ChinaGrid Overview

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Five Main Grid Projects in China

- China National Grid – CNGrid (Ministry of Science and Technology)
- China Spatial Information Grid (Ministry of Science and Technology)
- China Education and Research Grid – ChinaGrid (Ministry of Education)
- China Science Grid Project (National Science Foundation)
- Shanghai City Information Grid
ChinaGrid in a Nutshell

- China Education and Research Grid
- Funded by Ministry of Education
- Based on CERNET (China Education and Research Network)
- First Phase
  - From 2003-2005
  - 12 key universities as initiative
  - More than 6Tflops w/60TB
  - 20 key universities by the end of 2004
Prerequisites for Grid Computing

• Network infrastructure
• Wide area distribution of computational resources
• Continuous increasing requirement for resource sharing
About CERNET

• Second largest IP backboned network in China
  – 36 PoPs cover all the province capitals
  – The network backbone is 2.5Gbps DWDM
  – Total outgoing bandwidth outside China is 324Mbps

• Cover more than 1,000 colleges in about 200 cities
  – About 10 million users
  – Many universities have their own campus network in China
State-of-the-art of CERNET-1
ChinaGrid (The First Phase)
Goals of ChinaGrid Project

• Largest
• Most Advanced
• Most Practical
Resource Distribution of ChinaGrid (by 2004)
Main Research Tasks

• Campus grid platform
• Common platform for ChinaGrid
• Grid application platform and representative grid applications
  - Image processing grid
  - Bioinformatics grid
  - Course on-line grid
  - Computational fluid dynamic grid
  - Large scale information processing grid
Application Model for ChinaGrid Service Supporting Platform

Portal

CGSP

Grid Services (数字化图书馆)

CGSP

Grid Services (数字化信息资源)

CGSP

Grid Services (数字化奥运)

CGSP

CGSP: ChinaGrid Supporting Platform

ChinaGrid 服务门户

最终用户

CGSP Standards & Protocols
Architecture of ChinaGrid Service Supporting Platform

ChinaGrid application (Digital Olympic game, Digital library, ...)

E-Science Grid  E-Info Grid  E-Instrument Grid

ChinaGrid  Service Supporting Platform

Naming registration  Discovery & location  Lifecycle management  Monitor & Scheduling  Workflow  ......  Strategy control  Authentication & access control  Identity authentication  Communication security  Notification

Uniform information representation, storage, and exchange

Linux  Windows  Unix

All kinds of computers

Network infrastructure
CGSP in Detail

Web Portal

服务监控
- 虚拟接口管理模块
- 服务元数据管理模块
- 服务匹配选择模块
- 信息服务器容错
- SLA管理模块
- 网格信息共享拓扑管理

XML数据库接口模块

信息服务
- 服务动态部署模块
- 调度代理部署模块
- 网格结点故障管理
- 用户管理模块

域服务器

作业提交    作业调度    资源查询    作业状态管理
- Mmjfs    - Rips    - Mds

容错
- 用户视图组织
- 统一文件访问接口
- 统一数据库访问接口

错误检测
- 存储资源管理
- 副本策略
- 文件元数据管理器
- 数据存储抽象
- 数据库存储抽象

错误检测
- 存储资源错误检测
- 副本目录

数据服务扩展
- WS-Security
- Grid-mapfile
- UserProxy

服务级访问控制
- 用户-密码库
- 临时证书池
- Simple CA (替换)
CGSP Operation Model
Image Processing Grid

- Three-dimension reconstruction of digital virtual human being (HUST)
- Medical image diagnosis (ZSU)
- Remote sensing image processing (NUDT)
BioGrid
http://biogrid.hpcgrid.cs.tsinghua.edu.cn

Only two things for users:
1. Submit bioinformatics jobs through the web
2. Wait for the results

Users needs not to care about the job scheduling, task monitoring and task management.
BioGrid Applications

• Protein target selection for rice genome
• Multi-sequence alignment for ganoderma family
• Gene joint for white mice
• Cardiovascular disease research
Course On-line Grid (cont.)

• Domain names for course on-line Grid
  – realcourse.grids.cn
  – vod.grids.cn

• User can get the courses VOD by IE using realplayer

• System has already provided about 700-hour courses from 12 university for VOD and download
System Description

The diagram illustrates the connectivity of various institutions through the Internet. The institutions represented are:

- PKU
- BUAA
- BUPT
- THU
- CAS
- SCUT
- HIT
- CAPITEL
- XJTU
CFD Grid

• CFD (Computational Fluid Dynamics) integrates computational mathematics, computer science, hydromechanics, and computer visualization, etc.

• CFD classification
  – Computational aerodynamics
  – Computational hydrodynamics
  – Computational combustion
  – Computational heat transfer
  – Numerical weather forecast
  – etc.
Significant Applications based on CFD Grid

- Shanhai JiaoTong University: Aircraft genetic optimization design system
- Xi’an JiaoTong University: Parallel algorithm for molecular dynamics
- Southern China University of Technology: Simulation and optimization techniques for metal powder figuration process
- Northeast University: Large scale geological disaster forecasting system
- Southeast University: Computational electromagnetism applications in airplane and automobile design
Large Scale Information Processing Grid

- Digital aeronautical and astronautical museum (BUAA)
- Data processing center of Alpha Magnetic Spectrum (AMS-SOC) (SEU)
- Construction of YangBaJin Cosmic Ray Experimental Platform (SDU)
ChinaGrid 简介

ChinaGrid 专委会第五次会议定于4月2-4日在海南三亚召开。
ChinaGrid 参加2004中国教育信息化博览会和中国教育信息化论坛。
ChinaGrid 专家委员会第四次会议在清华大学举行。
中国教育科研网（ChinaGrid）网站开通。
中国教育科研网（ChinaGrid）部分成果在GCC2003上展示。
ChinaGrid简介

中国教育科研网ChinaGrid计划是教育部“十五”211工程公共服务体系建设的重大专项。ChinaGrid将充分利用中国教育科研网CERNET和高校的大量计算资源和信息资源，开发相应的网格软件，配合网格计算机（NG）的使用，将分布在教育与科研网上自治的分布异构的海量信息资源集成起来，实现CERNET环境下资源的有效共享，消除信息孤岛，提供有效的服务，形成高水平低成本的计算服务平台，将高性能计算送到教育与科研网用户的基础上，成为国家科研教学服务的平台。目前参加ChinaGrid计划第一期建设的高校包括华中科技大学、清华大学、北京大学、北京航空航天大学、上海交通大学、华南理工大学、东南大学、西安交通大学、东北大学、国防科技大学、山东大学、中山大学等12所高校，其目标是基于教育与科研网的基础，建立聚合能力超过每秒6万万亿次的教育科研网。同时，ChinaGrid计划希望在网格计算的基础研究和应用研究方面走在世界前列。目前ChinaGrid计划第一期上开展的专业应用网格包括图像处理网格、生物信息学网格、大学课程在线网格、海量信息处理网格和计算流体力学网格。ChinaGrid计划同时作为国家高技术发展计划863计划高性能计算重大专项的典型应用，也得到了国家科技部的大力支持。
ChinaGrid @ China Education Expo 2004
9 March, 2004 - Tony Hey will be a keynote speaker at GCC 2004.


6 March, 2004 - Charlie Catlett will be a keynote speaker at GCC 2004.

18 Feb, 2004 - Ian Foster will be a keynote speaker at GCC 2004.

16 Feb, 2004 - Jack Dongarra will be a keynote speaker at GCC 2004.

12 Feb, 2004 - Please notice that the conference paper due, Notification due and camera-ready paper due are extended to May 10, June 10 and July 5, 2004 respectively.
Meet with Them @
GCC’04, Wuhan, Oct. 2004
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<td>replacing the Internet</td>
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Thanks!