



Enabling Grids for E-scienceE

EGEE-III Network activity overall

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www.eu-egee.org



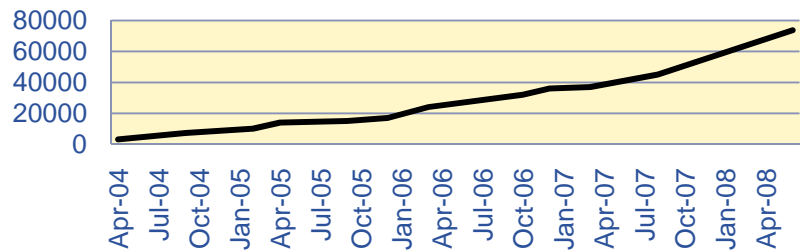
Information Society
and Media



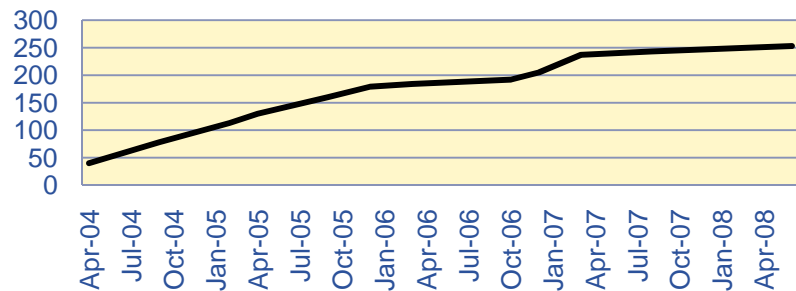
- **SA2 Network activity**
 - Technical Network Liaison Committee TNLC
 - EGEE Network Operations Center ENOC
 - EGEE-III Projects
 - LHCOPN support / operational Model
 - Trouble matching and correlation
 - Tools for troubleshooting
 - Grid site networking needs
 - Advanced network services
 - IPv6
 - Trouble Ticket standardization
- **European Grid Initiative, National Grid Initiative**
 - Lesson learnt from EGEE
 - Network activity in EGI/NGI
- **Conclusion**



No. Cores

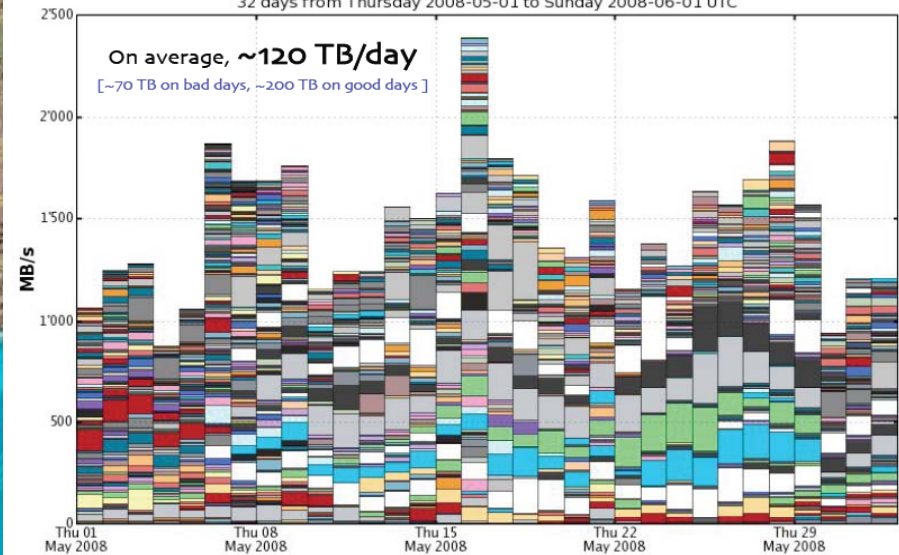


No. Sites

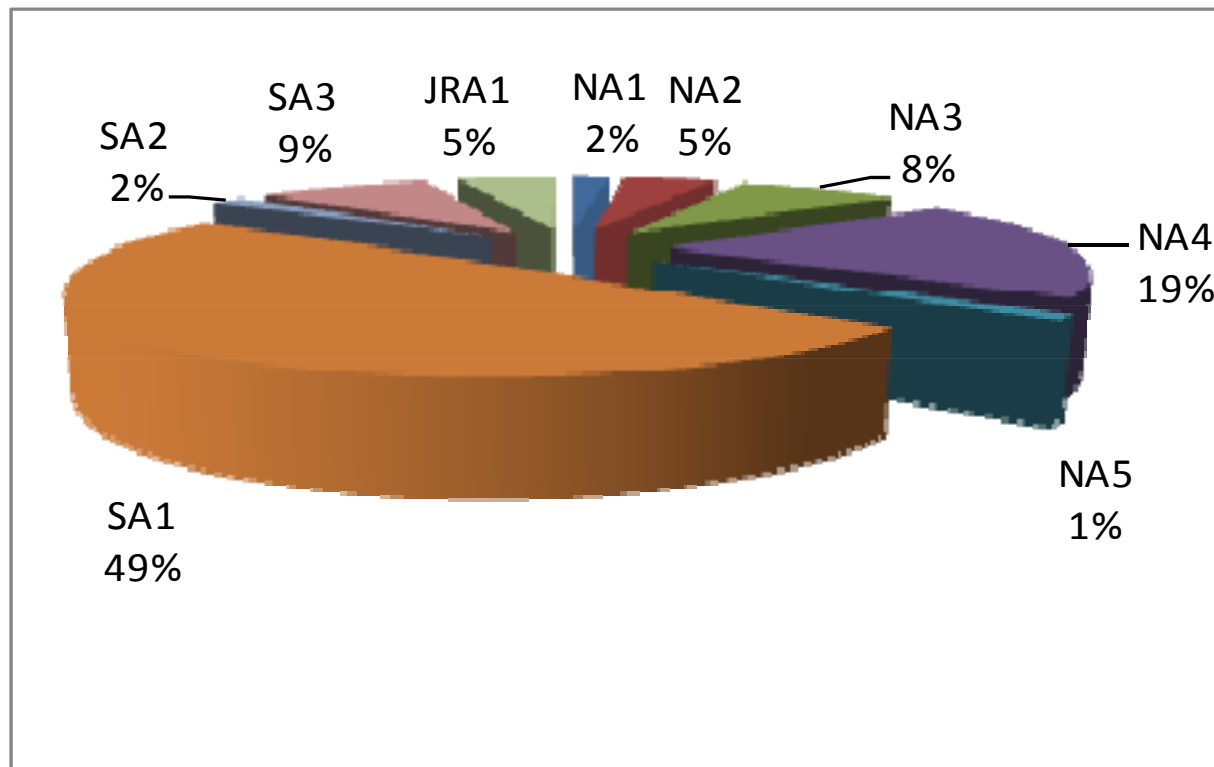


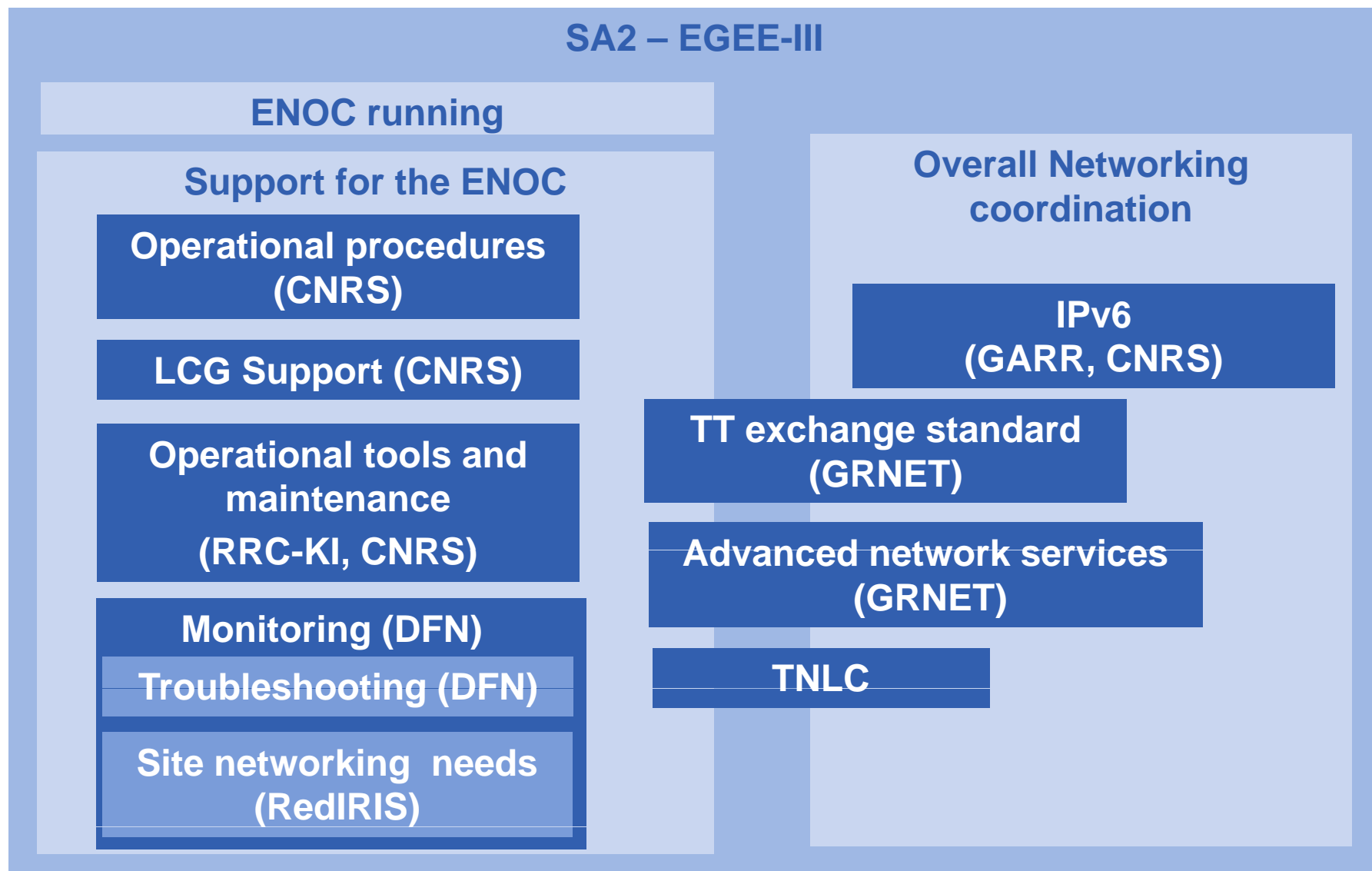
Daily CMS PhEDEx transfer rate, Debug + Production

By site links for non-tape storage only
32 days from Thursday 2008-05-01 to Sunday 2008-06-01 UTC

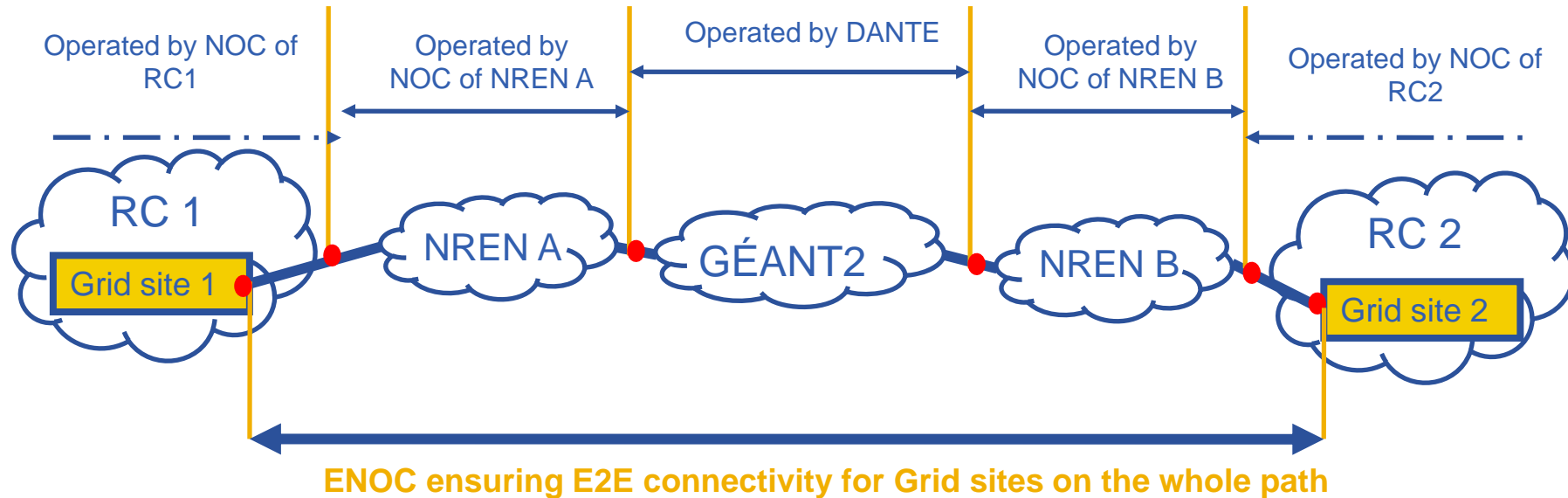


- **Total of 375 FTEs in EGEE-III**
 - 9010 person months (vs. 11165 PMs in EGEE-II; ~20% less)
 - Grand total combining funded and unfunded contributions
 - No difference for execution of program of work!
- **Network activity SA2 = 14 persons + TNLC, 159 PMs**



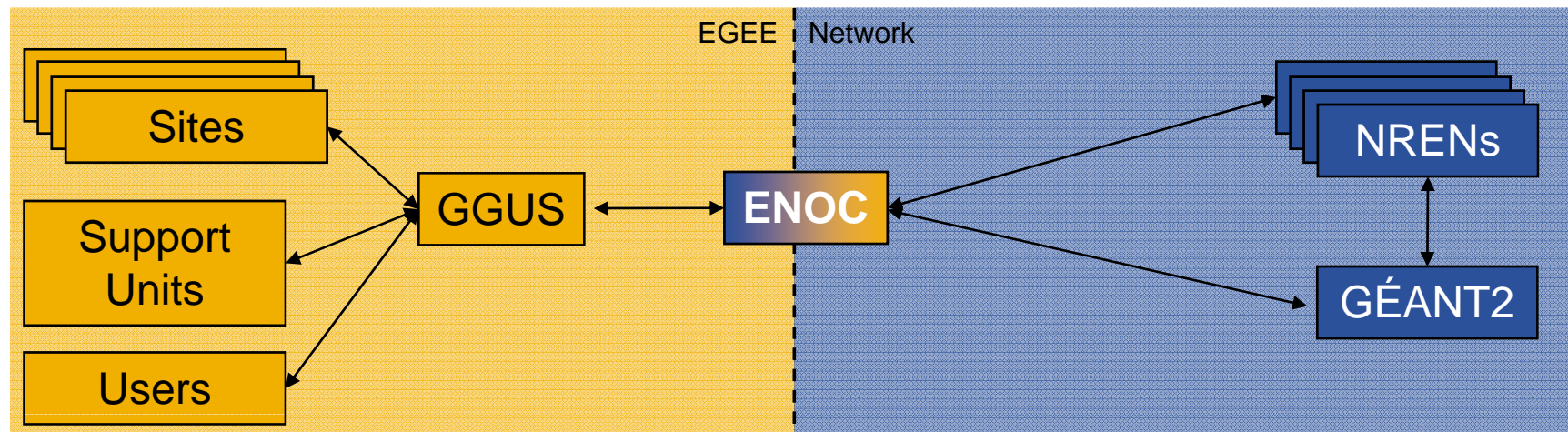


- **Technical Network Liaison Committee – TNLC**
 - Facilitate cooperation between EGEE on the one hand and GÉANT2 and the NRENs on the other hand
 - CERN; CNRS, France; DANTE, UK - the GÉANT2 operator; RRC KI, Russia; DFN-Verein, Germany; GARR, Italy; GRNET, Greece; RedIRIS Spain...
 - but also SWITCH Switzerland, BELNET Belgium, Nordunet Nordic backbone network (Finnish, Icelandic Swedish, Danish NREN), EENET, SRCE.
- **Main themes**
 - EGI-NGI
 - Monitoring
 - Standardization of network trouble tickets
 - Advanced network services
 - Trouble ticket



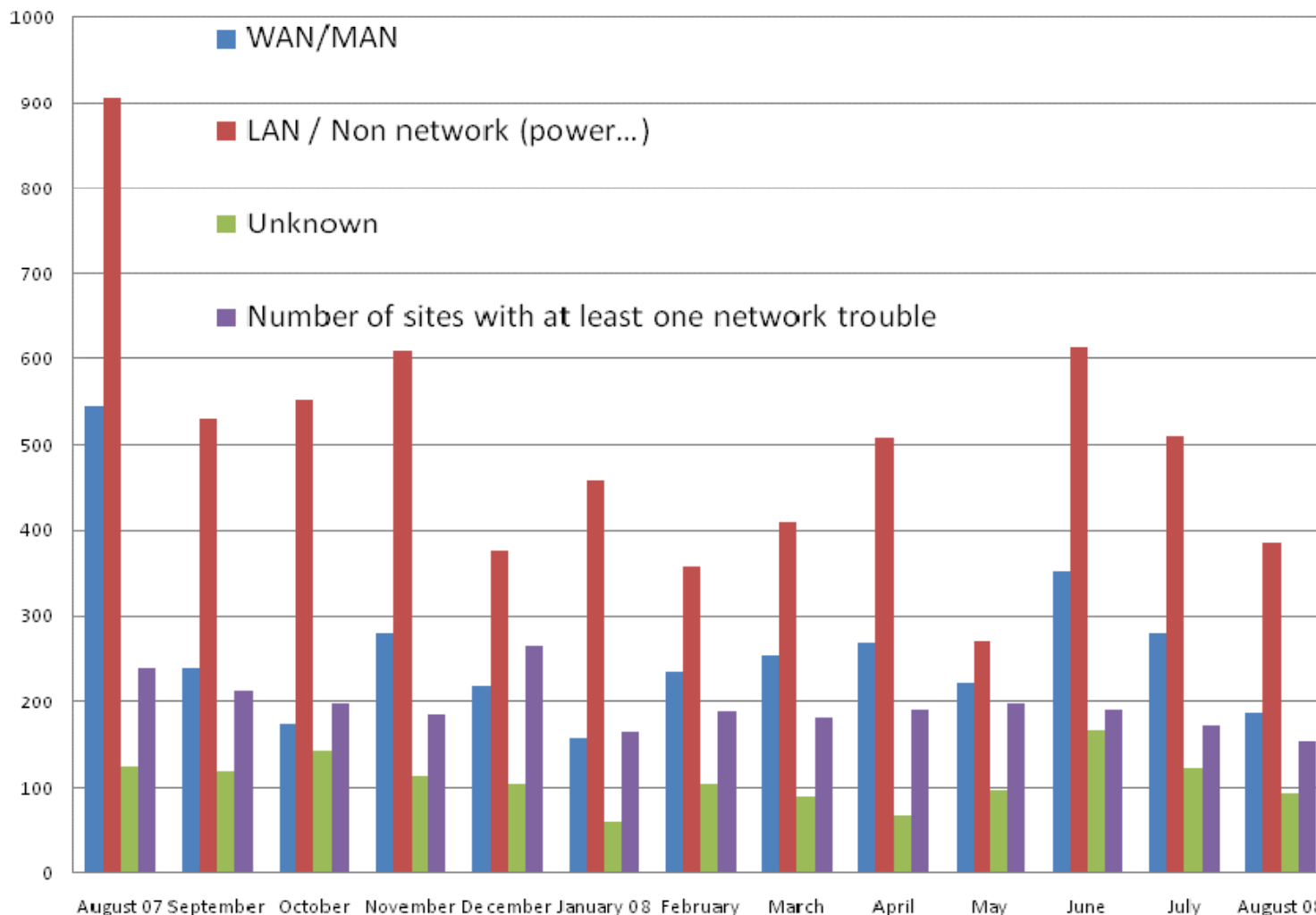
- **ENOC ensuring E2E connectivity for Grid sites**
- **Assess the impact on the Grid of network trouble**
- **Troubleshoot problems**
 - Provide support to users
 - Identify the faulty domain
- **Assess the network connectivity of the Grid sites**

- A single point of contact between EGEE and the NRENs where EGEE and the network can exchange operational information
- A Network support unit in GGUS (trouble ticket system of EGEE)



- **Interface with the EGEE user support:**
 - Receive tickets assigned to ENOC by the GGUS 1st level support
 - Troubleshoot them provided that the ENOC has access to suitable monitoring tools
 - Contact identified faulty domains or reassign ticket to the associated site if this is local network issue
- **Interface with network providers:**
 - Collect tickets from NRENs
 - Assess impact on the grid infrastructure
 - Forward to GGUS tickets that seem relevant

Number of connectivity troubles detected on EGEE Grid certified sites sorted per supposed location

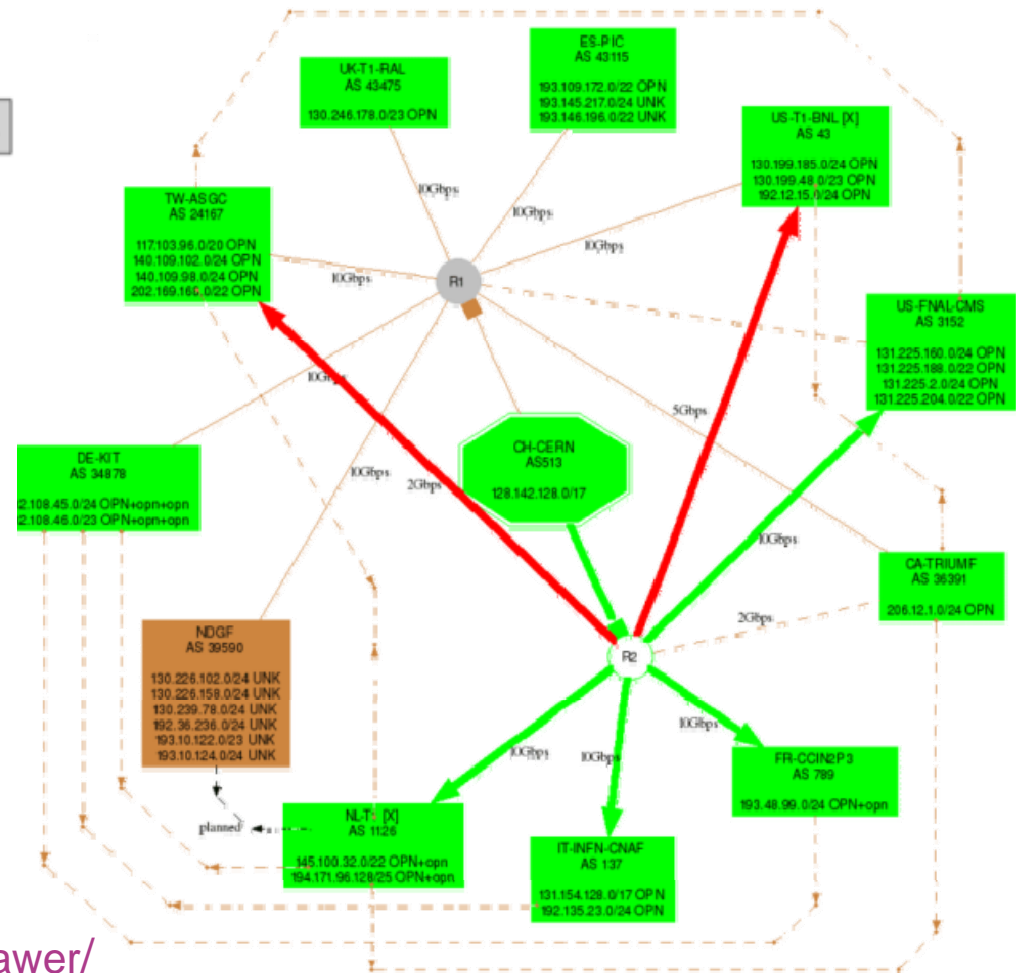


282 Certified Grid Sites

The LHC Optical Private Network



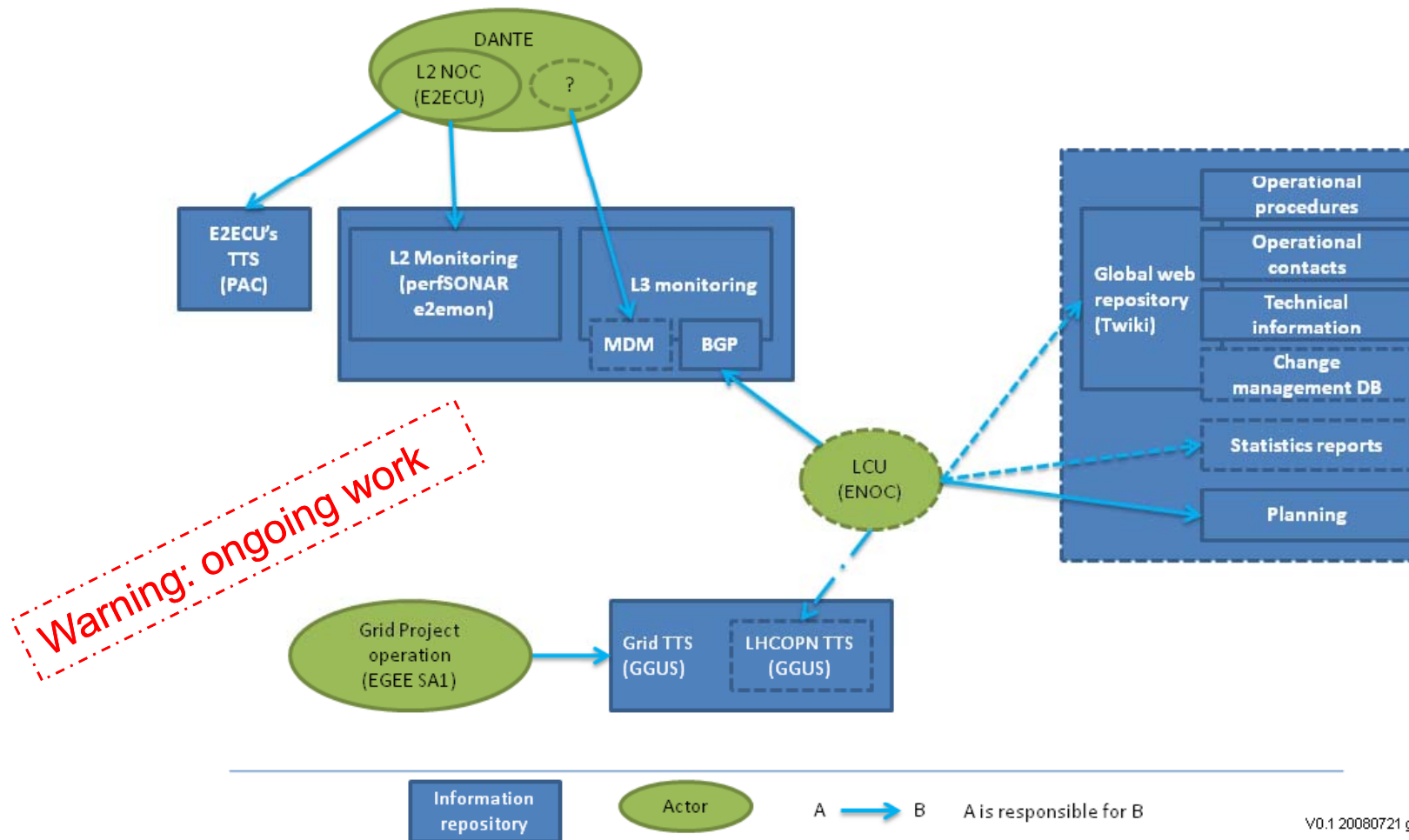
15 PB of data per year generated by the LHC



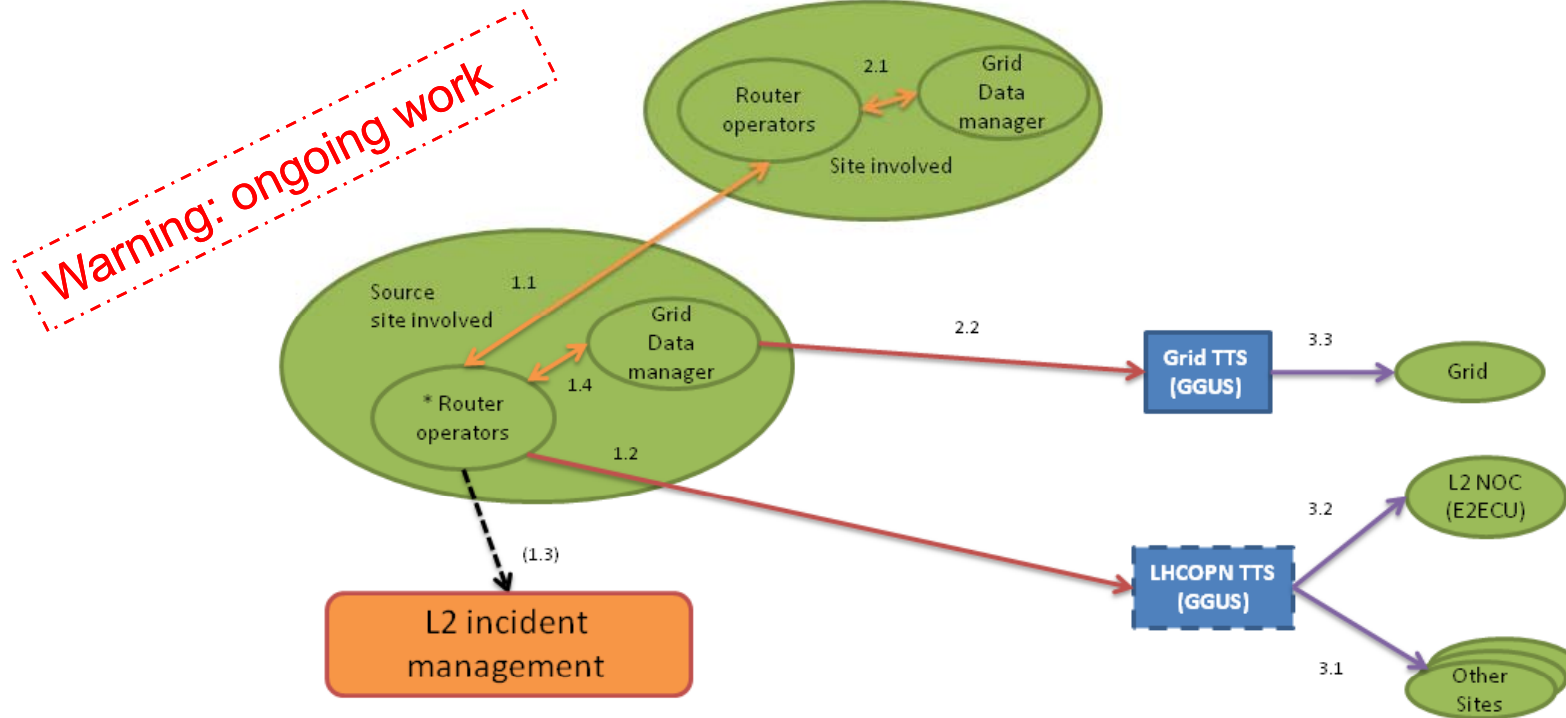
<http://ccenoc.in2p3.fr/ASPDrawer/>

- **SA2 objectives in LHCOPN context are:**
 - Define the operational Model
 - Define accurately responsibilities of each actor
 - Ensure a problem resolution is not delayed by an unsuitable operational model
 - Ensure the LHCOPN is well monitored
 - Set up communication channels between this network and the EGEE Grid (scheduled downtimes, incidents etc.)
- **LHCOPN operational model:**
 - Federative Model, responsibility shared by Tiers 1 and Tier 0
 - Approach: Define actors and their relationship, Where to find the information, The procedure
 - Each actor agrees on the operational model and is aware of its role and the procedure it should apply

Actors and information repositories management



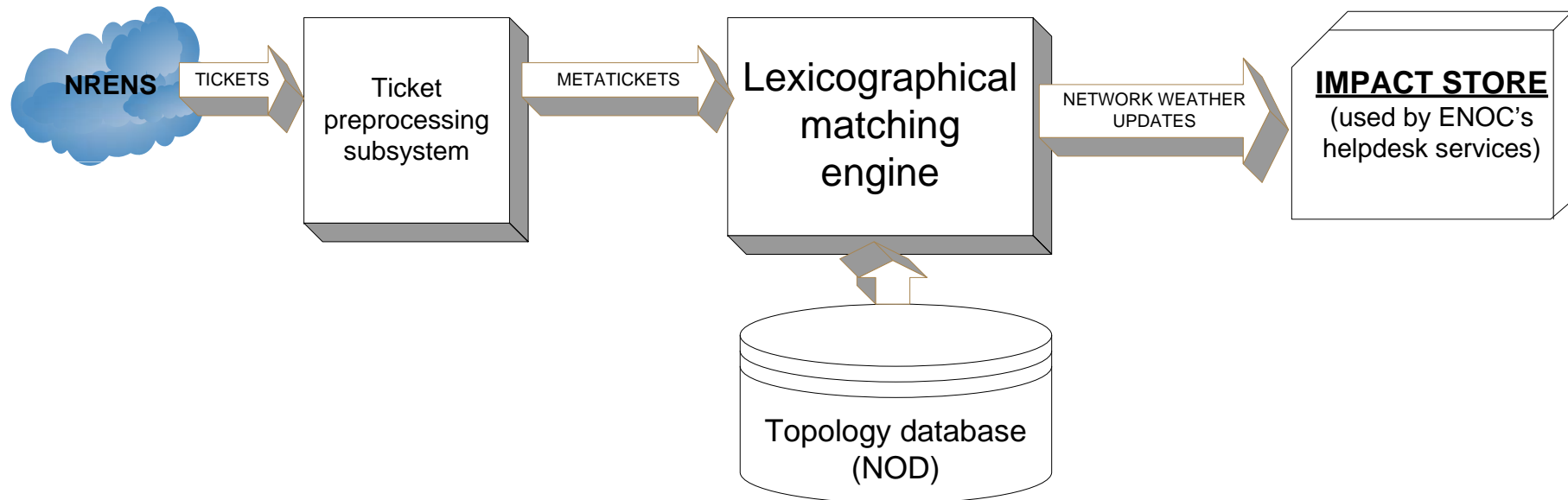
L3 Incident management process



Warning: ongoing work

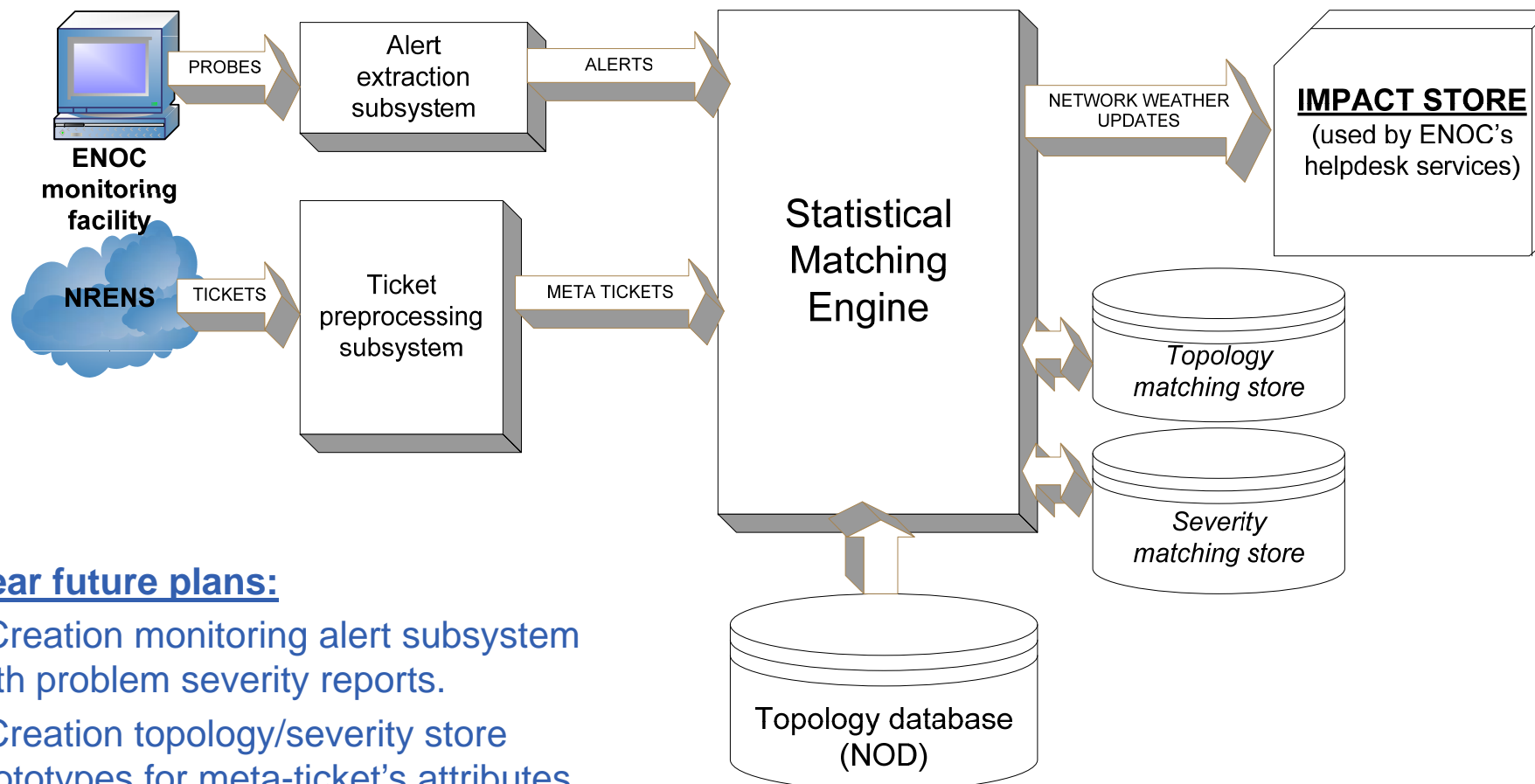
A → B A interacts with B A → B A notifies B
 A → B A goes to process B A → B A reads and writes B

V0.1 20080721 gcx



- Inaccurate mapping of problems location due to bad formalization of NREN's ticket.
- Inaccurate predictions of the problem severity. E.g. notifications with warning of possible QoS degradation are considered to be of service outage.
- Network topology complexity confusing WHO will really "feel" the predicted problem.

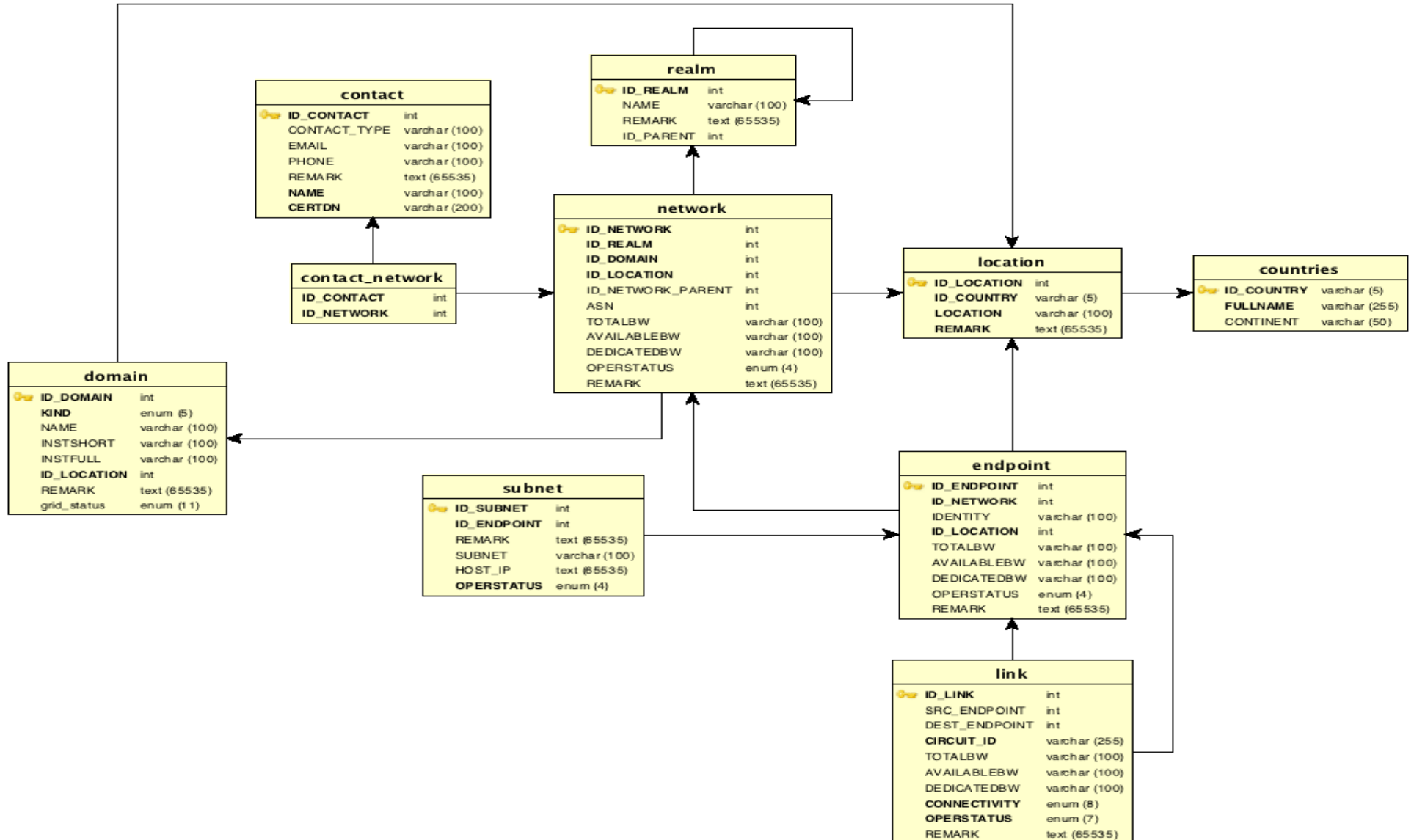
With the courtesy of Veniamin Konoplev



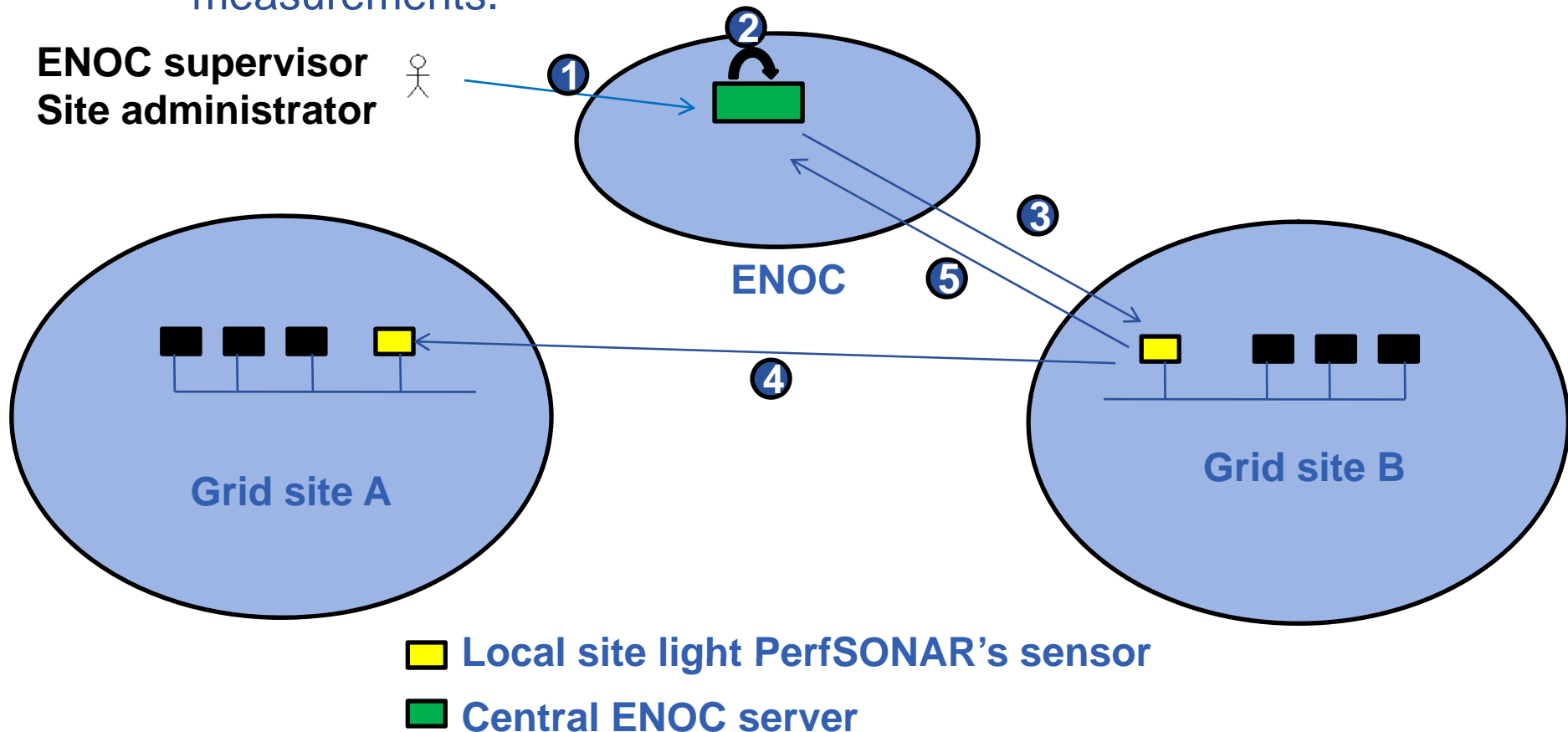
Near future plans:

- Creation monitoring alert subsystem with problem severity reports.
- Creation topology/severity store prototypes for meta-ticket's attributes mapping

With the courtesy of Veniamin Konoplev



- **Tools for efficient troubleshooting (university of Erlangen)**
 - Launch test on demand from the Grid site under central server control: ping, traceroute, DNS lookup, nmap and bandwidth measurements.



- **Active measure on demand, light weight PerfSONAR version with a specific plug-in**
- **Look for beta-tester sites**
- **NRENs can take advantage of the deployment of this software**
 - To troubleshoot their own grid nodes

- **Establish by an empirical way the site needs in term of network needs according to type of**
 - Site (Tiers 0, 1, 2, 3)
 - Experiment computed in the site
- **Working plan**
 - Review of the status of Tier2 / Tier3 in Spain
 - Translate the requirements and needs to network parameters to be measured.
 - Brief review of different network performance and monitoring tools that tiers agree to deploy
 - Pilot / Service definition for deploying perfSONAR
 - Performance and monitoring tests definition
 - Tests phase, Results and conclusions.

- **Enable access for applications to the advanced services provided by the NRENs**
- **SLA automation in multi-domain environment through AMPS (Advance Multi-domain Provisioning)**
 - Overcome the lack of automated mechanisms
- **SLA monitoring in EGEE**
 - Automate the monitoring procedure and generate alarms.
 - perfSONAR
- **Investigate the new advanced network services soon available**
 - Dynamic lightpath?

- **Future European Grid Initiative network activity:**
 - Troubleshooting activity should be lowered at minimum (only big issues)
 - Trouble ticket handling should be turned into a knowledge database and used as a part of the quality network monitoring level
 - Network monitoring is an open subject in EGI-NGI
 - The NGI/EGI will federate several grid projects and therefore handle more sites and more networks
 - Interaction (process, trouble sharing) and integration (operation design, monitoring...) with the Grid are essentials at project
 - Future possibilities offered from networks to the Grid should not be missed: Dynamic lightpath provisioning (Internet2, Phosphorus...), Ipv6 compliance
 - Network quality control should be fostered (statistics, MoU checking, feedbacks to network providers...)

- **Network activity key objectives in EGI/NGI**
 - **Interface between the European Grid Infrastructure and networks providers**
 - **Monitor the quality of networks used by Grid project:**
 - Public: Educational and research network.
 - Private: Non educational network providers (commercial...)
 - Dedicated: LHCOPN, LHC Optical Private Network...
 - **Ensure that application network requirements are fulfilled / monitoring**
 - **Put new network technologies forward in the Grid process.**

- **Foster IPv6 usage**
- **Support of LHCOPN**
- **Trouble ticket standardization**
 - Standardization
 - Better assessment of the impact on the Grid of a trouble ticket
- **Tools for troubleshooting**
 - Light weight PerfSONAR deployed on grid site
- **Foster the advanced network services usage**
- **Establish a future collaboration between NRENs and NGI/EGI**

Thank you.