Grid Operations Centre
LHCC Comprehensive Review

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25 Nov 2003

GOC Group

- The June GDB agreed that a task force should be created to define the requirements and agree on a prototype for a Grid Operations Service

- The members of this GOC Steering Group are
  - Trevor Daniels (RAL) RAL, Convenor
  - Markus Shultz (CERN) CERN
  - John Gordon (RAL) RAL
  - Rolf Rumler (IN2P3) IN2P3
  - Cristina Vistoli (INFN) INFN
  - Claude Wang Taipei (observer)
  - Eric Yen Taipei
  - Ian Fisk FNAL, US-CMS
  - Bruce Gibbard BNL, US-Atlas

GOC Group

The views of the group have been sought on several topics:

- Revised proposal for GOC
  - resulted in submission to July GDB
- Prototype website
  - general layout
  - restrictions on certain pages
  - monitoring pages
- Approaches to monitoring SLAs
  - possible tests for CE and RB services
- Security proposals
  - as presented to Sept GDB
- SLA Guide
  - a supplement to the Security Policy

Overview

GOC Proposal envisaged three Phases

- Phase 1 Jul 03 – Oct 03
- Phase 2 Nov 03 – May 04
- Phase 3 Jun 04 – Jun 05

- GOC Vision
- What was planned in Phase 1 and its current status
- What is planned for Phase 2
- User Support
  - Brief summary on behalf of GGUS at FZK

The Vision

- GOC Processes and Activities
  - Coordinating Grid Operations
  - Defining Service Level Parameters
  - Monitoring Service Performance Levels
  - First-Level Fault Analysis
  - Interacting with Local Support Groups
  - Coordinating Security Activities
  - Operations Development

Phase 1
(Jun 03 – Oct 03)

Taken from Proposal Jun 2003

- An evolutionary approach
- Phase 1 explores possible approaches to an operations centre

- a) Set up an initial monitoring centre - Done
- b) Draft Security Policy and Procedures - Done
- c) Define Service Level Parameters – Partly Done
- d) Establish a Monitoring Regime – Done
  (but further development is ongoing)
- e) Select tools for use and evaluation in Phase 2 - Done

Phase 1

- In addition to the work envisaged in the Proposal for Phase 1 RAL is acting as an operational GOC by monitoring LCG sites from the moment they install the LCG software.
  - All CE s are tested every 10 mins with an authentication test
  - All RB s are tested every 10 mins with a job-list-match test
  - Network connectivity is tested every 10 mins from RAL to every host
  - Port accessibility is tested to every externally accessible service every 10 mins
  - A trivial job is submitted to every CE every hour via Globus and via the CERN RB
  - Logs are examined and analysed several times a week
  - Significant failings or problems are reported to the LCG-Rollout list
  - Several problems have been uncovered in both the monitors and in various sites

Approach to Service SLAs

- Formal Contract with GOC? – No, because
  - GOC is not (likely to be) a legal body
  - GOC will not (be likely to) have any formal powers over Service Providers
  - GOC will not (be likely to) pay for any Services
  - So difficult for GOC to enforce a traditional SLA
- Instead, prefer a virtual contract between Service Provider and the LCG Grid Community
  - Any Centre wishing to provide a Service must publish its design levels for the specified service level parameters of that Service
  - GOC will then monitor the actual levels achieved and publish them so they may be compared with the design levels
  - Service Providers (Centres) will then compete on quality or possibly quality/cost, either to attract work or enhance reputation

Form of SLA

- One for each instance of a LCG Service
- To be published on the GOC website in standard format exactly as provided by the Service Administrator
- Format still to be agreed, but likely to contain as a minimum
  - Identification of Service (type, release, etc)
  - Statement on compliance with Security and Availability Policy (standard wording)
  - Limitations on use (if any)
  - Designed Availability
  - Designed Reliability
  - Designed Performance (Service-specific; to be defined for each type of Service)

Monitoring

The monitoring pages bring together the several LCG monitoring tools which are readily available, together with a touch-sensitive map which links to pertinent information about each LCG site, including a link to each site's published status.

The currently running and displaying monitors are:

- GridICE monitoring of LCG-1 (at CERN)
- MapCenter monitoring of LCG-1 (at RAL)
- LCG-1 status measured with GridPP (at RAL)

also shows

- LCG-1 overall rollout status page (at CERN)

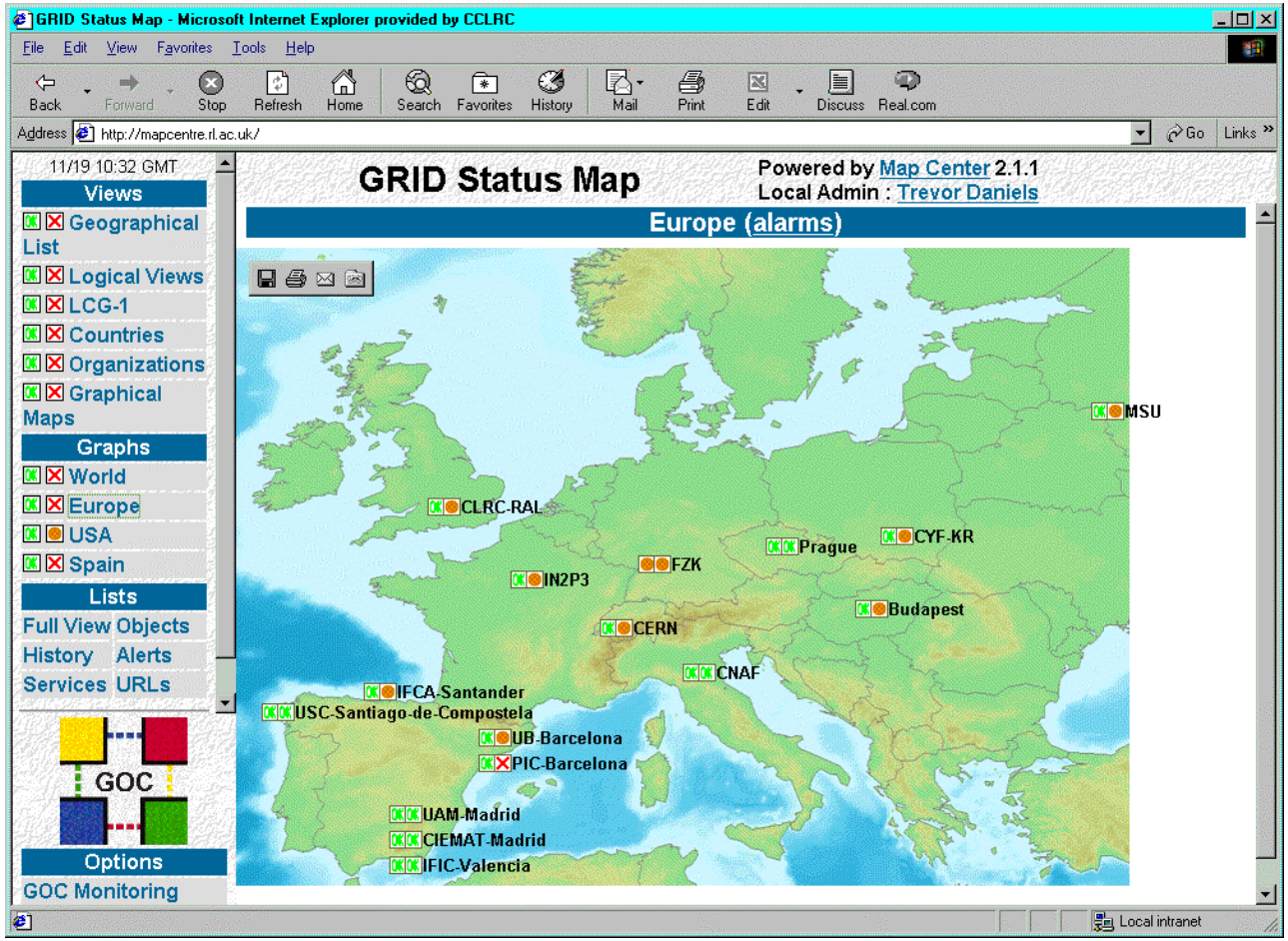
➢ Each of these provides multiple views of status information

MapCenter

Performs low-level tests and aggregates these up through several levels to country, showing best and worst status at each level.

This is the view of Europe showing individual sites.

Other views show world-wide sites, USA, etc



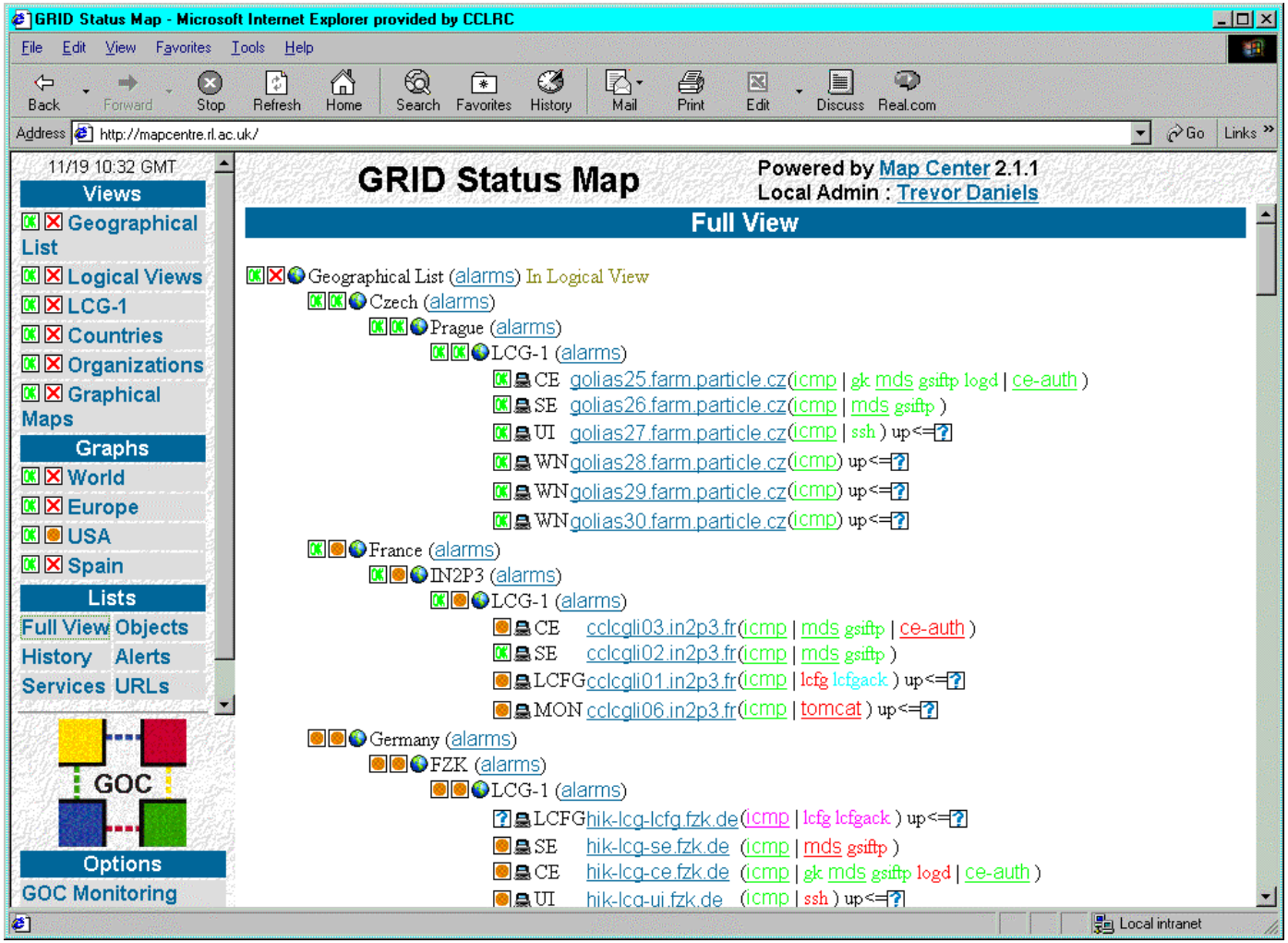
MapCenter

Part of the MapCenter full list view showing aggregation up to country.

Tests include icmp response, ports tests to gk, mds, gsiftp, etc

and specific SLA-based tests like

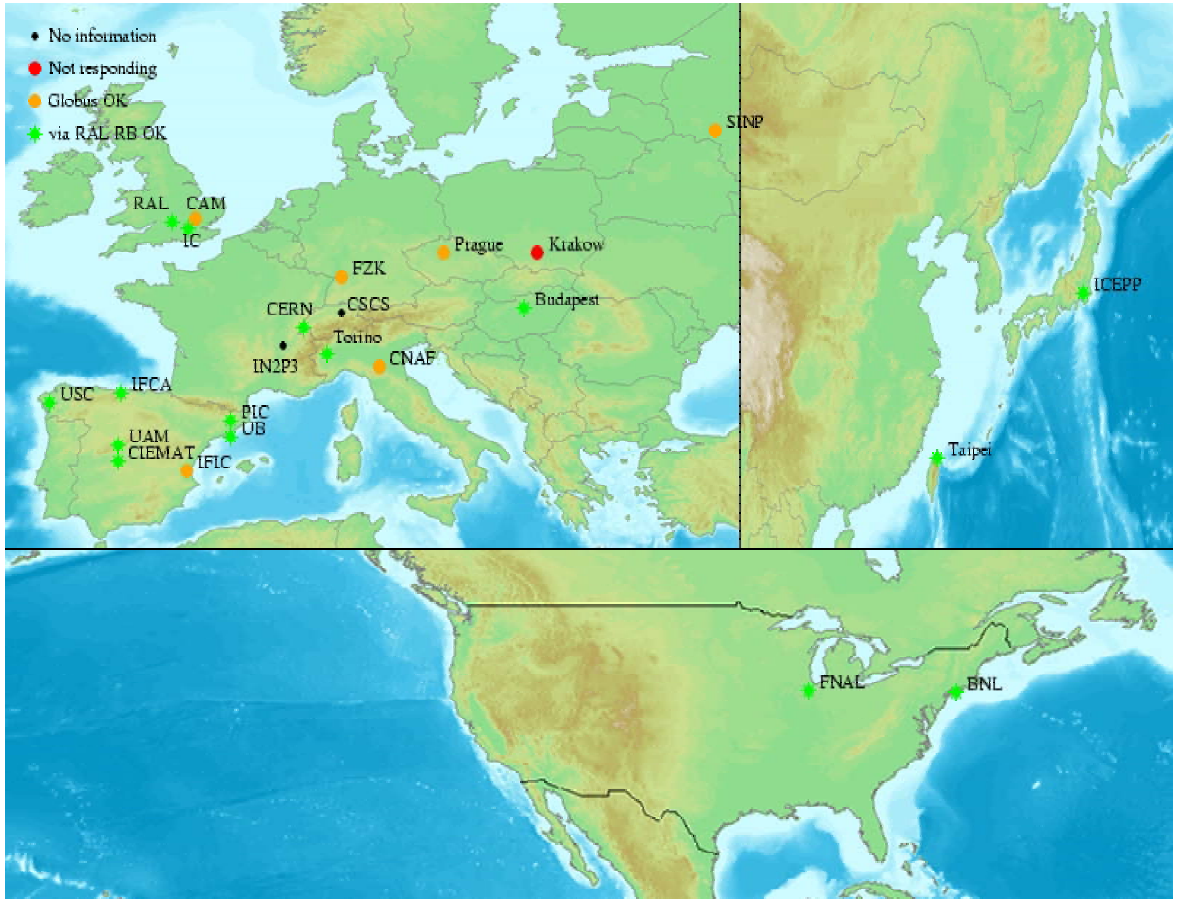
ce-auth



GridPP Monitor

Submits jobs via globus-job-run, via CERN, RAL and other RBs, displays coloured dot to indicate recent results on map and also in list form.

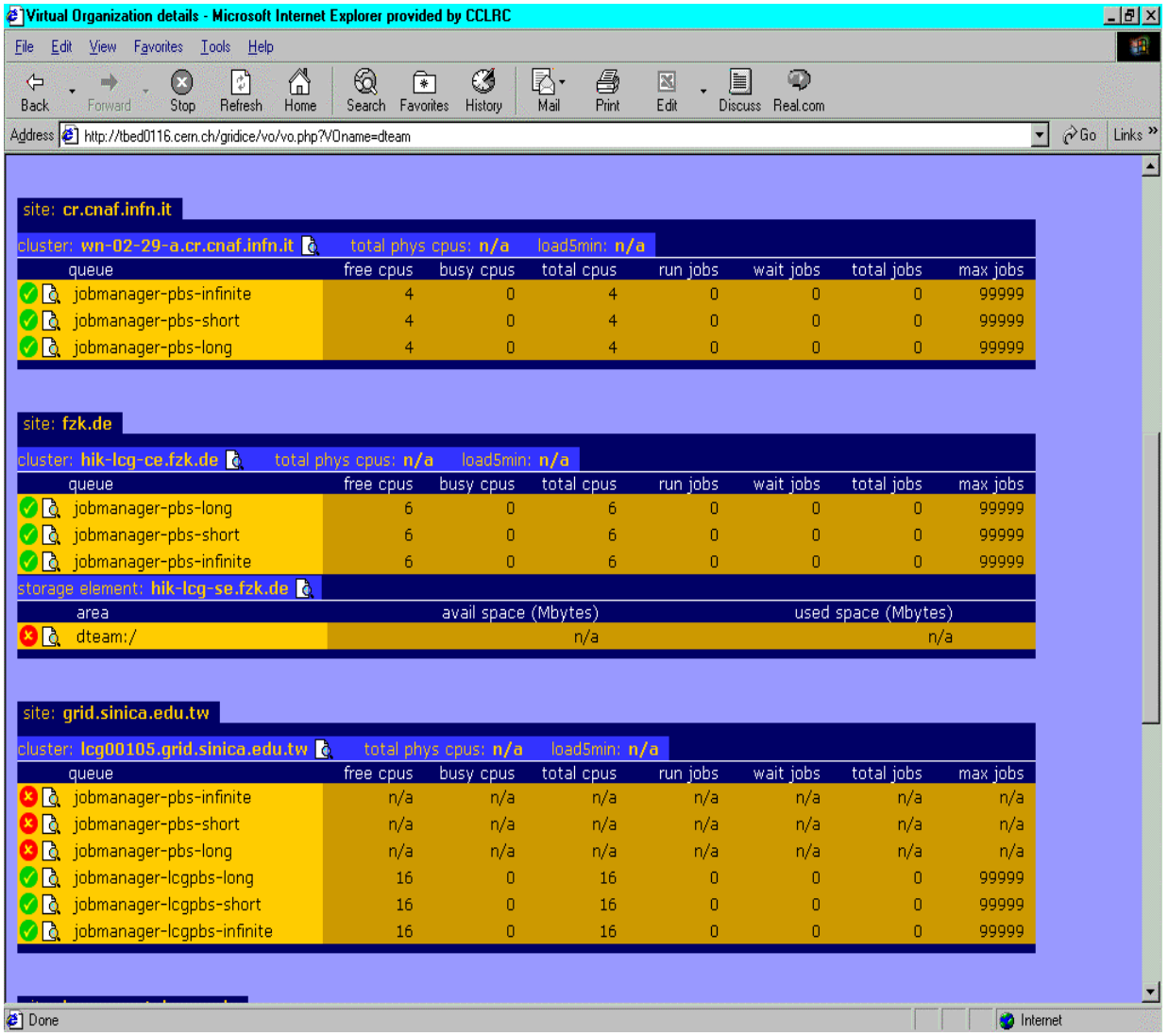
Gives user-level view of status



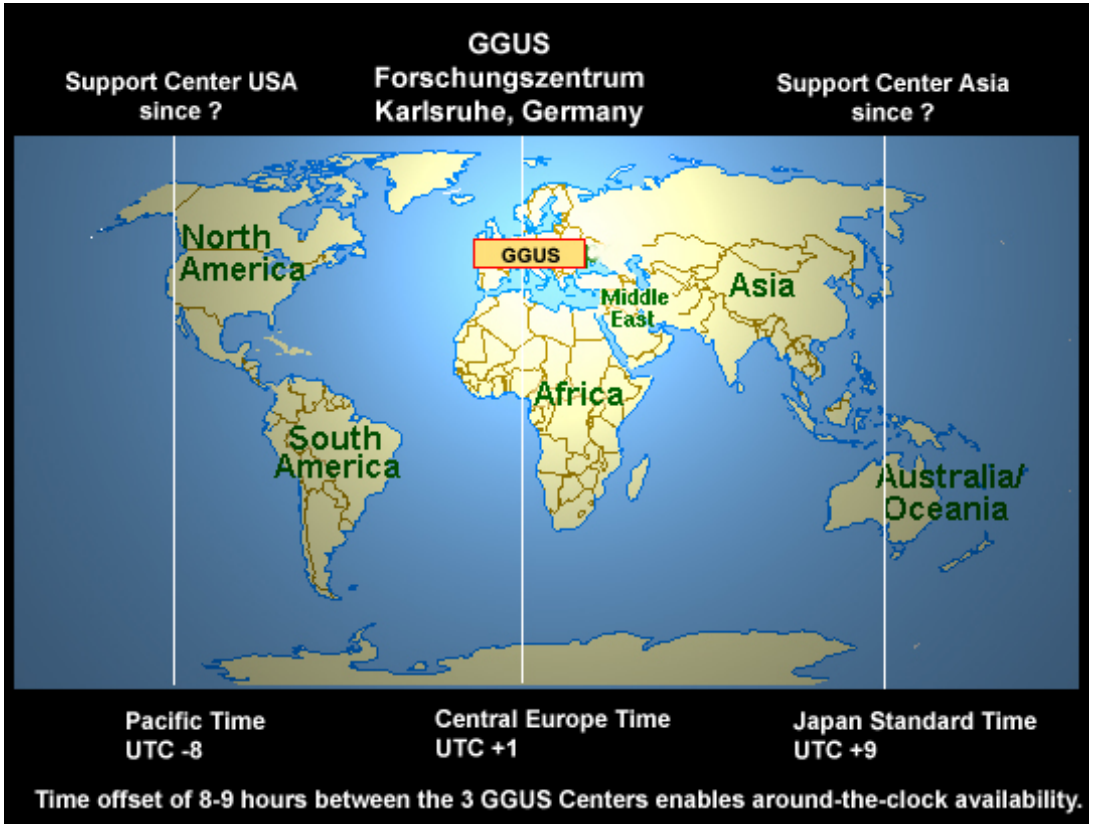
GridICE VO view

Partial view of DTEAM VO showing infn, fzk and sinica

Shows info on cpu loading, jobs, and storage by cluster



Global Grid User Support – GGUS
The Model



- Started 1st of october at GridKa Forschungszentrum Karlsruhe (Germany)
- Supports already 41 usergroups of GridKa
- Website http://www.ggus.org
- E-Mail support@ggus.org

Information flow

Grid User

Service Request

GGUS

Interaction

Data flow

Interaction

GOC

ESUS

Interaction

Local operations

Grid related problems will be solved by GGUS or sent to GOC using the GGUS system;

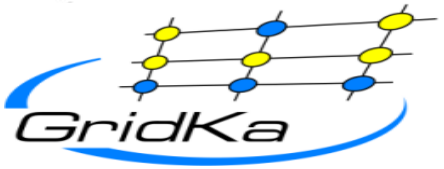
First line of support: Problems (experiment specific) will be solved by ESUS (with Savannah) or sent to GGUS using an agreed interface;

GGUS: Global Grid User Support

ESUS: Experiment Specific User Support

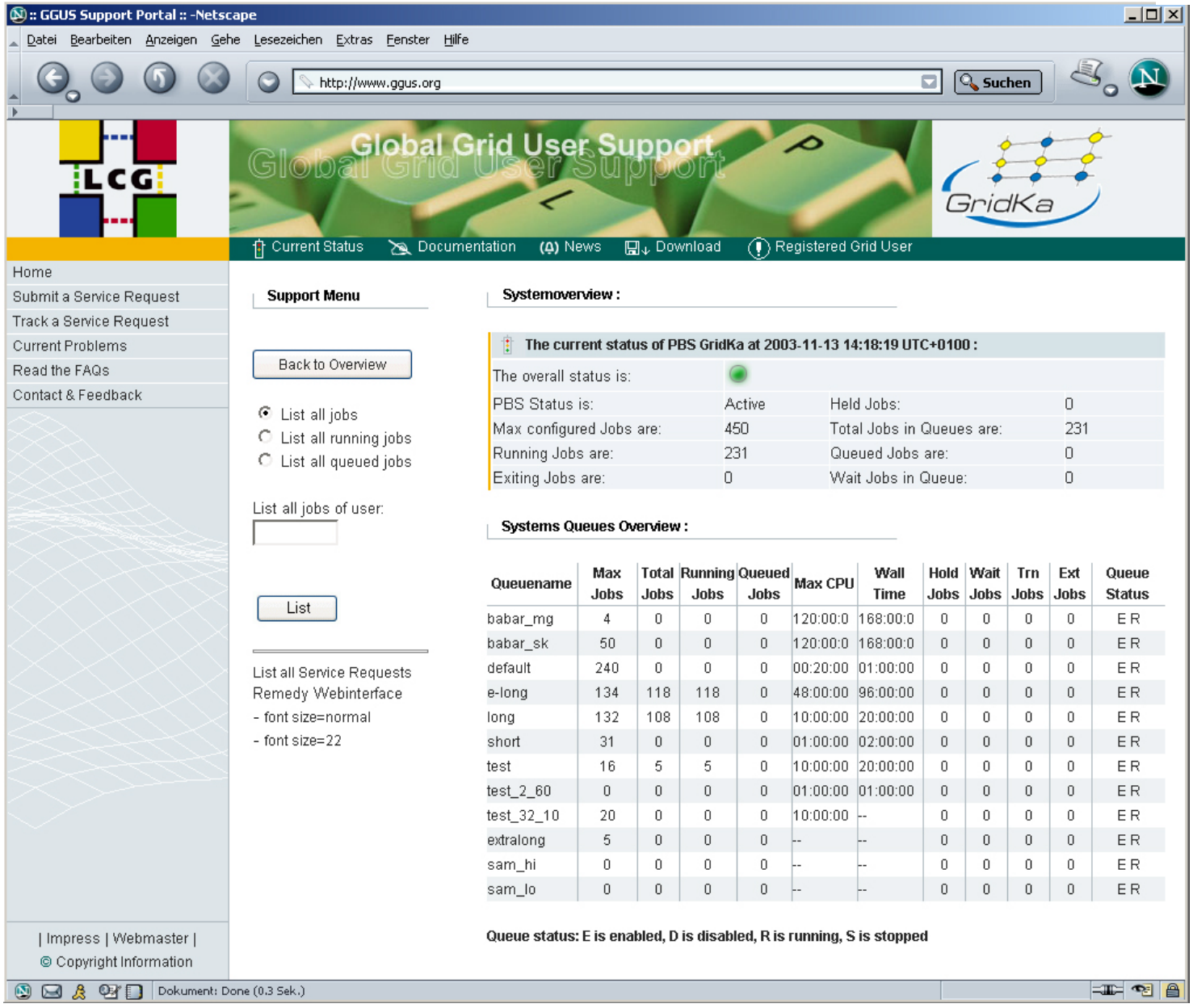
GOC: Grid Operations Centre

Present GGUS Services
(November 2003)



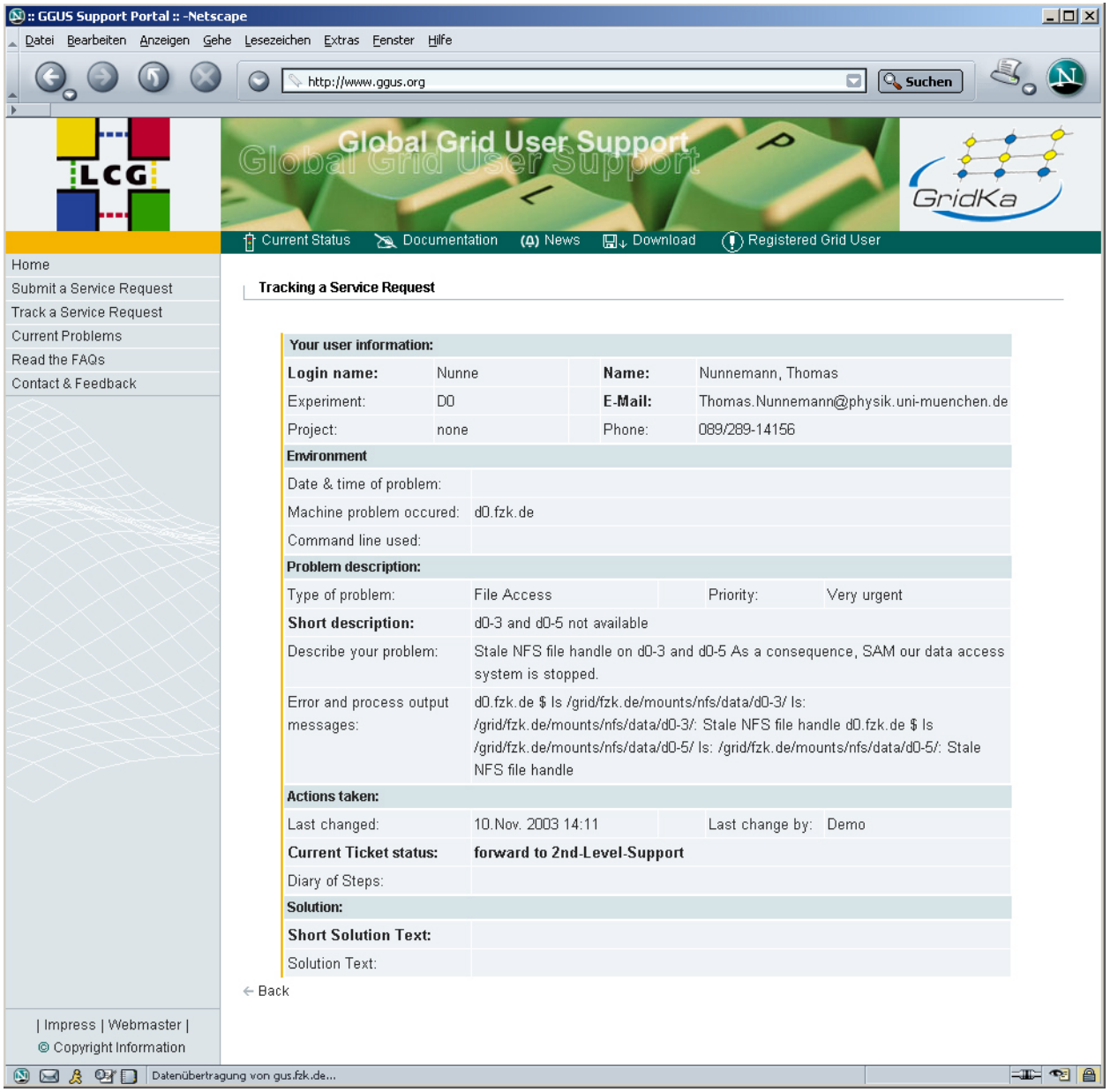
- Support for GridKa users via web portal
- Entry point for grid related questions and problems
  - problem tracking with a problem management tool: remedy action request system
  - rapid development of processes, workflow elements, escalations and automated email
  - entry of problem tickets via web browser, email, phone
  - ticket information for user via web browser
  - offer a web interface to problem database to other support teams
  - working hours 8 am to 4 pm Monday – Friday (to be extended)
  - FAQs
- Status and diagnostic information of jobs and job queues, documentation about grid resources
- News, temporary problems, bottlenecks and down times

http://www.ggus.org
System Overview (jobs and queues)



Queuename	Max Jobs	Total Jobs	Running Jobs	Queued Jobs	Max CPU	Wall Time	Hold Jobs	Wait Jobs	Trn Jobs	Ext Jobs	Queue Status
babar_mg	4	0	0	0	120:00:0	168:00:0	0	0	0	0	E R
babar_sk	50	0	0	0	120:00:0	168:00:0	0	0	0	0	E R
default	240	0	0	0	00:20:00	01:00:00	0	0	0	0	E R
e-long	134	118	118	0	48:00:00	96:00:00	0	0	0	0	E R
long	132	108	108	0	10:00:00	20:00:00	0	0	0	0	E R
short	31	0	0	0	01:00:00	02:00:00	0	0	0	0	E R
test	16	5	5	0	10:00:00	20:00:00	0	0	0	0	E R
test_2_60	0	0	0	0	01:00:00	01:00:00	0	0	0	0	E R
test_32_10	20	0	0	0	10:00:00	--	0	0	0	0	E R
extralong	5	0	0	0	--	--	0	0	0	0	E R
sam_hi	0	0	0	0	--	--	0	0	0	0	E R
sam_lo	0	0	0	0	--	--	0	0	0	0	E R

http://www.ggus.org
Tracking a Service Request



Roadmap for Q1 & Q2 2004

- Further development of GGUS Portal
- Further work on Remedy: problem database, knowledge database and workflows, escalations
- Define requirements for a centralised LDAP-based user authentication and authorisation
- Implement a centralized LDAP authentication and authorisation if possible
- Implement a GOC <--> GUS interface to share common tools
- Implement a ESUS <--> GUS interface for problem interchange
- Integrate another Tier-1 Centre for first and second level support (including Remedy integration)

End of Presentation

- Questions?

Supplementary Slides

- Some more detailed slides follow which will not be used in the LHCC presentation

Phase 1
(Jun 03 – Oct 03)

Taken from Proposal Jun 2003

- a) Set up an initial monitoring centre - Done
  - Steering Group established
  - LCG-Rollout list installed
    - 99 members
    - July – 74 messages
    - Aug – 121 messages
    - Sep – 311 messages
    - Oct – 200 messages
    - Nov – 140 messages (to 11th)
  - GOC website set up
    - Includes certificate protection for sensitive pages
  - MapCenter configured and installed
  - GppMon configured and installed
  - GridICE (link)
  - SLA tests developed and running for CE and RB

Phase 1

- b) Draft Security Policy and Procedures - Done
  - Drafted with the LCG Security Group
    - Approved by GDB in October
    - Will be submitted to SC2 for Adoption
  - Three GOC-related supporting Annexes in preparation
    - Service Level Agreement Guide - drafted
    - Procedures for Resource Admins - partly drafted
    - Procedure for site self-audit - in outline

Phase 1

c) Define Service Level Parameters – Partly Done

- Schedule, Availability, Reliability all clear and defined
  - Schedule
    - The published periods of downtime for upgrading etc
  - Availability
    - The proportion of actual up-time to scheduled up-time
  - Reliability
    - The mean time to failure
- Performance is service-specific; ideas under discussion
  - needs experience with real users before deciding what is important
- Service Level Agreement
  - The publication by the site of the targeted (designed) service level parameters for an LCG service in a prescribed format will comprise the SLA for that service
  - The GOC will monitor and publish alongside the actual achieved values of the same parameters

Phase 1

- d) Establish a Monitoring Regime – Done
- (but further development is ongoing)
  - SLA Monitoring
    - CE and RB availability and reliability are being crudely monitored now
    - Reports of significant failures sent to Rollout List
  - Use and Development of MapCenter
    - Good low and high level tool
    - Needs no local sensors
    - Easily extended and has history
    - will be used for SLA monitoring
    - CE and RB SLA monitoring tests installed in test
  - Use and Development of GppMon
    - tests job submission via Globus and CERN RB
  - GridICE
    - at CERN – we simply link to it

Phase 1

- e) Select tools for use and evaluation in Phase 2 - Done
  - As Phase 1
    - GppMon (extended to add history)
    - MapCenter (extended to accommodate SLA tests)
    - GridICE (as implemented at CERN)
  - plus MonALISA
    - needs local sensing agents
  - plus network monitoring tools from EDG WP7
    - needs local agents
    - needs R-GMA

Plans for Phase 2
(Nov 03 – May 04)

- a) Set up a second monitoring centre
  - Eventually there should be 2 more, one in the East and one in the West to provide 24 hour cover, and to provide regional coordination of operational issues like alerts and SLAs
  - A second site would immediately deploy the Phase 2 monitoring tools
  - A second site would enable the details of inter-site coordination to be established and permit a parallel monitoring system to be set up
  - The October GDB thought finding a second site was premature, so this may be delayed

Plans for Phase 2

- b) Establish Grid operations and security coordination regime in consultation with
  - LCG Security Group
  - Local Security Officers
  - Local Support Groups
  - LCG User Support Centre (GGUS)
- to
  - promote the Security Policy and associated documents
  - agree and establish common operational practices, principally the way in which SLAs and monitoring will work
  - agree a fault analysis and alerting mechanism
  - agree an incident response mechanism

Plans for Phase 2

- c) Establish a simple change control regime
  - question whether or to what degree 'control' is appropriate
  - as a minimum ensure information about recent and prospective changes is published to the community
  - establish whatever mechanism is agreed in coordination with local support groups
  - the minimum in outline would include:
    - the schedule of service down time (part of SLA)
    - the schedule and nature of proposed changes
    - site would publish information via GOC web site

Plans for Phase 2

- d) Monitoring service levels
  - Investigate using EDG WP7 network monitoring tools
    - uses R-GMA
  - Install tools to monitor and detect deviations from SLA
  - Deploy remote agents - include in software distributions?
  - Automatic alert mechanisms for operations staff
  - Set up mechanisms to notify local support of problems

Plans for Phase 2

- e) Establish accounting mechanism
  - define accounting schema,
  - develop filters to transform required data from sites to the schema for one or two batch systems,
  - develop mechanisms for collecting data from sites and transmitting it to the GOC,
  - develop mechanism for matching up data from batch and CE,
  - develop and install suitable DB to hold accounting data,
  - develop suitable web-based static and interactive reports

Open Issues

- To find partners for two other time zones (USA, Asia)
- Further development of processes with ESUS
  - Definition of working groups
  - Contact person
  - Synchronization with experiment specific
- Access to a centralized (distributed) LDAP directory of Grid Users for authentication and authorisation
  - Additional attributes necessary
  - Standardised format of VOs