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

http://www.ngs.ac.uk

The National Grid Service

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http://www.eu-egee.org/

Policy for re-use

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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

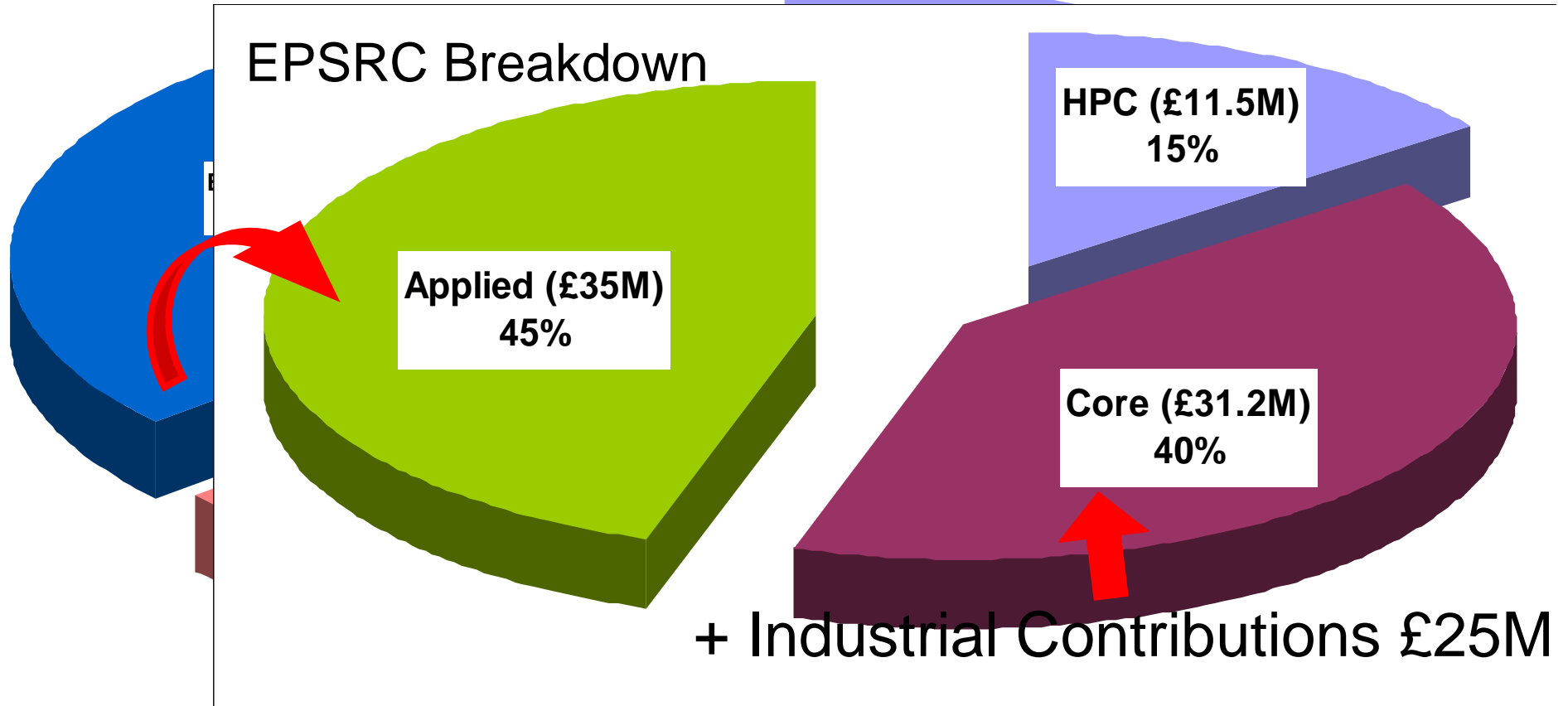- Also slides from Malcolm Atkinson on e-Science programme

Overview

- The UK e-science programme

- Grid Operations Support Centre

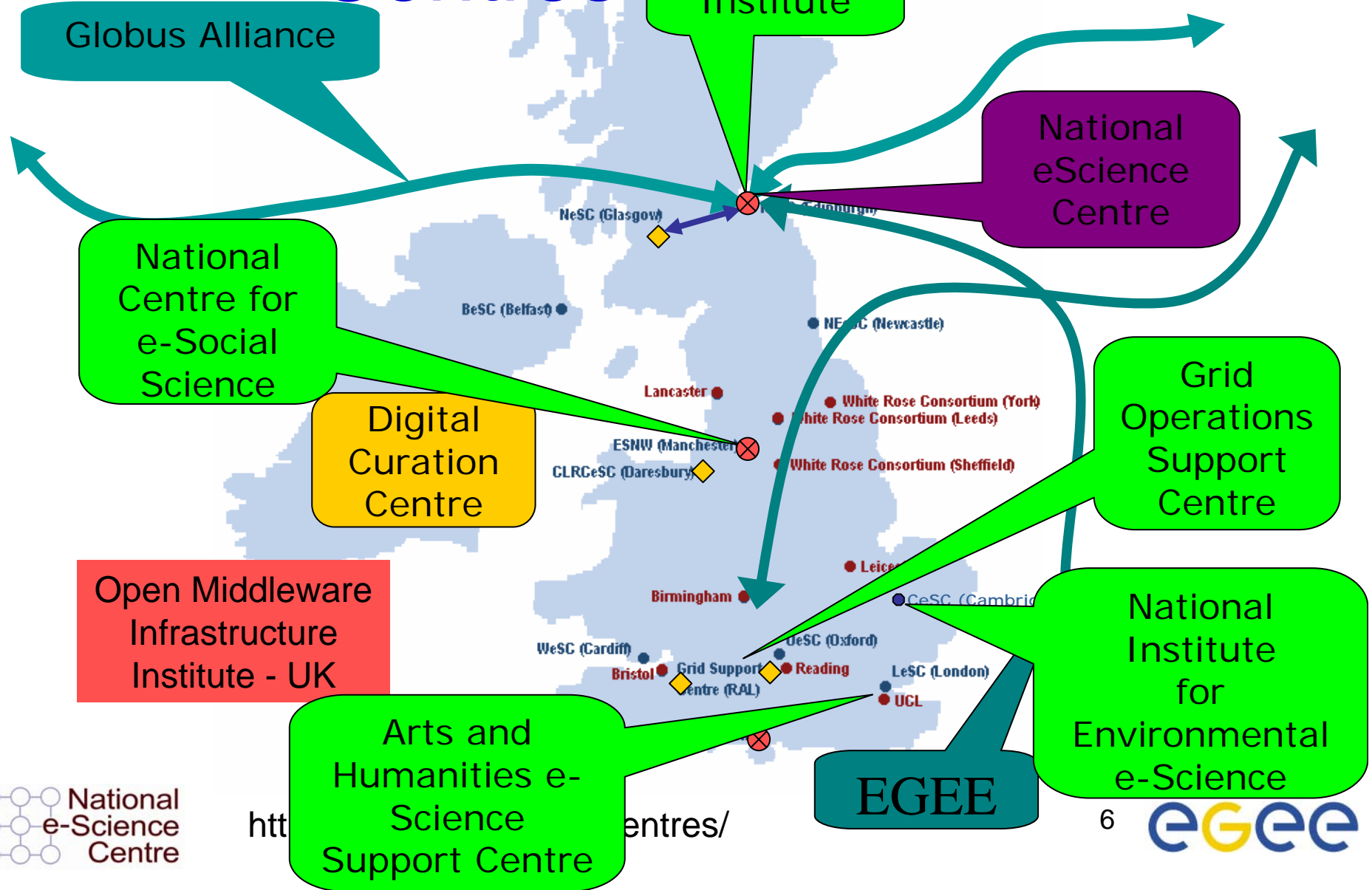- The NGS

UK e-Science Budget (2001-2006)

Total: £213M + £100M via JISC

EPSRC Breakdown

HPC (£11.5M) 15%

Applied (£35M) 45%

Core (£31.2M) 40%

+ Industrial Contributions £25M

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

The e-Science Centres

GOSC

Globus Alliance

e-Science Institute

NGS National Grid Service

National eScience Centre

National Centre for e-Social Science

NeSC (Glasgow)

BeSC (Belfast)

NE?SC (Newcastle)

Digital Curation Centre

Lancaster

White Rose Consortium (York)
White Rose Consortium (Leeds)

ESNW (Manchester)

CLRCeSC (Daresbury)

White Rose Consortium (Sheffield)

Grid Operations Support Centre

Open Middleware Infrastructure Institute - UK

Leice?

Birmingham

CeSC (Cambri?

National Institute for Environmental e-Science

WeSC (Cardiff)

Bristol

?eSC (Oxford)

Grid Support ?entre (RAL)

Reading

LeSC (London)

UCL

Arts and Humanities e-Science Support Centre

EGEE

National e-Science Centre

htt   entres/

6

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
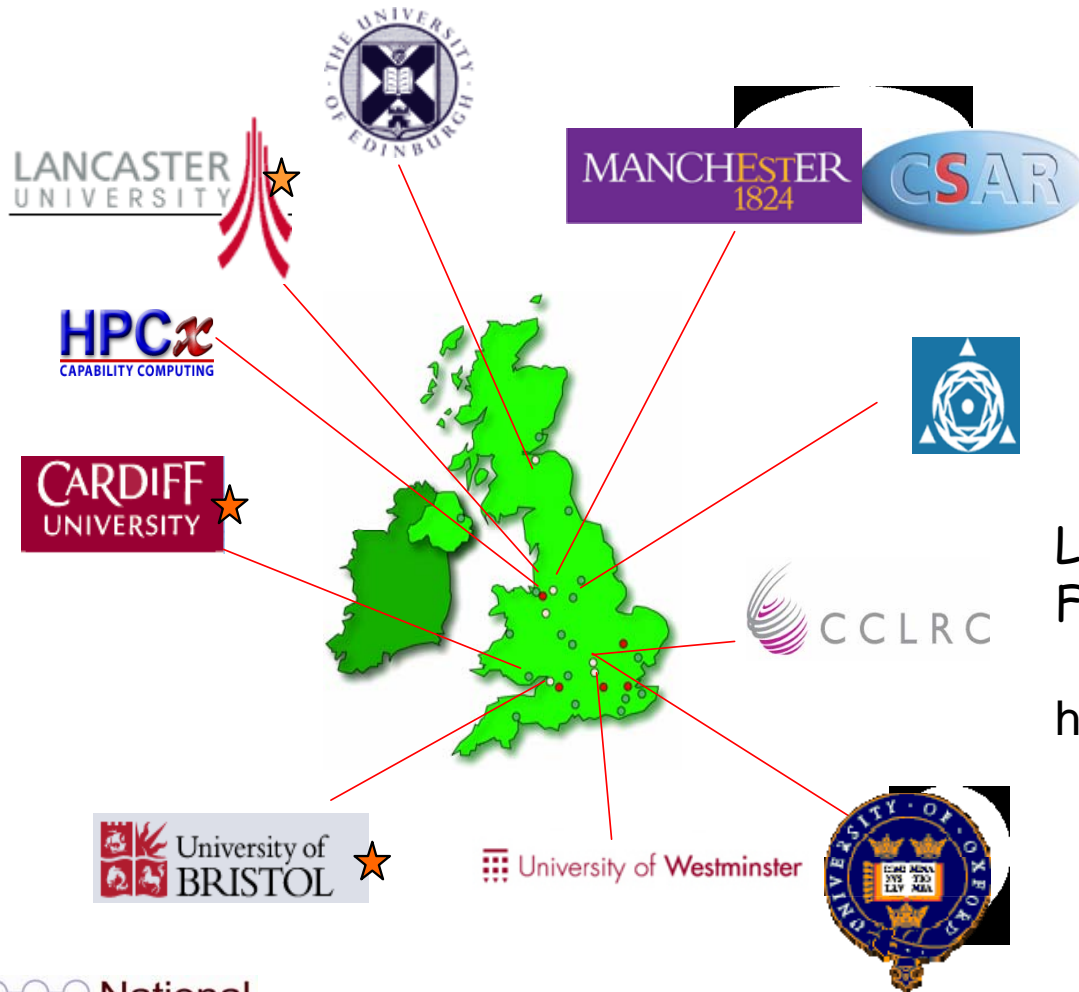
The National Grid Service

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).
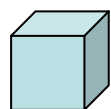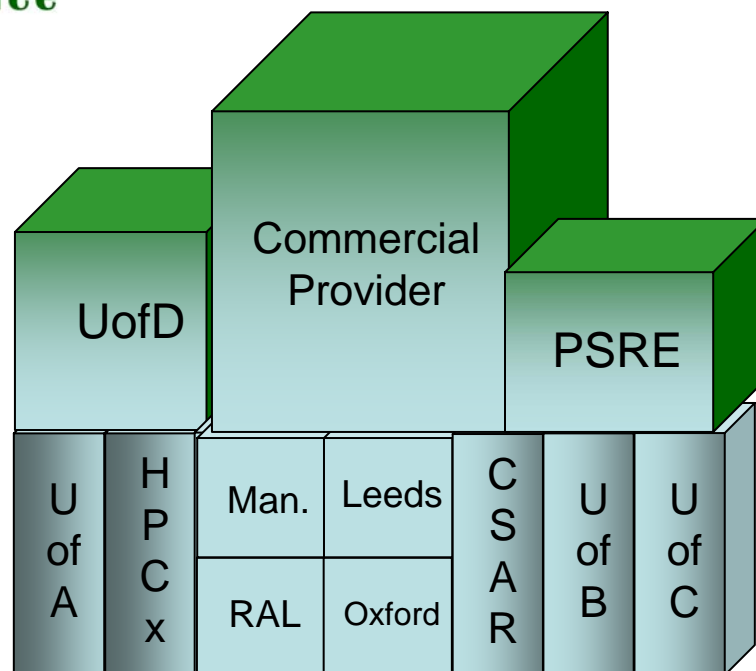
The National Grid Service
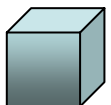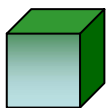
Launched April 2004
Full production - September 2004

http://www.ngs.ac.uk/

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.)

Induction to Grid Computing and the NGS

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**
  - …

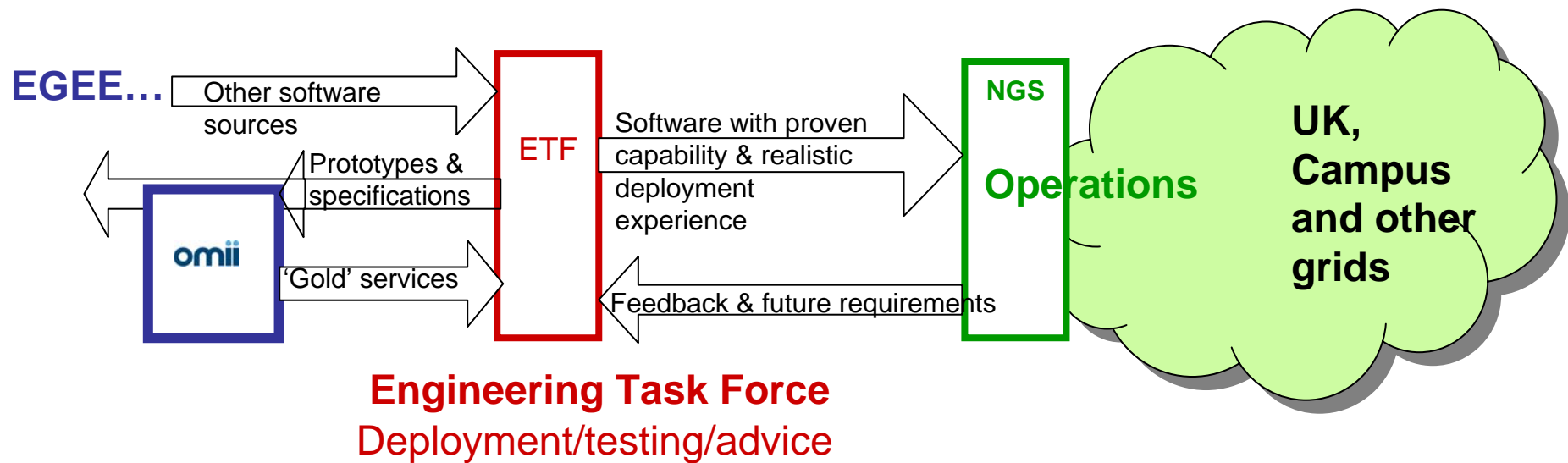For more details: http://www.ngs.ac.uk/resources.html

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.

EGEE…

Other software sources

Prototypes & specifications

ETF

'Gold' services

Software with proven capability & realistic deployment experience

Feedback & future requirements

NGS

Operations

UK, Campus and other grids

omii

Engineering Task Force
Deployment/testing/advice

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
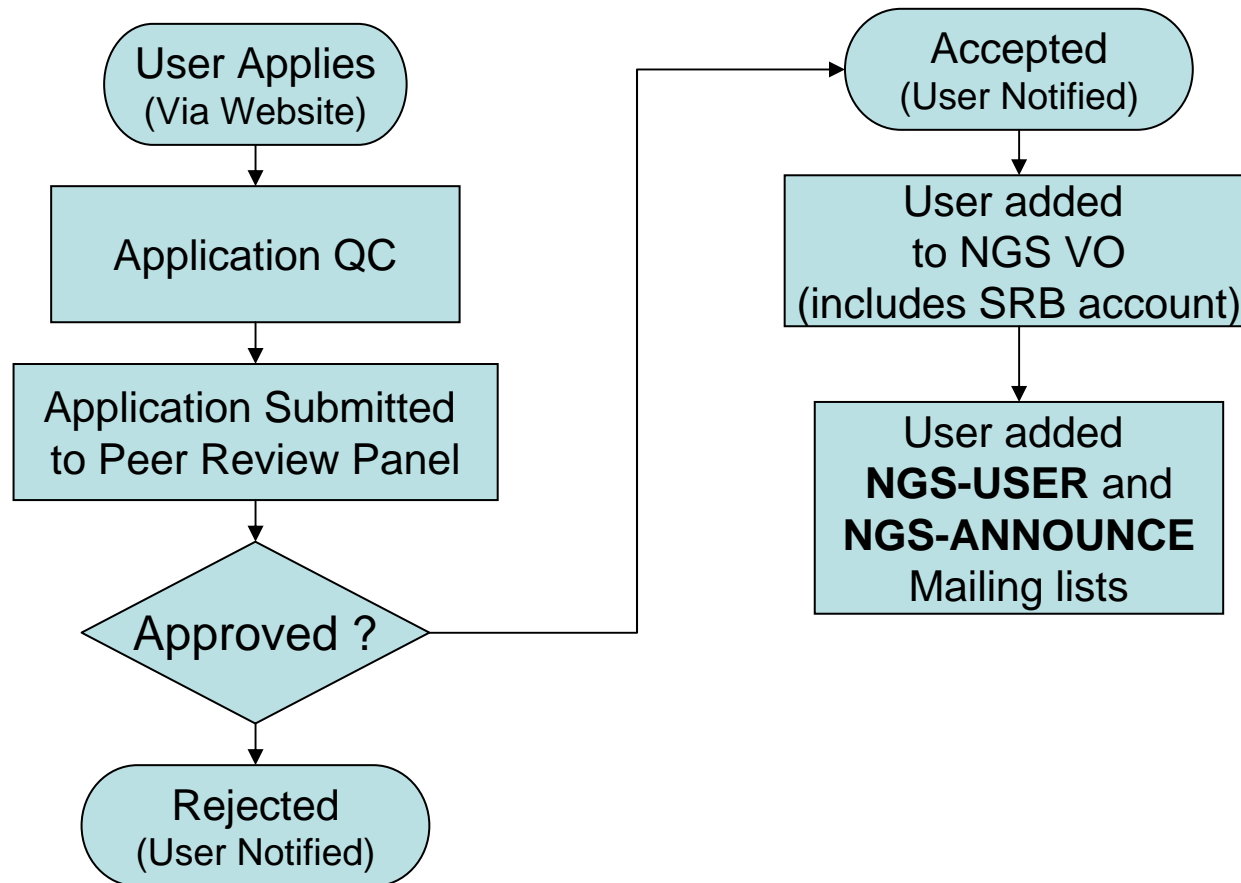
Joining the NGS - Users

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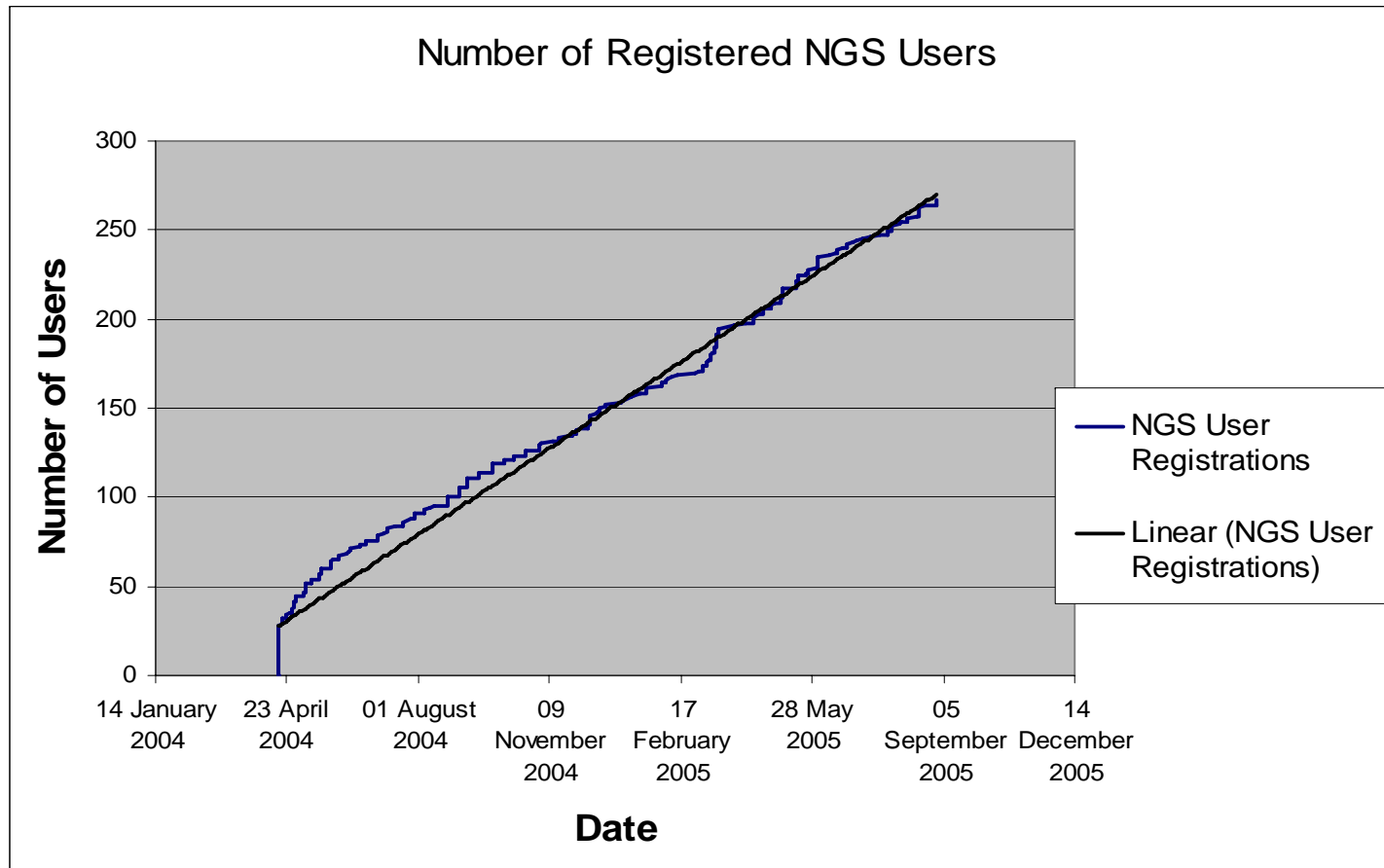   - NGS provides a basis for collaboration with UK colleagues

free to UK academic users!

User Registration (Process)

User Applies
(Via Website)

↓

Application QC

↓

Application Submitted
to Peer Review Panel

↓

Approved ?

→ Accepted
(User Notified)

↓

User added
to NGS VO
(includes SRB account)

↓

User added
NGS-USER and
NGS-ANNOUNCE
Mailing lists

↓

Rejected
(User Notified)

NGS Users

Number of Registered 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