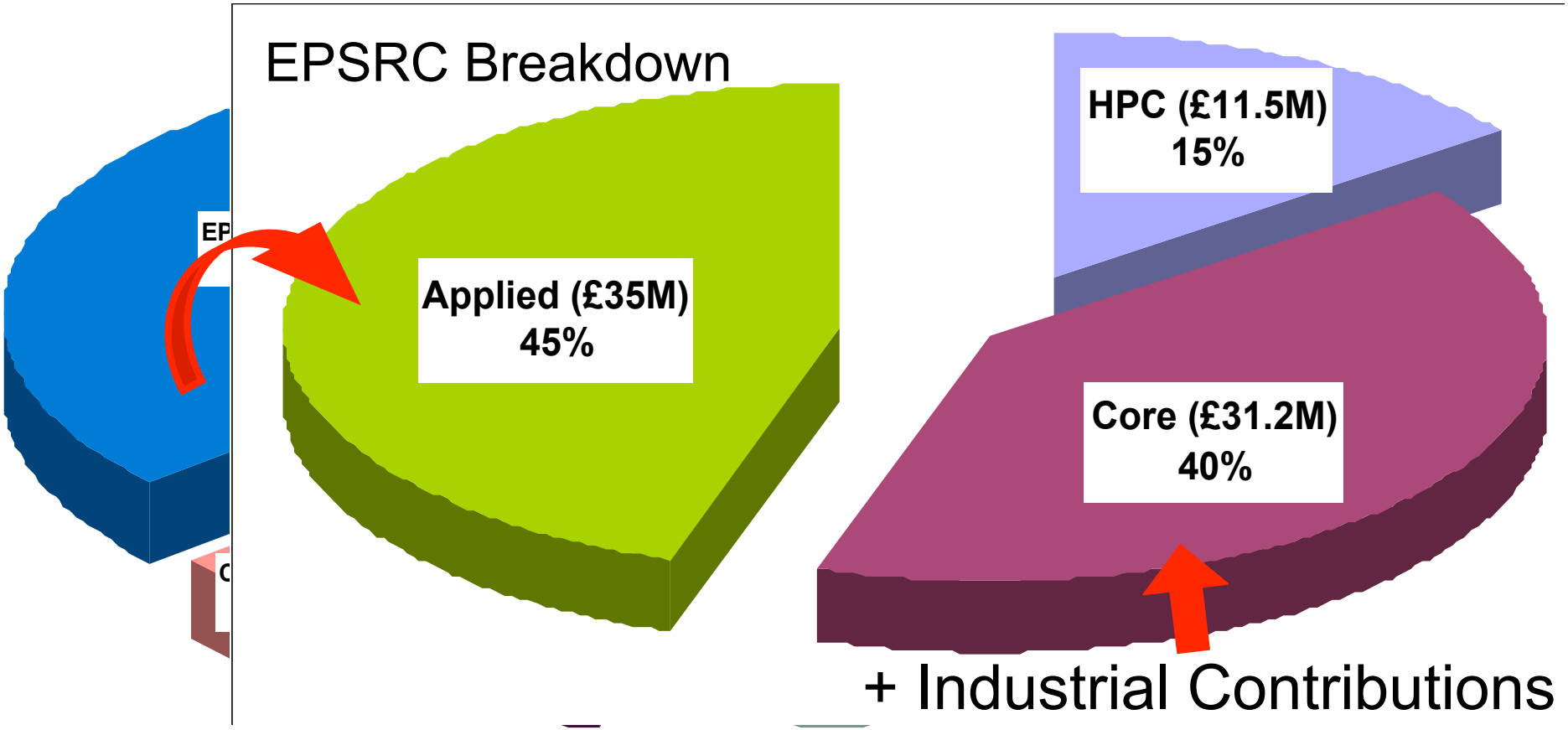
UK Grid:
Moving from Research to Production

Steven Newhouse

Neil Geddes & Alistair Dunlop

UK e-Science Budget (2001-2006)

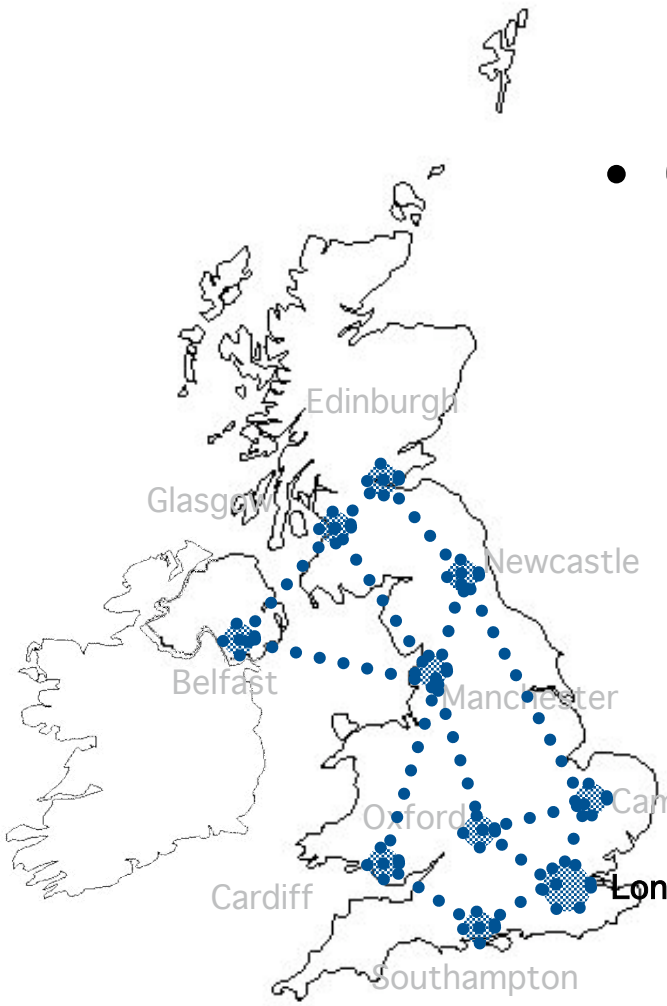


Total: £213M

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

UK e-Science Programme

- Multi-disciplinary applied projects
  - Applied Scientists
  - Computer Scientists
- Core Technology Programme
  - Regional e-Science Centres
  - Centres of Excellence
  - Demonstrators

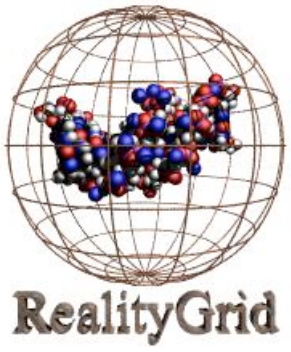


UK e-Science Pilot Projects

- GRIDPP (PPARC)
- ASTROGRID (PPARC)
- Comb-e-Chem (EPSRC)
- DAME (EPSRC)
- DiscoveryNet (EPSRC)
- GEODISE (EPSRC)
- myGrid (EPSRC)
- RealityGrid (EPSRC)

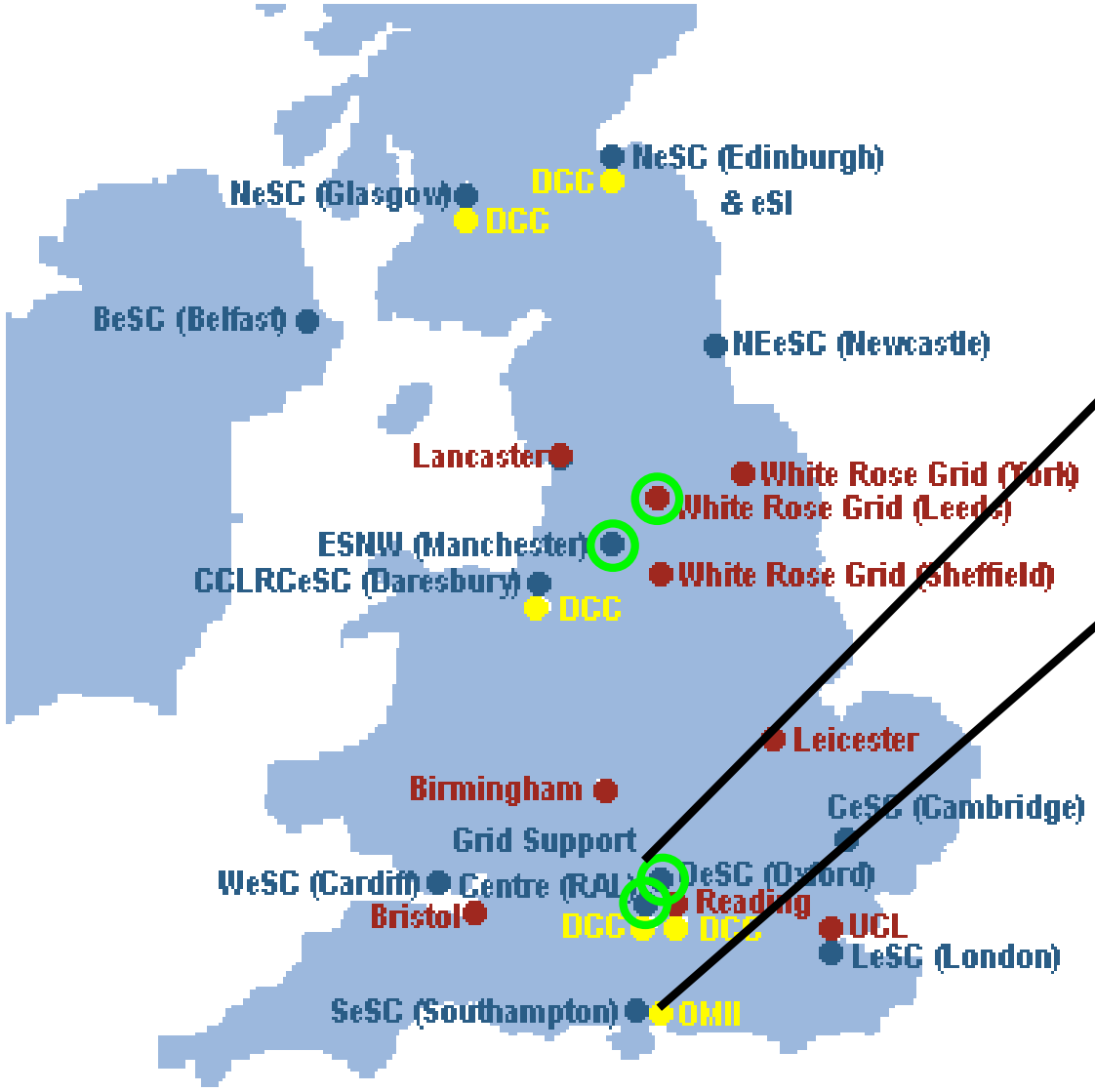
e-PROTEIN

myGrid



- Climateprediction.com (NERC)
- Oceanographic Grid (NERC)
- Grid Enabled Integrated Earth System Model (NERC)
- Molecular Environmental Grid (NERC)
- NERC DataGrid (NERC+OST-CP)
- Biomolecular Grid (BBSRC)
- Proteome Annotation Pipeline (BBSRC)
- High-Throughput Structural Biology (BBSRC)
- Global Biodiversity (BBSRC)

UK Grid Institutions



Regional Centres

Centres of Excellence

Grid Operational Support Centre

Open Middleware Infrastructure Institute

Data Curation Centre

National Grid Service

Grid Operational Support Centre (GOSC) & Open Middleware Infrastructure Institute (OMII)

- New organisations for emerging UK Grid
- OMII (Director: Alistair Dunlop)
  - Ingest software from UK & other projects for hardening
  - Provide integrated & tested software stack
- GOSC (Director: Neil Geddes)
  - Research: Engineering Task Force (ETF)
    - Leverage resources, expertise & people at the regional centres
  - Production: Support UK Grid activity
    - National Grid Service (resources)
    - Certificate Authority
    - Other Services: Portals, Scheduling, etc.

OMII (www.omii.ac.uk): Open Middleware Infrastructure Institute

The source of open source grid software

- Based at the University of Southampton
- Conservative, production focused software development
- Regular releases of integrated and tested software stack
- Builds on widely accepted WS specifications and stable OS software (e.g. Apache, Axis)

ETF (www.grid-support.ac.uk/etf): UK e-Science Grid (2001-2004)

- Uses existing resources at the regional centres
- Heterogeneous: Linux, Solaris, AIX, …
- No centralised management
- Centralised co-ordination
- Gained experience on Grid construction
- Provided a testbed for application use

ETF: Software Environment

- Globus 2.4.3 (now)
  - Interoperability between different version
- GITS: Grid Integration Tests
  - Regular automated check of Grid fabric
  - http://www.soton.ac.uk/~djb1/gits.html
- VOM: Virtual Organisation Management
  - Co-ordinate account generation
  - Distribute gridmap file entries
  - Upload local job accounts to centre for monitoring

NGS (www.ngs.ac.uk): National Grid Service

- 'Free' dedicated resources accessible only through Grid interfaces, i.e. GSI-SSH, GT
- Compute clusters (York & Oxford)
  - 64 dual CPU Intel 3.06 GHz nodes, 2GB RAM
  - Gigabit & Myrinet networking
- Data clusters (Manchester & RAL)
  - 20 dual CPU Intel 3.06 GHz nodes, 4GB RAM
  - Gigabit & Myrinet networking
  - 18TB Fibre SAN
- Also national HPC resources: HPC(x), CSAR
- Affiliates: Bristol, Cardiff, …

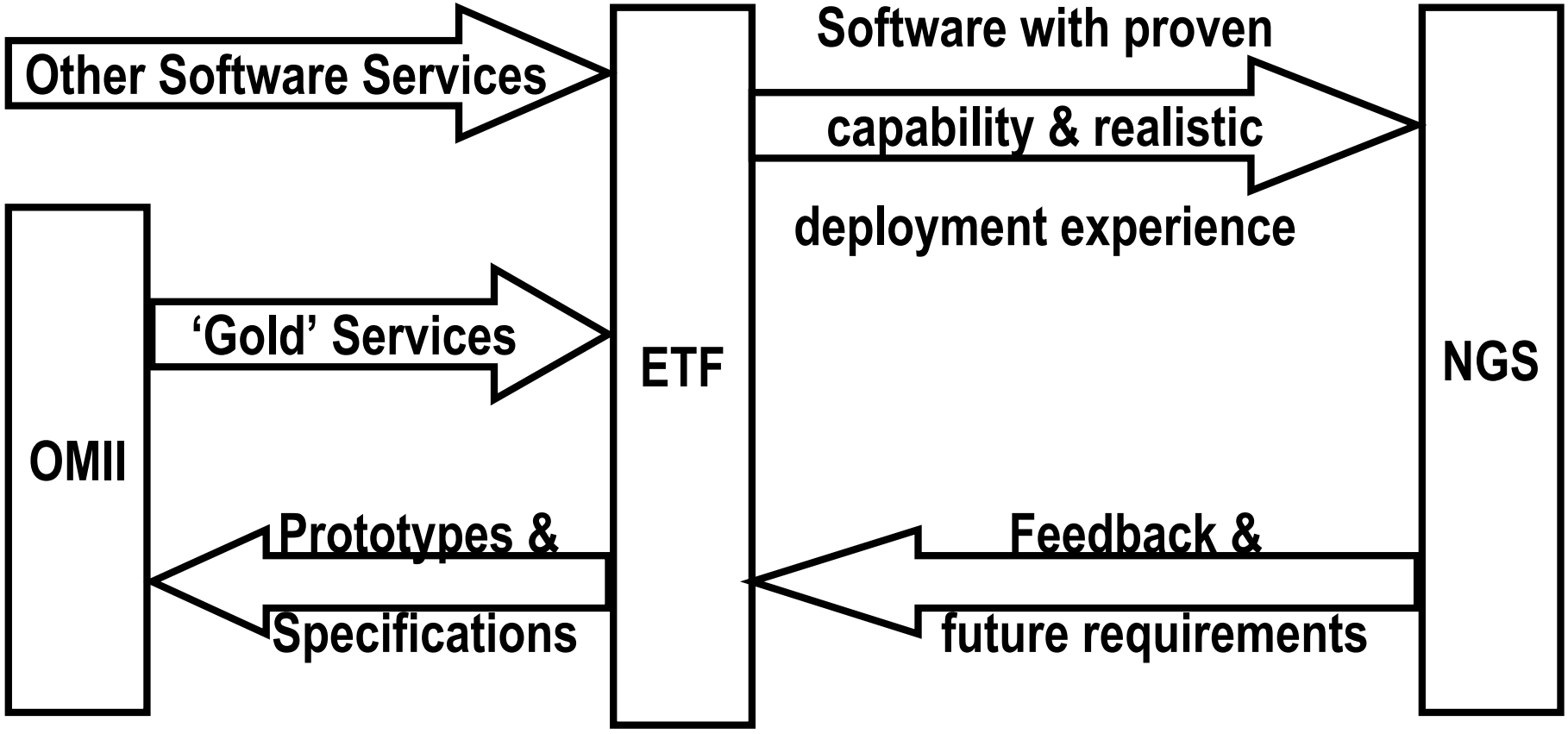
NGS: Focus on production

- Staff:
  - 4 FTE systems staff (1 at each core site)
  - 1 FTE co-ordination management
- Current Software:
  - Use GT software through VDT 1.1.14 distribution
  - BDII (GIIS), GSI-SSH, SRB
- Additional software:
  - GITS (Fabric testing)
  - VO & accounting tools
  - Resource Brokering
- Deploy & provide robust national services
- Need deployable & manageable software

UK Grid Goal: Provide a reliable Grid Infrastructure

- NGS can only deploy software that works!
- OMII provides robust & packaged software services for the UK Grid community
- ETF evaluates software to inform deployment decisions:
  - Heterogeneous resources
  - Expose software to production environment
  - Examine usability

The OMII, ETF & NGS in context



Emerging Role for the ETF…
…bridge between development & operation

- Deployment and evaluation of software
  - Fitness for deployment?
  - What needs to be fixed (by the OMII?) to be deployable?
- Leveraging UK expertise & resources
  - To develop specifications and/or prototypes to fix problems
  - To provide a distributed testbed for Grid software

Conclusions

- Emerging UK Grid community & infrastructure
- Relevant research services from UK projects to be picked up and hardened by the OMII
- ETF evaluates software products on research testbed for NGS
- NGS deploys and maintains stable production UK service

Talk Abstract

- The UK e-Science programme has now established two key elements required to deliver a production quality e-research infrastructure within the UK: the OMII (Open Middleware Infrastructure Institute) with a remit to deliver a high-quality software infrastructure to support e-research, and the GOSC (Grid Operational Support Centre) to deploy a software environment that will deliver production quality e-research services to the UK community. The GOSC has direct responsibility for the delivery of the production quality National Grid Service (NGS) and the co-ordination of the Engineering Task Force (ETF).

  This talk will describe the processes now being put in place within the UK to establish a production Grid infrastructure focussed on the requirements of the applied user communities that will develop and expand as new stable middleware products becomes available.