http://www.grid-support.ac.uk

http://www.ngs.ac.uk

The National Grid Service

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Acknowledgements

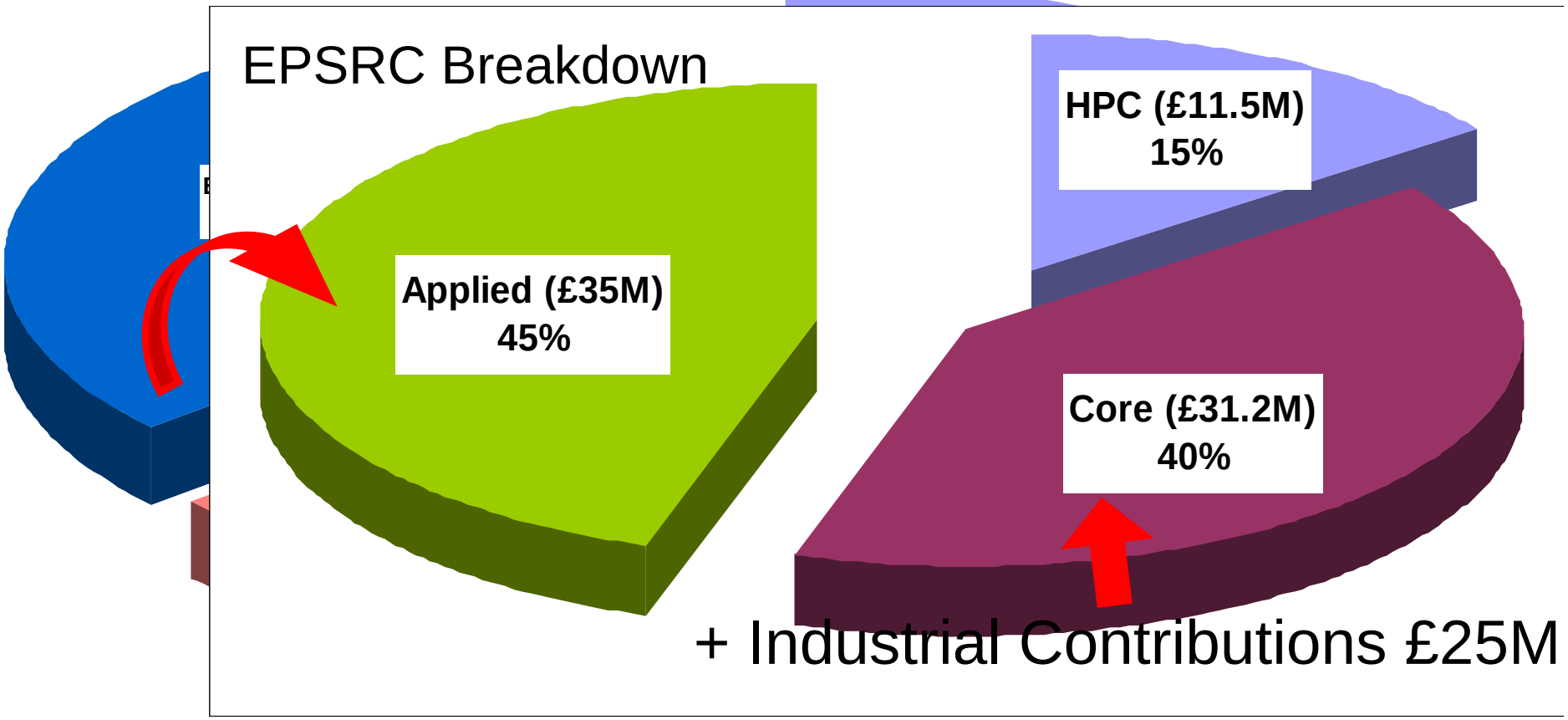
- This talk was originally put together by Mike Mineter
- Some NGS and GOSC slides are taken from talks by Stephen Pickles, Technical Director of GOSC
- Also slides from Malcolm Atkinson on e-Science programme

Overview

- The UK e-science programme
- Grid Operations Support Centre
- The NGS

UK e-Science Budget (2001-2006)

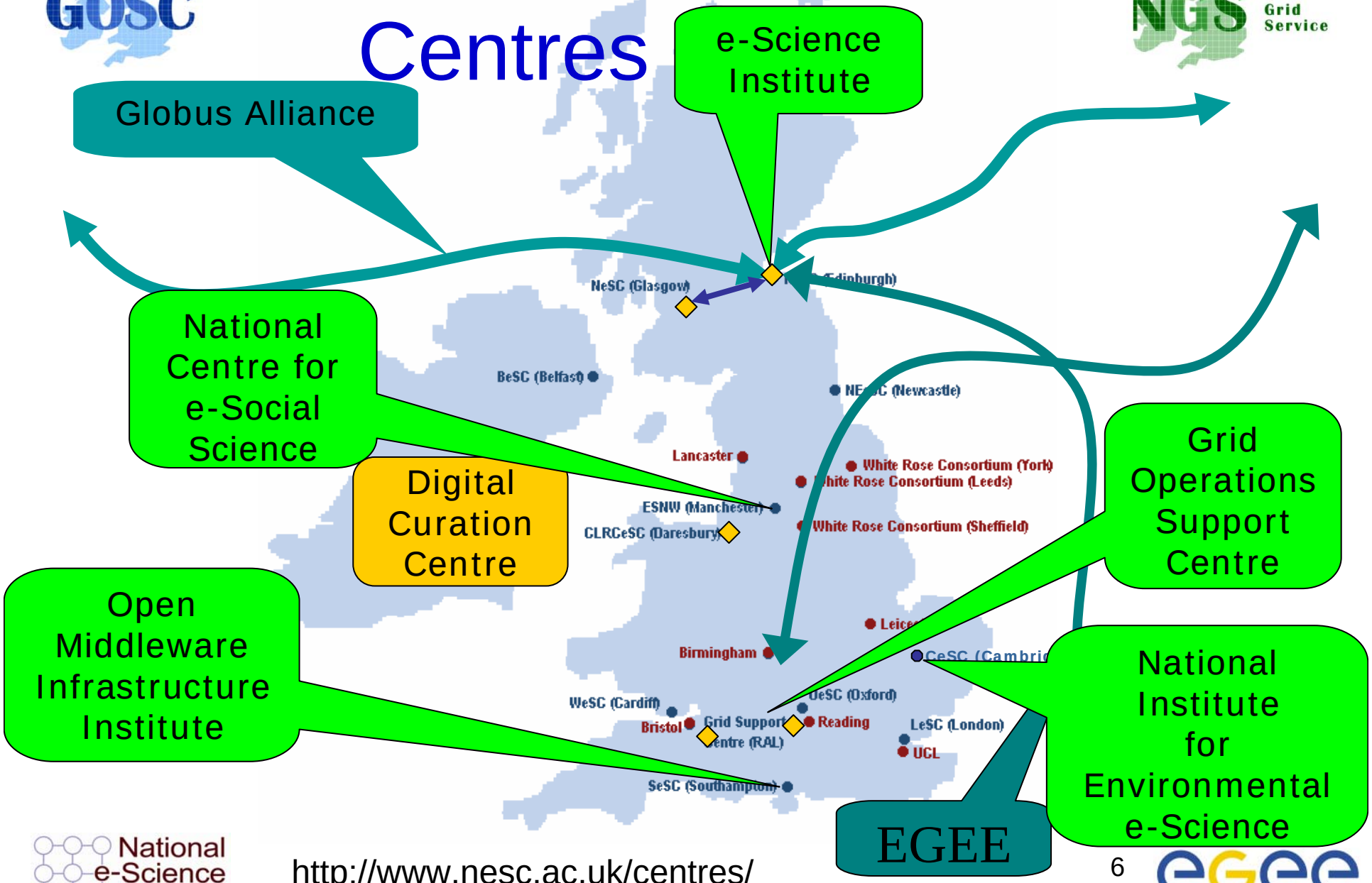
Total: £213M + £100M via JISC



+ Industrial Contributions £25M

Source: Science Budget 2003/4 – 2005/6, DTI(OST)

The e-Science Centres



National e-Science Centre

http://www.nesc.ac.uk/centres/

egee

Grid Operations Support Centre

GOSC

The Grid Operations Support Centre is a distributed “virtual centre” providing deployment and operations support for the UK e-Science programme.

GOSC Services

- UK Grid Services
  - National Services
    - Authentication, authorisation, certificate management, VO registration, security, network monitoring, help desk + support centre.
  - NGS Services and interfaces
    - Job submission, simple registry, data transfer, data access and integration, resource brokering, monitoring and accounting, grid management services, workflow, notification, operations centre.
  - NGS core-node Services
    - CPU, (meta-) data storage, key software
  - Services coordinated with others (eg OMII, NeSC, EGEE, LCG):
    - Integration testing, compatibility & Validation Tests, User Management, training

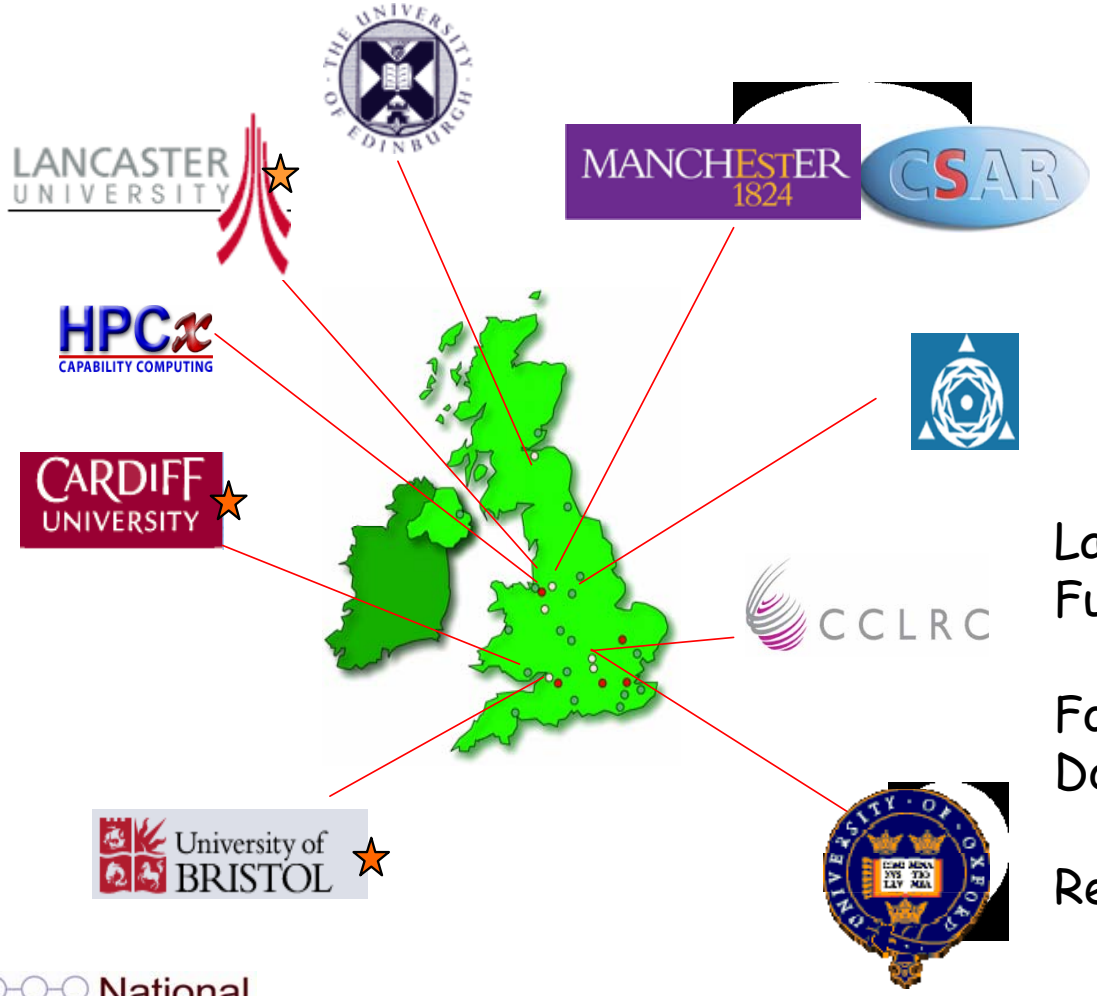
- Administration:
  - Policies and acceptable use
  - Service Level Agreements and Definitions
  - Coordinate deployment and Operations
  - Operational Security

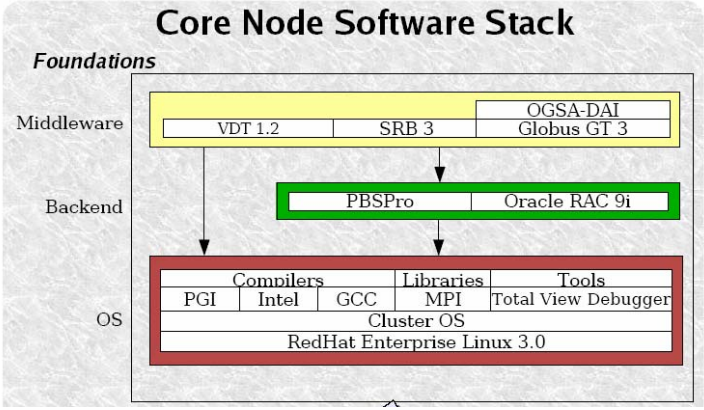
The National Grid Service

The National Grid Service

- The core UK grid, resulting from the UK's e-Science programme.
  - Grid: virtual computing across admin domains
- Production use of computational and data grid resources.
- Supported by JISC, and is run by the Grid Operations Support Centre (GOSC).

The National Grid Service

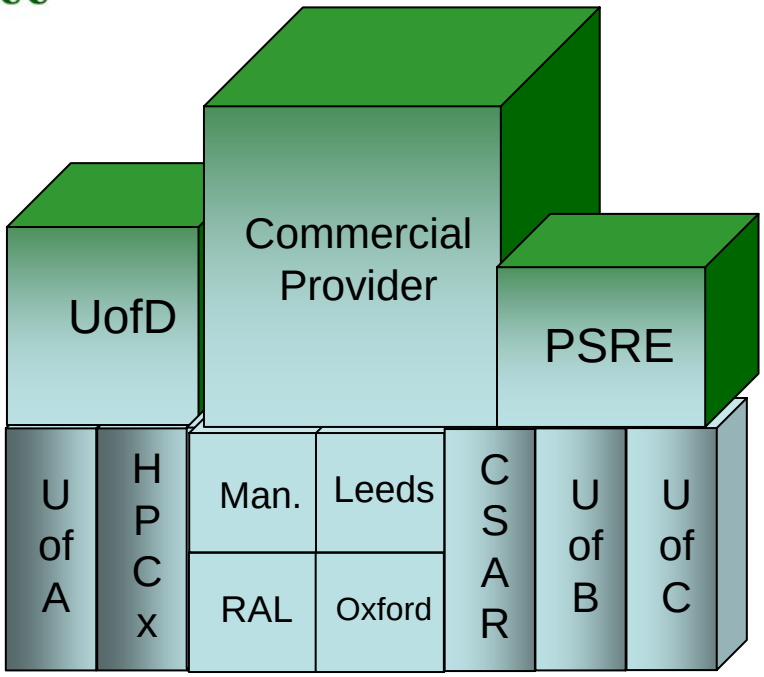




Launched April 2004
Full production - September 2004

Focus on deployment/operations
Do not do development

Responsive to users needs



NGS Core Nodes: Host core services, coordinate integration, deployment and support
+free to access resources for all VOs. Monitored interfaces + services

NGS Partner Sites: Integrated with NGS, some services/resources available for all VOs
Monitored interfaces + services

NGS Affiliated Sites: Integrated with NGS, support for some VO's
Monitored interfaces (+security etc.)

New partners

Over the last year, several new full partners have joined the NGS:

- Bristol, Cardiff, Lancaster and Westminster
- Further details of resources can be found on the NGS web site: www.ngs.ac.uk.

- Resources committed to the NGS for a period of at least 12 months.

- The heterogeneity introduced by these new services has
  - provided experience in connecting an increasingly wide range of resources to the NGS
  - presented a challenge to users to make effective use of this range of architectures
  - basic common interface for authentication+authorisation is the first step towards supporting more sophisticated usage across such a variety of resources.

NGS Facilities

- **Leeds** and **Oxford (core compute nodes)**
  - 64 dual CPU intel 3.06GHz (1MB cache). Each node: 2GB memory, 2x120GB disk, Redhat ES3.0. Gigabit Myrinet connection. 2TB data server.
- **Manchester** and **Rutherford Appleton Laboratory (core data nodes)**
  - 20 dual CPU (as above). 18TB SAN.
- **Bristol**
  - initially 20 2.3GHz Athlon processors in 10 dual CPU nodes.
- **Cardiff**
  - 1000 hrs/week on a SGI Origin system comprising 4 dual CPU Origin 300 servers with a Myrinet™ interconnect.
- **Lancaster**
  - 8 Sun Blade 1000 execution nodes, each with dual UltraSPARC IIICu processors connected via a Dell 1750 head node.
- **Westminster**
  - 32 Sun V60 compute nodes
- **HPCx** and **CSAR**
  - …

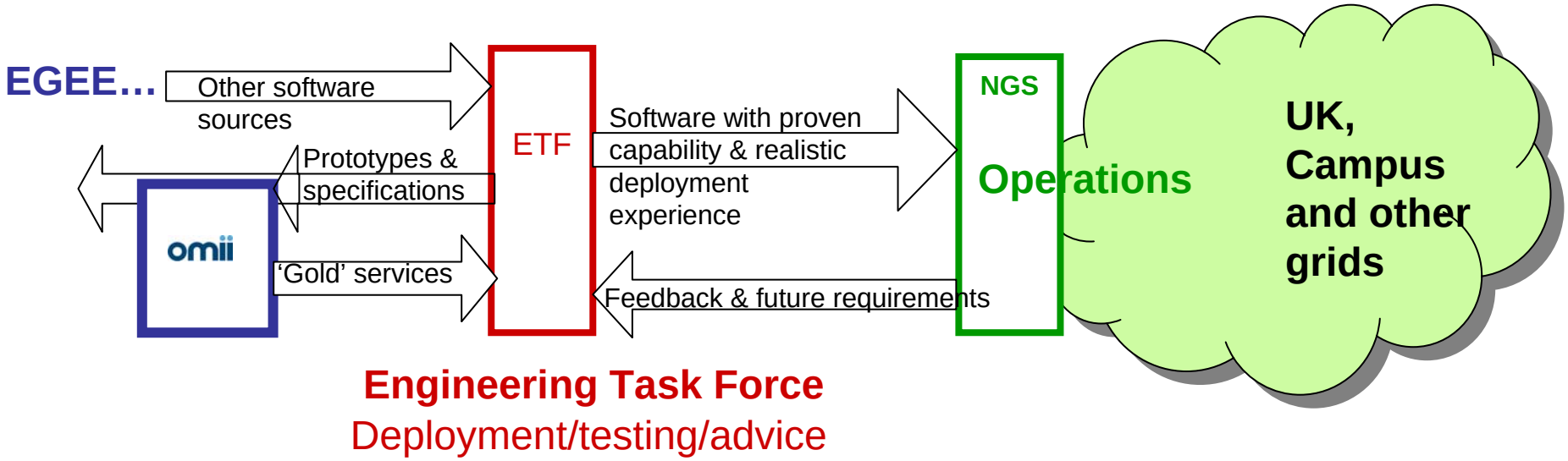
For more details: http://www.ngs.ac.uk/resources.html

NGS software

- Computation services based on GT2
  - Use compute nodes for sequential or parallel jobs, primarily from batch queues
  - Can run multiple jobs concurrently (be reasonable!)
- Data services:
  - Storage Resource Broker:
    - Primarily for file storage and access
    - Virtual filesystem with replicated files
  - "OGSA-DAI": Data Access and Integration
    - Primarily for grid-enabling databases (relational, XML)
  - NGS Oracle service

Managing middleware evolution

- Important to coordinate and integrate this with deployment and operations work in EGEE, LCG and similar projects.
- Focus on deployment and operations, NOT development.



Gaining Access

NGS nodes

- data nodes at RAL and Manchester
- compute nodes at Oxford and Leeds
- partner nodes at Bristol, Cardiff, Lancaster and Westminster

- all access is through digital X.509 certificates
  - from UK e-Science CA
  - or recognized peer

National HPC services

- HPCx
- CSAR

- Must apply separately to research councils

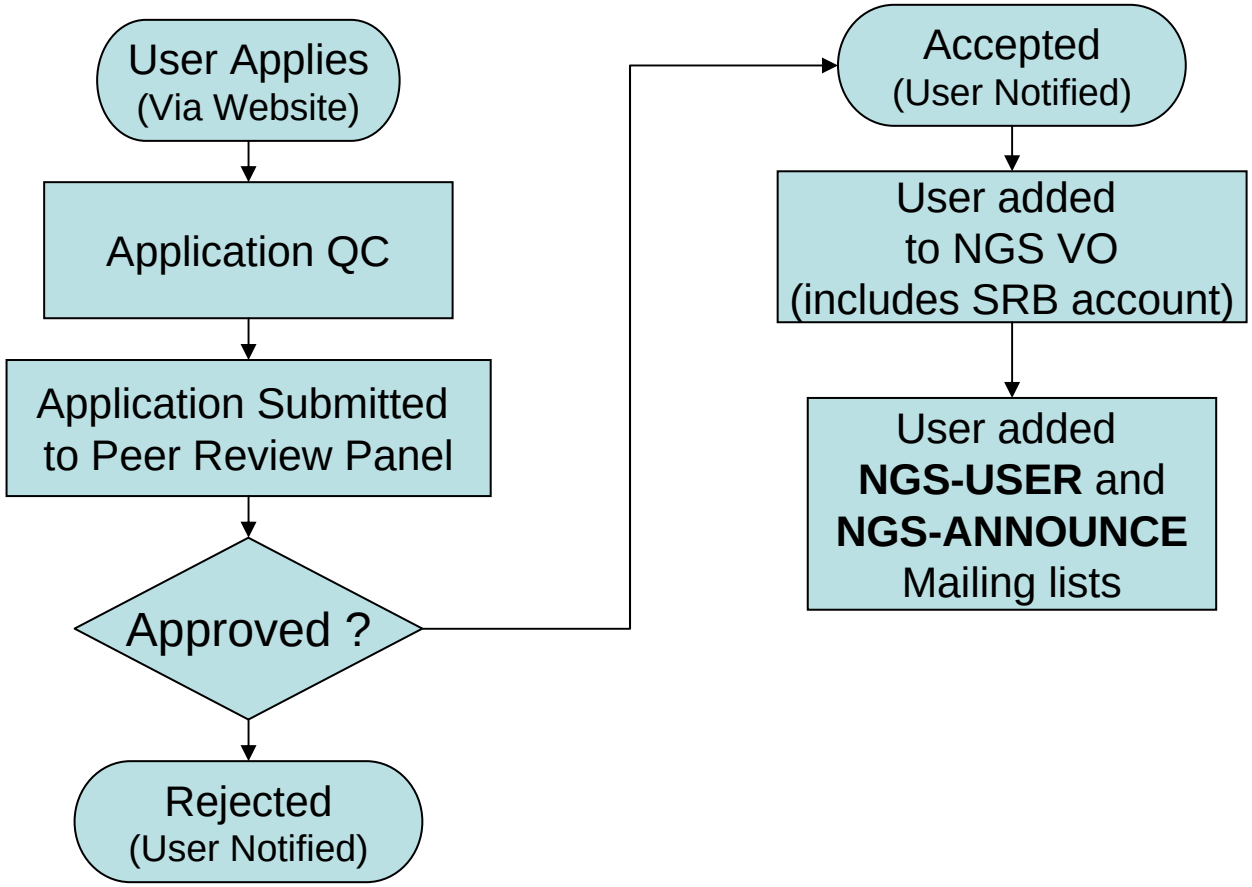
- Digital certificate and conventional (username/ password) access supported

Joining the NGS - Users

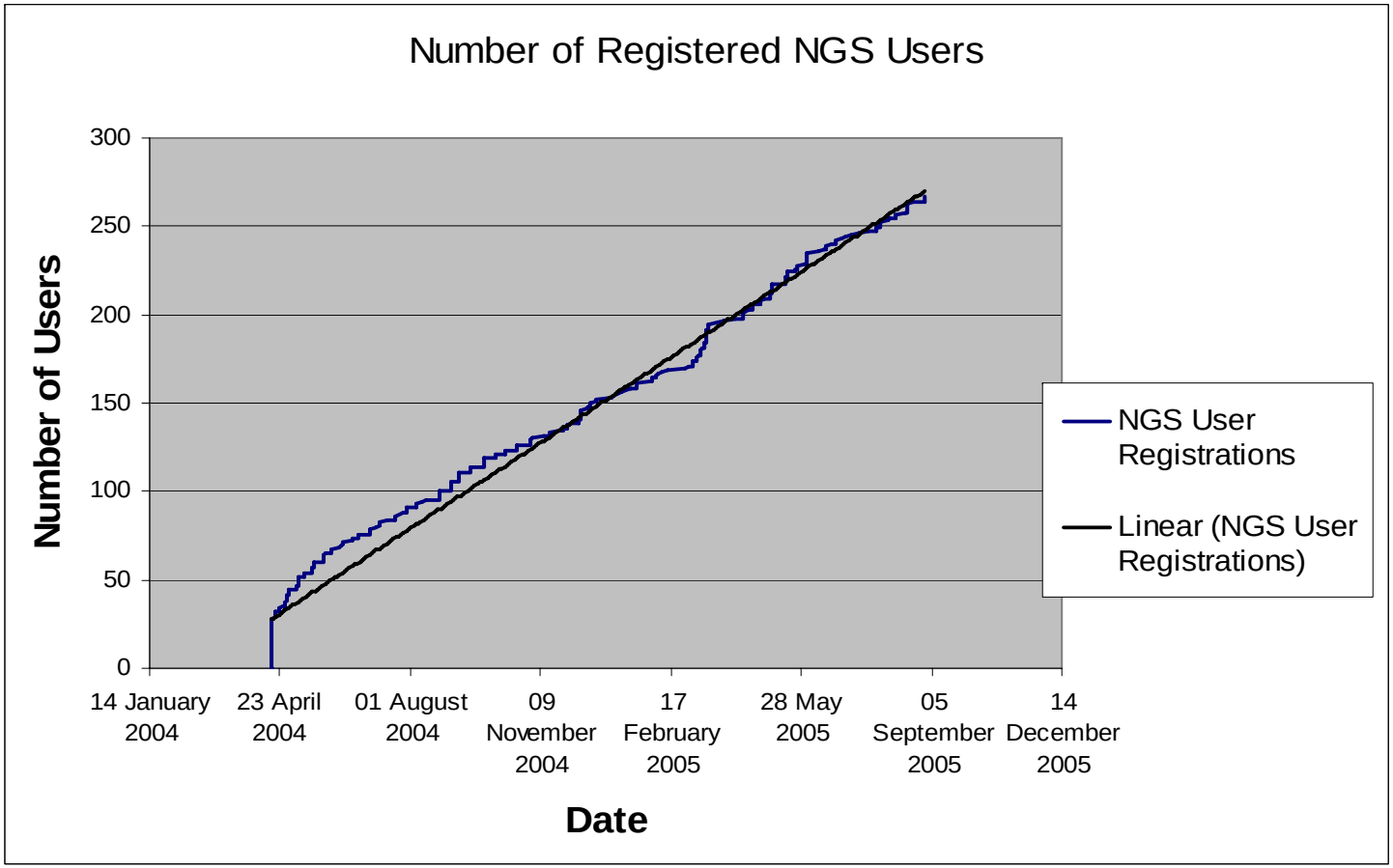
- Users
  - Most apply for NGS accounts as individuals
  - Projects (Virtual Organisations) – talk to GOSC
    - NGS provides a basis for collaboration with UK colleagues

free to UK academic users!

User Registration (Process)



NGS Users



Note: Numbers have increased since this slide was made

NGS Organisation

- Operations Team
  - led by Andrew Richards (RAL)
  - representatives from all NGS core nodes
  - meets bi-weekly by Access Grid
  - day-to-day operational and deployment issues
  - reports to Technical Board

- Technical Board
  - led by Stephen Pickles
  - representatives from all sites and GOSC
  - meets bi-weekly by Access Grid
  - deals with policy issues and high-level technical strategy
  - sets medium term goals and priorities
  - reports to Management Board

- GOSC Board meets quarterly
  - representatives from funding bodies, partner sites and major stakeholders
  - sets long term priorities

Key facts

- Production: deploying middleware after selection and testing – major developments via Engineering Task Force.
- Evolving:
  - Middleware
  - Number of sites
  - Organisation:
    - VO management
    - Policy negotiation: sites, VOs
- International commitment
- Gathering users' requirements – National Grid *Service*

Web Sites

- NGS
  - http://www.ngs.ac.uk
  - To see what's happening: http://ganglia.ngs.rl.ac.uk/
- GOSC
  - http://www.grid-support.ac.uk
- CSAR
  - http://www.csar.cfs.ac.uk
- HPCx
  - http://www.hpcx.ac.uk

Summary

- NGS is a production service
  - Therefore cannot include latest research prototypes!
  - ETF recommends what should be deployed
- Core sites provide computation and also data services
- NGS is evolving
  - OMII, EGEE, Globus Alliance all have m/w under assessment by the ETF for the NGS
    - Selected, deployed middleware currently provides “low-level” tools
  - New deployments will follow
  - New sites and resources being added
  - Organisation