BalticGrid Project

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BalticGrid

SIXTH FRAMEWORK PROGRAMME
RESEARCH INFRASTRUCTURES
COMMUNICATION NETWORK DEVELOPMENT

INTEGRATED INFRASTRUCTURE INITIATIVE

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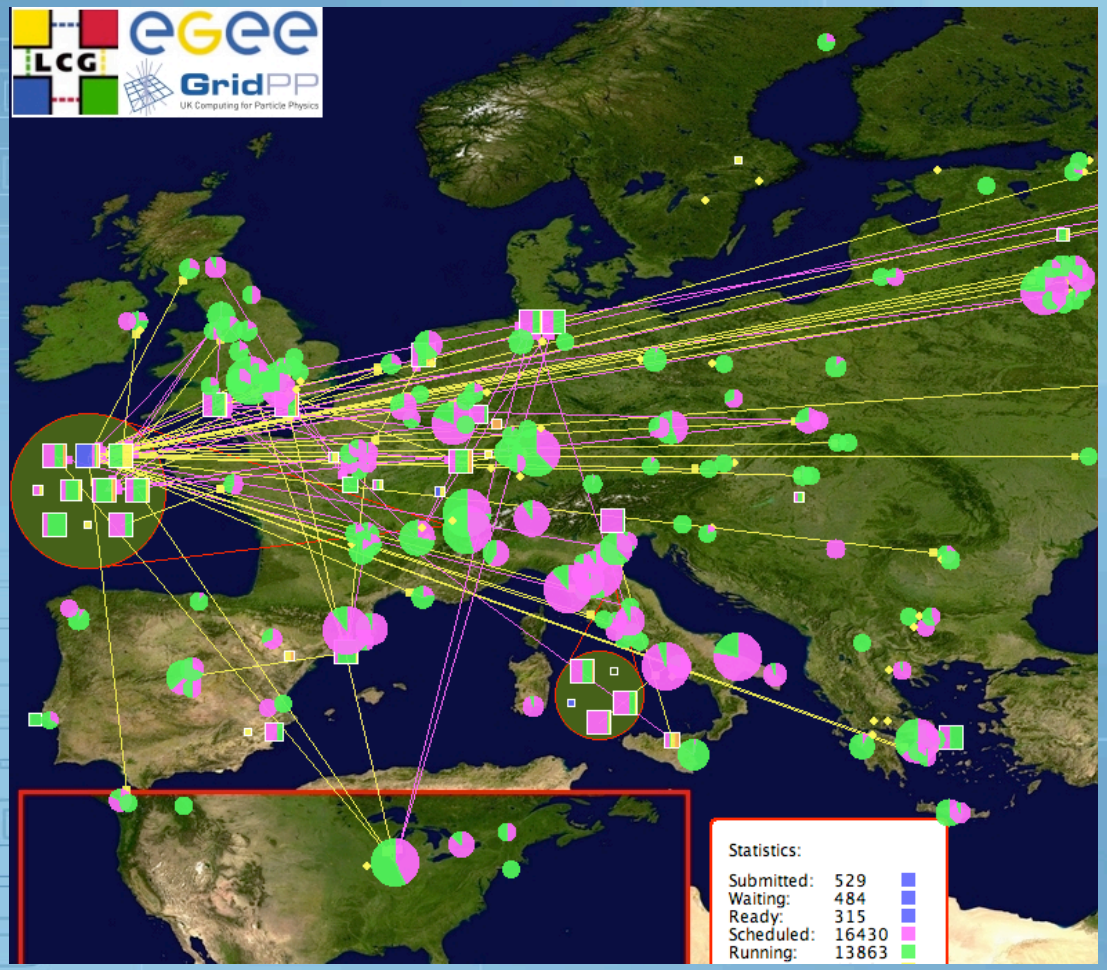
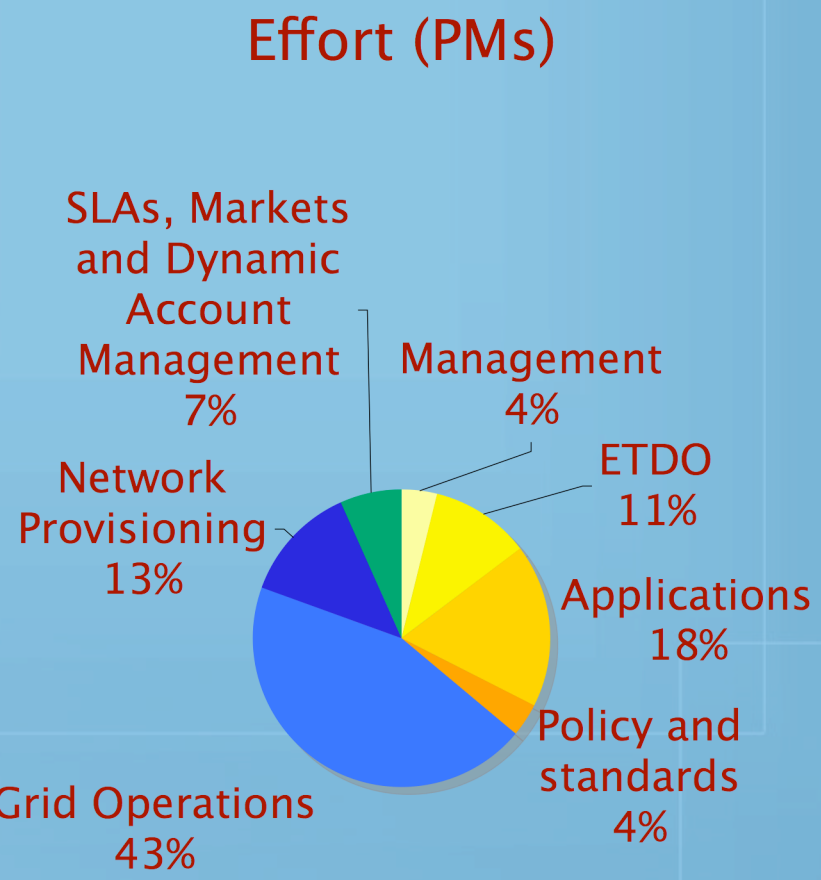
Baltic Grid on the Map



BalticGrid Facts

- Partners:
  - 10 Leading institutions in six countries in the Baltic Region and Switzerland (CERN)
- Budget:
  - 3.0 M€
- Coordinator:
  - KTH, Stockholm
- Duration:
  - 30 Months
  - Started 1 November 2005



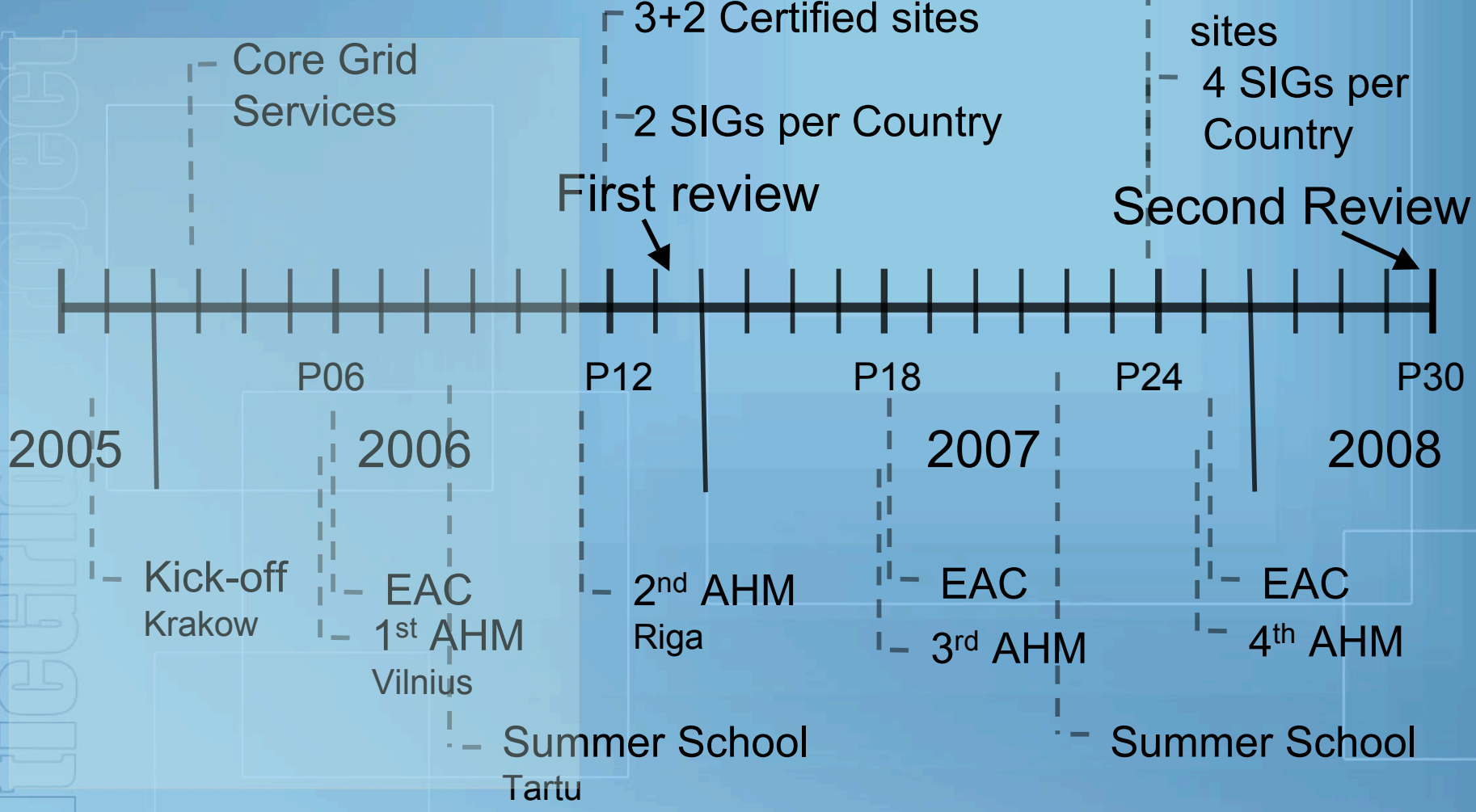
Partners

- Estonian Educational and Research Network, EENet
- Keemilise ja Bioloogilse Füüsika Instituut, NICPB
- Institute of Mathematics and Computer Science, IMCS UL
- Riga Technical University, RTU
- Vilnius University, VU
- Institute of Theoretical Physics and Astronomy, ITPA
- Poznan Supercomputing and Networking Center, PSNC
- Instytut Fizyki Jadrowej, im. Henryka Niewodniczanskiego, Polskiej Akademii Nauk, IFJ PAN
- Parallelldatorcentrum at Kungl Tekniska Högskolan, KTH PDC
- CERN

BalticGrid Objectives

- Establish a production quality Grid infrastructure with high-quality services in the Baltic States
- Enable scientists to efficiently participate in the European Research Area and contribute to the European knowledge based economy
- Disseminate knowledge about Grids and their use to a broad academic community and public community;
- Provide education and training to Grid users and operators of Grid resources
- Develop a successful user base of significant scientific importance
- Establish Special Interest Groups in significant application areas
- Promote the Open Source Community by making use of Open Source Software for the BalticGrid basic infrastructure and services whenever possible
- Actively contribute to the development of standards and (European) policies for the use, operation and development of Grids and the infrastructure upon which Grids rely to interoperate with other European Grids.

Timeline


6+4 Certified sites
4 SIGs per Country
3+2 Certified sites
2 SIGs per Country
Core Grid Services
First review
Second Review
P06
P12
P18
P24
P30
2005
2006
2007
2008
Kick-off
Krakow
EAC
1st AHM
Vilnius
2nd AHM
Riga
EAC
3rd AHM
EAC
4th AHM
Summer School
Tartu
Summer School

Management of the Project

Executive Board
- One member per partner.

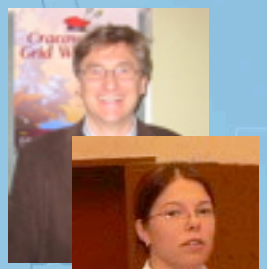
Project Director
- Overall responsibility for implementation of project plans

Project Management Board
- Activity Leaders and Managers
- Assure overall project coordination

External Advisory Committee

Operations Director

Networks Manager



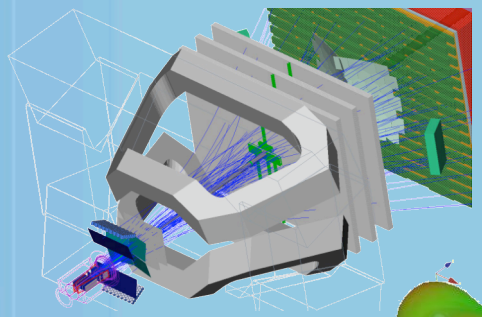
Activity Leader: Per Öster (KTH) Budget: 208k€ (7%) Effort: 22 person months (4%)

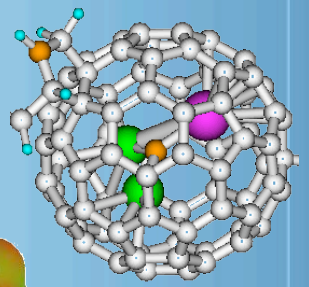
Education Training Dissemination and Outreach

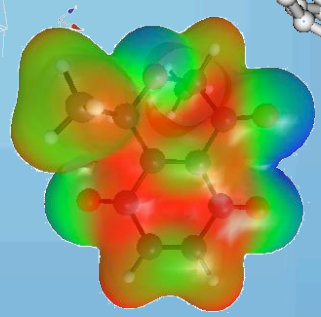
- BalticGrid web (www.balticgrid.org)
- Tutorials
- Seminars
- Kick-off
- Brochure
- Posters
- Articles
- Press
- Summer Schools

Activity Leader: Zofia Mosurska (IFJ PAN) Budget: 347k€ (12%) Effort: 60 person months (11%)

Application Identification and Support





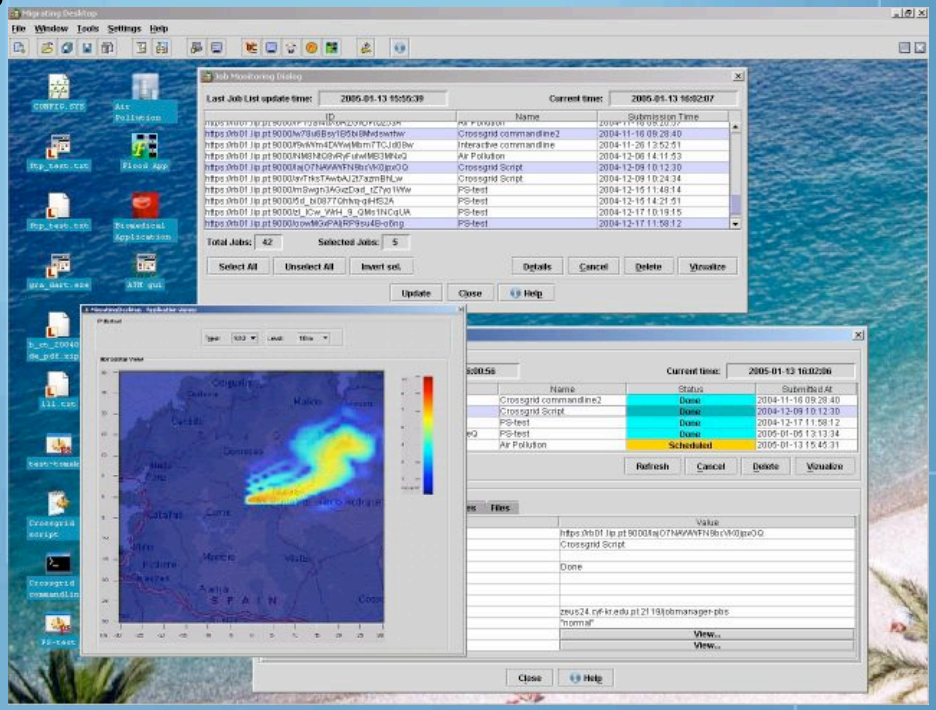


- Pilot Applications
  - High-Energy Physics
  - Materials Science
  - Bioinformatics
- Special Interests Groups
  - Gather research groups with similar or related R&D interest such as;
    - Modelling of the Baltic Sea eco system
    - Linguistic research
- Application Support
  - Formation of a Application Expert Group

AL: Algimantas Juozapavicius (VU) Budget: 489k€ (16%) Effort: 100 person months (18%)

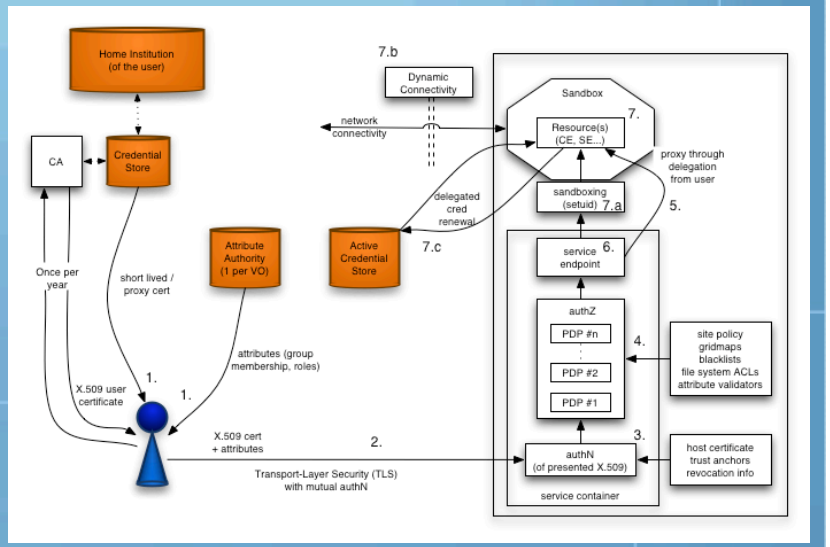
Application Identification and Support

- Application Survey
  - Detailed information about ~35 applications collected and analysed
- Analysis resulted in Application Support Roadmap
- Migrating Desktop
  - Platform for making applications available on the Grid
- PnP UI for Dalton users based on Zeus Grid Toolkit



Policy and Standards Development

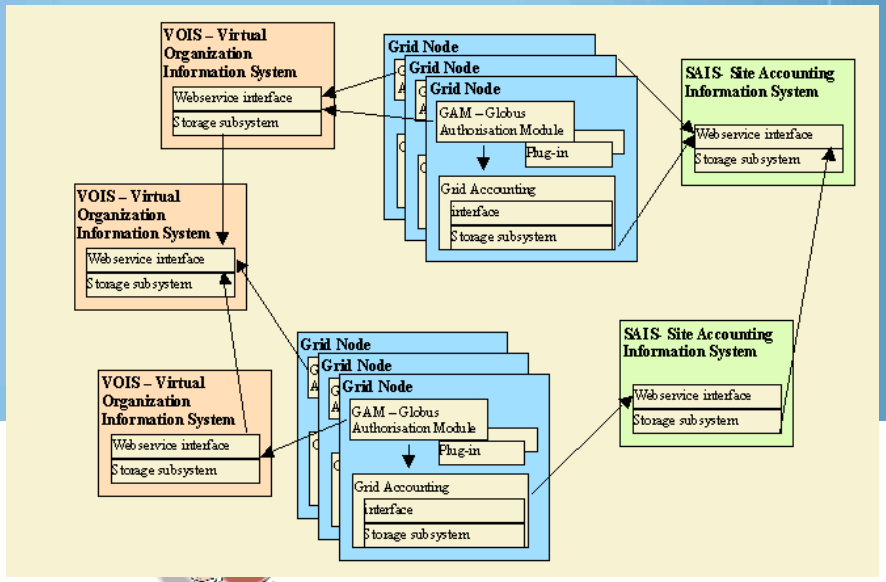
- Engage the BalticGrid partners in international standards and policy shaping activities
  - GGF, EU GridPMA, e-IRG,…
- Specific areas;
  - Infrastructure
  - Security
  - Research applications
  - Grid operations

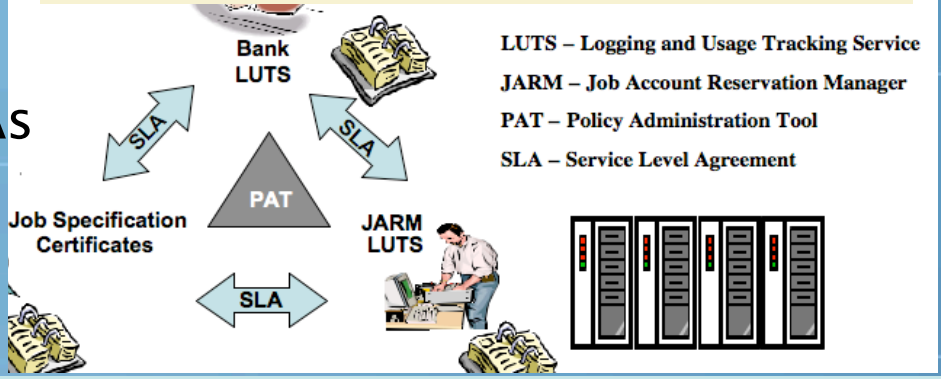


Former Activity Leader: Olle Mulmo (KTH) Budget: 113k€ (4%) Effort: 20 person months (4%)

SLAs, Markets and Dynamic Account Management

- Investigate and prototype standard conforming and secure mechanisms for SLAs in BG
- Design, development and integration of user account management with Grid accounting systems (SGAS)
- Research, prototype and support deployment of SLAs in BalticGrid

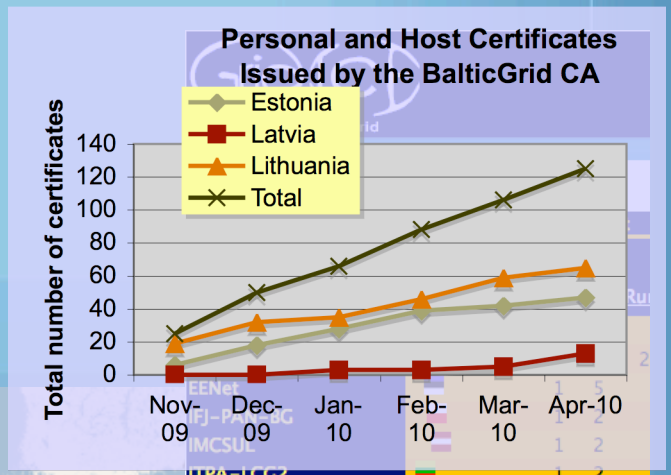


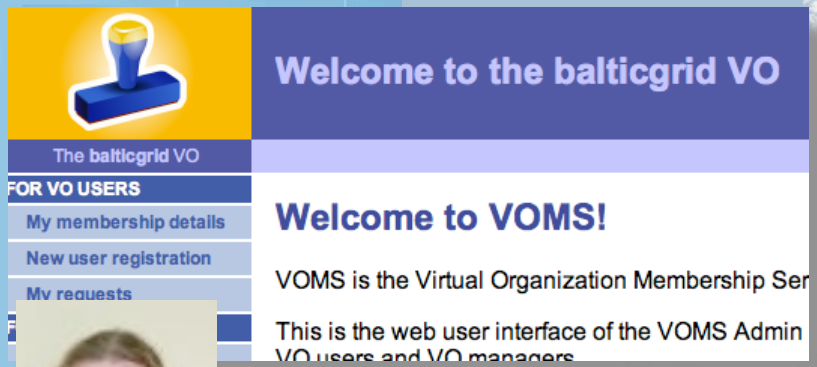


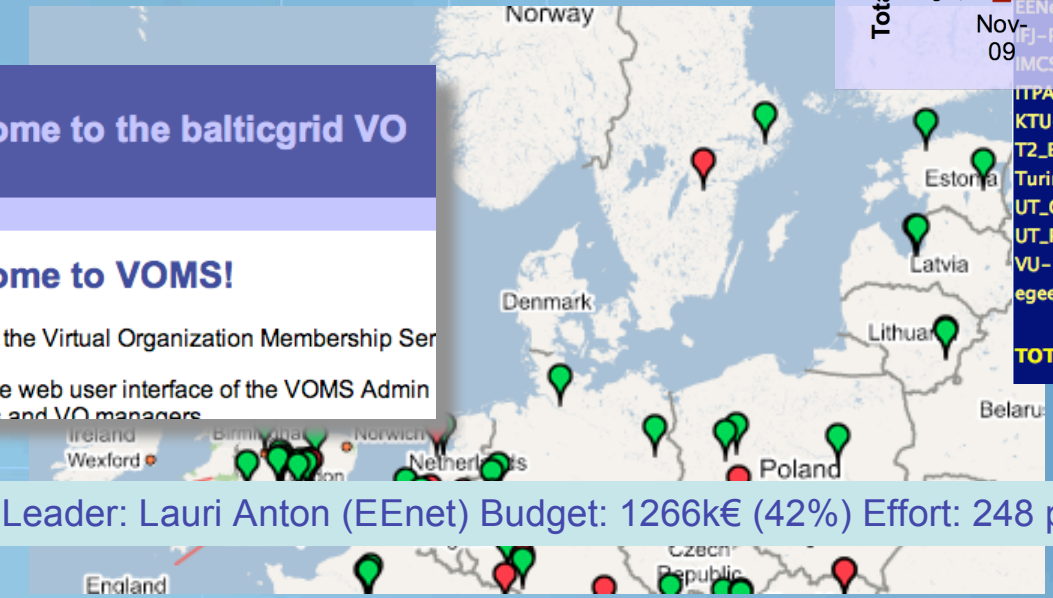
Acting Activity Leader: Norbert Mayer (PSNC) Budget: 230k€ (7%) Effort: 38 person months (7%)

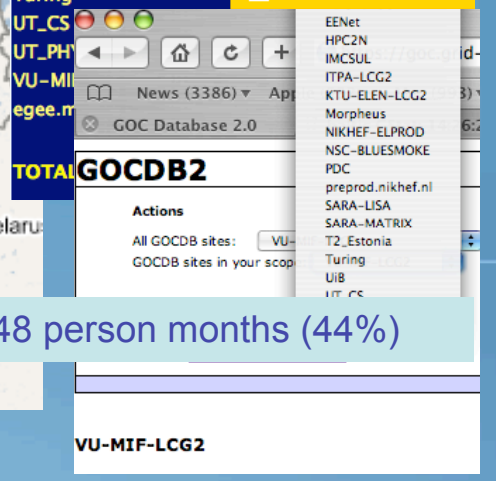
Grid Operations

- Set up and mange BalticGrid core infrastructure and operation
  - 12 Sites in Baltic Countries (6 certified with EGEE)

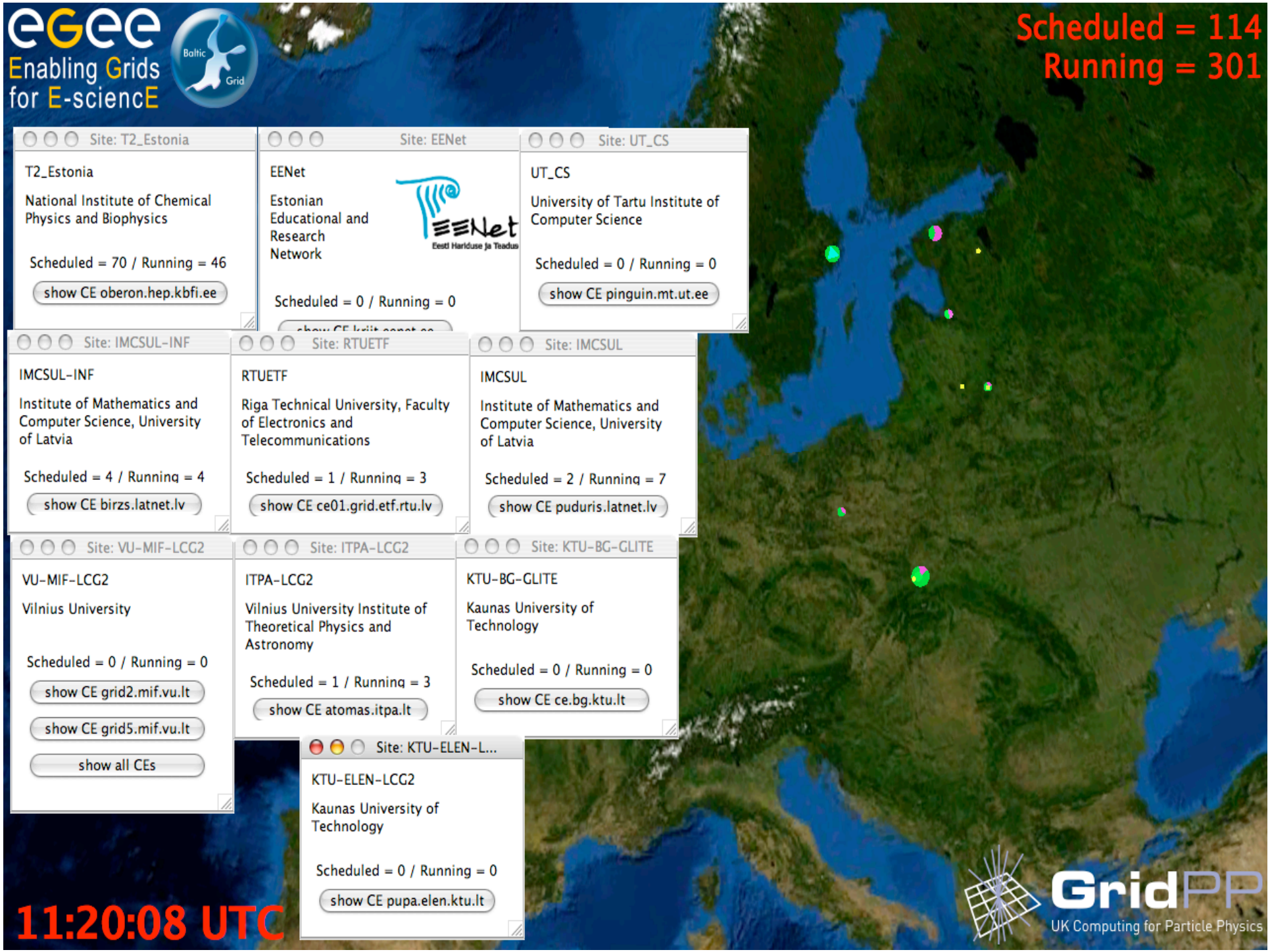








Activity Leader: Lauri Anton (EEnet) Budget: 1266k€ (42%) Effort: 248 person months (44%)


eGee
Enabling Grids for E-sciencE
Baltic Grid
Scheduled = 114
Running = 301
Site: T2_Estonia
T2_Estonia
National Institute of Chemical Physics and Biophysics
Scheduled = 70 / Running = 46
show CE oberon.hep.kbfi.ee
Site: EENet
EENet
Estonian Educational and Research Network
EENet
Eesti Haridluse ja Teadus
Scheduled = 0 / Running = 0
Site: UT_CS
UT_CS
University of Tartu Institute of Computer Science
Scheduled = 0 / Running = 0
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Site: IMCSUL-INF
IMCSUL-INF
Institute of Mathematics and Computer Science, University of Latvia
Scheduled = 4 / Running = 4
show CE birzs.latnet.lv
Site: RTUETF
RTUETF
Riga Technical University, Faculty of Electronics and Telecommunications
Scheduled = 1 / Running = 3
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IMCSUL
Institute of Mathematics and Computer Science, University of Latvia
Scheduled = 2 / Running = 7
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Site: VU-MIF-LCG2
VU-MIF-LCG2
Vilnius University
Scheduled = 0 / Running = 0
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show CE grid5.mif.vu.lt
show all CEs
Site: ITPA-LCG2
ITPA-LCG2
Vilnius University Institute of Theoretical Physics and Astronomy
Scheduled = 1 / Running = 3
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Site: KTU-BG-GLITE
KTU-BG-GLITE
Kaunas University of Technology
Scheduled = 0 / Running = 0
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Site: KTU-ELEN-L...
KTU-ELEN-LCG2
Kaunas University of Technology
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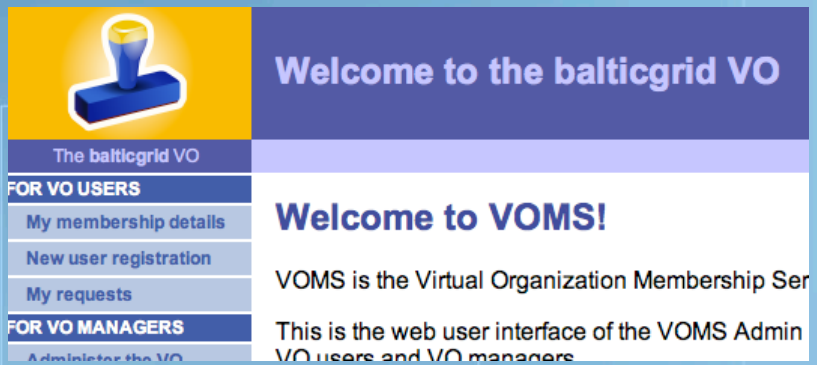
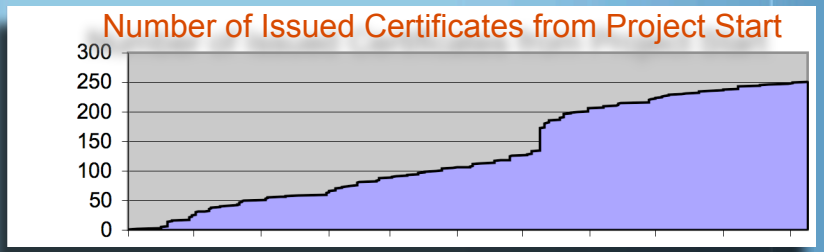
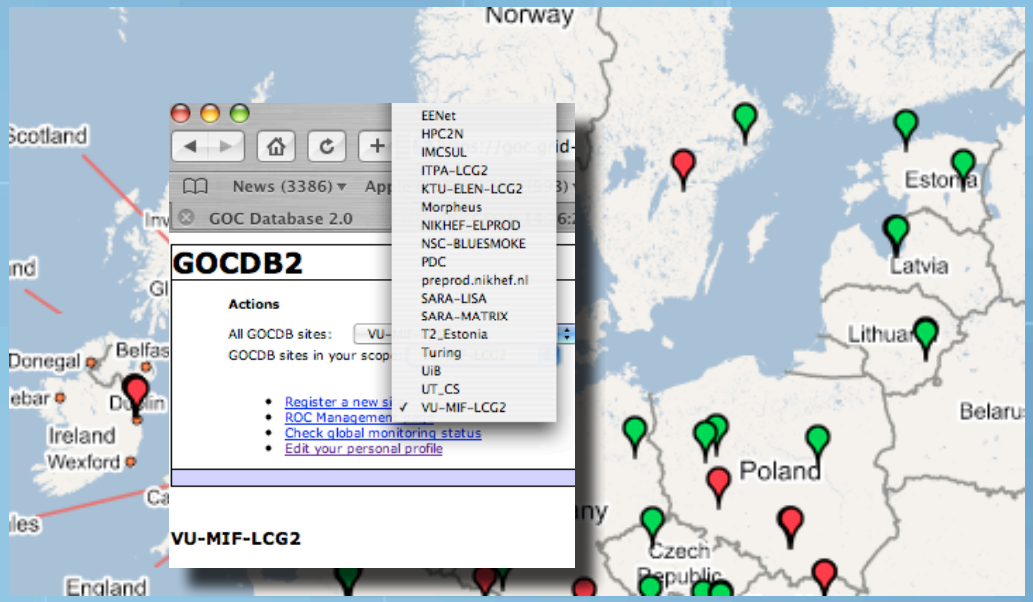
11:20:08 UTC
GridPP
UK Computing for Particle Physics

Core Grid Services







- BalticGrid CA
- Multiple VOMS
- Multiple RB
- BDII (top)
- LFC
- …

Monitoring and Tests

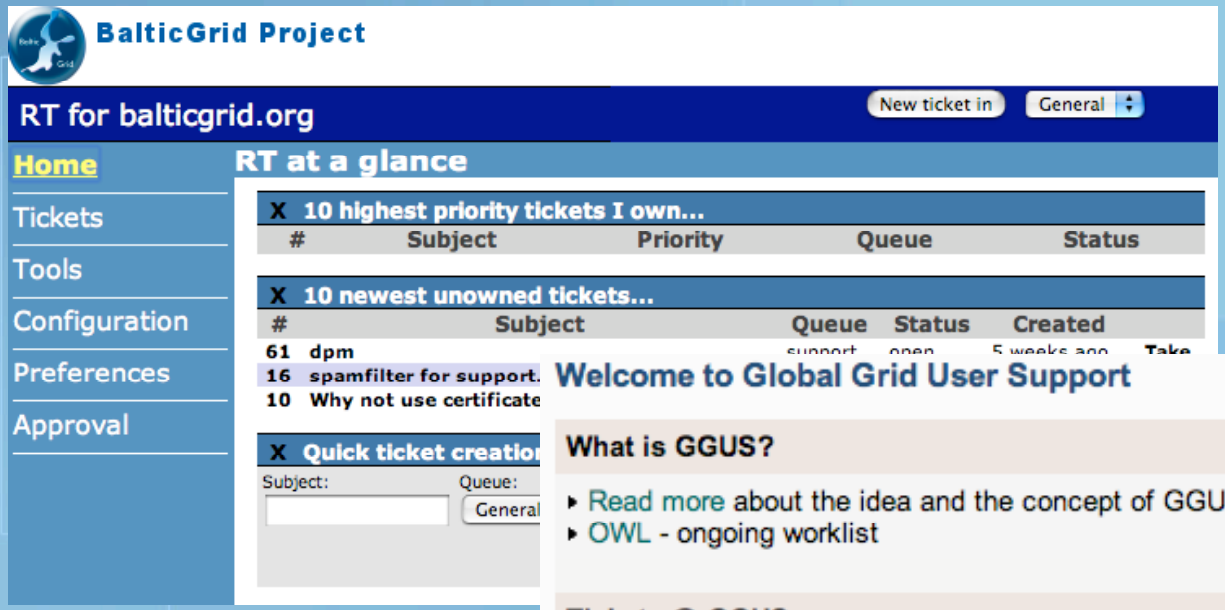
- SFT Tests run within BalticGrid
- Tests have started with SAM
- BalticGrid own stress test

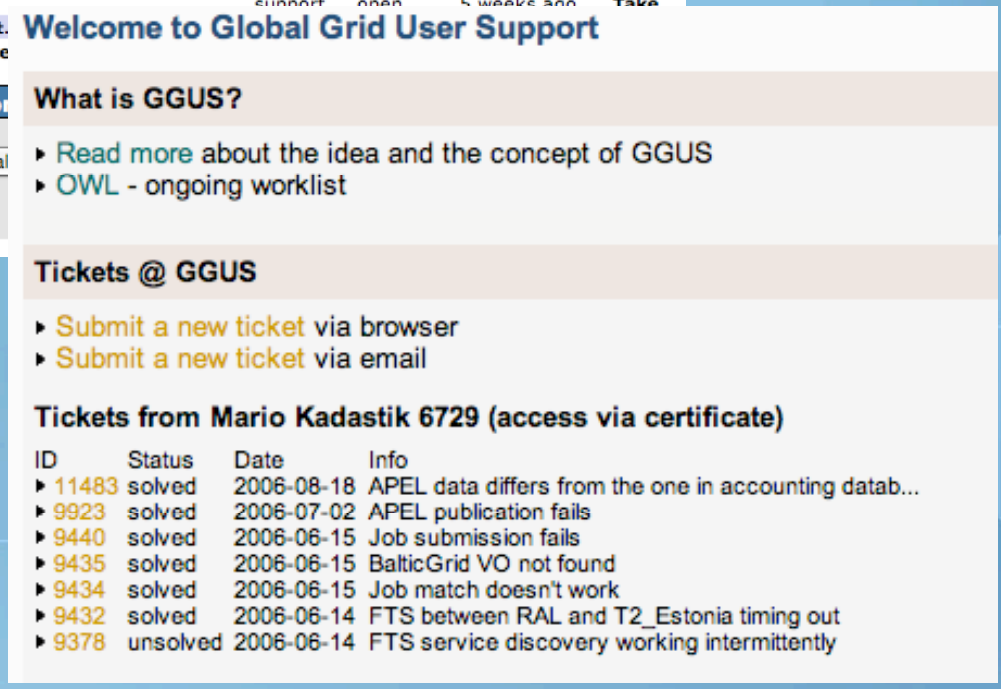
	St.	Region	Site Name	Site CE	VO balticgrid St.	js	wn	ver	ca	rgma	bi	csh
1.	JL	CentralEurope	A									
2.	JS	CentralEurope	C									
3.	OK	CentralEurope	C									
4.	OK	CentralEurope	C									
5.	OK	NorthernEurope	E									
6.	OK	CentralEurope	eg									
7.	JL	NorthernEurope	IE									
8.	CT	CentralEurope	IF									
9.	CT	NorthernEurope	IM									
10.	JS	NorthernEurope	IM									
11.	OK	NorthernEurope	IT									
12.	JS	NorthernEurope	K									
13.	OK	NorthernEurope	K									

No	RegionName	SiteName	NodeName	Status	rgmasc	rm							
1	Baltic	cyf-certif-tb	zeus13.cyf-kr.edu.pl	ERROR	na	na							
2	Baltic	cyfronet-ia64	ares02.cyf-kr.edu.pl	ERROR	ok	ok							
3	Baltic	cyfronet-lcg2	zeus02.cyf-kr.edu.pl	OK	ok	ok							
4	Baltic	eenet	kriit.eenet.ee	OK	ok	ok							
5	Baltic	egee.man.poznan.pl	ce.egee.man.poznan.pl	OK	ok	ok							
6	Baltic	ifj-pan-bg	fwe01.ifj.edu.pl	ERROR	error	ok							
7	Baltic	imcsul	puduris.latnet.lv	ERROR	ok	erro							
8	Baltic	imcsul-inf	birzs.latnet.lv	ERROR	ok	ok							
9	Baltic	itpa-lcg2	atomas.itpa.lt	WARN	ok	ok							
10	Baltic	ktu-bg-glite	ce.bg.ktu.lt	ERROR	error	ok							
11	Baltic	ktu-elen-lcg2	pupa.elen.ktu.lt	WARN	ok	ok							
12	Baltic	pdc	g03n02.pdc.kth.se	ERROR	error	ok							
13	Baltic	rtuetf	ce01.grid.etf.rtu.lv	OK	ok	ok							
14	Baltic	t2_estonia	oberon.hep.kbfi.ee	OK	ok	ok							
15	Baltic	ut_cs	pinguin.mt.ut.ee	ERROR	error	ok	warn	ok	ok	ok	ok	error	ok
16	Baltic	vu-mif-lcg2	grid2.mif.vu.lt	OK	ok	ok	ok	ok	ok	ok	ok	ok	ok

	CE	Last test	Last result
1.	ares02.cyf-kr.edu.pl	2006-09-11 16:01:02	Done
2.	atomas.itpa.lt	2006-09-11 16:01:02	Done
3.	birzs.latnet.lv	2006-09-11 16:01:02	Done
4.	ce.bg.ktu.lt	2006-09-11 16:01:02	Done
5.	ce.egee.man.poznan.pl	2006-09-11 16:01:02	Done
6.	ce01.grid.etf.rtu.lv	2006-09-11 16:01:02	Done
7.	fangorn.man.poznan.pl	2006-09-07 10:01:02	Aborted
8.	fwe01.ifj.edu.pl	2006-09-11 16:01:02	Aborted
9.	g03n02.pdc.kth.se	2006-09-11 16:01:02	Aborted
10.	grid.vtu.lt	2006-08-28 16:01:02	Aborted
11.	grid2.mif.vu.lt	2006-09-11 16:01:02	Done
12.	kriit.eenet.ee	2006-09-11 16:01:02	Done
13.	oberon.hep.kbfi.ee	2006-09-11 16:01:02	Done
14.	pinguin.mt.ut.ee	2006-09-11 16:01:02	Done
15.	puduris.latnet.lv	2006-09-11 16:01:02	Done
16.	pupa.elen.ktu.lt	2006-09-11 16:01:02	Done
17.	zeus02.cyf-kr.edu.pl	2006-09-11 16:01:02	Aborted
18.	zeus13.cyf-kr.edu.pl	2006-09-11 16:01:02	Aborted

Support Ticketing System





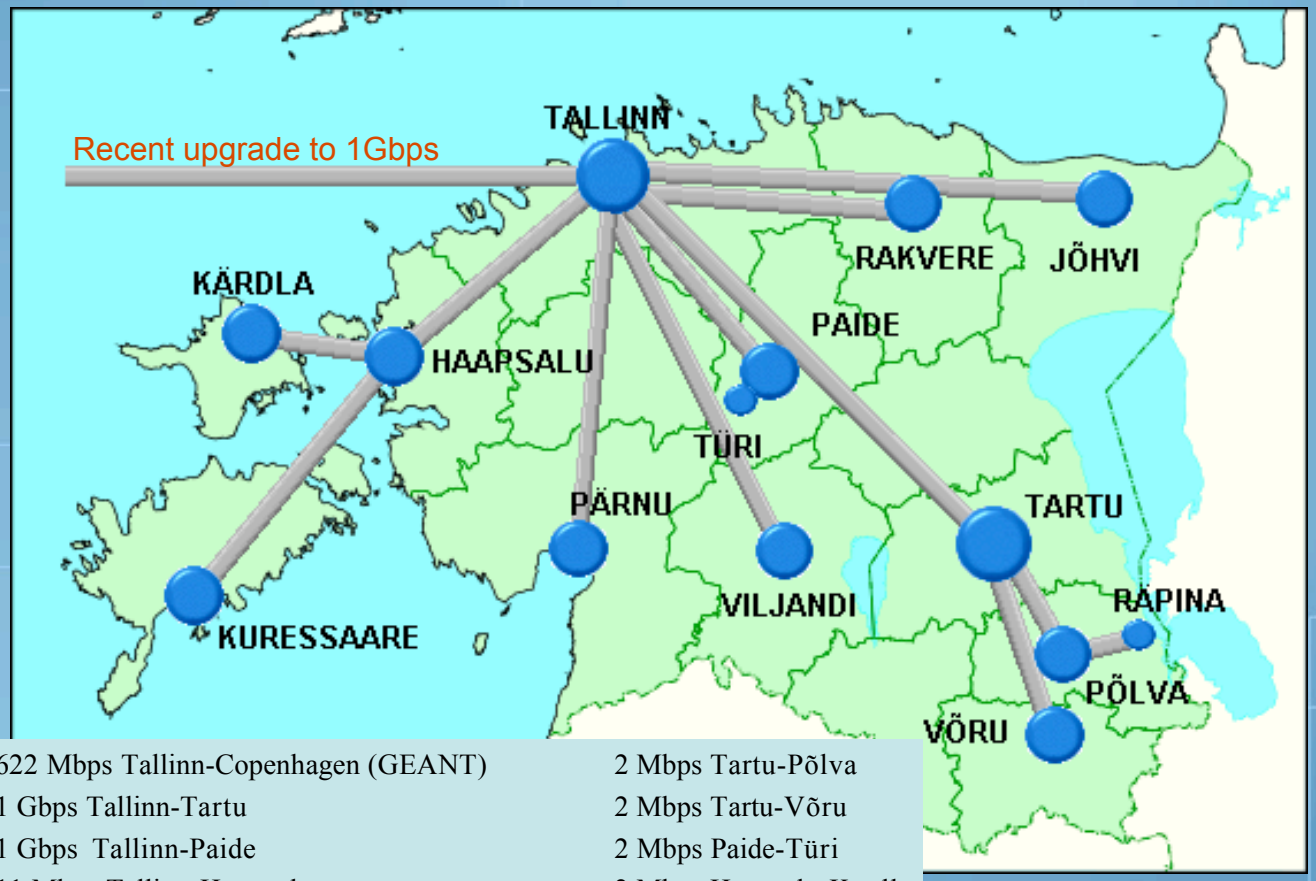
Network Resource Provisioning

- Assure and monitor proper network provisioning and associated services
- Overview of requirements for Baltic Grid and interconnection to other Grids
- Network Service Level Specifications and SLAs
- Network monitoring

Current* BalticGrid network topology
Stockholm-Poznan-Cracow 10 Gbit/s
Stockholm-Tallin 622 Mbit/s
Tallin-Tartu 1 Gbit/s
Stockholm-Riga 155 Mbit/s
Stockholm-Kaunas 622 Mbit/s
Kaunas-Vilnius 1 Gbit/s

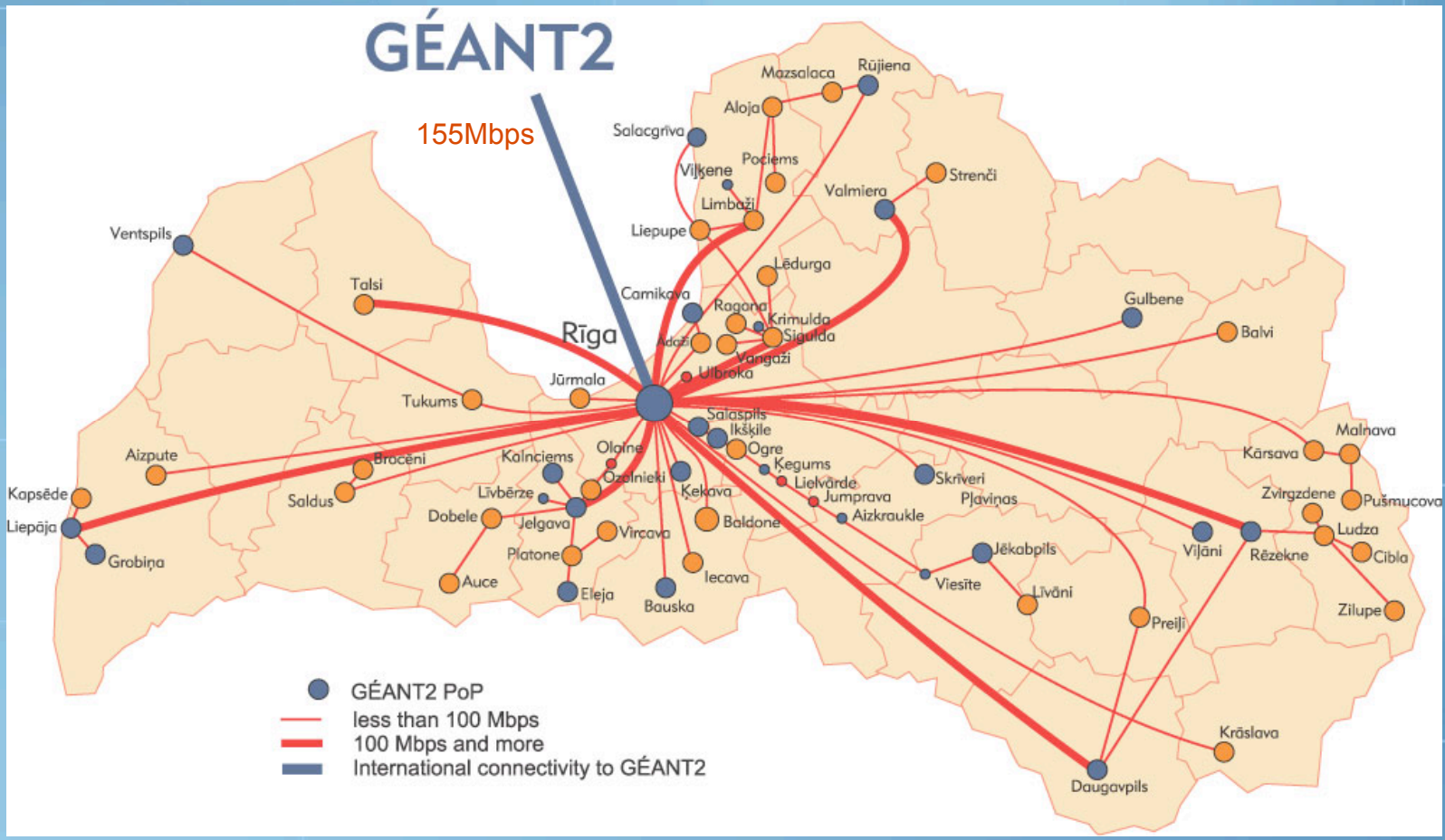
Activity Leader: Guntis Barzdins (IMCS UL) Budget: 368k€ (12%) Effort: 72 person months (13%)

Estonian Networking Situation

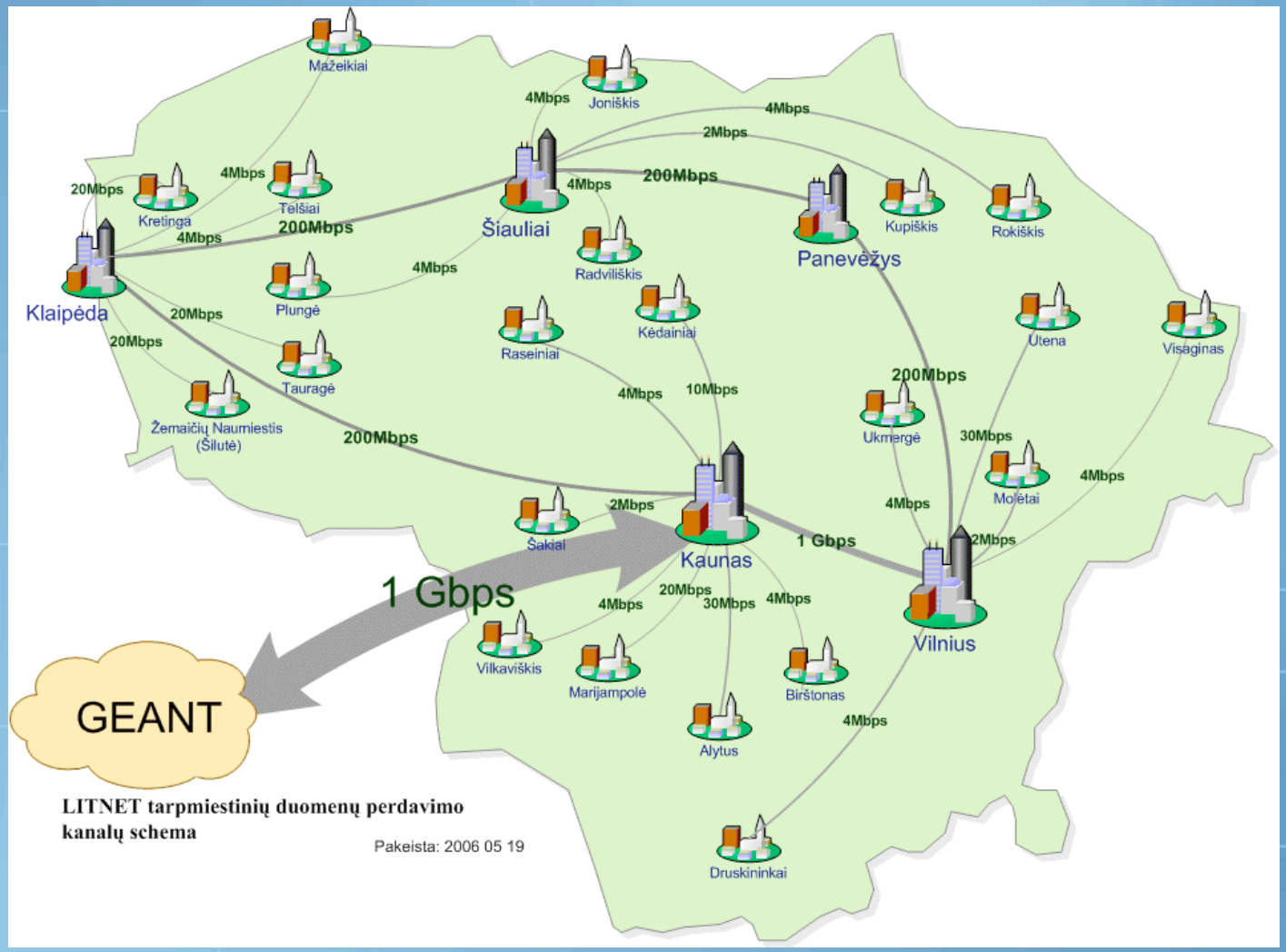


622 Mbps Tallinn-Copenhagen (GEANT)	2 Mbps Tartu-Põlva
1 Gbps Tallinn-Tartu	2 Mbps Tartu-Võru
1 Gbps Tallinn-Paide	2 Mbps Paide-Türi
11 Mbps Tallinn-Haapsalu	2 Mbps Haapsalu-Kärdla
8 Mbps Tallinn-Viljandi	2 Mbps Põlva-Räpina
4 Mbps Tallinn-Pärnu	
4 Mbps Tallinn-Rakvere	
4 Mbps Tallinn-Jõhvi	
4 Mbps Tallinn-Kuressaare	

Latvian Networking Situation

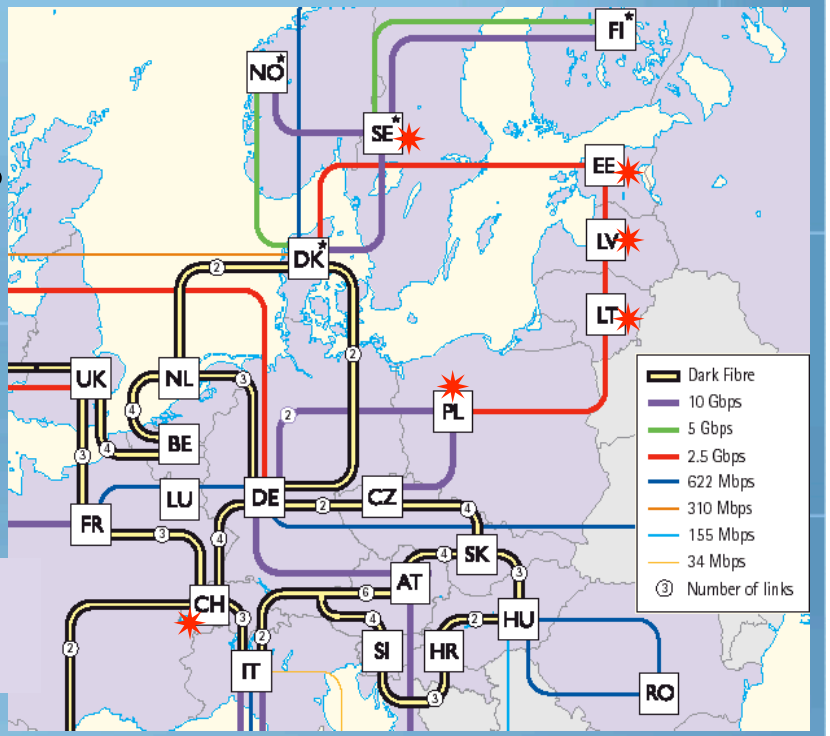


Lithuanian Networking Situation



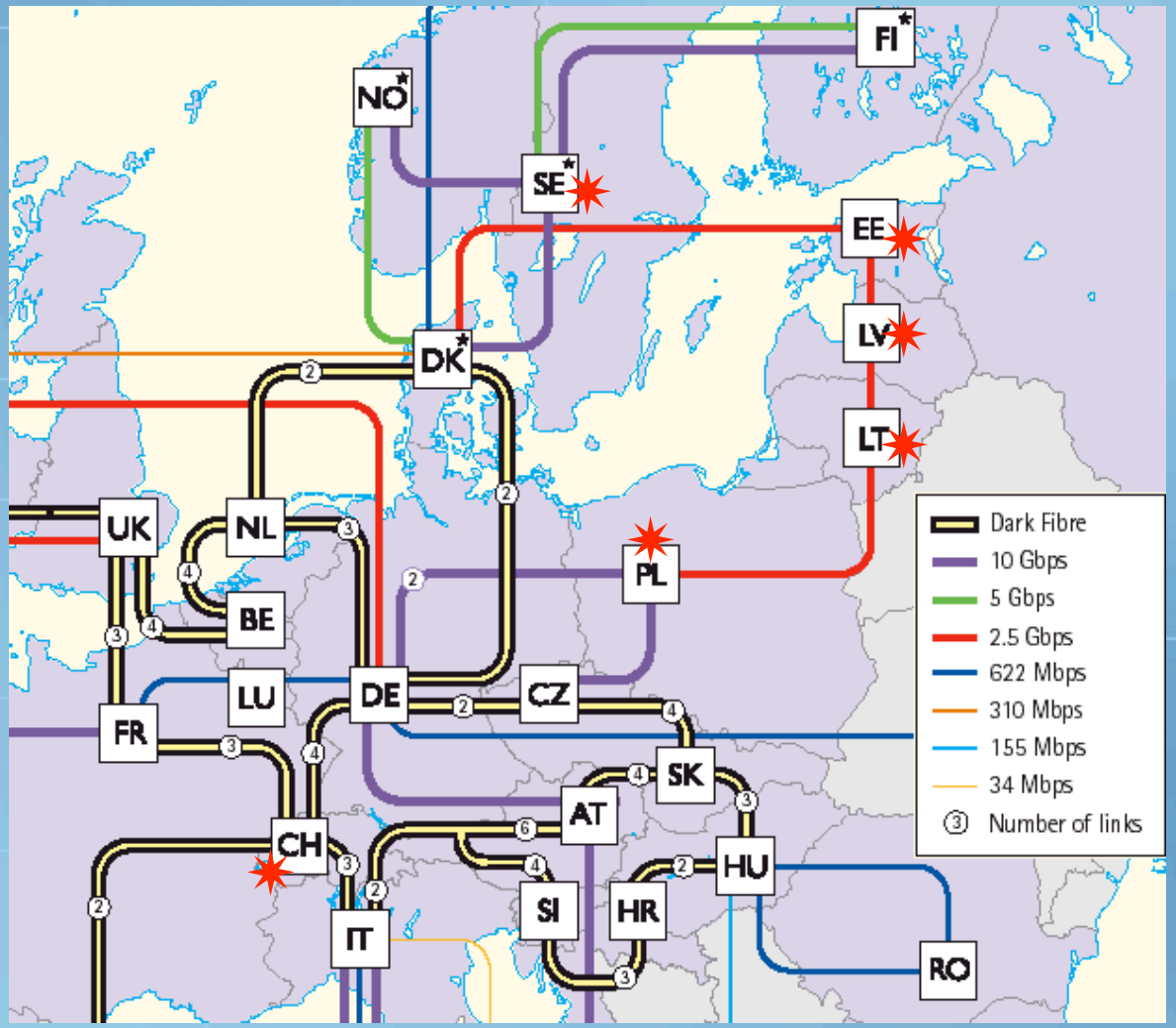
BW Requirements Analysis

- BalticGrid internal application survey so far has indicated negligable bandwidth requirements
- CMS, Atlas experiments indicate ~1Gbps capacity need between T1←→ T2 resource centers
- GEANT has 2.5Gbps infrastructure in Baltics, but NREN access limited by DANTE pricing and costly hardware upgrades>1Gbps
  - EENET: 1Gbps
  - LATNET: 155Mbps
  - LITNET: 622Mbps ➠ 1Gbps



GEANT2 PoPs established but not utilized to full capacity in the Baltic States

Geant2 Points of Presence Established in the Baltic States



Service Level Specifications (SLS)

- Two problems
  - BalticGrid users want to use GEANT at max
  - BalticGrid must not destroy GEANT experience for other users
- Two solutions:
  - Over-provisioning
    - utilization <75% for 90% of time over 1 month
  - Service Level Specifications (SLS)
    - **Amber** (Gold) = Premium IP (PIP)
      - <10% of total GEANT capacity
    - **Rock** (Silver) = BestEffort (BE), rate-limited
      - grid+users <85% of total GEANT capacity (dynamic rate-limit)
    - **Timber** (Bronze) = LessThanBestEffort (LBE)
      - unused PIP, BE capacity, (>5% of total GEANT capacity)
- SLA – defines demarcation points and responsibilities
  - Premium IP (Amber) regardless or QoS or Over-provisioning

Actual GEANT link utilization

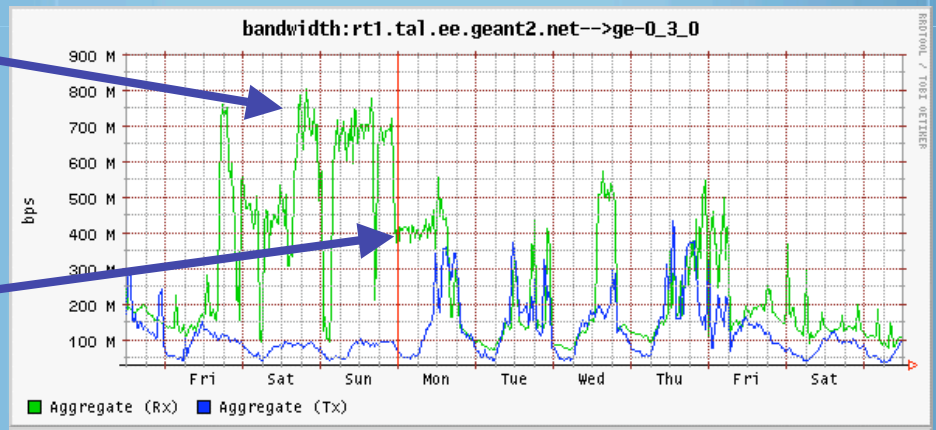
CMS traffic

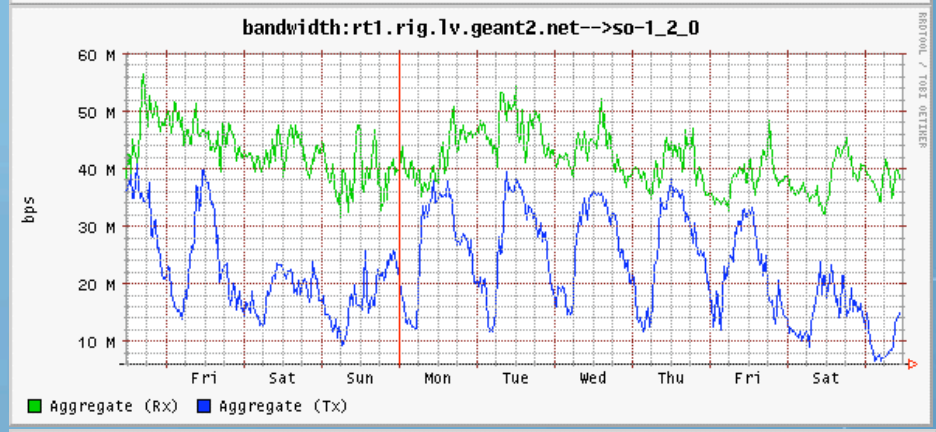
- EENET 1Gb/s

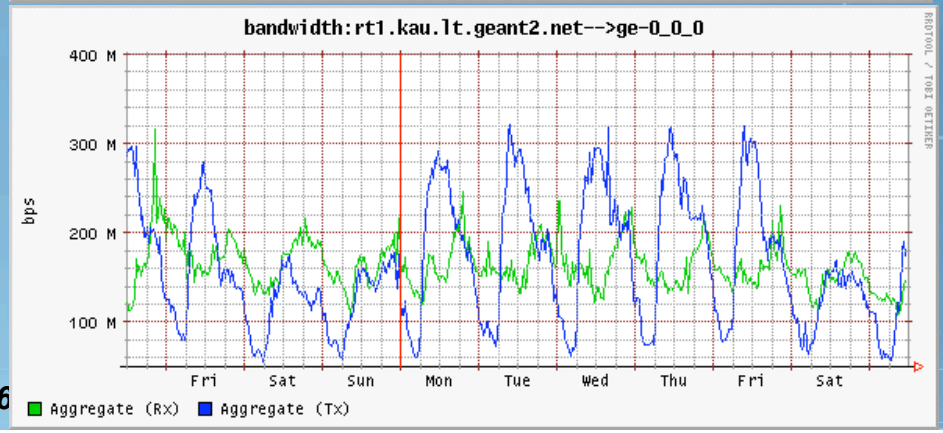
"ROCK-like" QoS class shaping was applied to BalticGrid traffic to avoid congestion for other users

- LATNET 155Mb/s

- LITNET 622Mb/s







From Project to Sustained Infrastructure

- Focus on national and regional strategic research areas
- Recognition by national research funding bodies (Dept. Of Education or Research Council)
  - Research Council need to take responsibility for
    - Set-up of national organisation
    - International coordination
    - National access and application procedures