

Grid Activities in China

CHEP'06

Mumbai, 16/Feb/2006

Gang CHEN

Institute of High Energy Physics, CAS

Baoping YAN

Computer Network Information Center, CAS



Agenda

- CNGrid
(China National Grid)
- ChinaGrid
(China Education and Research Grid)
- HEP Grid/WLCG



CNGrid

- Key project supported by the National High-Tech R&D Program (the 863 program)
- 4-year project
 - Launched in May 2002
 - Earliest and largest Grid project in China
 - 100 million yuan fund from the Government (MoST)
 - Two to three times more associated funds from local governments, organizations and industry



CNGrid Nodes

- **Major nodes**

- Supercomputing Center, CNIC, CAS (SCCAS, Northern Node)
- Shanghai Supercomputer Center (SSC, Southern Node)

- **Normal nodes**

- Beijing Institute of Applied Physics and Computational Mathematics
- Tsinghua University
- University of Science and Technology
- Xi'an Jiaotong University
- National University of Defense Technology
- Hong Kong University



CNGrid Sites



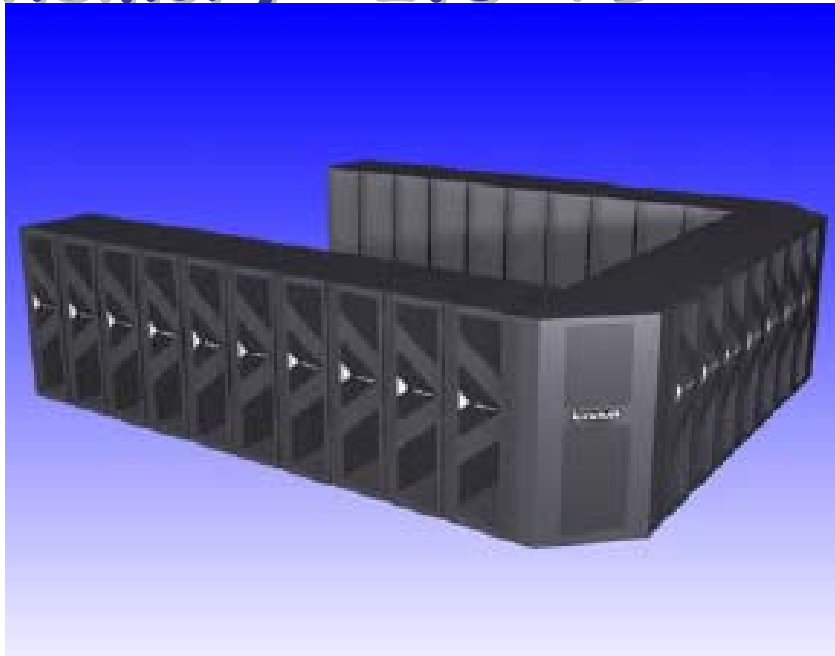
Major Computing resources (SSC)

- **Dawning 4000A**
 - 640 nodes
 - 2560 AMD Opteron 2.2 GHz CPUs
 - Memory: 5 TB
 - Network: Myrinet
 - Peak Perf.: 11 Tflops
 - OS: Linux



Major Computing resources (SCCAS)

- DeepComp 6800
- 256 nodes
- 1032 Itanium-2 1.3 GHz CPUs
- Memory: 2.6 TB



Applications on CNGrid

- Bioinformatics
- Environment science
- Material Science
- Computational Chemistries
- Distributed java computing
- Scientific visualization
-



Hong Kong node: Grid services

- Projects
 - G-JavaMPI
 - JESSICA2
 - ICT-Services
- Applications
 - WireGL
 - MatlabMPI
- Support grids
 - drug discovery grid
 - Data Grid: GridDaEn



The screenshot shows a Mozilla Firefox browser window displaying the website for the China National Grid Hong Kong node. The page features a header with the logo and name of the grid, and a main content area with a 3D rendering of the Gideon 300 cluster. The rendering shows a large array of server racks connected by a network of switches and cables. Text labels on the rendering include '312-port Foundry Fossilion 1200', '312-port switches', '300 P4 Linux PCs', and '30-port SCSI SuperDisk 5.4934'. To the right of the rendering, there is a text block in Chinese describing the Gideon 300 cluster, mentioning its 300 nodes, 2GHz processors, 512MB memory, and 40GB hard drives. The browser's address bar shows the URL 'http://147.8.179.124:8080/index.jsp'. The Windows taskbar at the bottom shows the Start button, several open applications, and the system clock displaying 10:07 on a Tuesday.

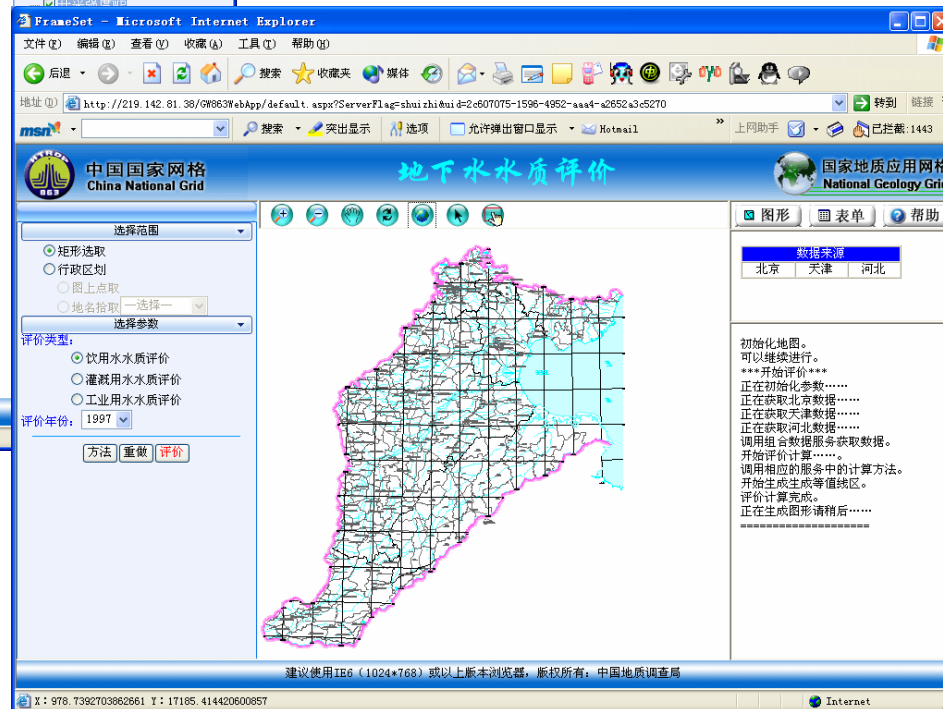
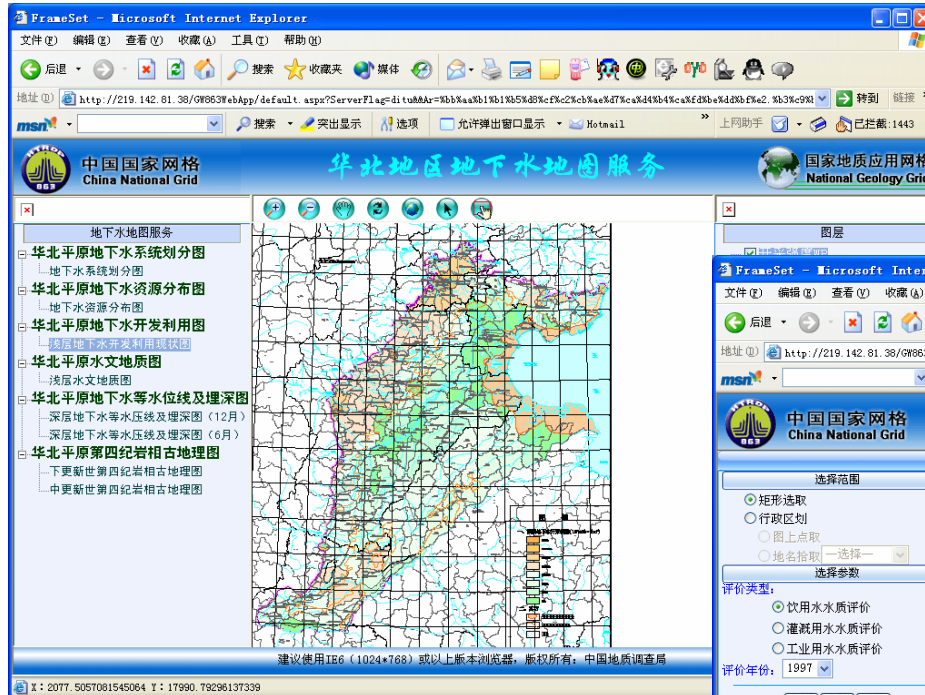


Geological Survey Grid

- Undertaken by China National Geologic Survey Bureau
 - Nation-wide productive grid
 - Data exchange and sharing
 - Resource evaluation services
- Shorten the evaluation time from 3 years to 3 months
- Delivering achievements in
 - North China ground water resources evaluation
 - Mineral resources evaluation



Ground Water Survey

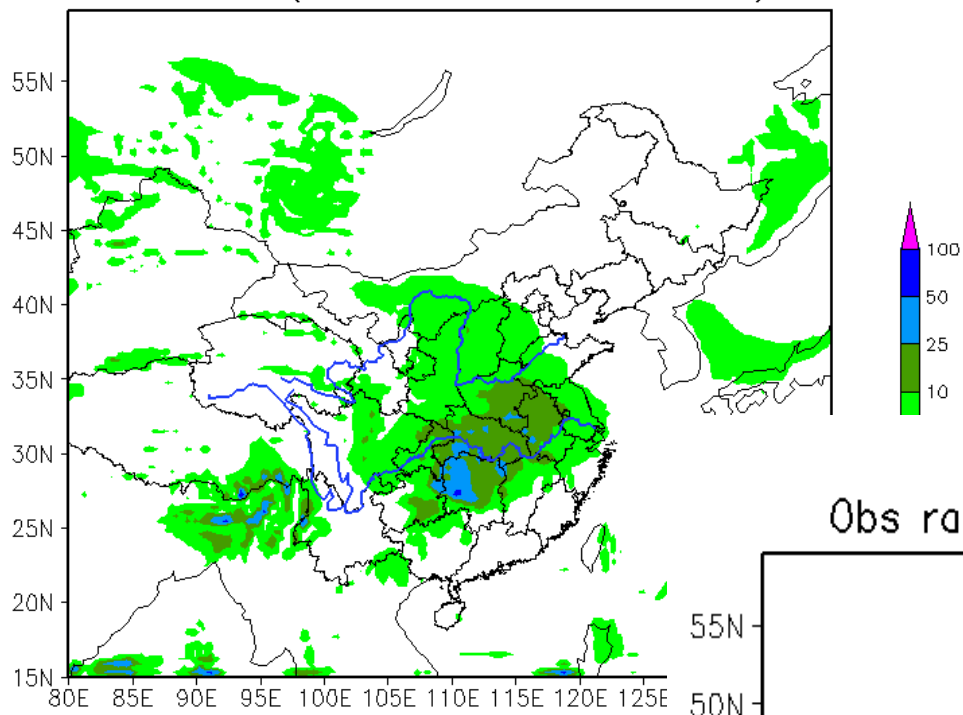


Meteorological Service Grid

- Undertaken by China National Meteorological Center
- Multiple sites to form the research platform for new weather forecasting model research
- Provide new weather forecast services (time and location-specific)

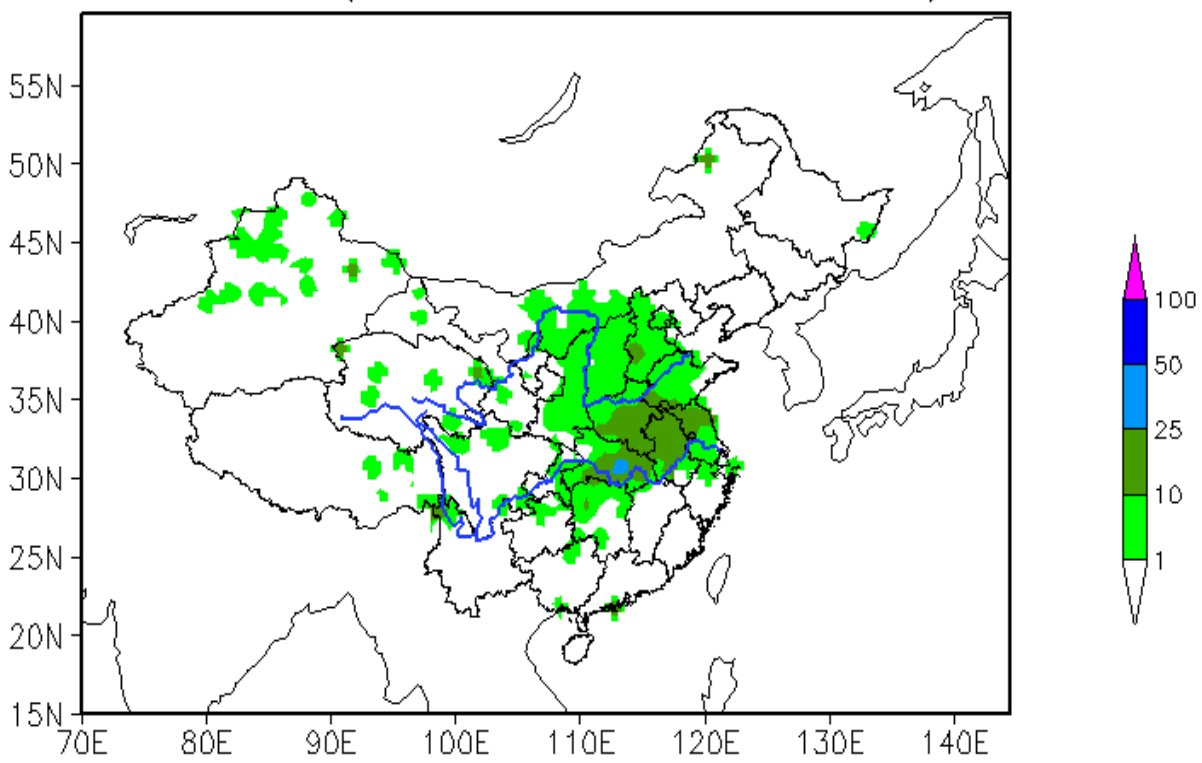


Fcst rain (2004122100 - 2004122200)



**Result from GRAPES for forecasting
snow (rain) in Dec. 21, 2004
(grid: 30km)**

Obs rain (2004122100 - 2004122200)



Scientific Data Grid

- Undertaken by the Network & Information Center (CNIC) of CAS
- Integration of more than 200 scientific databases from more than 40 institutes across the country by means of metadata management
- Virtual astronomical observatory



Scientific Data Grid Portal

科学数据网格门户

首页 | 虚拟天文台 | 状态监控 | 数据量统计 | 数据综合查询 | 背景介绍

科学数据网格以中国科学院科学数据库为基础，利用网格技术促进科学数据资源的集成与共享，为信息化的科学研究环境提供支持。现有数据节点45个，分布在全国16个城市。到2003年底，专业数据库达到313个，数据总量为8.2TB。

版权所有：中国科学院计算机网络信息中心

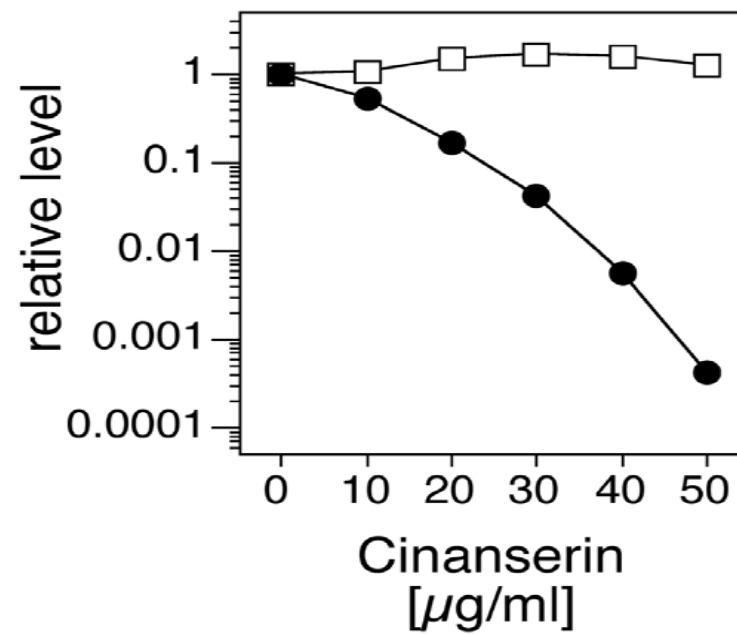
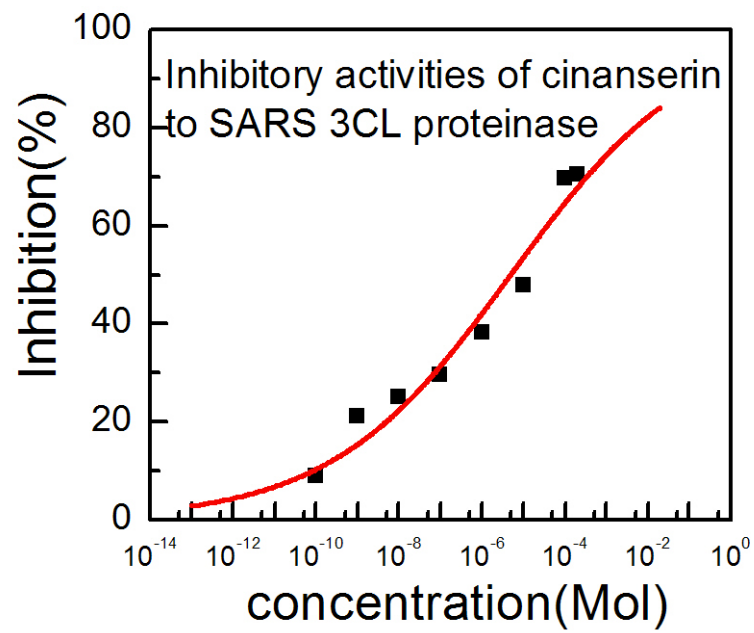
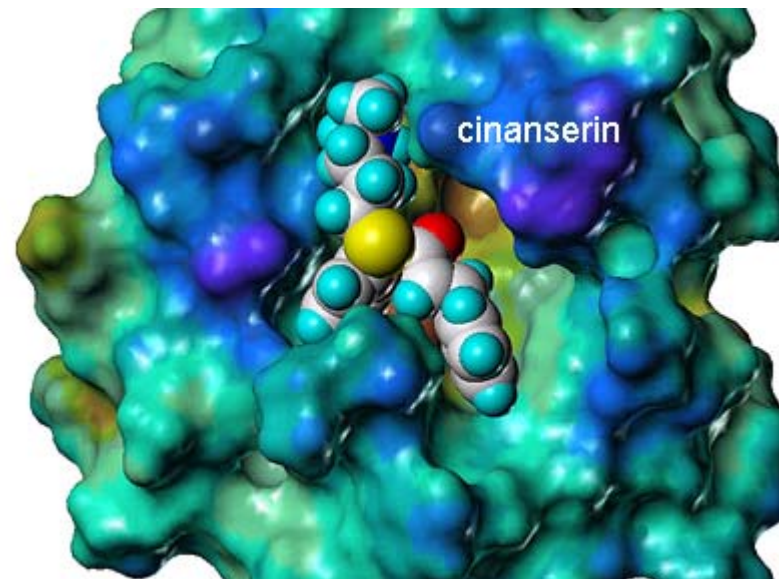
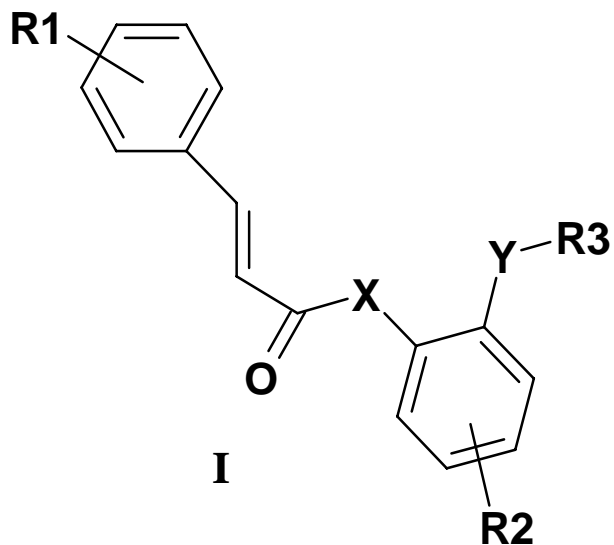
小应用程序 TestApplet started

Internet

New drug discovery grid

- Undertaken by Shanghai Institute of Materia Medica of CAS
- Compound screening for new drug discovery
 - Speed up the process by computer simulation
 - Higher accuracy
- Using HPC in P2P mode
- New drug for diabetes is under development and will enter clinic testing by the end of 2005



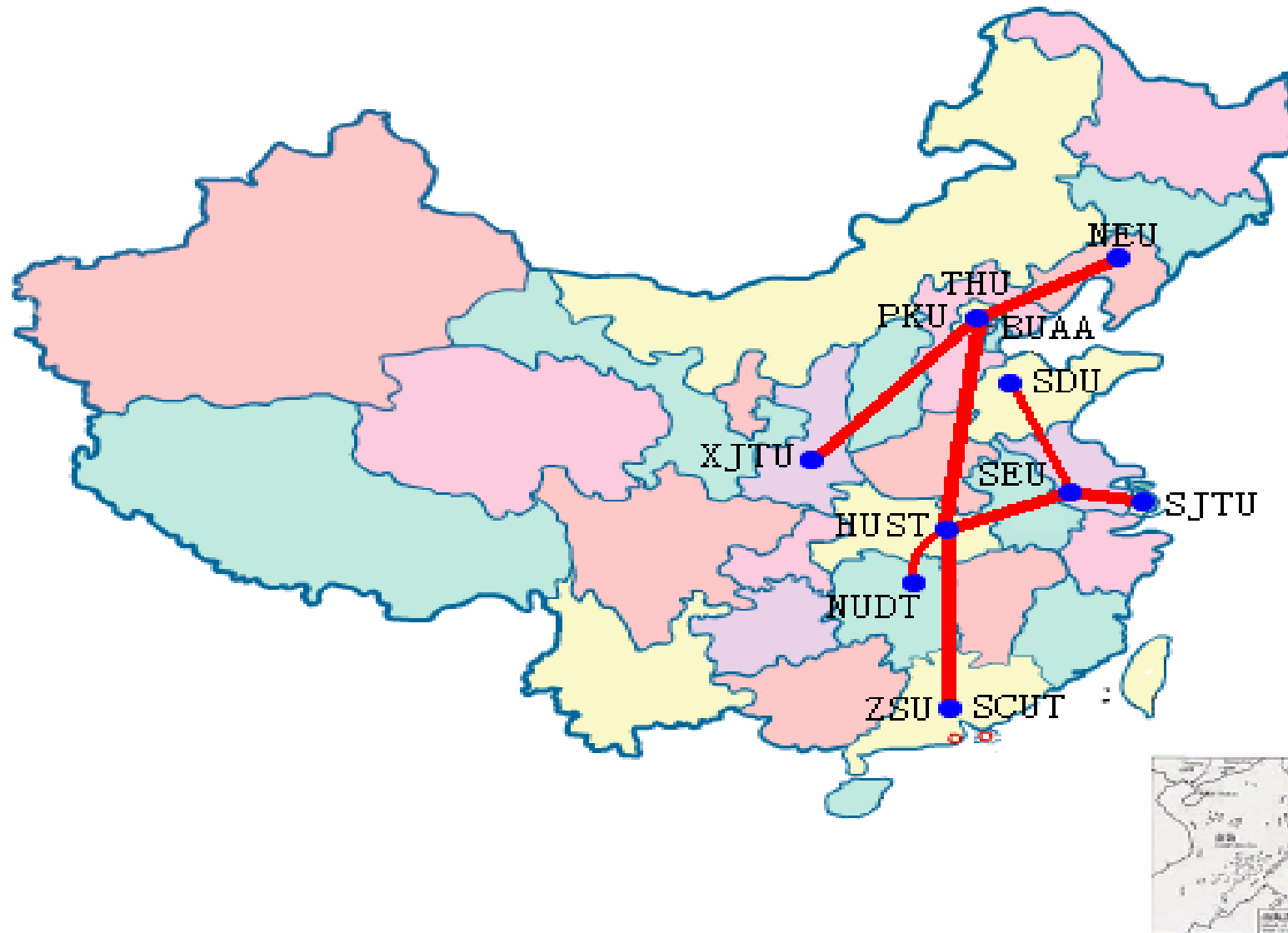


ChinaGrid

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



ChinaGrid (The First Phase)



Bio-info Grid

- To provide the bio-information data resources (such as gene databases and Chinese medicine components databases,) and bio-information analysis tools to grid users
- To develop computing grid aided drug design systems based on the integration of the techniques of assembled biology, assembled chemistry, and computer aided filter, sequence analysis and structure



Image Processing Grid



14:50:12

China Grid

图像处理网格

华中科技大学 | 国防科技大学 | 中山大学

最新动态

格早期原型系统在会议上成功展示，教育部赵沁平副部长及国内外专家参观了展示。

图像网格简介

图像处理在生物医学、石油、天然气、环境科学以及模式识别等领域有广泛的应用。图像处理网格是以ChinaGrid网络设施为基础建立的网格图像应用平台。作为一个集成的问题解决环境，图像处理网格将ChinaGrid中的各类计算资源组织起来，隐藏内部异构性和动态性，充分实现网格互操作的特性，为用户提供安全、透明的图像处理和相关服务。

图像处理网格首期集成了华中科技大学数字化虚拟人重建、国防科技大学遥感图像处理及中山大学医学图像诊断等应用。其中，华中科技大学互联网与集群计算中心承担整个图像处理网格平台的平台研究、设计、开发和维护工作。

数字化虚拟人的重建应用在高速网格计算体系上利用网格计算的强大处理能力和存储能力，对已有的彩色人体切片数据集进行信息提取，将人体结构和组织器官进行数字化与可视化处理，从理论和方法上大大提高我国在数字化虚拟人基础上的研究水平，依次提取的数字化虚拟人的三维数据将为多学科图像研究与应用提供基础。

网格医学图像诊断应用让医生和医院能够以更快、更准确和简便的方式，获得更加可靠和精确的各种医学图片（如：X光片，CT片，MR片，B超片等等），从而提高疾病早期发现、早期诊断的几率，增加患者生存的机会。这一应用将改变疾病的诊断方式，实现医疗资源共享。

用户登录

用户名:

密码:

图像网格原入口

- 网站地图
- 人员介绍
- 项目进展
- 资料中心
- 相关网站

CFD Grid

serviceindex.jsp - Microsoft Internet Explorer

文件(F) 编辑(E) 查看(V) 收藏(A) 工具(T) 帮助(H)

后退 前进 搜索 收藏夹

地址(A) http://grid.sjtu.edu.cn:7080/grid/en/index.htm 转到 链接 上网助手

CFD Grid Application Platform

上海交通大学
Shanghai Jiao Tong University

Welcome

Introduction

Transaction

Tools

Documents

中文版

Computational Fluid Dynamics

Computational Fluid Dynamics(CFD) Grid Platform is based on ChinaGrid and utilizes its wide-spaced and large-scale functions of computer resource management, user management, system security, data access and data transfer straightway. It is also the multi-CFD software integration application platform built in grid field aiming at different engineering backgrounds in computational fluid dynamics. The platform supply different industrial users and research users with various public computational software services and specific software services. On one hand, it provides professional and abundant computational software services for ChinaGrid. On the other hand, it also offers users a high-powered CFD computational platform solving all kinds of hydromechanical problems. The platform can make use of the specialty of grid computing expediently to supply users with more high-powered and more high-qualified services. Shanghai JiaoTong University has taken the advantage of its all CFD research power to build the platform and has formed relatively comprehensive CFD engineering computational platform series, which includes many commercial softwares such as CFX,Fluent,Star-CD,CFL3D,Phoenix etc. We have also develop some independent-developed softwares, which includes ELAN2D, ELAN3D in hydrodynamics field and Jamesn2D, Jamesn3D in aerodynamics field. They will provide knight sarvice to most industrial users.

Now several application constructions are developing on the platform, which include Aircraft Genetic Optimization Design System (Shanghai JiaoTong University), Simulation and Optimization Techniques for Metal Powder Figuration Process (Southern China University of Technology), Parallel Algorithm for Molecular Dynamics (Xi'an Jiao Tong University), Large Scale Geological Disaster Forecasting System (Northeast University) and Computational Electromagnetism Applications in Airplane and Automobile Design (Southeast University).



Course On-line Grid

大学课程在线 - Microsoft Internet Explorer

文件(F) 编辑(E) 查看(V) 收藏(A) 工具(T) 帮助(H) eSend

地址: http://realcourse.grid.cn/

大學課程在綫 COURSE On Line

回到首页 | 热门讲座 | 北京大学 | 联系我们 | 精彩讲座荟萃

课程在线搜索

按 课程名 查询 在 所有课程 中查询

精确查询 模糊查询

计算机

- 计算概论
- 数据结构
- 问题求解与程序
- 汇编程序设计
- 人工智能
- 空间信息系统
- 数据库
- 并行程序设计
- Internet与We
- 计算机网络与分
- 文科计算机基础
- 计算机网络
- 计算机网络传输
- 面向对象的分析
- 集合论与图论
- 操作系统原理
- 数据库原理与技
- 计算机组织与系
- 移动计算引论
- 并行计算
- 数据挖掘
- 算法分析与复杂

1.4 算法

- 算法设计的两个目
- 贪婪、基础可解问题
- 左分利用计算机

1996年计算机的生物

Microsoft Windows Supercomputer

图形讲解: 光刻

- 神经网络识别技术
- 基础进阶 (11/1)
- 光子学光刻

Internet



Massive Information Processing Grid

网格北航 - Microsoft Internet Explorer

文件(F) 编辑(E) 查看(V) 收藏(A) 工具(T) 帮助(H)

地址: http://athena.vrlab.buaa.edu.cn/gcc/

 中国教育科研网格计划ChinaGrid
海量数据处理网格应用平台与典型应用
北京航空航天大学 东南大学 山东大学

简要介绍

根据海量数据处理的特点,在中国教育科研网格计划ChinaGrid中建立海量数据处理网格的应用平台与典型应用示范。

基于中国教育与科研机构已有的软件和硬件资源,构建面向Web服务的网格支撑平台WebSASE4G,形成一个海量数据处理网格应用平台,将分布节点上的计算与存储资源以有效的方式组织起来,为用户提供海量数据处理的资源共享与高性能计算环境,并且在应用中为用户提供更高性能和更高质量的海量数据处理服务。

面向Web服务的网格支撑平台WebSASE4G门户网站

应用平台与典型应用

 航空航天数字博物馆 北京航空航天大学	 虚拟奥运博物馆 北京航空航天大学	 AMSO2数据处理与分析系统 东南大学	 高性能物理计算 山东大学
--	---	---	--

北京航空航天大学
ChinaGrid海量数据处理网格应用平台与典型应用课题组



HEP Grid

- Coordinated by IHEP
- Based on LCG
- To build a Tier-2 center at IHEP for LHC, WLCG MoU has been signed
- Cooperating among institutes and universities



LCG sites

- **LCG site at IHEP**
 - RB, UI, CE, SE, Myproxy, MON (R-GMA), BDII
 - WNs with Xeon CPUs
 - China HEP CA, serve HEP and other communities
 - Supported VOs: ATLAS, CMS, BES/ARGO
- **Other LCG sites in China**
 - Shandong University: SDU-LCG2
 - CNIC: BEIJING-CNIC-LCG2-IA64
 -



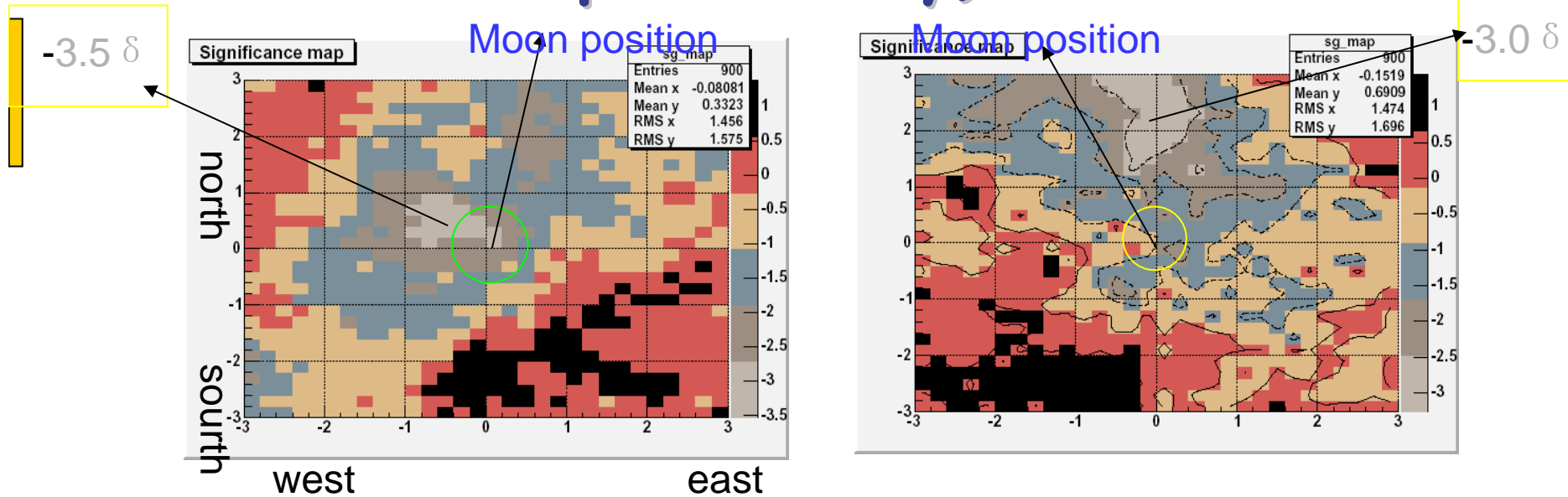
HEP Applications

- LHC
- BEPC-II/BES-III:
Beijing Electron-Positron Collider/Beijing Electron Spectrometer: tau/charm physics
- ARGO-YBJ:
China-Italy cosmic ray observatories in Tibet
-

- LHC, BES-III softwares are running
- Deploying ARGO onto LCG. started running



Moon shadows (zenith < 40°, preliminary)



- The left histogram is for the 1st reconstruction: events: 536165, background: 537473, difference: $1309 \pm 733(\text{stat.}) \pm ?(\text{sys.})$, expected deficit number : 3168 ($\sim N_{\text{bg}} \times \pi (\text{Moon Radius})^2 / (6 \times 6)$)
- The right histogram is for the 2nd reconstruction: event: 539039, background: 540060, difference: $1021 \pm 734(\text{stat.}) \pm ?(\text{sys.})$, expected deficit number : 3178 ($\sim N_{\text{bg}} \times \pi (\text{Moon Radius})^2 / (6 \times 6)$)



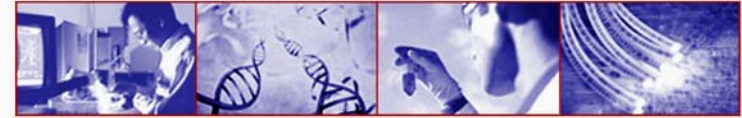


EUChinaGrid

A EU funded project of Interconnection & Interoperation of Grid between Europe and China

- To foster the creation of a intercontinental eScience community
 - Training people
 - Supporting existing and new applications: **LHC, ARGO, Biology...**
- To support interoperable infrastructure for grid operations between Europe and China



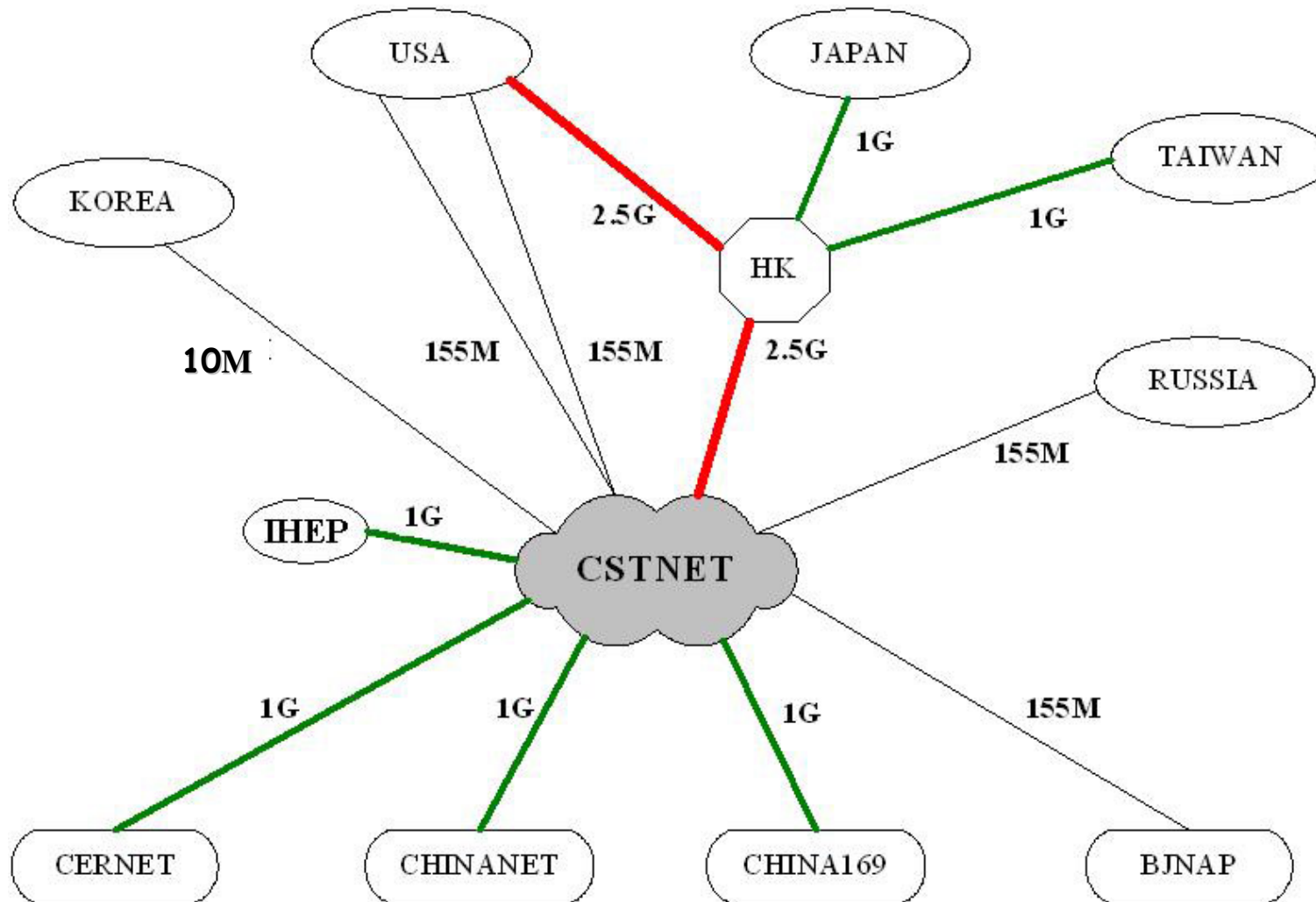


Partners

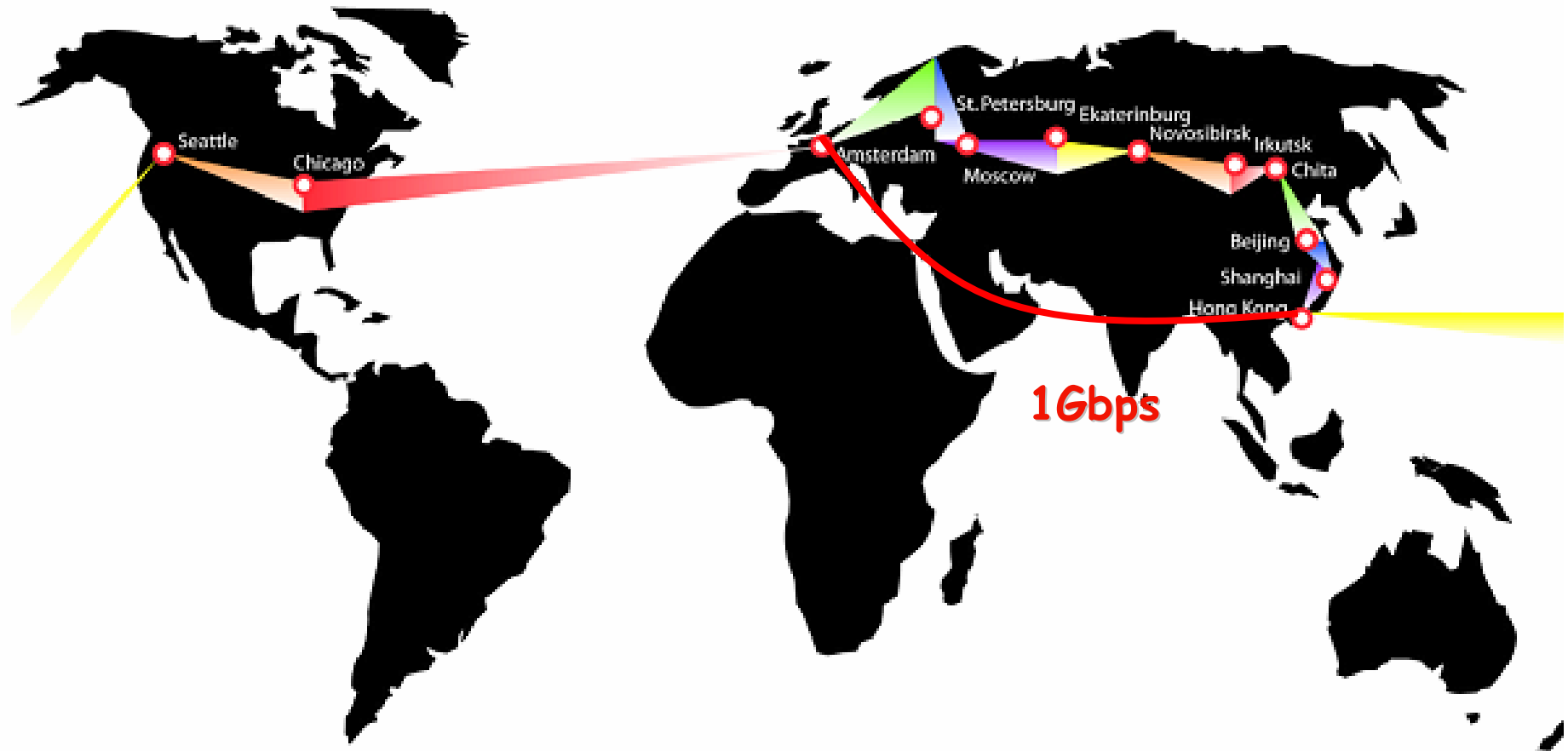
1	Istituto Nazionale di Fisica Nucleare (IT) (coordinator)
2	European Organisation for Nuclear Research CERN (CH)
3	Dipartimento di Biologia - Università di Roma Tre (IT)
4	Consortium GARR (IT)
5	Greek Research & Technology Network (GR)
6	Jagiellonian University – Medical College, Cracow (PL)
7	School of Computer Science and Engineering – Beihang University Beijing (CN)
8	Computer Network Information Center, Chinese Academy of Sciences – Beijing (CN)
9	Institute of High Energy Physics, Beijing (CN)
10	Peking University – Beijing (CN)



Networking

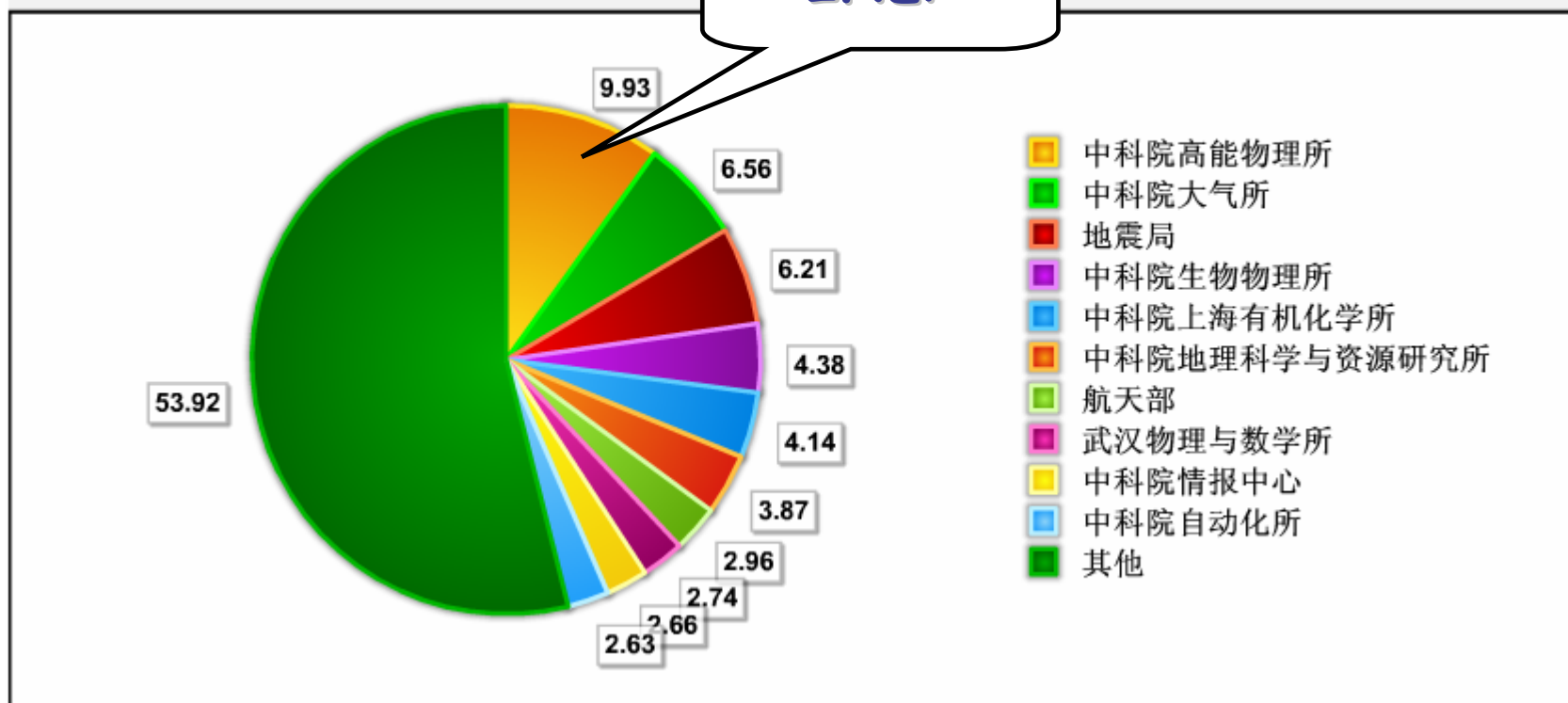


Networking



Users of Gloriad

HKOEP节点GLORIAD线路的月流量比例图



GLORIAD

- Gloriad is an initiative from China, USA and Russia. And now has been extended with Korea, Netherlands, and Canada.
- Gloriad provides expanded capacity for science and education collaboration (10 Gbps).
- Gloriad is open to more members, especially in Asia Pacific region!



Resource Plan at IHEP

For BES (~50%), LHC(~50%) and others:

	Resources	Planned Resources				
	2005	2006	2007	2008	2009	2010
CPU (kSI2K)	200	600	1500	2000	3000	4000
Disk (TB)	3	100	200	600	1000	1400
Tape (TB)	14	500	1000	2000	3000	4400
Tape (MB/s)	15	80	160	200	260	300
WAN (Mb/s)	1000	1000	10000	10000	10000	10000



Summary

- Grid projects are supported by government with high priority.
- HEP Grid (LCG...) is more mature and will help other grid applications in China!





Thank you!

