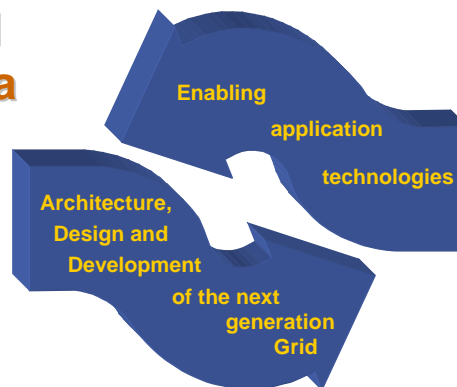## International Co-operation on Grid Technologies
Target Country: China

Overview of Grid Activities in China

Jorge Gasós
European Commission

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http://www.cordis.lu/ist/grids

Enabling application technologies

Architecture, Design and Development of the next generation Grid

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Unit Grid Technologies
IST-Call 6 Information Day - Brussels, 27 January 2006

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Main Grid initiatives in China

Ministry of Science and Technology

⇨ **China National Grid (CNGrid); part of the National Hi-tech Program(863)**

NSF of China

⇨ **CROWNE Grid**

Application Grids

⇨ **ChinaGrid, supported by the Ministry of Education**

⇨ **China Science Data Grid (SDG), supported by the Chinese Academy of Science**

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Overview of CNGrid

A 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 government fund from the MOST of China**
- ⇨ **Two to three times more associated funds from local governments, application organizations, and industry**

Major tasks of the project

Developing a Grid test-bed

Developing a 4TFlops high performance computer for the grid

Developing a set of grid software to support grid applications and grid operation and management

Developing several application grids

- ⇨ **Productive systems**
- ⇨ **Demonstration of the future grid applications**

Grid test-bed and HPC development

Eight nodes across the country

- ⇨ **CAS Network Center (Beijing)**
- ⇨ **Shanghai Supercomputer Center (Shanghai)**
- ⇨ **Tsinghua University (Beijing)**
- ⇨ **Institute of Applied Physics and Computational Mathematics (Beijing)**
- ⇨ **University of Science and Technology of China (Hefei, Anhui)**
- ⇨ **Xi'an Jiaotong University (Xi'an, Shaanxi)**
- ⇨ **NUDT (Changsha)**
- ⇨ **Hong Kong University (Hongkong)**

Two >4TFlops machines: Dawning 4000 and Lenovo DeepComp 6800

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grid nodes across China

Beijing

Xi'an

Shanghai

Hefei

Changsha

Hong Kong

3

Grid Technologies and Applications

Effective sharing of hardware, software, data, information, and knowledge

⇨ **Seamless access to services**

Life cycle support to applications

⇨ **development, testing, deployment, and operation**

Applications are the driving force

Emphasize feedback from applications to research

Emphasize cooperation between applications and technology teams

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Grid software development

Grid system software

⇨ **Interfacing to heterogeneous systems**
⇨ **Resource management**
⇨ **scheduling**

Grid application development environment

⇨ **Portal based**

Grid user environment

⇨ **Grid browser**
⇨ **GSML**

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Grid Applications

Resource and environment
- ⇨ **Geological Survey Grid; Digital Forest Grid**
- ⇨ **Seismic Imaging Grid;**

Research
- ⇨ **Scientific Data Grid (astronomy);**
- ⇨ **Bioinformatics Grid; New Drug Discovery Grid**

Services
- ⇨ **Traffic Information Grid**
- ⇨ **Meteorological Application Grid**

Manufacturing
- ⇨ **Aviation Grid**
- ⇨ **Simulation and Manufacturing Grid**

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China Meteorological Application Grid

Numerical weather prediction system
- ⇨ **includes data preprocessing, analysis, numerical models, post processing, visualization and verifications etc.**

Execution processes are dynamically connected

Enormously complex even if used individually

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China Meteorological Application Grid

Numerical Weather Prediction system

⇨ includes data preprocessing, analysis, numerical models, post processing, visualization and verifications, etc.
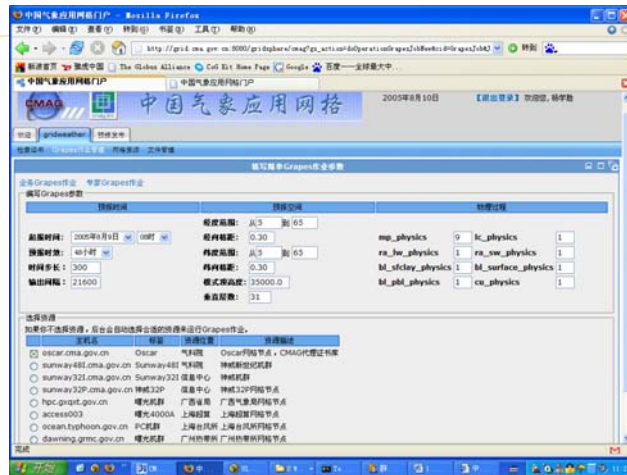
Grid portal

GridWeather

⇨ **a NWP workflow control interface**

CVSExplorer

⇨ **a code management system**

GRAPES meso-scale model

User management sub-system

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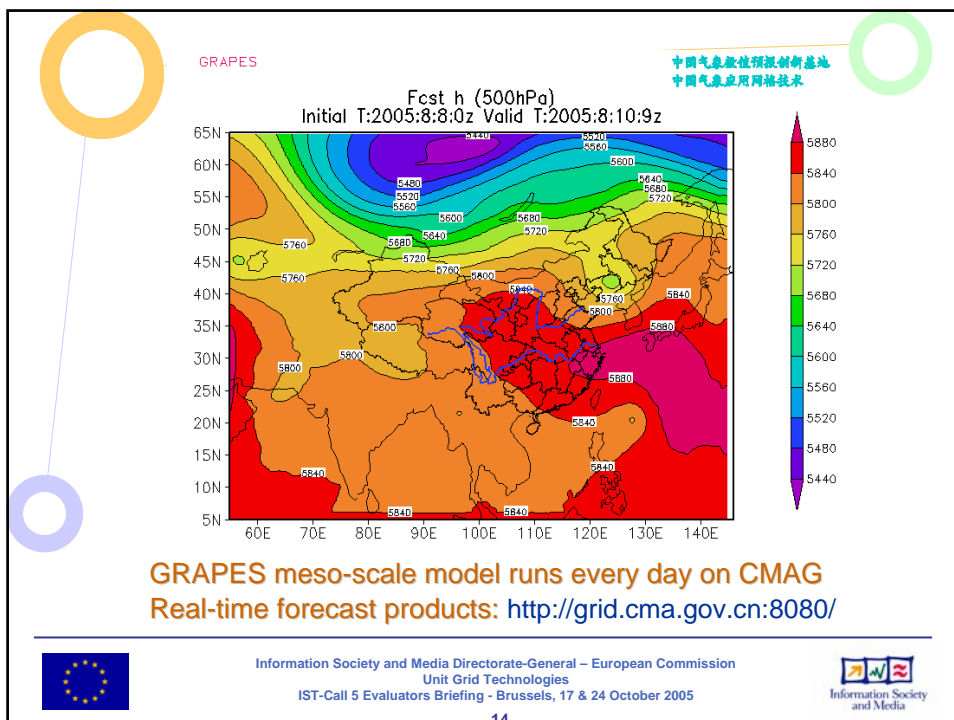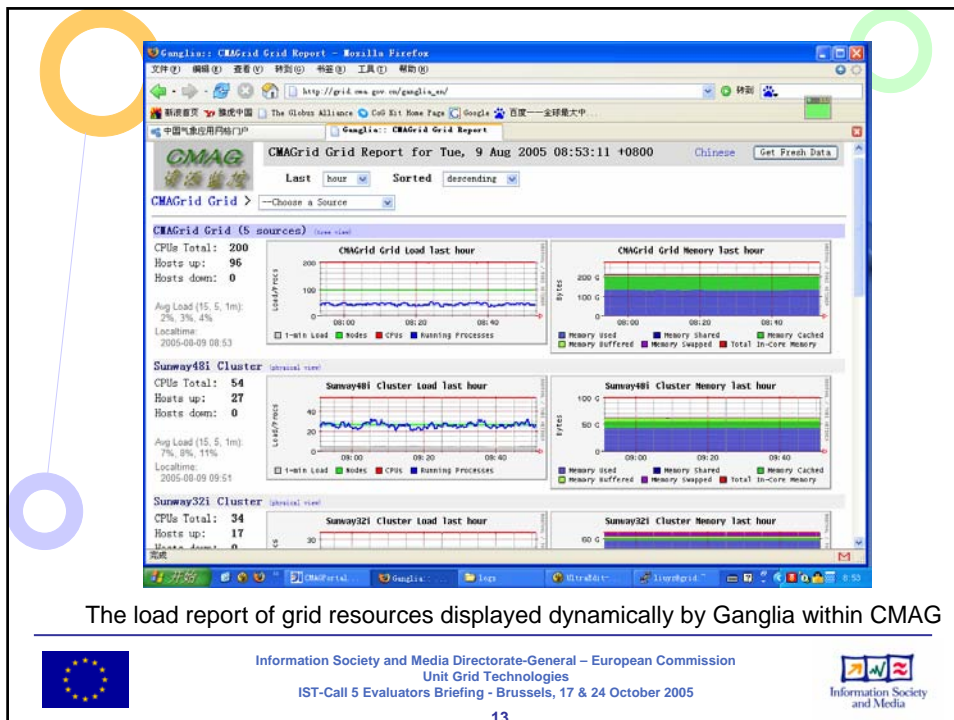

User interface for GARPES model improvement

⇨ to select the appropriate physical parameterization schemes
⇨ to designate forecast domain, available numerical schemes, etc.

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The load report of grid resources displayed dynamically by Ganglia within CMAG

GRAPES meso-scale model runs every day on CMAG
Real-time forecast products: http://grid.cma.gov.cn:8080/

Traffic Information Grid

Showing road status
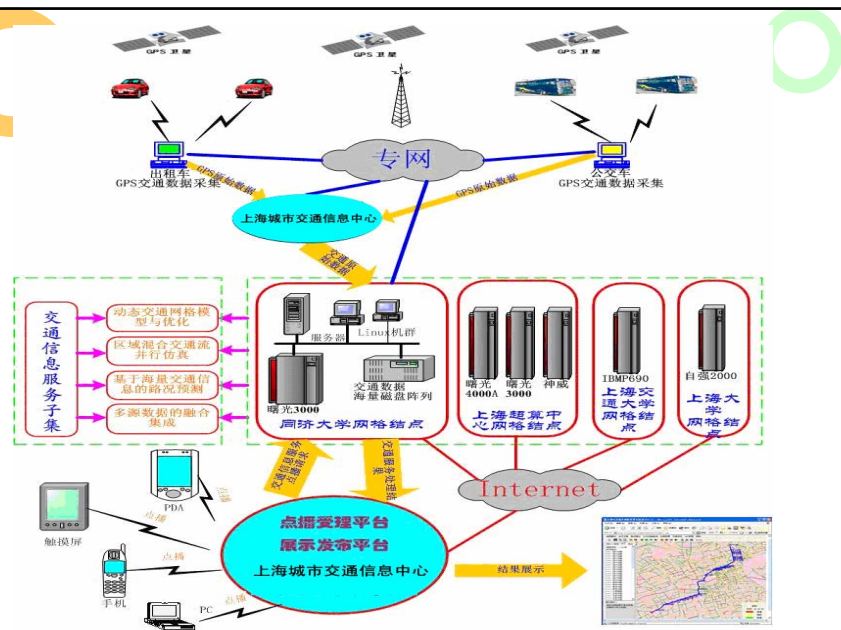
Predicting bus arrival time

Optimal route selection

Multiple accesses
- ➩ **Web**
- ➩ **Mobile phone**
- ➩ **touch screens**

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Overview of CROWNE

China Research and Development Environment Over Wide-area Network

⇨ **Duration 2002 - 2006**

⇨ **Group Members(Stage 1): 7 Universities and 5 Institutes, such as Beihang University, Peiking U., Tsinghua U., NIC/ CAS, domain partners, etc.**

⇨ **Focus on service Grid R&D, testbed and its applications**

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Overview for ChinaGrid

⇨ **Sponsored by China Ministry of Education**

⇨ **Since 2003, Supported by National High-Tech Program (863 Program)**

⇨ **Goal: Connecting Resources over CERNET, building an application Grid for China**

⇨ **20 Universities are involved in ChinaGrid**

Main Messages

⇨ **China has well established programs and a critical mass of research in the Grid technologies area**

⇨ **There are many research and application areas in common with potential for collaboration**

⇨ **Call 6 aims to link existing Chinese initiatives with corresponding activities in the EU**

⇨ **Towards establishing a long-term co-operation framework**

⇨ **Contact information of main Chinese initiatives will become available in February at: www.gridatasia.net**