

UK e-Science

**Dave Berry, Research Manager
National e-Science Centre**

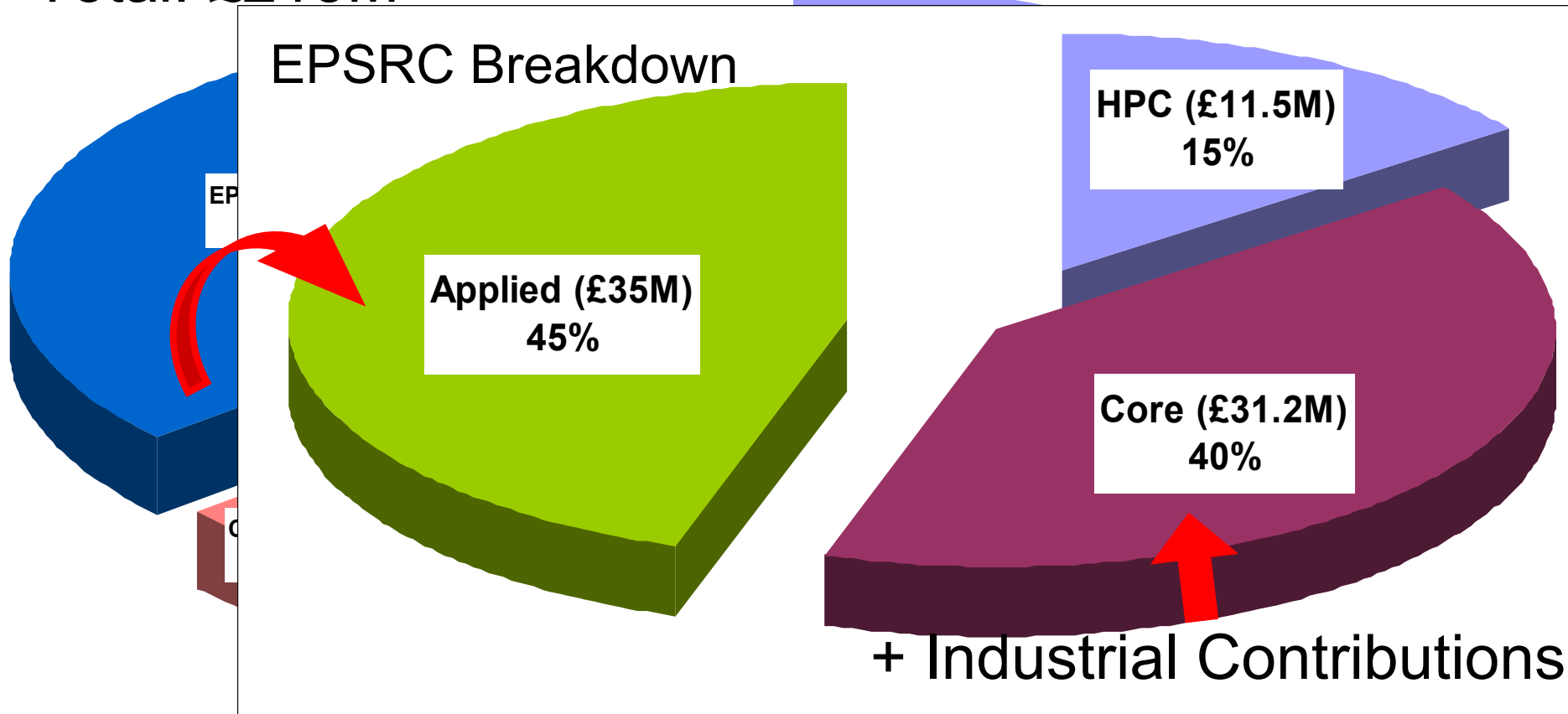
**e-Science: Computational Grid
Infrastructure and Scientific & Engineering
Applications
Delhi, February 2004**

Outline: The UK e-Science Programme

- **The UK e-Science Programme**
 - Funding and organisation
 - The UK Grid
 - The European dimension
- **The National e-Science Centre**
 - Role and mission
 - The e-Science Institute

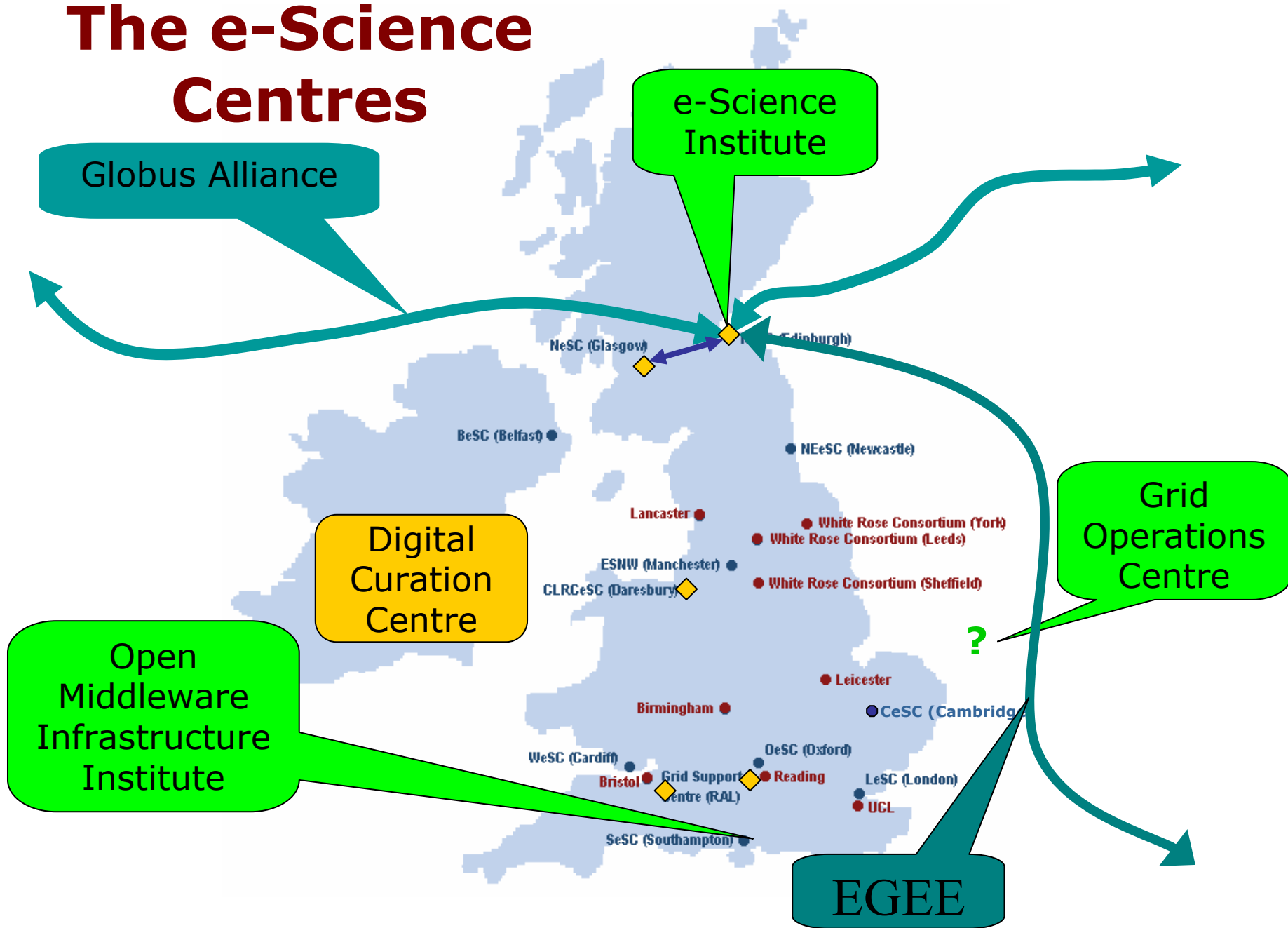
UK e-Science Budget (2001-2006)

Total: £213M

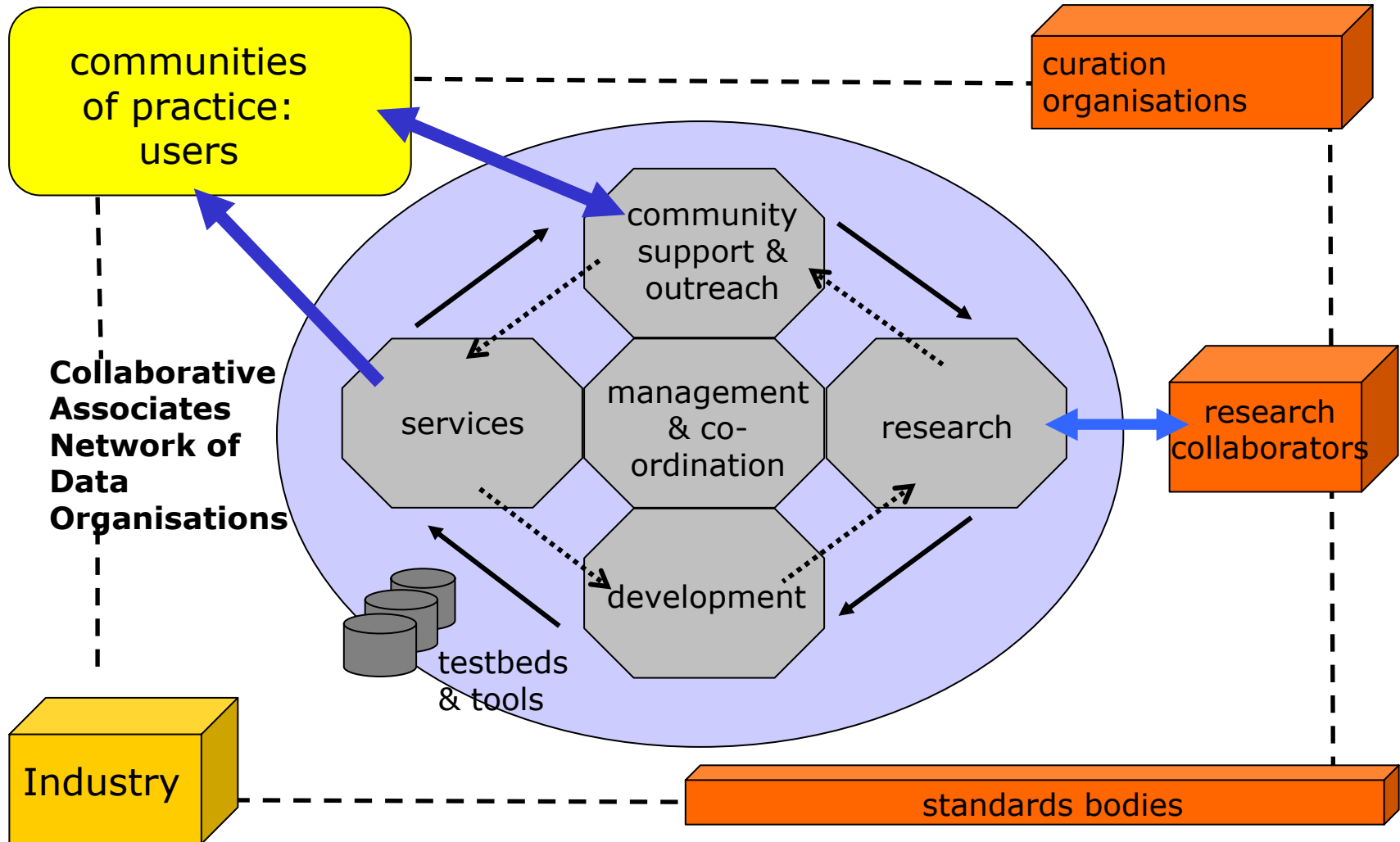


Source: Science Budget 2003/4 – 2005/6, DTI(OST)

The e-Science Centres



Digital Curation Centre



Task Forces

- **Directors' Forum**
 - Helped build a community
- **Engineering Task Force**
 - Built the UK Grid
- **Architecture Task Force**
 - UK Adoption of OGSA
 - OGSA Grid Market
 - Future approaches
- **Security Task Force**
- **Database Task Force (now disbanded)**
 - OGSA-DAI (www.ogsadai.org.uk)
 - GGF DAIS-WG
- **Usability Task Force**

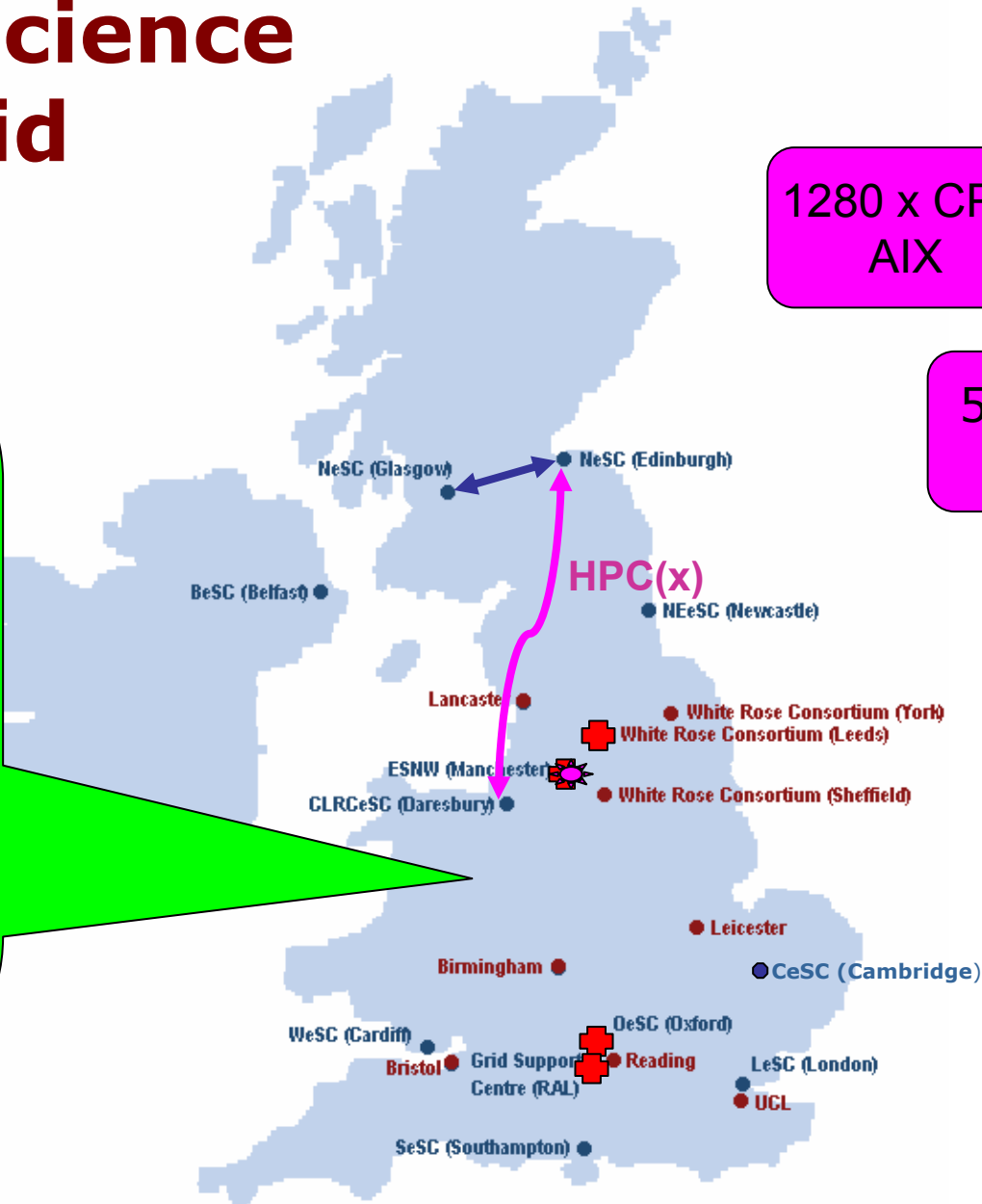
The e-Science Grid



Engineering Task Force
(Contributions from e-Science Centres)

Grid Support Centre / Grid Operations Centre

OGSA Test Grid projects



1280 x CPU
AIX

512 x CPU
Irix

20 x CPU
18TB Disk
Linux

64 x CPU
4TB Disk
Linux



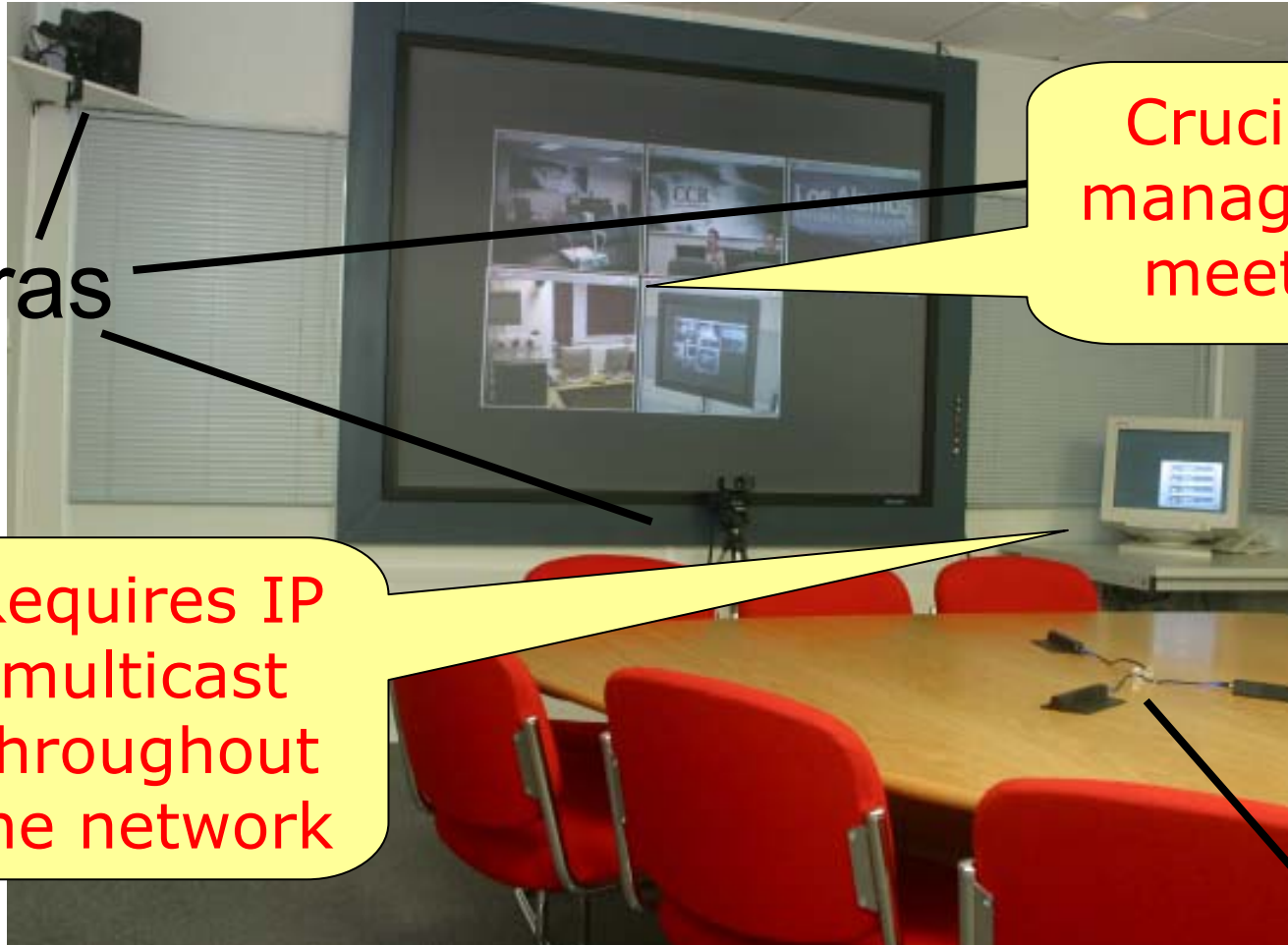
Joint Academic NETWORK (JANET)

- **10Gbps Network Backbone**
 - Connecting all higher education establishments
 - 1Gbps links at major sites (e.g. e-Science centres)
 - > 100 Mbps link elsewhere
- **Separate funding**
 - Institutions contribute to costs
 - Bandwidth for free at the point of consumption
- **Developments in progress:**
 - IPv6
 - Bandwidth reservation
 - Quality of Service

Grid Resources & Infrastructure

- **Globus Toolkit v2 (+ Condor, SGE)**
- **Heterogenous resources**
 - Linux, Solaris, AIX, ...
 - Sun, IBM, Intel, SGI, ...
- **UK e-Science certificate authority**
 - Recognised by international certificate authorities
- **Operational & network monitoring**
 - MDS, GIIS, Portals
 - <http://tyne.dl.ac.uk/InfoPortal/php/>
- **Virtual organisation management**
 - VOM system
 - <http://www.lesc.ic.ac.uk/projects/oscar-g.html>
- **Access Grid**
 - Crucial for management meetings

Access Grid



Cameras

Crucial for management meetings

Requires IP multicast throughout the network

Microphones

The European dimension

- **EGEE: Enabling Grids for E-Science in Europe**
 - ... and beyond
 - 32M Euro, 10 regions, 70 partners
 - Additional funding from NSF (USA)
 - 50% production, 30% development, and 20% dissemination and training
- **“The Grid Infrastructure in Europe”**
 - Deploy a production Grid across Europe
 - Initially based on LHC Computing Grid

European Interoperability: the short term

- **Simple techniques to integrate aspects of EGEE and UK GT2 Grids**
 - Cross-load info from VO managers
 - Use GLUE schema for information services
 - Common choice of middleware versions
 - Investigate cross-grid brokering solutions
- **Organisational links between EGEE & UK e-Science Grid**
 - Operation centres
 - Middleware development groups
 - Deployment groups

European Interoperability: Migration to OGSA

- **UK e-Science Grid by April 2005**
 - Two OGSA Test Grid projects in progress
- **Multiple implementations**
 - Globus Toolkit v3/v4
 - UNICORE, MS.NETGrid, OGSI::Lite, ...
 - Possibly exploring other combinations of Web Services
 - Initially running alongside GT2-based Grid
- **EGEE in 2006**

Long term possibilities

- **New architectures**
 - EU NextGrid project
 - EPSRC “Fundamental Computer Science for e-Science”
- **New mechanisms**
 - Proof-carrying code?
 - Autonomic computing?
 - More peer-to-peer technologies
 - Better tools
 - New networking technologies
 - ...

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NeSC Roles

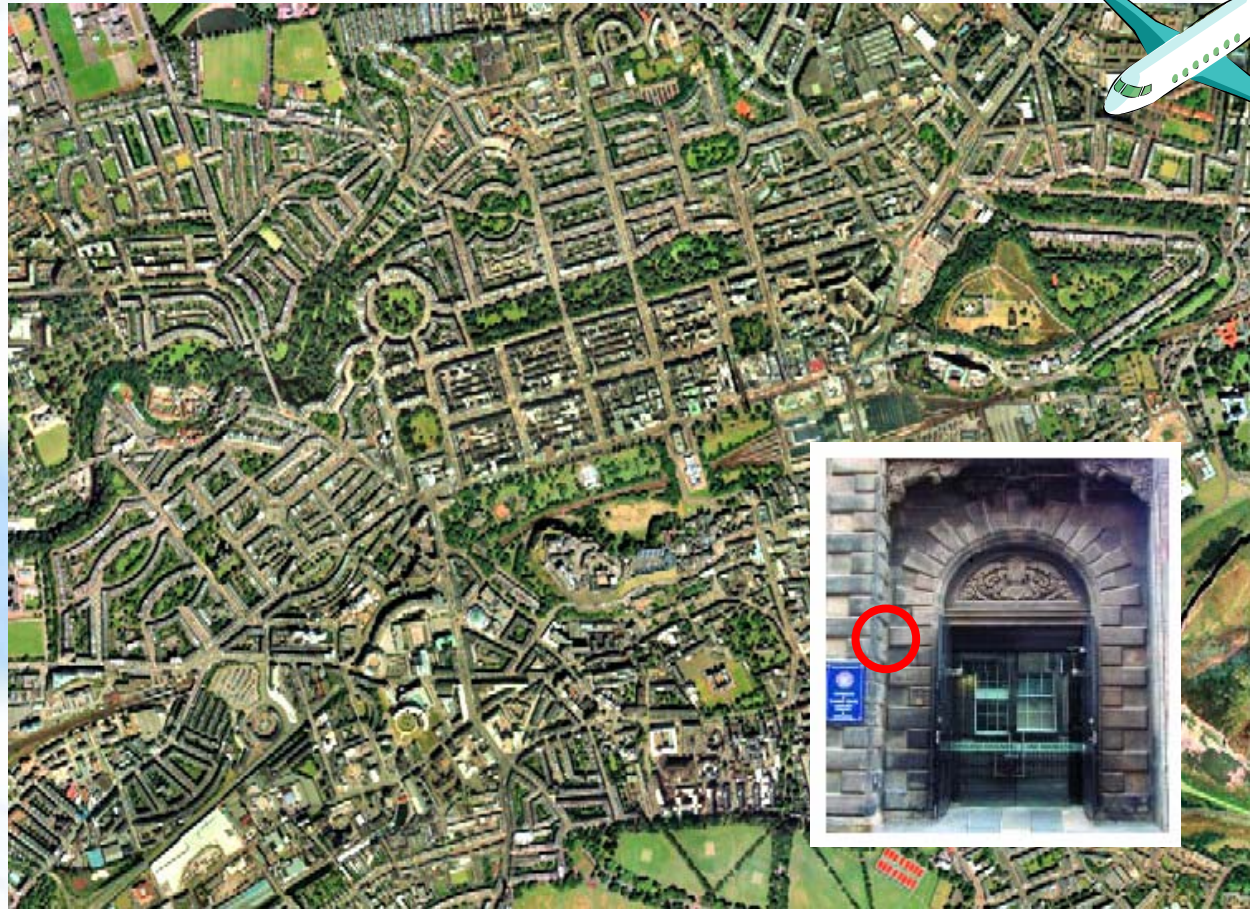
- **Help coordinate and lead UK e-Science**
 - Community building activities & outreach
 - Skill building through training events & support centre
- **Help establish the UK's international role**
 - The focus for presenting UK e-Science
 - International meetings, standardisation work & presentations
- **Run the e-Science Institute**
 - A meeting place
 - Knowledge building through workshops and conferences
 - Research visitors and events
- **Undertake R&D projects**
 - Reliable middleware (OGSA-DAI, SunDCG, MS.NETGrid, ...)
 - Engage industry (IBM, Sun, Microsoft, HP, Oracle, ...)
 - Stimulate the uptake of e-Science technology and methods

NeSC Website

- **National e-Science Centre** <http://www.nesc.ac.uk/>
 - Mission, Background, Foundation
 - Locations, Staff, Resources, Projects
 - Register interest, Mailing lists, NeSCForge
 - Regional associations and Collaborations
 - News, Notices
 - Presentations and Lectures <http://www.nesc.ac.uk/presentations/>
- **e-Science Institute** <http://www.nesc.ac.uk/esi/>
 - Mission, Events (Future and Past)
 - Register for Events, Visitor Programme
- **UK e-Science**
 - Map and Index of Centres <http://www.nesc.ac.uk/centres/>
 - Technical Papers http://www.nesc.ac.uk/technical_papers/
 - Index of >100 Projects <http://www.nesc.ac.uk/projects/>
 - Task Forces <http://www.nesc.ac.uk/teams/>
- **General Information**
 - Glossary, Bibliography,
 - Who's who
 - E-Science job vacancies

e-Science Institute

National e-Science
Centre →



eSI Events held in our 2nd Year (from 1 Aug 2002 to 31 Jul 2003)

We have had 86 events:

- 11 project meetings
- 11 research meetings
- 25 workshops
- 2 “summer” schools
- 15 training sessions
- 12 outreach events
- 5 international meetings
- 5 e-Science management meetings
(though the definitions are fuzzy!)

eSI Workshops

- **Space for real work**
 - Crossing communities
 - Creativity: new strategies and solutions
 - Written reports
- **Scientific Data Mining, Integration**
- **Grid Information Systems**
- **Portals and Portlets**
- **Virtual Observatory as a Data**
- **Imaging, Medical Analysis and**
- **Open Issues in Grid Scheduling**
- **Data Provenance & Annotation**
- **e-Science Workflow Services**
- **GeoSciences & Scottish Bioinformatics Forum**



Suggestions
always
welcome!

<http://www.nesc.ac.uk/events/>

eSI Industrial Involvement

- **133 delegates have attended events from 64 companies**
including not only:
 - **IBM, Microsoft, Oracle, Sun, Hewlett-Packard**but also:
 - **Apple, Astra Zeneca, BAE, Cisco, Honeywell, Motorola, Organon, Pfizer, Siemens**



eSI Research Visitors

- **Collaborate in UK research and development**
- **Engage in and develop our event programme**
- **Build bridges with your community**
- **Visit for anywhere between one week and six months**
- **Link up with regional e-Science centres**

Becoming a research visitor

- **Establish a collaboration with NeSC**
 - Pre-established mutual interests
- **We encourage diversity of disciplines**
 - Complementary experience, knowledge and skills
 - We can help match interests and develop a plan
- **Visitors already engaged in relevant R&D**
 - This is not a training opportunity
- **Our support depends on the length and value of visit**
 - Typically covers travel and/or local living costs
 - Application via our web site

Questions?

www.nesc.ac.uk