

Enabling Pervasive Grids

The OGF GIN Effort

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Worldwide Grid Infrastructures

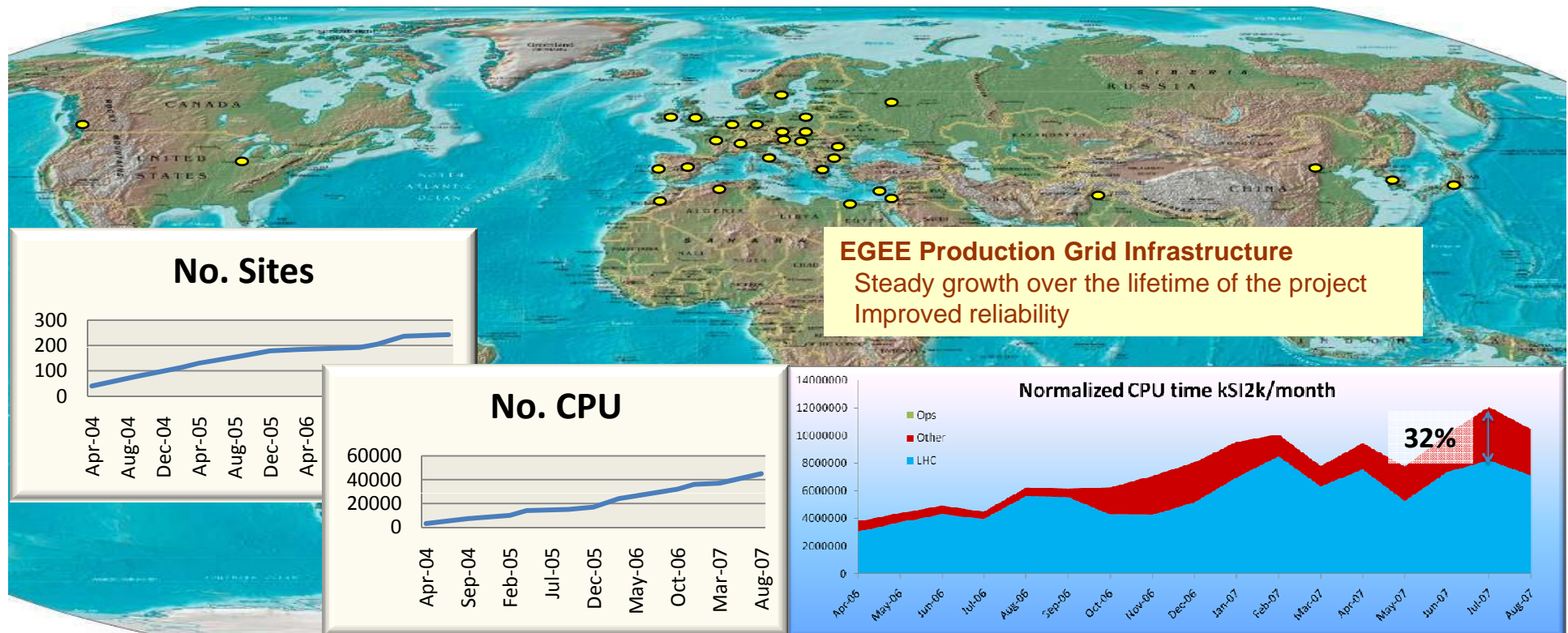


- APAC
- DEISA
- EGEE
- Naregi
- NDGF
- NGS
- OSG
- Pragma
- Teragrid



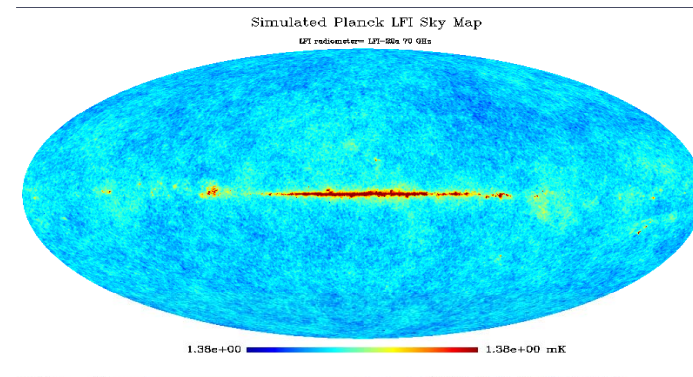
The Opportunity

- Grid infrastructures moved from testbeds to dependable production services
- Provide unprecedented combination of compute and storage resources on a global level



The Challenge

- Most applications run on one infrastructure
 - Requires significant investment – Grids are still hard to use
 - Example: Astrophysics on EGEE
 - Planck, Magic



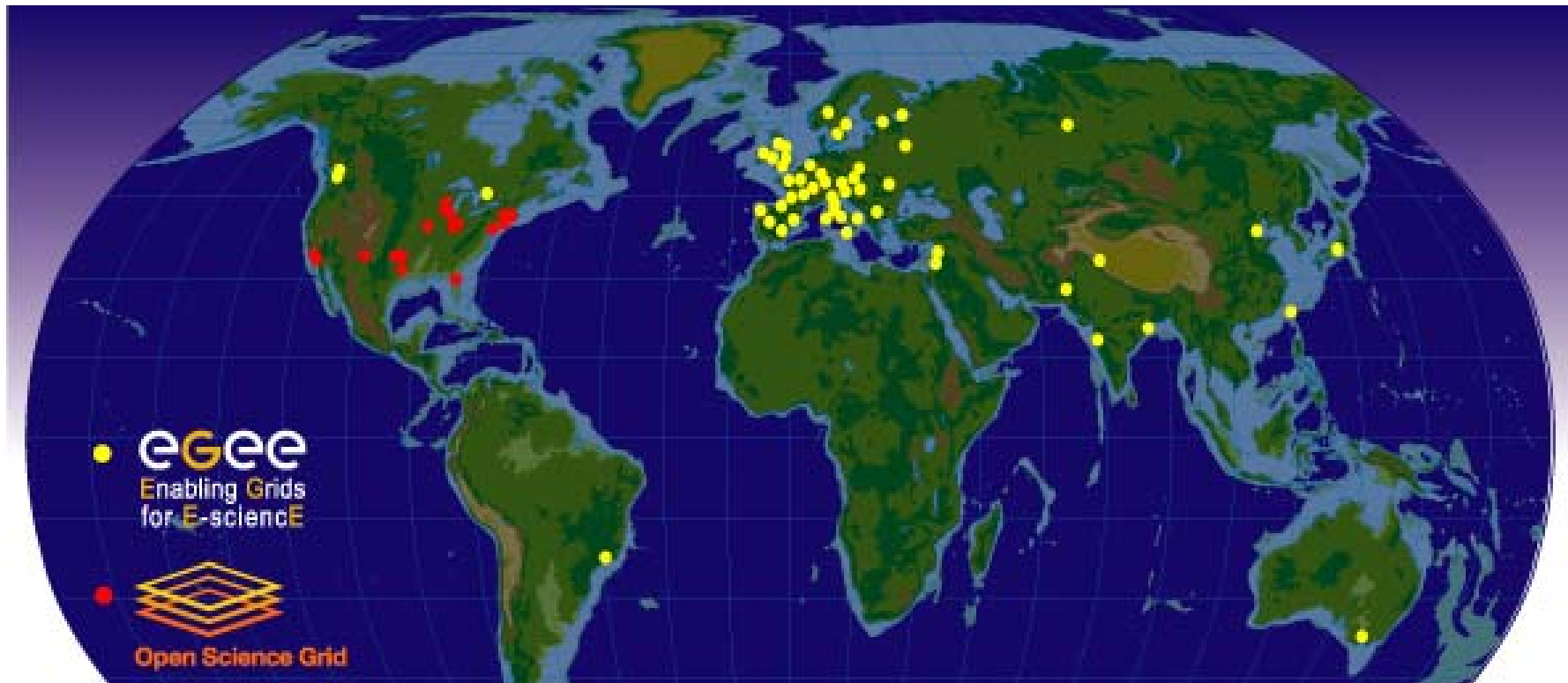
- Some applications, in particular ones based on international collaborations require seamless access to multiple infrastructures
 - Usage even harder

Example: High Energy Physics (LCG)

LCG depends on two major science Grid infrastructures (plus regional Grids)

EGEE - Enabling Grids for E-Science

OSG - US Open Science Grid



A map of the worldwide LCG infrastructure operated by EGEE and OSG.



Cross Infrastructure
Data Transfer via linked
GPFS clusters



Involved
TeraGrid Sites



Involved
DEISA Sites

SRB Data Grid Federation Status



| Data Grid | Country | SRB version | Demouser ggfsdsc | SRB Zone name | Storage Resource Logical Name | I/O MB/sec |
|-----------|-------------|-------------|------------------|---------------|-------------------------------|------------|
| APAC | Australia | 3.4.0-P | yes | AU | StoreDemoResc_AU | 3.9 |
| NOAO | Chile/US | 3.4.2 | yes | noao-ls-t3-z1 | noao-ls-t3-fs | |
| ChinaGrid | China | CGSP-II | (software) | | | |
| RNP | Brazil | 3.4.1-P2 | yes | GGF-RNP | demoResc | |
| UERJ | Brazil | 3.4.1-P2 | yes | UERJ-HERPGrid | demoResc | |
| IN2P3 | France | 3.4.2 | yes | ccin2p3 | LyonFS4 | [25.] |
| DEISA | Italy | 3.4.0-P | yes | DEISA | demo-cineca | |
| KEK | Japan | 3.4.0-P | yes | KEK-CRC | rsr01-ufs | 7.4 |
| SARA | Netherlands | 3.4.0-P | yes | SARA | SaraStore | |
| IB | New Zealand | 3.4.1 | yes | aucklandZone | aucklandResc | (0.3) |
| ASGC | Taiwan | 3.4.0-P | yes | TWGrid | SDSC-GGF_LRS1 | (0.1) |
| NCHC | Taiwan | 3.4.0-P | yes | ecogrid | ggf-test | |
| CCLRC | UK | 3.4.0-P | yes | tdmg2zone | | |
| IB | UK | 3.4.1 | yes | avonZone | avonResc | |
| WunGrid | UK | 3.3.1 | (hardware) | SDSC-wun | sfs-tape | |
| LCDRG | US | 3.4.2-P2 | Yes | LCDRG-GGF | demoResc | |
| Purdue | US | 3.4.0-P | yes | Purdue | uxResc1 | (2.5) |
| Teragrid | US | 3.4.0-P2 | yes | SDSC-GGF | sfs-disk | |
| U Md | US | 3.4.0-P | yes | umiacs | narasrb02-unix1 | |

Why is it difficult?

- Grid infrastructures use different technologies
 - And even if same technologies are used they are usually heavily customized
- Only a few widely adopted standards
 - gridFTP, X.509 (but used differently!)
 - Prototypes: BES, JSDL, ...
 - Production Grids are difficult to change – adopting standards takes time
 - Standards need to be stable before adoption
- Strong interactions between infrastructures and application community needed

GIN-CG



- Started at SC'05
- Develop pragmatic techniques for interoperability
- Provide feedback to standards groups, middleware developers, and Grid operators
 - Initial focus on authentication, information system, job submission, file based data movement
- Does NOT provide a pervasive infrastructure
 - Access needs to be negotiated with the respective infrastructure

Authentication



- Example AUP
- X.509 certificates and VOMS based VO management
 - Individual techniques (e.g. gridmapfile) derived from VOMS information
 - Some Grids, in particular Supercomputer Grids, require additional authentication
- Recommendation:
 - Set up a VOMS server for the VO

Information



- Common top level database for service discovery
 - Allows to find service endpoints for all Grids
 - Available in different schemas used
- GLUE schema now being standardized by OGF-WG
- Recommendation
 - Use this top level database for service discovery

Data Transfer



- gridFTP commonly supported
- SRM and SRB based Grids
 - Interoperability is being worked on
- Recommendation
 - Decide on what technology to use
 - Use gridFTP for data transfer

Job Submission



- Currently many different systems used, event GT2 based systems differ
- BES prototypes demonstrated at SC'06
 - No adoption path available, yet
- Recommendation
 - Usage of portals
 - Usage of VO specific submission systems

Summary



- Pervasive access to Grid infrastructures is possible
 - Difficult and labor intensive
- Strong interactions between infrastructures and community needed
- GIN can help in providing the contacts and initial recommendations
 - Findings should be fed back into GIN