UNIVERSITY OF WESTMINSTER

Porting applications to the NGS, using the P-GRADE portal and GEMLCA

Peter Kacsuk
kacsuk@sztaki.hu

MTA SZTAKI
Hungarian Academy of Sciences

Centre for Parallel Computing
University of Westminster

Tamas Kiss
kisst@wmin.ac.uk

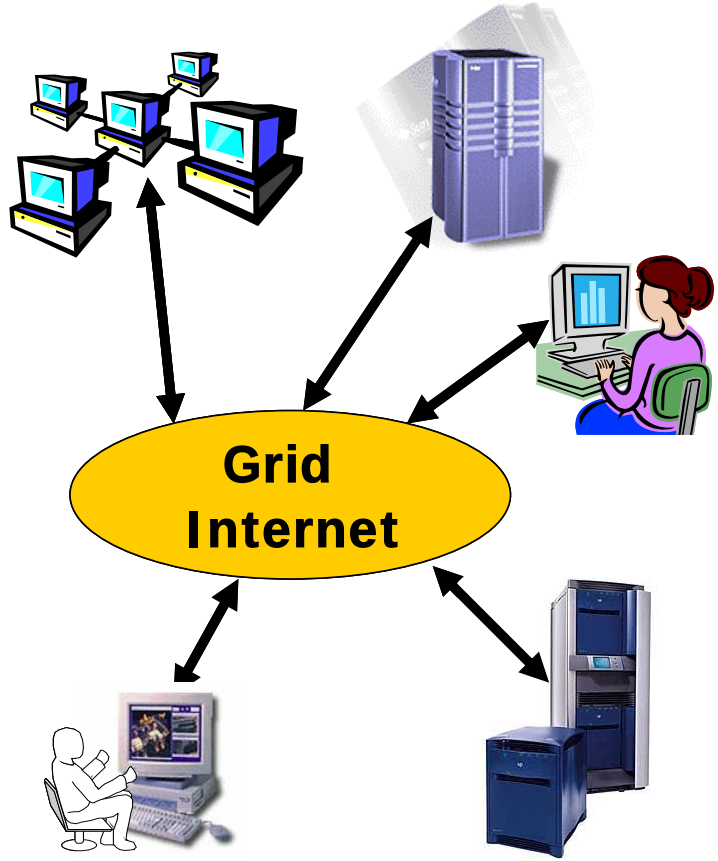
Centre for Parallel Computing
University of Westminster

Outline of the day

- Introduction to Grid computing and the NGS
- The P-GRADE Grid portal
- GEMLCA: legacy applications on the Grid
- Accessing multiple Grids - Workflow level Grid interoperability
- **Hands-on with the P-GRADE portal and GEMLCA**

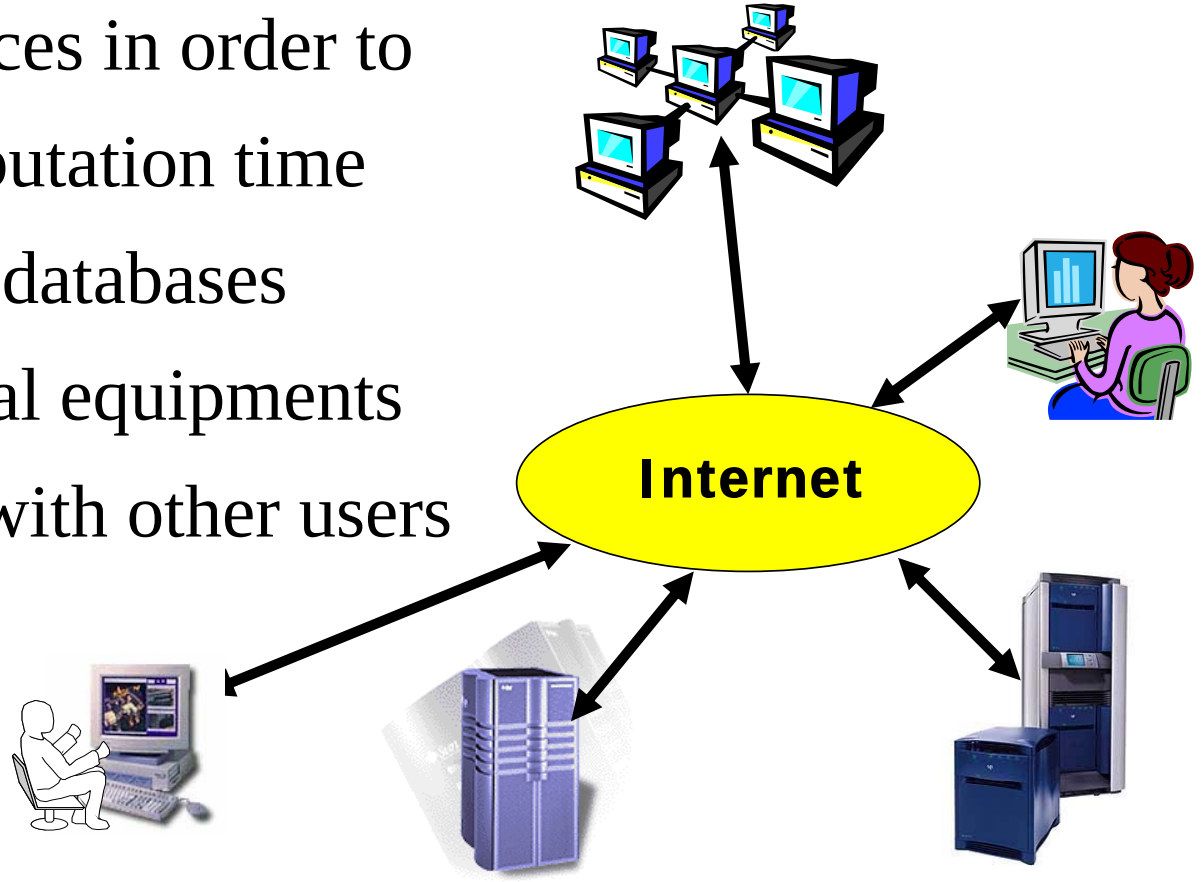
What is a Grid?

- Grid is a collection of computers, storages, special devices, services that can **dynamically join and leave** the Grid
- They are **heterogeneous** in every aspect
- They are geographically **distributed** and connected by a **wide-area network**
- They can be accessed **on-demand** by a set of users



Why use a Grid?

- A user has a complex problem that requires many services/resources in order to
  - reduce computation time
  - access large databases
  - access special equipments
  - collaborate with other users



Typical Grid application areas

- **High-performance computing (HPC)**
  - To achieve **higher performance** than individual supercomputers/clusters can provide
  - Requirement: **parallel computing**
- **High-throughput computing (HTC)**
  - To exploit the **spare cycles** of various computers connected by wide area networks
- **Collaborative work**
  - Several users can jointly and remotely solve complex problems

Production academic Grids

e.g. The UK National Grid Service (NGS)

Core members:

- Manchester
- CCLRC RAL

} Data clusters

- Oxford
- Leeds

} Compute clusters

- CSAR
- HPCx

} National HPC services

Partner sites

- Bristol
- Cardiff
- Lancaster
- **Westminster**

stable highly-available production quality Grid service to the UK research community

NGS National Grid Service
core production computational and data grid

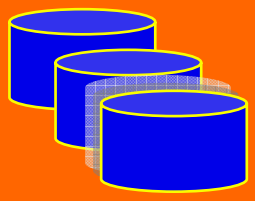
Layered view of Grid systems

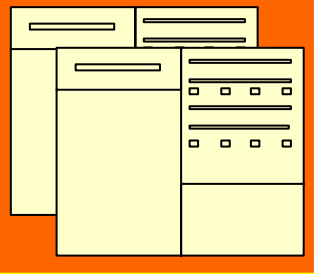
Applications

Application toolkits, portals

Higher-level grid services: brokering, data replica, …

Basic Grid services: security, job submission, info, …





E-Scientists

Graphical grid tools

P-GRADE Portal

Command line grid tools

Grid middleware:
e.g. Globus, EGEE, …

Resources to be shared

E-scientists' concerns

- How to concentrate own **my own research** if the technology I would like to use is in continuous change?
- Which is the most suitable grid for me?
- How can I learn and understand **the usage of that technology**?
- How can I **develop applications**?
- How can I **execute applications**?
- How to **tackle performance issues**?
- How to **use several Grids at the same time**?
- How to **migrate my application** from one grid to another?
- How can I **collaborate with fellow researchers**?

The P-GRADE Grid Portal gives you all the answers!