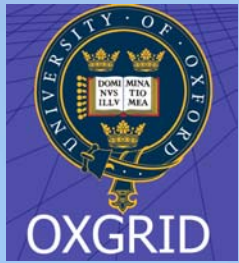


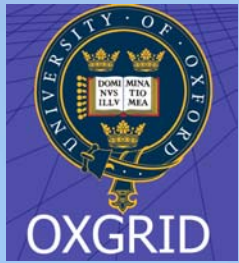
The University of Oxford campus grid, expansion and integrating new partners

Dr. David Wallom
Technical Manager



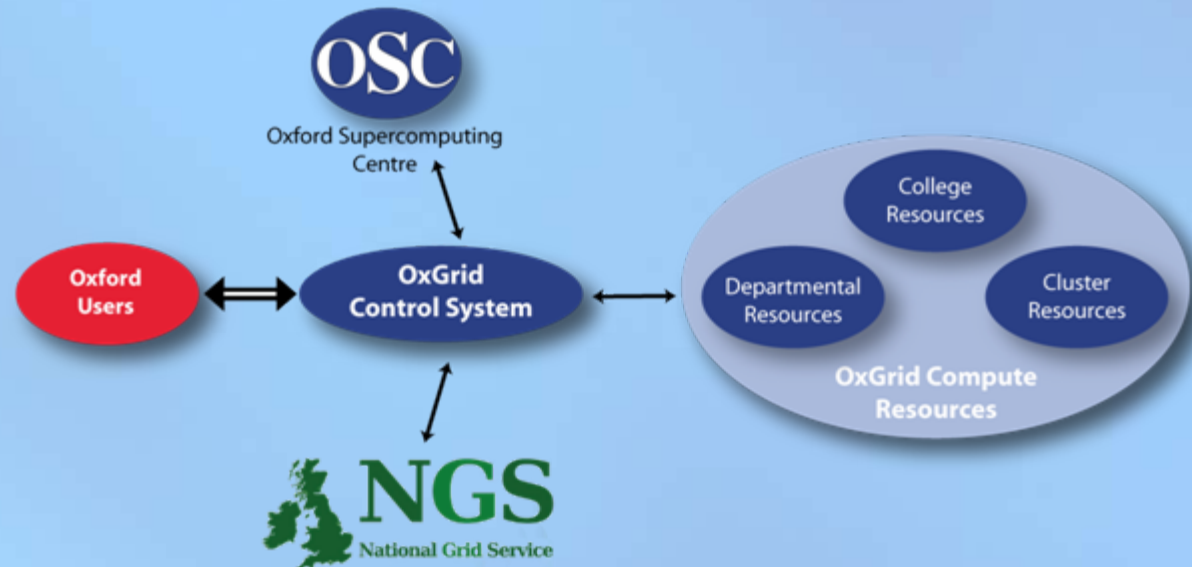
Outline

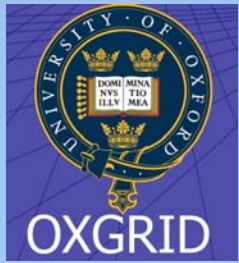
- Overview of OxGrid
 - Self designed components
 - Users
- Resources, adding new local or become part of national/international grids?



OxGrid, a University Campus Grid

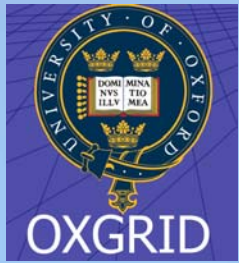
- Single entry point for users to shared and dedicated resources
- Seamless access to NGS and OSC for registered users





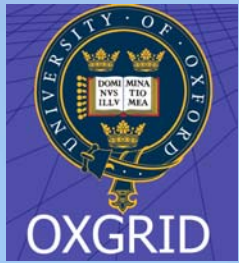
Authorisation And Authentication

- For users requiring external system access, use standard UK e-Science Digital Certificates
- For users that only access university resources, a Kerberos CA system connected to the University authentication system
- Closely observing developments in shibboleth-grid projects



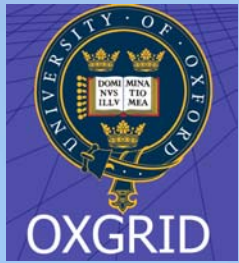
Software

- Virtual Data Toolkit
 - Using
 - Globus Toolkit version 2.4 with several enhancements
 - GSI enhanced OpenSSH
 - myProxy Client & Server
- Developed our own lightweight Virtual Organisation Manager and Accounting system



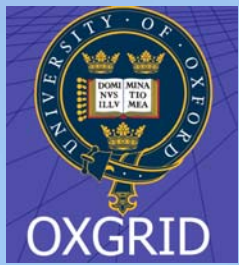
Services necessary to connect to OxGrid

- For a system to connect to OxGrid
 - Must support a minimum software set (without which it is impossible to submit jobs from the Resource Broker)
 - GT2 GRAM and RUS reconfigured jobmanager
 - MDS compatible information provider
 - Desirable though not mandated
 - OxVOM compatible grid-mapfile installation scripts
 - Scheduling system to give fair-share to users of the resource



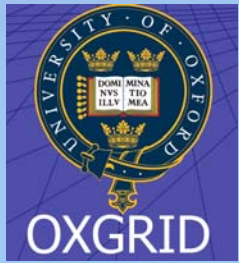
Expansion

- Due to federated nature of university expansion into other colleges & departments is very similar to expansion into other universities
- Have to satisfy resource owners of value
 - Aim to get one of their own users



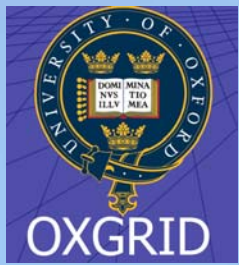
Core Resources

- Available to all users of the campus grid
 - Individual Departmental Clusters (PBS, SGE)
 - Grid software interfaces installed
 - Management of users through pool accounts or manual account creation.
 - Clusters of PCs
 - Running Condor/SGE
 - Single master running up to ~500 nodes
 - Masters run either by owners or OeRC
 - Execution environment on 2nd OS(Linux), Windows or Virtual Machine



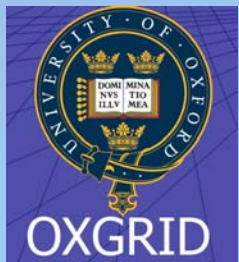
External Resources

- Only accessible to users that have registered with them
 - National Grid Service
 - Peered access with individual systems
 - OSC
 - Gatekeeper system
 - User management done through standard account issuing procedures and manual DN mapping
 - Controlled grid submission to Oxford Supercomputing Centre
 - Some departmental resources
 - Used as method to bring new resources initially online
 - Show the benefits of joining the grid
 - Limited accessibility to donated by other departments to maintain incentive to become full participants



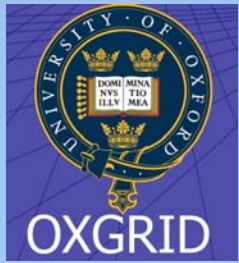
System Layout

- Current resources:
 - All Users
 - OUCS Linux Pool (Condor, 250 CPU, 32-bit)
 - Oxford NGS node (PBS, 128 CPU, 32-bit)
 - Condensed Matter Physics (Condor, 10 CPU, 32-bit)
 - Theoretical Physics (Rocks SGE, 14 CPU, 32-bit)
 - OeRC Cluster (Rocks SGE, 5 CPU, 32-bit)
 - OeRC MS-Cluster (CCS, 48 CPU, 64-bit)
 - High Energy Physics (LCG-PBS, 120 CPU, 32-bit) **not registering with RB**
 - Registered users
 - OSC (Zuse, 40 CPU, 64-bit)
 - NGS (all nodes, 342 CPU, 32-bit)
 - Biochemistry (SGE, 30 CPU, 32/64-bit)
 - Materials Science (SGE, 20 CPU, 64-bit)
 - GridPP nodes (those that support NGS VO, 32-bit)



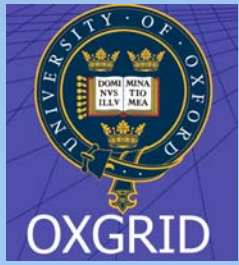
Users

- Conscious decision to target trivially parallel tasks to remove un-necessary load from University HPC facility
- Total ~30 users
 - Statistics (1 user)
 - Materials Science (1 user)
 - Inorganic chemistry (2 users)
 - Theoretical Chemistry (2 users)
 - Biochemistry (6 users)
 - Computational Biology (3 users)
 - Astro-Physics (3 users)
 - Centre for Ecology and Hydrology (2 users)
 - OeRC (6 users)



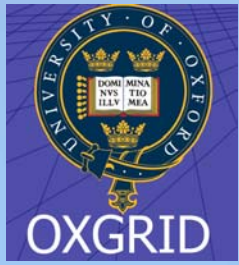
User code

- Vast majority of serial users have built their own code, distributed within
- Starting to see commercial code being requested, e.g Matlab
- Providing gateway to MPI - SMP resources next stage of development



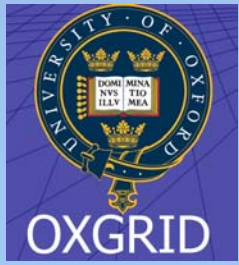
Problems to overcome when expanding internally

- Sociological
 - Getting academics to share resources
 - IT officers in departments and colleges
- Technical
 - Minimal firewall problems
 - Information servers
 - OS Versions
 - Programming languages



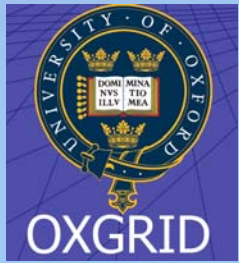
Institutional Connections

- Already connecting Reading and Oxford Campus Grids together
- Have an agreement to connect CamGrid environment 2 with OxGrid
- In both cases we peered their Condor resources with internal resources in Oxford



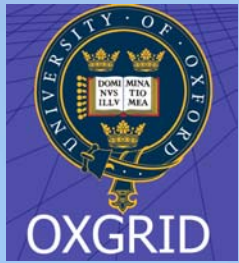
Joining a national infrastructure?

- Depends on integration method
 - Mustn't interfere with resource broking, accounting etc.
- Responsibility for actually making the decision?
 - If we take the whole grid then university decision
 - If we only take individual systems then up to system owners



Joining a national infrastructure?

- Benefits
 - More resources for users
 - Gain in middleware development effort and experience
- Disadvantages
 - legacy systems often part of local grids
 - Mechanisms for user management, accounting etc may not be compatible
 - Extra effort/hardware required if significantly different software systems involved



Conclusions

- Displaying interoperability between university and national resources
 - Led by research needs rather than institutions
- Working to engage more users and systems, resulting in a very heterogeneous system
- National/international infrastructures must accept that they will only get local infrastructures to join if they are not intrusive in their requirements