (HEP, BioMed + other EGEE VOs!)





SEE-GRID-1 key results: - human network

- The Human Network that will outlive the project
- Dissemination
  - Policy and concertation
  - Conferences and publications
  - Relationships with other projects
  - Donations
- NGIs
- Trainings

SEE-GRID Newsletter

VOLUME 1, ISSUE 2 MAY 2005

SPECIAL POINTS OF INTEREST:

INSIDE THIS ISSUE:

Progress of the SEE eInfrastructure deployment

SEE-GRID has made significant progress in the deployment of the regional pilot Grid infrastructure. All sites in the region successfully follow the LCG release cycle and are currently upgrading to LCG2.4.0. The SEE-GRID infrastructure now also successfully supports a set of core services - Resource Broker (RB), Virtual Organization Membership Service (VOMS), Berkeley Database Information Index (BDII), MyProxy - which support the experimental SEE-GRID Virtual Organization (VO).

In more detail, the VOMS server that has been installed in the Ruđer Bošković Institute in Zagreb as an authorization system for the SEE-GRID VO, provides information on the user's relationship with the Virtual Organization, his/her groups, roles and capabilities. A backup VOMS server for the SEE-GRID VO exists in CERN. Also, secondary SEE-GRID RB and BDII nodes are installed at the Institute of Physics in Belgrade site, following the installation of the primary ones in TUBITAK in Turkey.

Furthermore, the University of Ss Cyril and Methodius in Skopje, responsible for the deployment of monitoring tools for the SEE-GRID testbed is supporting the deployment of GridICE and Ganglia. Currently, almost all sites have installed GridICE, and thus the monitoring node is able to provide services to the monitored sites.

Additionally, an Open-Source, PHP-based solution for the Trouble Ticketing System (TTS) providing user support and operational support in the SEE-GRID project has been developed by the National Institute for R&D in Informatics in Bucharest. The system prototype, based on the "One or Zero" application has been developed and is currently available for testing. It should be mentioned that the same support application is used by the South-East Federation in the EGEE project which will facilitate the cooperation between the two projects on user support issues.

Further progress also took place in Bulgaria where the SEE-GRID partner IPP-BAS installed a second SEE-GRID site (both sites have enabled the grid-ice monitoring). After having successfully run the first SEE-GRID VO test job submissions, IPP-BAS is now preparing to port the GATE application from EGEE biomed VO on SEE-GRID clusters.

Finally, under the overall coordination of GRNET and with the valuable contribution from CERN, acceptance of SEE-GRID sites in product-level EGEE infrastructure has gradually commenced with sites from beneficiary partners Serbia-Montenegro, Croatia, Turkey, and FYR of Macedonia, being assessed as conforming to the criteria for EGEE inclusion. These sites will shortly begin joining the EGEE infrastructure and will mark the progress of the region towards digital integration with the rest of Europe.

SEE-GRID-2 project partners: expansion

Start date:	01/05/2006
Duration:	24 months
Total Budget:	2,028,886 €

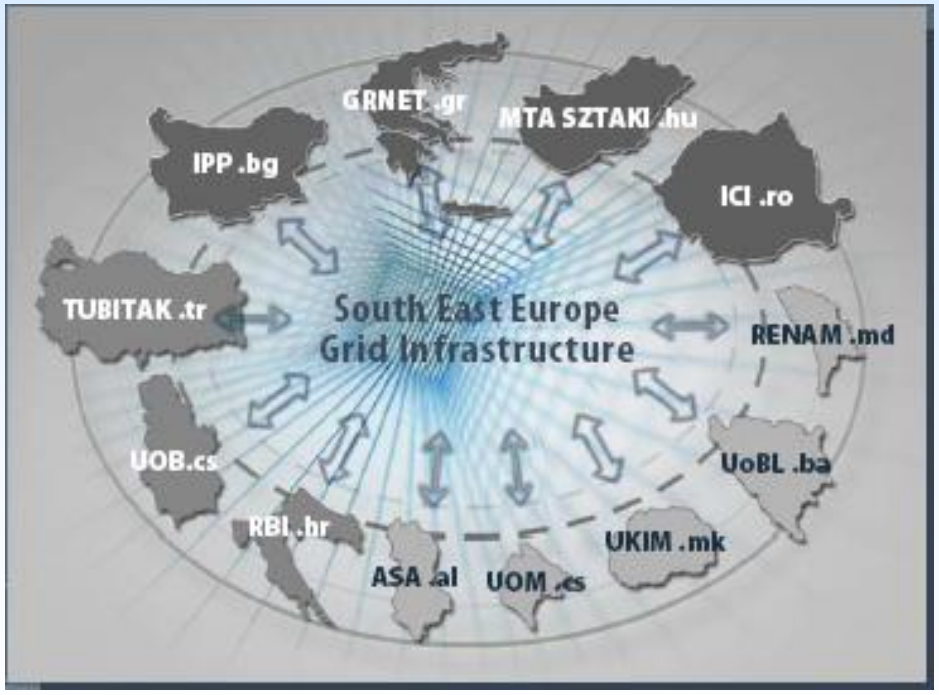
Contractors

GRNET	Greece
CERN	Switzerland
SZTAKI	Hungary
IPP-BAS	Bulgaria
ICI	Romania
TUBITAK	Turkey
ASA/INIMA	Albania
UoBL	Bosnia-Herzegovina
UKIM	FYR of Macedonia
UOB	Serbia
UoM	Montenegro
RENAM	Moldova
RBI	Croatia

3 types of countries

Third Parties

27 universities / research centres

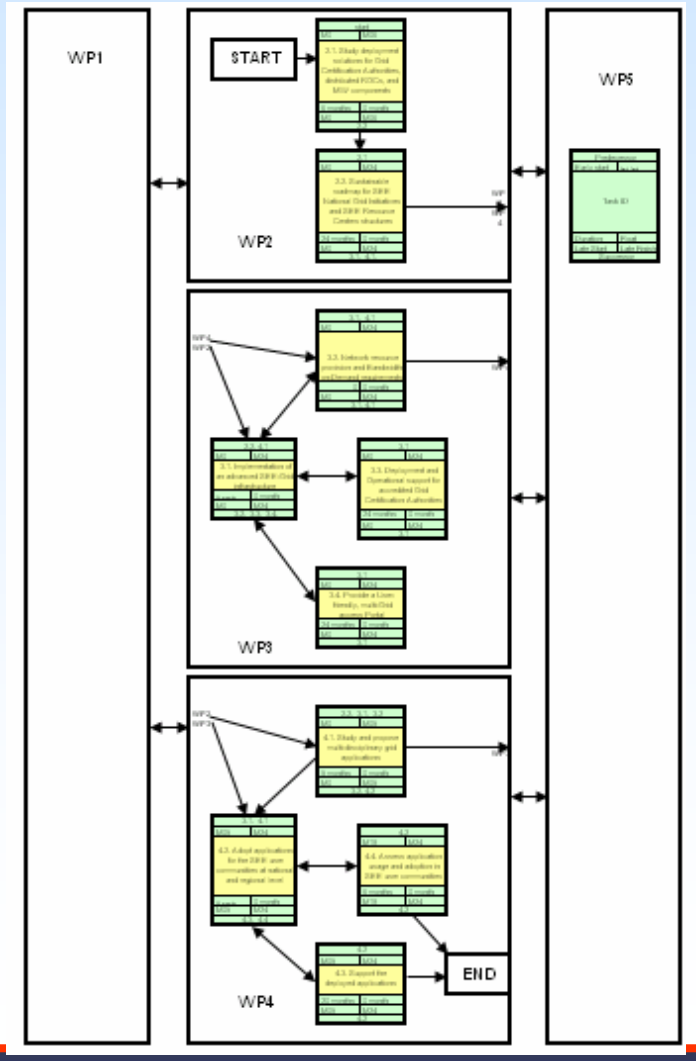


SEE-GRID-2: new directions

- Policy-focused deployment strategy
  - Shift priority from a "top-down" approach (i.e. from regional project execution to national implementation) towards a a "bottom-up" approach (from national priorities, cooperation, and innovation to regional cohesiveness)
  - Achieve Grid uptake and buy-in beyond the "usual suspects" of the R&E community (-> government, policy-makers, dialogue with industry…)
- Growth of infrastructure
  - Expand regionally to include new countries/areas and widen the SEE eInfra community
  - Expand nationally to include new sites/institutes and strengthen collaboration in each country
- Application-driven deployment approach
  - serve the needs of diverse and multi-disciplinary communities
  - extend the user-base – USE the grid, USE the network, USE the Infrastructure

Work organization

- WP1 - Project management
- WP2 – Sustainability
  - Studies and Strategies for sustainable operational, organizational and policy schemes
- WP3 - eInfrastructure expansion and operations support
- WP4 - User community enlargement and applications support
- WP5 - Training, dissemination and communication



SEE-GRID-2 objectives: ensure sustainable development

- Clear NGI strategy
- National government commitment and support for incubating NGIs
- Build solidarity and cooperation with research and academic organizations at national level
- Engage regional and national user communities
- Build long-term operational solutions: operations centres, CAs, etc, in each country

SEE-GRID-2 objectives: upgrade SEE grid infrastructure

- Upgrade the capacity of the regional pilot infrastructure
- Guarantee stability and interoperability of the infrastructure
- Support the accreditation of national Grid CAs.
- Strengthen operations at national level
- Deploy portal technology for accessing the grid and supporting application development and deployment
- Draw upon deployment experience/results of other grid projects (EGEE/EGEE-II, EUMEDGRID, BalticGrid, EELA, etc)

SEE-GRID-2 objectives: strengthen the human network

- Liaise with and beyond SEE user communities
- Training events
  - at regional level for site admins and end-users
  - at national-level
- Dissemination events
  - at regional level for policymakers and public at large
  - at national-level
- Regional eInfra projects Policy Workshop – September in Geneva!

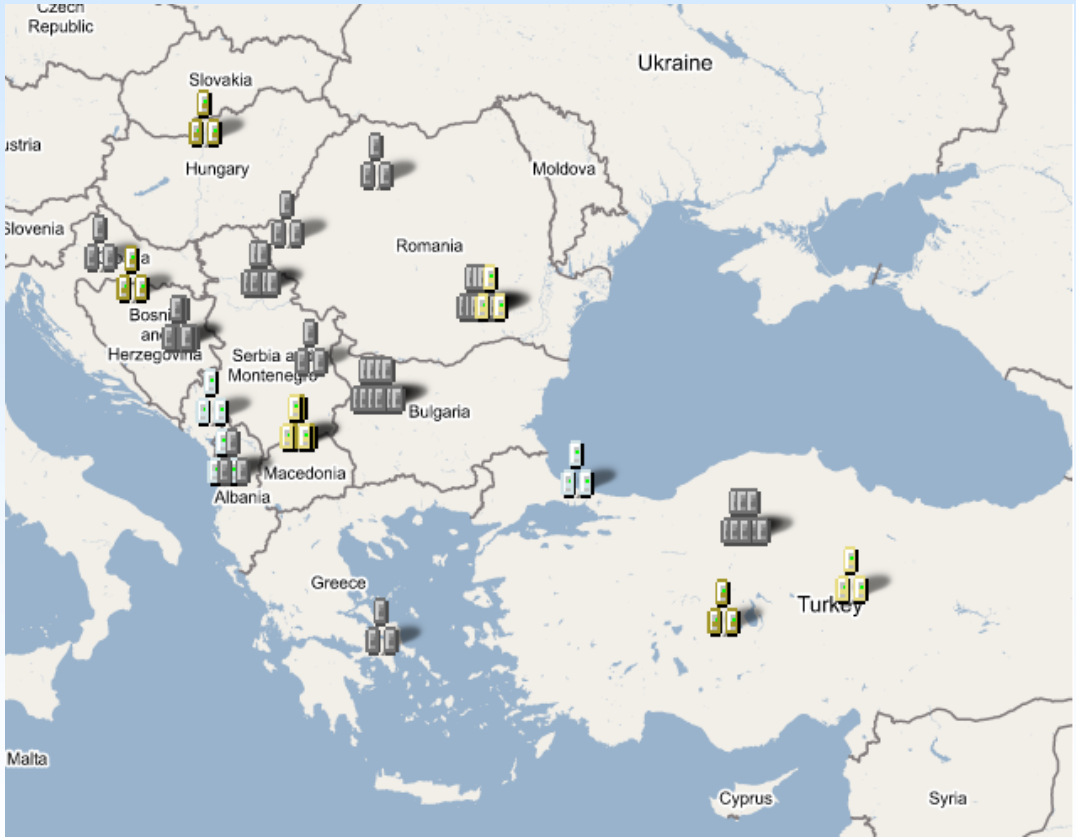
Joint Regional CE EGEE and SEE-GRID Summer School on Grid Application Support

- **Budapest, Hungary 03-08/07/2006**
  - aims at introducing Grid technology to potential users and at studying and practicing application development methods and tools using
    - the Central European Virtual Organization of the EGEE Grid infrastructure and
    - the Southern Eastern European Grid infrastructure
  - Gridification of the users' own applications
- **www.egee.hu/grid06/**

Current infrastructure

- Number of Countries: 11
- Number of Sites: 31
- Number of CPUs: 540
- TBs of Storage: 11.64

- Migrating from LCG to gLite



Infrastructure management: monitoring

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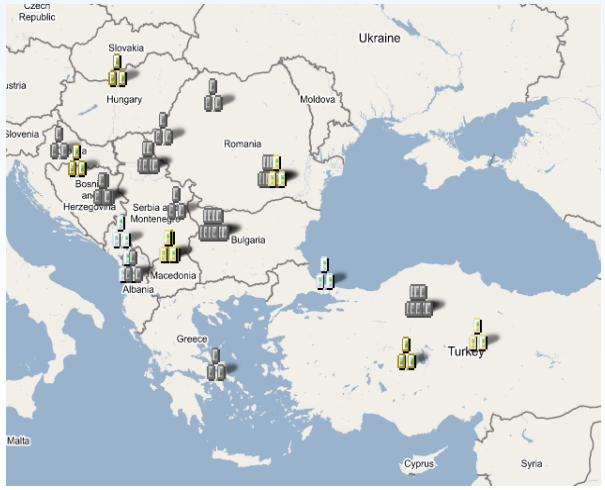
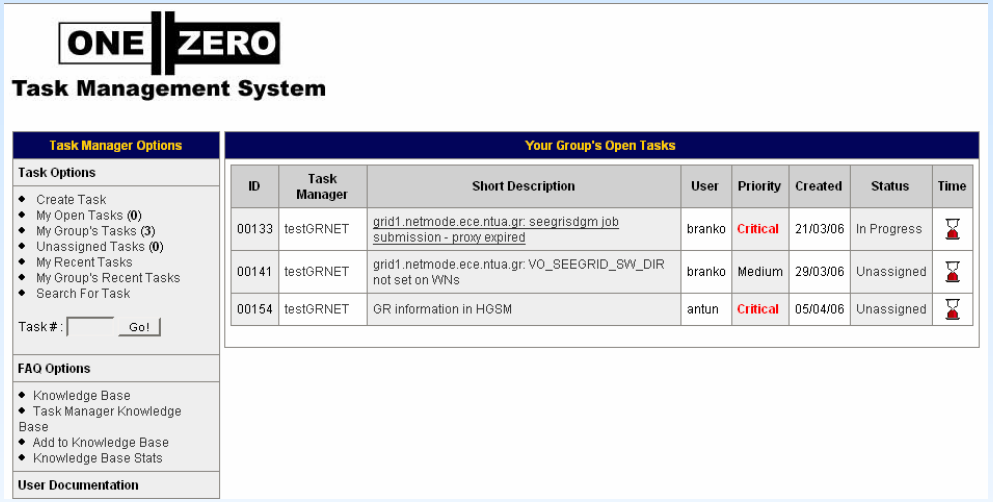
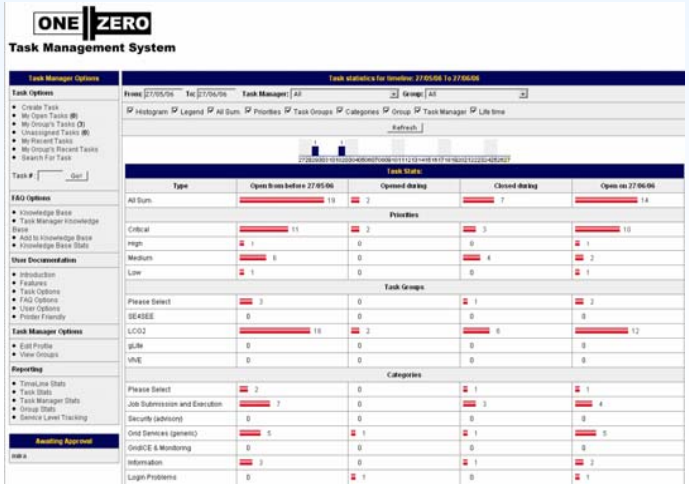
No	Site Reports	GIIS Host	lmode	cerose	gserf	sanity	serv	version	totalCPU	freeCPU	runJob	waitJob	seAvail TB	seUsed TB	maxCPU	avgCPU
1	AEGIS01-PHY-SCL	ce.phy.bg.ac.yu	ok	ok	ok	ok	ok	GLITE-3_0_1	100	1	99	276	0.06	0.07	100	95
2	AEGIS02-RCUB	grid01.rcub.bg.ac.yu			ok	ok		LCG-2_7_0	12	6	6	0	0.10	0.08	12	11
3	AEGIS03-ELEF-LEDA	grid01.elfak.ni.ac.yu			ok	ok		LCG-2_7_0	4	4	0	0	0.00	0.00	4	3
4	AEGIS04-KG	cluster1.csk.kg.ac.yu			ok	ok		GLITE-3_0_1	6	6	0	0	0.07	0	6	5
5	AL-01-INIMA	prof.salla6.inima.al			ok	ok		LCG-2_7_0	4	2	1	28	0.00	0.01	8	4
6	AL-02-FIE	seegrid2.fie.upt.al			info	ok		GLITE-3_0_0	0	0	0	13332	0.02	0.00	8	2
7	BA-01-ETFBL	c01.grid.etfbl.net				error		na							4	3
8	BA-02-ETFIS	g01.etf.unssa.rs.ba			ok	ok		LCG-2_7_0	2	2	0	12	0.04	0.01	6	5
9	BA-04-PMFSA	grid01.pmf.unsa.ba			ok	ok		LCG-2_7_0	6	0	3	0	0.03	0.00	12	7
10	BG01-IPP	ce002.ipp.acad.bg			ok	ok	ok	GLITE-3_0_0	19	1	0	0	0.93	0.07	20	16
11	BG02-IM	ce001.imbm.bas.bg			ok	ok	ok	LCG-2_7_0	5	1	4	69	0.03	0.03	5	4
12	BG05-SUGrid	ce001.grid.uni-sofia.bg			ok	ok	ok	LCG-2_7_0	7	2	7	16	0.05	0.02	9	5
13	HR-01-RBI	grid1.irb.hr			ok	ok		LCG-2_7_0	20	20	0	2	0.05	0.00	20	19
14	MK-01-UKIM_II	grid-ce.ii.edu.mk			ok	warn	ok		12	12	0	5	0.21	0.00	12	11
15	MK-02-ETF	grid-ce.etf.ukim.edu.mk				error		na							1	0
16	MREN-01-CIS	grid01.cg.ac.yu			info	ok		LCG-2_7_0	4	4	0	0	0.12	0.00	4	3
17	RO-01-ICI	testbed001.grid.ici.ro			ok	ok	ok	GLITE-3_0_0	20	0	14	36	0.40	0.02	21	15
18	RO-03-UPB	gw01.rogrid.pub.ro			ok	ok		LCG-2_7_0	5	5	0	0	0.05	0.00	5	4
19	RO-06-UNIBUC	ce01.rogrid.unibuc.ro			ok	ok		LCG-2_7_0	2	2	0	0	0.05	0.01	2	2
20	RO-07-NIPNE	tbit01.nipne.ro			ok	warn		LCG-2_7_0	10	10	0	0			12	11
21	RO-08-UVT	ce01.info.uvt.ro			ok	ok		LCG-2_7_0	20	20	0	1	0.29	0.00	22	20
22	RO-09-UTCN	ce01.mosgrid.utcluj.ro			ok	ok		LCG-2_7_0	10	10	0	0	0.38	0.04	10	9
23	SZTAKI	n31.hpcc.sztaki.hu	error	note	ok	ok	ok	LCG-2_7_0	4	4	0	0	0.03	0.00	24	4
24	test-Grnet	grid1.netmode.ece.ntua.gr			ok	ok		LCG-2_7_0	0	0	0	41	0.05	0.00	0	0
25	TR-01-ULAKBIM	ce.ulakbim.gov.tr	ok	ok	ok	ok	ok	LCG-2_7_0	125	47	25	37	2.71	0.34	125	93
26	TR-02-BILKENT	grid2.cs.bilkent.edu.tr			ok	ok		LCG-2_7_0	7	7	1	0	0.25	0.14	8	7
27	TR-03-METU	ngyon01.cc.metu.edu.tr			ok	ok		LCG-2_7_0	7	7	0	0	0.04	0.00	7	6
28	TR-04-ERCIYES	grid01.erciyes.edu.tr			ok	warn		LCG-2_7_0	6	6	0	0			6	5
29	TR-05-BOUN	stalr.grid.boun.edu.tr			info	ok		LCG-2_7_0	3	0	3	0	0.06	0.00	3	2
30	TR-06-SELCUK	grid0.selcuk.edu.tr				error		na							0	0
							sites	countries	totalCPU	freeCPU	runJob	waitJob	seAvail TB	seUsed TB	maxCPU	avgCPU
						Total	30	11	420	179	163	13855	6.13	0.93	476	371

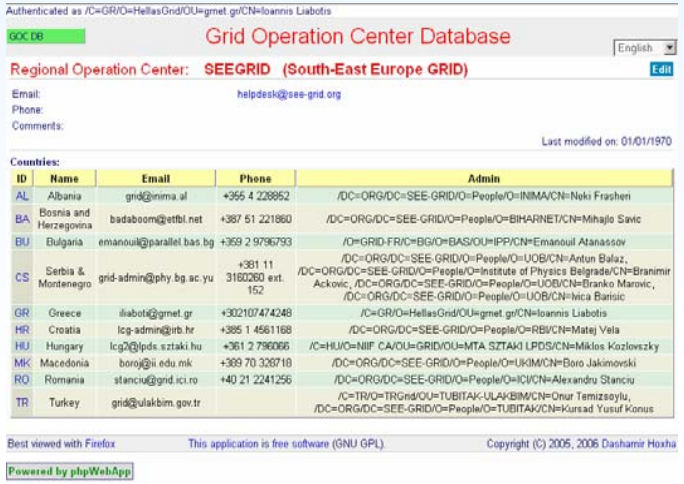
Site	Domain	GK#	Q#	RunJob	WaitJob	SlotLoad	Power	WN#	CPU#	CPULoad	Available	Total	%
		Computing Resources									Storage Resources		
AEGIS01-PHY-SCL	phy.bg.ac.yu	1	8	99	2	99%	560K	25	100	99%	135.2 GB	278.5 GB	51%
AEGIS02-RCUB	rcub.bg.ac.yu	1	3	6	0	50%	48K	12	12	11%	112.2 GB	199.2 GB	44%
AEGIS03-ELEF-LEDA	elfak.ni.ac.yu	1	3	0	0	0%	19K	4	4	0%	8.5 GB	9.3 GB	9%
AL-01-INIMA	salla6.inima.al	1	2	1	28	0%	4K	3	3	0%	1.2 GB	9.1 GB	87%
AL-02-FIE	fie.upt.al	2	6	0	26664	-	45K	8	8	0%	47.5 GB	49.1 GB	3%
BA-01-ETFBL	grid.etfbl.net	1	2	0	0	0%	17K	2	3	0%	147.2 GB	149.5 GB	2%
BA-02-ETFIS	etf.unssa.rs.ba	1	2	0	10	-	29K	3	6	0%	24.1 GB	29.8 GB	19%
BA-04-PMFSA	pmf.unsa.ba	1	2	3	0	166%	40K	7	9	0%	33.6 GB	34.4 GB	2%
BG01-IPP	grid.bas.bg	1	10	0	1	0%	-	-	-	-	591.7 GB	705 GB	16%
BG02-IM	imbm.bas.bg	1	5	4	15	83%	-	-	-	-	15.4 GB	32.9 GB	53%
BG04-ACAD	grid.acad.bg	1	10	1	3	0%	373K	39	78	14%	27 GB	70.3 GB	62%
BG05-SUGrid	grid.uni-sofia.bg	1	9	12	87	66%	-	-	-	-	58.5 GB	83.5 GB	30%
HR-01-RBI	irb.hr	1	4	0	2	70%	112K	5	20	0%	60.8 GB	64.6 GB	6%
MK-01-UKIM_II	ii.edu.mk	1	4	0	5	0%	72K	6	12	0%	327.5 GB	337.7 GB	3%
MK-02-ETF	etf.ukim.edu.mk	1	2	0	0	0%	-	-	-	-	-	-	133%
MREN-01-CIS	cg.ac.yu	1	2	0	0	0%	25K	2	4	0%	64.6 GB	67.7 GB	5%
RO-01-ICI	grid.ici.ro	1	8	8	8	80%	-	-	-	-	410.7 GB	433 GB	5%
RO-03-UPB	rogrid.pub.ro	1	3	0	0	0%	20K	6	6	0%	29.9 GB	34 GB	12%
RO-08-UVT	info.uvt.ro	1	7	0	1	0%	-	-	-	-	298.2 GB	299 GB	0%
RO-09-UTCN	mosigrid.utcluj.ro	1	3	0	0	0%	-	-	-	-	196 GB	216.6 GB	9%
SZTAKI	hpcc.sztaki.hu	1	2	0	0	0%	-	-	-	-	17.9 GB	18.7 GB	4%
TR-01-ULAKBIM	ulakbim.gov.tr	1	14	24	25	75%	665K	125	125	44%	2.7 TB	3.1 TB	11%
TR-02-BILKENT	cs.bilkent.edu.tr	1	13	0	0	0%	12K	1	2	0%	128.7 GB	205.1 GB	37%
TR-03-METU	cc.metu.edu.tr	1	13	0	0	0%	3K	1	1	0%	46 GB	50.3 GB	8%
TR-04-ERCIYES	erciyes.edu.tr	1	13	0	0	0%	-	-	-	-	97.3 GB	102.6 GB	5%
TR-05-BOUN	grid.boun.edu.tr	1	13	0	0	0%	-	-	-	-	30.8 GB	34.7 GB	11%
TR-06-SELCUK	selcuk.edu.tr	1	13	6	60	166%	-	-	-	-	24.5 GB	33.2 GB	26%
test-Grnet	netmode.ece.ntua.gr	1	2	0	27	-	-	-	-	-	29.3 GB	32.9 GB	11%
TOTAL	28 sites	29	178	164	26938	37%	2M	249	393	11%	5.6 TB	6.6 TB	15%



Infrastructure management: Helpdesk, database, wiki







Using the infrastructure

- Going to website www.seegrid.eu
- Talking to the SEEGRID representative in the country
- Obtaining a certificate from SEE-GRID catch-all CA
- Joining the SEE-GRID VO
- Asking local country Grid team to provide support

- Currently 10+ new applications under development, ~20 in the course of the project

Strategic priority: NGIs

- Formation of stable NGIs is the key to long-term sustainability
- National Grid Initiatives are concertated efforts taken at National level in order to deploy, operate, and expand grid infrastructures in a coherent and coordinated way
- Usually involves the inter-connection and inter-operation of academic and research-based resource centers under an umbrella of a national program aiming to integrate the available resources in order to establish an e-Infrastructure for the benefit of the R&E (e-Science) community, and in the long-term for the society at large

"A roadmap for establishing NGIs": first recommendations

- SEE-GRID Policy Workshop: held in Nov 2004 in The Hague during the EU Grid leadership week / 2nd EGEE conference

- No (product-quality, high-performing) grid without a (product-quality, high-capacity, reliable) network
- "Web of trust" that brings human capital together
- Exploit existing infrastructure and provide alternative technical roadmaps
  - Homogeneity of all available infrastructure/resources is not realistic
  - Key issue is interoperability
- Study both "best-practices" and "bad-practices" in grid-advanced regions and countries
- Sustainability is achieved through coordinated and complementary actions.
  - No single instrument/framework can address all issues of e-Infrastructure expansion and deployment
  - Political support is of primary importance, even more than available funding and technology solutions
  - A "champion" is needed to drive things per region/country / committed end-user community

- **-> http://www.see-grid.org/Policy.pdf**

Greenfield regions: further recommendations

- Carry out complementary but coordinated actions
- Training!
- NGI establishment, but allow for separate national strategies/agendas of NGIs: no sliver bullet
- Broad partnerships through MoUs and joint work: EGEE, SEEGRID, other regions
- Use EC financing as seed money – seek other sources

- Organize in federations with clear relations and modus operandi; scalable structure needed
- Distribute Grid and management services to spread the know-how and ensure joint responsibility and control
- Aim to have possibility of stand-alone operations, independent on related federated Grids and projects
- Adopt good technical solutions but also pursue alternatives
- Have clear/quantified target/criteria for migrating to EGEE

SEE-GRID-2 long-term strategy

- Strategic success metrics of regional Grid initiatives:
  - not Gbps/sec
  - not the number of nodes
  - not the TBs of storage

- The initiatives are puzzle pieces of RTD efforts to sustain regional development
  - Increasing the retention of talented scientists in the region
  - Pursuing joint R&D efforts among countries in the region
  - Making available the benefits of the Information Society for citizens
  - Easing the digital divide between the region and the countries at other side of spectrum
  - Improvement of regional competitiveness in all market sectors
  - Regional political stability and cohesiveness

Conclusions

- SEE-GRID was the first step for regional eInfrastructure integration
- SEE-GRID-2 is the next step towards SUSTAINABLE Grid-related ACTIVITIES (NOT just infrastructure!) in the SEE region
- SEE-GRID-2 is open for discussions, feedback, inputs to other related regional initiatives