

## Covering the Spectrum Grid activities @ UCL

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## Grid activities at UCL

- Integrated structure. <http://www.grid.ucl.ac.uk>
  - Enhances collaboration between research groups spanning the entire spectrum.
  - Provides the forum for information exchange.
  - Provides the opportunity to share resources.
- Grid Networking Research Group (UCL):
  - Working on QoS and scheduling issues.
  - <http://www.cs.ucl.ac.uk/research/gnrg/>



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## Grid activities

- Applications level.
  - Heuristic, Parallel & Stochastic modelling.
  - Projects associated with Astronomy, Bioinformatics, Chemistry, Environment, High Energy Physics.
- Middleware level.
  - Application mobility, consistency management, reflective middleware, resource scheduling.
- Networking level.
  - QoS management, network scheduling, IPv6.
  - Optical switching.



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## Primary interests

- Applications level.
  - Heuristic, Parallel & Stochastic modelling.
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- Middleware level.
  - Application mobility, consistency management, reflective middleware, resource scheduling.
- Networking level.
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  - Optical switching.


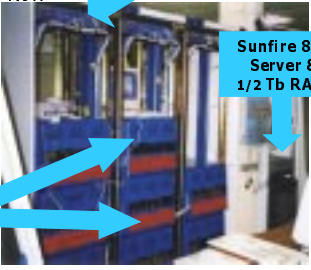


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## Modelling facilities

1997  Now 

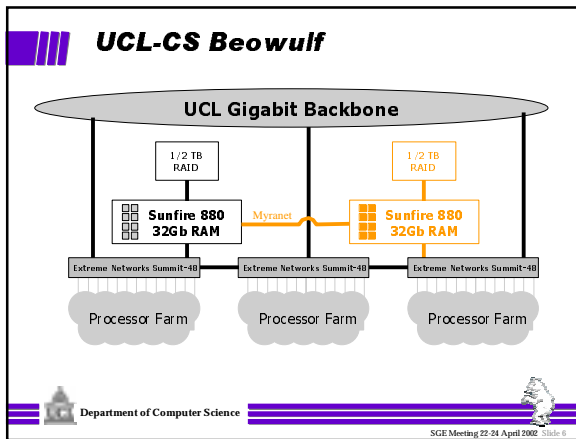
Switching fabric

Sunfire 880 Server & 1/2 Tb RAID

Total 170 CPUs  
20 per box

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## Grid Resource Scheduling

- GRS (EPSRC/PPARC)
  - http://www.cs.ucl.ac.uk/research/grs/
- Will provide network resource control and signalling within the context of the EU-DataGrid.
- Provides feedback control mechanisms and decision-making
  - Uses standard control-theory coupled with rule-based reasoning mathematical models, biological modelling, fuzzy logic & knowledge-based heuristics

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## 6Net

- Major EC Native IPv6 Deployment Project
  - Initially OC-3, but going to OC-48 in 2003
  - Involves 12 European countries, Korea, Japan, US
- UCL one of four British partners
  - UCL activities include multicast, VPNs, applications
- UCL Applications include:
  - MM conferencing, App-level active networks, Grid
- Grid application now porting Globus to IPv6
  - Intend to work also with IPv6 version of SGE, if this is not too hard

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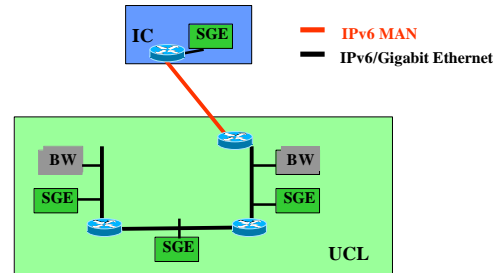
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## Grid Regional Networking project

- Examination and characterisation of end-to-end performance in QoS controlled network environment.
  - Network "health" management.
  - Monitoring of QoS performance.
  - Performance analysis of interaction between middleware components and network.
  - Cluster interoperation.
- Deployment and interoperability testing.



## Plan Connected Grid Clusters



## In Networking CoE

- Plan to connect first UCL Grid Clusters
  - At least with Gigabit Ethernets
  - Native IPv4 and IPv6 services on Ethernet
  - QoS, Reconfiguration, Possibly MiP, Multicast
- Ensure interoperability between Beowulf and SGE
- Move to connect in IC Grid Cluster over London MAN (possibly IPv6/IPv4)
- Will work with dedicated smaller clusters first to ensure the IPv4, IPv6 and interworking.



## Conclusions

- Wide range of Grid-related activities
  - Includes several major applications
- Concerned also with network components
  - Interactions with QoS and other factors best provided over IPv6
  - May consider also mobile users and mobile networks as well as mobile applications
- Expect to monitor performance bottlenecks
  - Propose performance improvements

