

Asian Grid Projects

Satoshi Sekiguchi
Grid Technology Research Center,
AIST, Japan

Asian Pacific Grid Activities

- ▶ ApGrid – we started here
- ▶ PRAGMA, APAN
- ▶ APGrid PMA

National Grid Projects

- ▶ Thailand National Grid Project
- ▶ National Grid Office, Singapore
- ▶ Taiwanese Grid Activities, KING

Japanese Grid Projects

- ▶ NAREGI
- ▶ Grid ASP, business grid

Emerging e-Science type of application

- ▶ GEO Grid

● ApGrid: Asia Pacific Partnership for Grid Computing

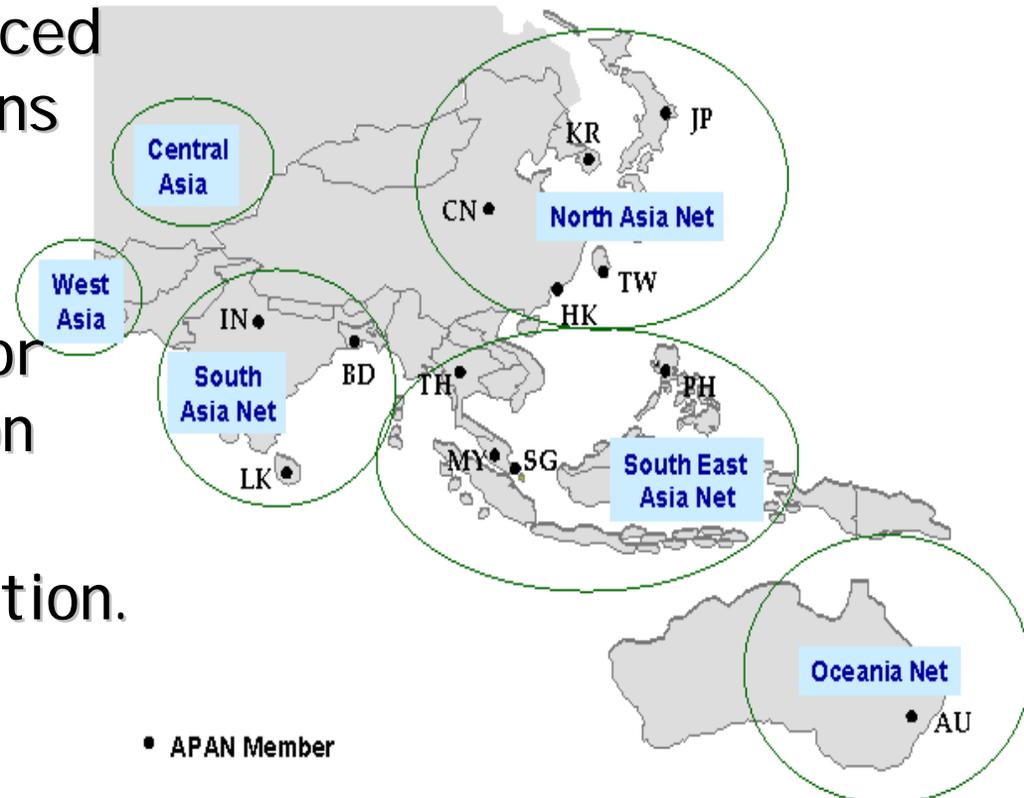
- ▶ Open community for Grid researchers in Asia Pacific



● ApGrid:

- ▶ A meeting point for all Grid researchers in Asia-Pacific
- ▶ A communication channel to the GGF, and other grid communities (e.g. TeraGrid, UK-eScience, EUGrid, etc.)
- ▶ A computing testbed for making real grid-collaboration
- ▶ Kick off 1st meeting in 2000

- Non-profit international consortium established on 3 June 1997.
- Being a high-performance network for R&D on advanced next generation applications and services.
- Providing an advanced networking environment for the research and education community in Asia-Pacific.
- Promoting global collaboration.
- Tightly collaborating with TransPAC, TEIN.
- Having meetings twice a year.



Pacific Rim Application and Grid Middleware Assembly - PRAGMA:





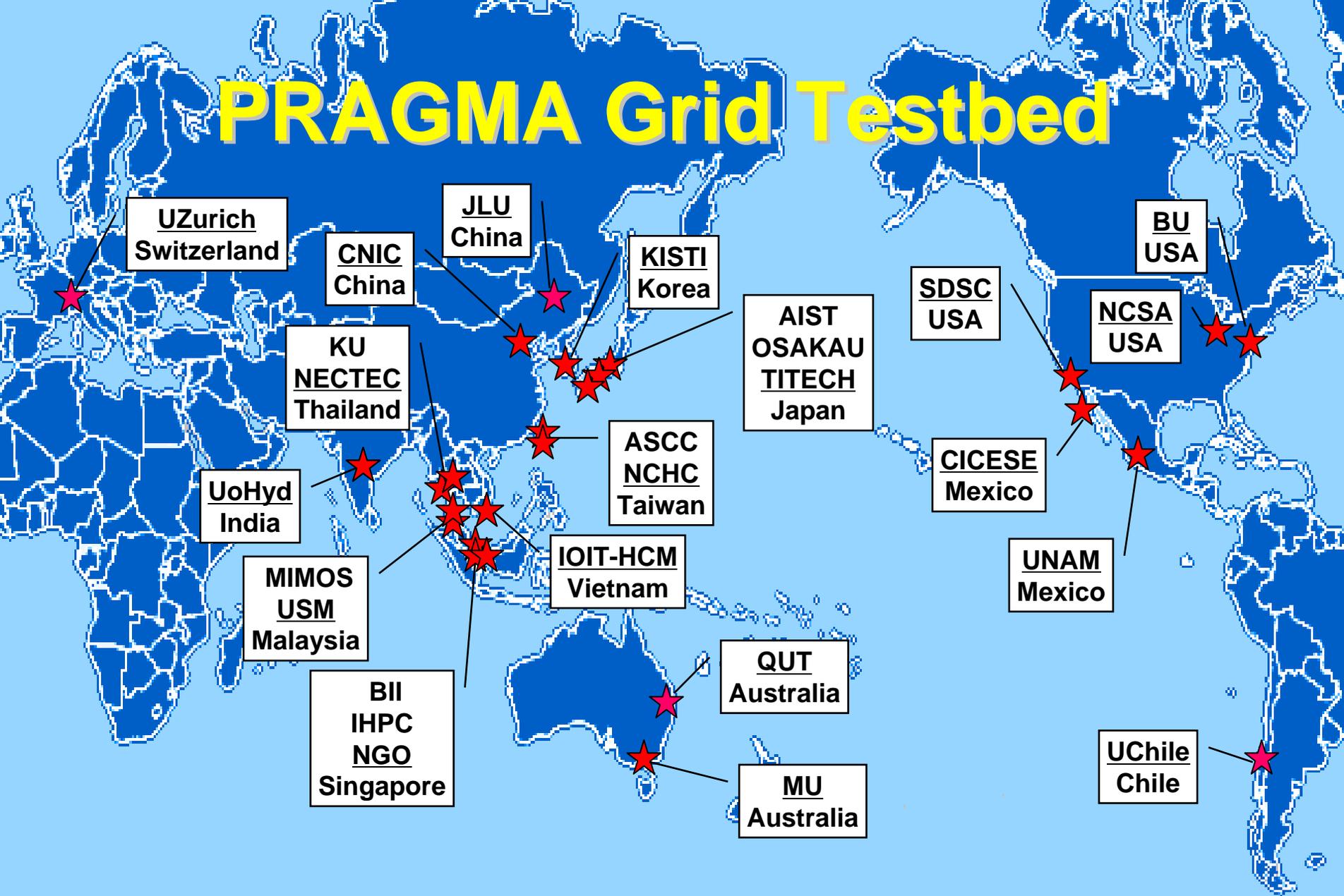
- NSF-funded project lead by UCSD/SDSC.
- 1st workshop was held in March 2002.
- Establish sustained collaborations and advance the use of the Grid technologies for applications.

- Expected outcomes:
 - ▶ Advance scientific applications
 - ▶ Increase productive and effective use of the grid by researchers and scientists in the Pacific Rim
 - ▶ Increase interoperability of grid middleware in Pacific Rim and throughout the world



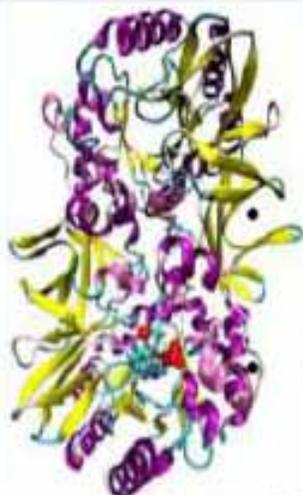
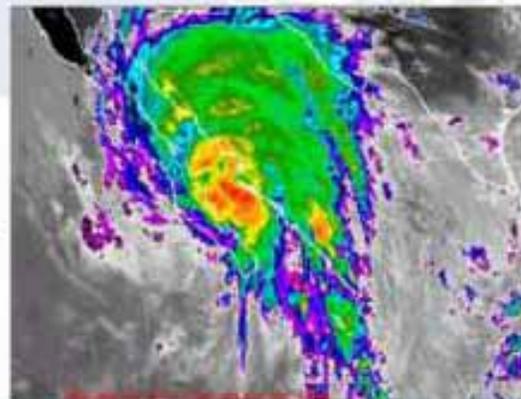
PRAGMA 11 Workshop attendees gather in Osaka, Japan

PRAGMA Grid Testbed



Applications

<http://goc.pragma-grid.net>



Achieved long run and scientific results

- Savannah/Nimrod, MU, Australia
- FMO/Ninf-G, AIST, Japan

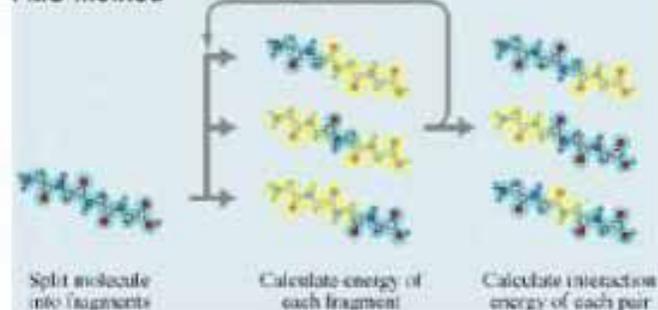
Successful run

- MM5/Mpich-Gx, CICESE/KISTI, Mexico/KISTI

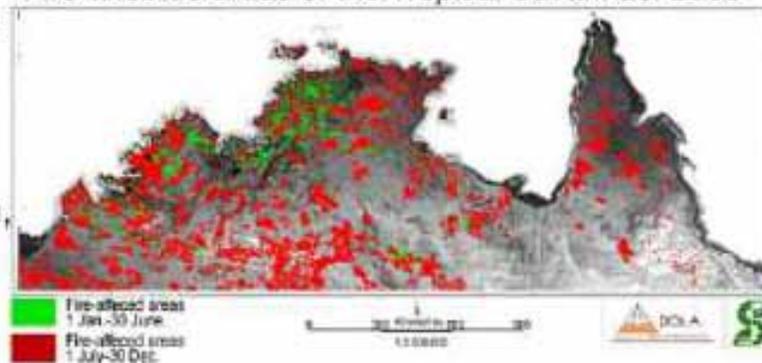
• 11 applications continue run in testbed

- Savannah: climate model, MU, Australia
- MM5: climate model, CICESE, Mexico
- QM-MD, FMO: quantum-mechanics, AIST, Japan
- iGAP: genomics, UCSD, USA
- HPM: genomics, IOIT-HCM, Vietnam
- mpiBlast: genomics, ASCC, Taiwan
- Gamess-APBS: organic chemistry, UZurich, Switzerland
- Siesta: molecular simulation, UZurich, Switzerland
- Amber: molecular simulation, USM, Malaysia

FMO method



Fire-affected areas of the Tropical Savannas: 2000



Grid Security

- IGTF (OGF) <http://www.gridpma.org/>
 - APGrid PMA, <http://www.apgridpma.org/>
 - 5 site-CAs are IGTF accredited
 - AIST, ASGC, CNIC, **KISTI**, NCSA
- PRAGMA CA
 - Naregi-CA, <https://www.naregi.org/ca/>
 - APGrid, UChile, ...
 - Experimental CA in use for users/hosts
 - Working on production CA under APGrid PMA
- GAMA and Naregi-CA integration
 - GAMA, <http://grid-devel.sdsc.edu/gridsphere/gridsphere?cid=gama>
 - User private key issue



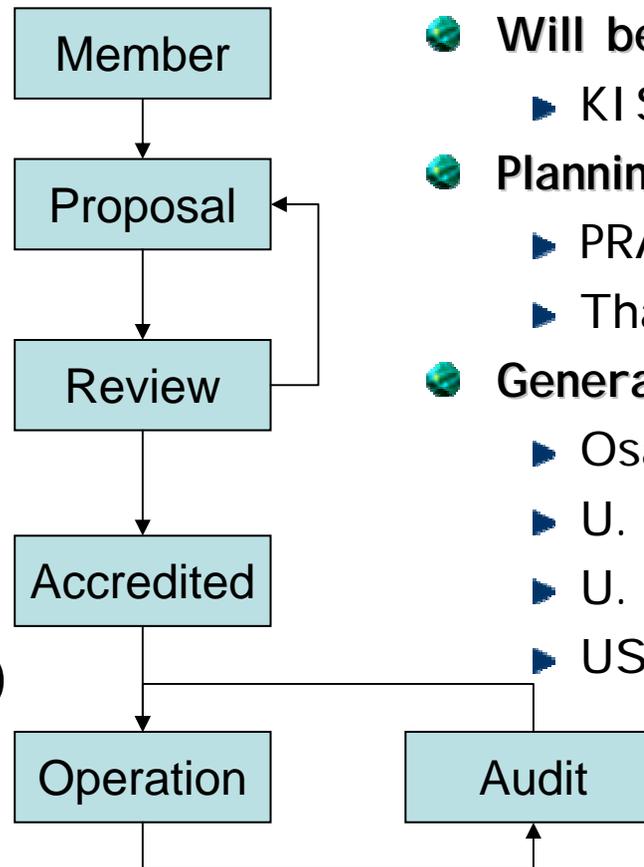
9 Accredited CAs

▶ In operation

- @ AIST (Japan)
- @ APAC (Australia)
- @ ASGCC (Taiwan)
- @ CNIC (China)
- @ IHEP (China)
- @ KEK (Japan)
- @ NAREGI (Japan)

▶ Will be in operation

- @ NCHC (Taiwan)
- @ NECTEC (Thailand)



1 CA under review

- ▶ NGO (Singapore)

Will be re-accredited

- ▶ KISTI (Korea)

Planning

- ▶ PRAGMA (USA)
- ▶ ThaiGrid (Thailand)

General membership

- ▶ Osaka U. (Japan)
- ▶ U. Hong Kong (China)
- ▶ U. Hyderabad (India)
- ▶ USM (Malaysia)

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Thailand National Grid Project

Putchong Uthayopas¹ and Vara Varavithya²

¹ Director

High Performance Computing and Networking Center
Kasetsart University, Bangkok, Thailand
pu@ku.ac.th

² Department of Electrical Engineering
Faculty of Engineering

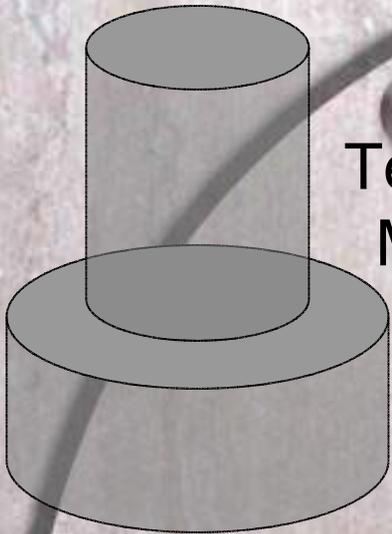
King Mongkut's Institute of Technology North Bangkok
vara@kmitnb.ac.th

ThaiGrid Project

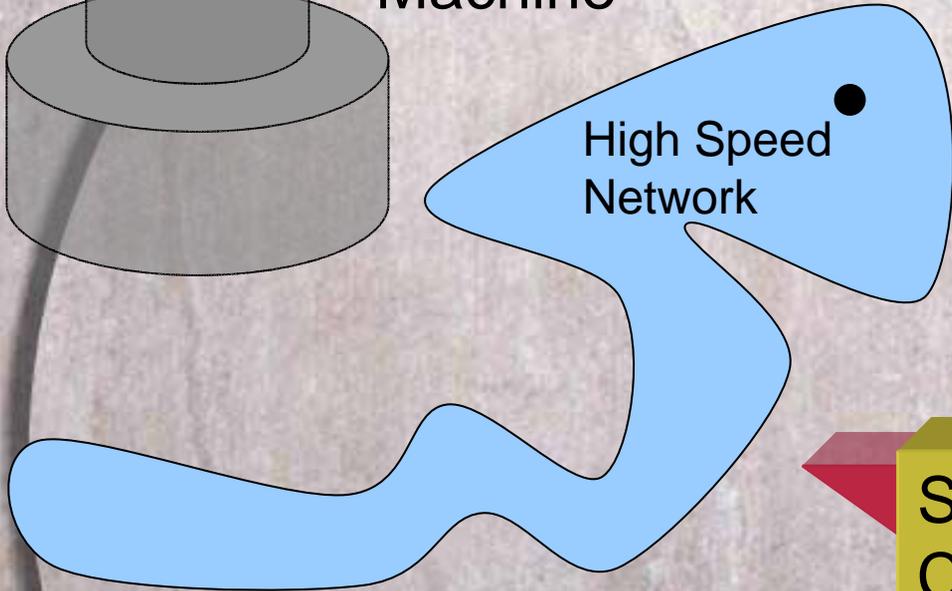
- Found Jan 2002
- Build up a long term research partnership to explore
 - The construction of Grid testbed and production environment
 - The building of Grid tools and middleware.
 - The deployment of grid technology to support the mission of scientific discovery
 - The development of Grid application

Computing Infrastructure

Tera Flops
Machine



High Speed
Network



Satellite
Clusters

32-proc.
Machine

Satellite
Clusters

32-proc.
Machine

Satellite
Clusters

32-proc.
Machine

Satellite
Clusters

32-proc.
Machine

16 Satellite Sites



Applications

- Health Care Data Grid
- High Performance Computing Applications
 - Drug Design
 - CFD
 - FEM
 - Evolutionary Computing
- Financial Application

Based on
Participated Inst.
Expertise

National Grid in Singapore

Hing-Yan Lee
Deputy Director, National Grid Office

National Grid Vision

to facilitate the seamless use of an integrated cyber infrastructure in a secure, effective and efficient manner to advance scientific, engineering & bio-medical R&D,

with the longer term goal of transforming the Singapore economy using grid

National Grid Steering Committee

Chairman – Mr. Peter Ho

MTI
(A*STAR,
EDB, RIs)

MINDEF
(DSTA, DSO)

MITA
(IDA, MDA)

MOH
(Hospitals)

MOE
(Schools,
NUS, NTU)

Industry
(Lilly, Philips,
SCS, StarHub)

Working Groups

Security

Middleware & Architecture

Governance & Policy

Applications

Network

SIGs

System Administrators

Access Grid

Physical Sciences

Life Sciences

Digital Media

...

Virtual Grid Communities

**National Grid
Governance Council
(NGGC)**

Facilitates &
coordinates activities

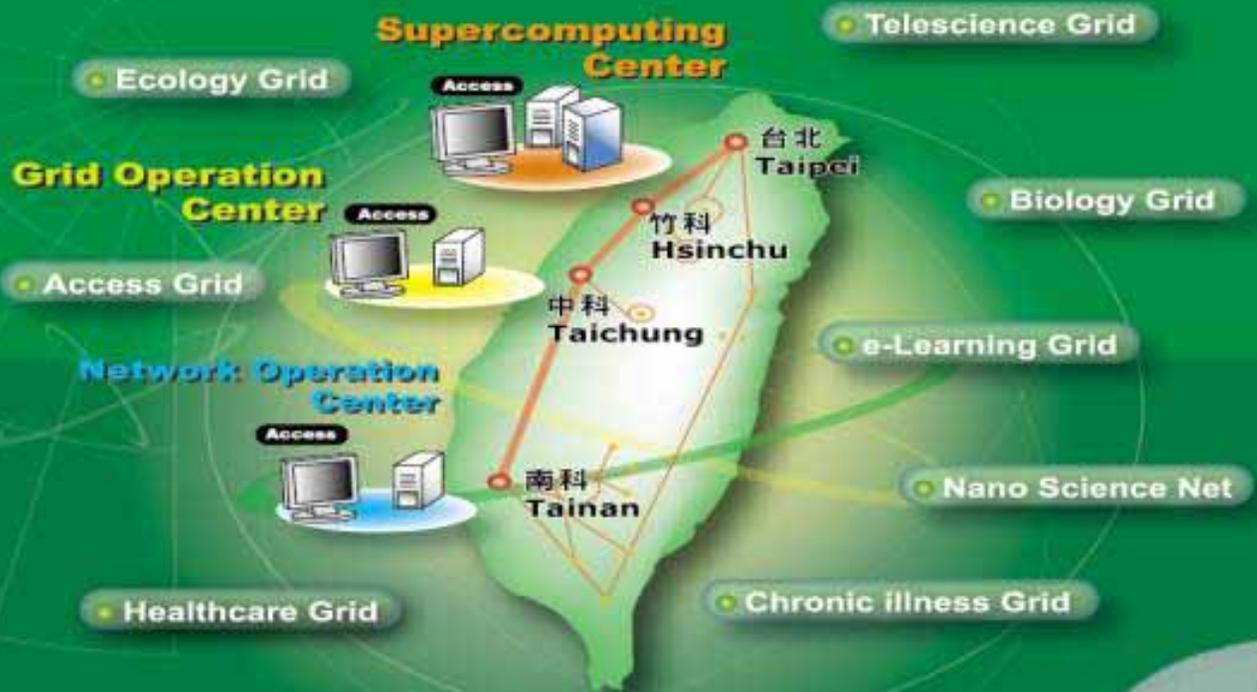
**National Grid
Office
(NGO)**

**National Grid
Operations
Centre
(NGOC)**

**National Grid
Competency
Centre
(NGCC)**

KING

Knowledge Innovation National Grid



- Access
- Teleconference Grid
- Multimedia
- 40 Gps
- 10 Gps
- Computing Platform
- Knowledge Database Equipment

National Development Project

2003~2006; 30M USD (TWAREN 60M USD)

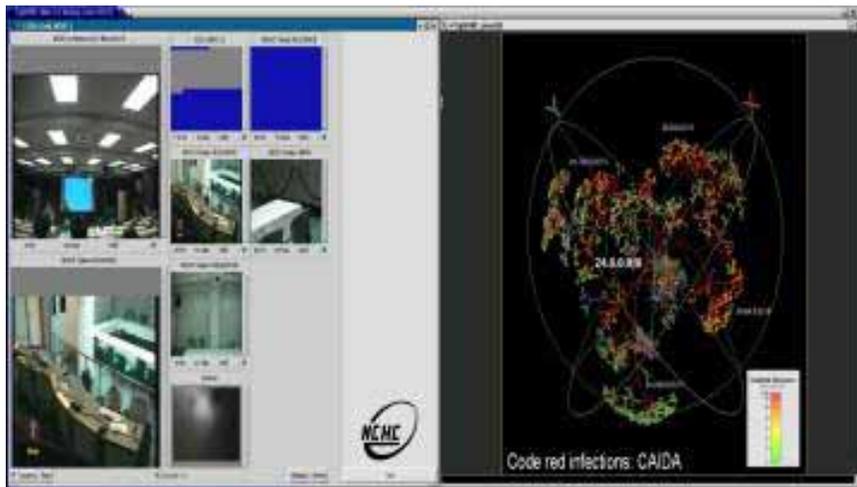
Deploy Grid Infrastructure and Applications

Build Advanced & Collaborative Environment for Research Communities

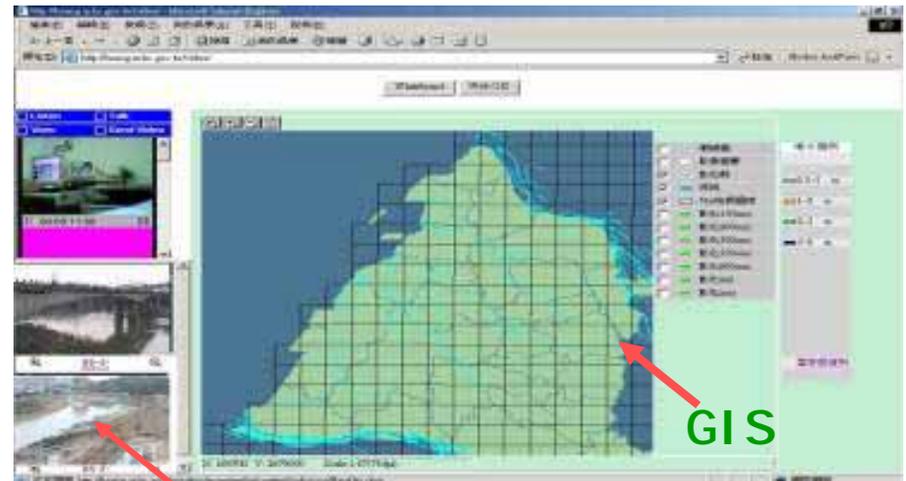


Multiple Communication

AG for EDU Grid/E-learning



Web-Based Access Grid



Sensor net

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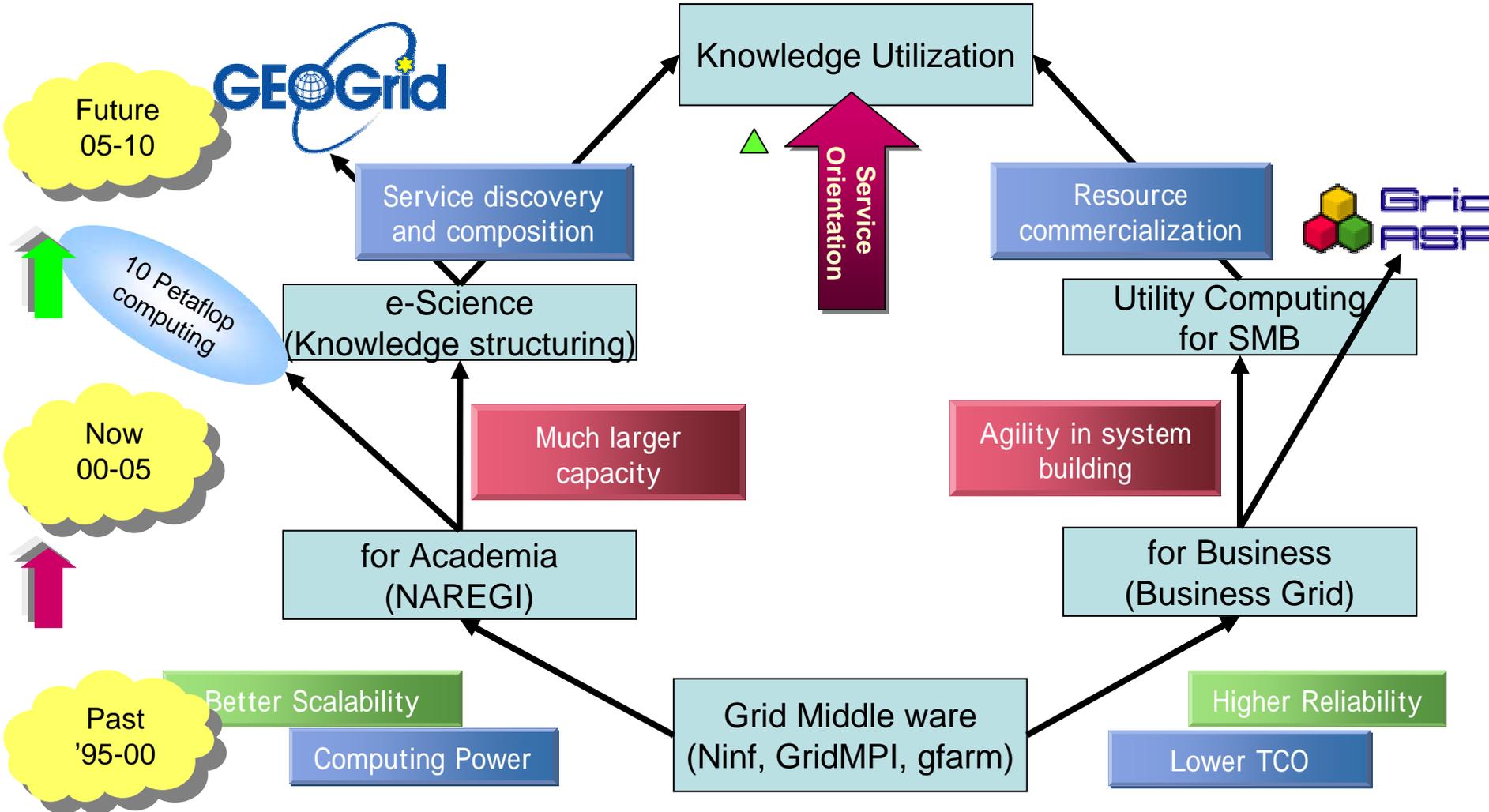
- ▶ GEO Grid

R&D manufacturing

Better Life

Business

ITサービスベンチャー
独立系データセンター
コンテンツ産業



NAREGI Activities for Grid Interoperation

NAREGI program
National Institute of Informatics

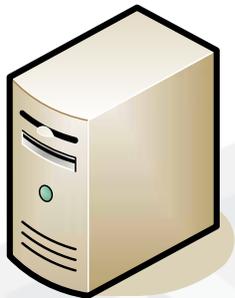
- ◆ Developing an interoperation island with EGEE
- ◆ Developing an Interoperation island with WS-GRAM based grids
- ◆ JSDL interoperability (for Phase-2)



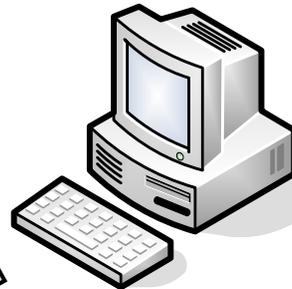
**SRM copy (srmcp) command was ported in NAREGI.
Bi-directional file copy can be performed by srmcp.**

EGEE

(lxdpm01.cern.ch)



SRM (DPM)
Server



SRM client

NAREGI

(pbg1052.naregi.org)

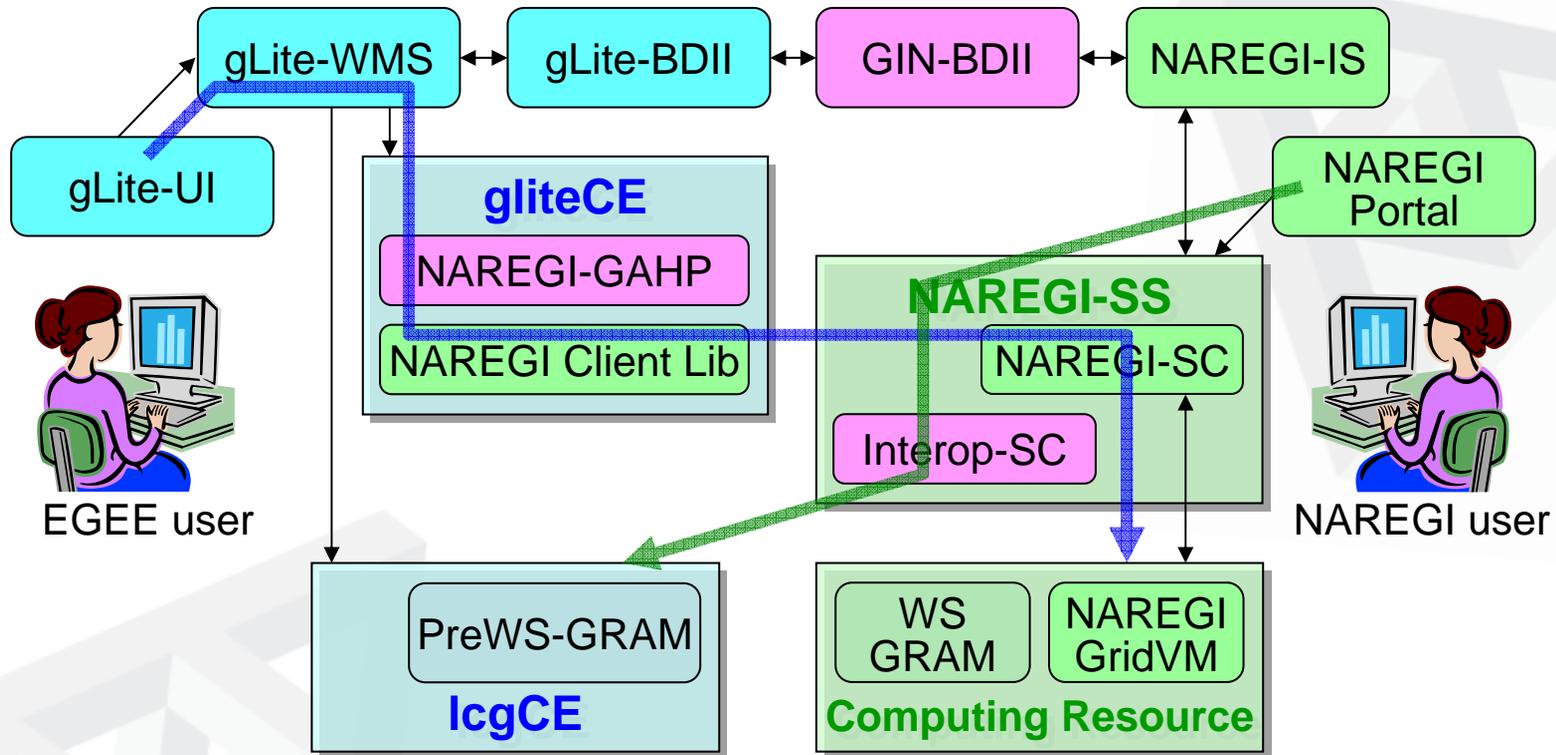


Gfarm Server

`srmcp gsiftp://pbg1052 srm://lxdpm01`

`srmcp srm://lxdpm01 gsiftp://pbg1052`

Architecture



Demo

- NAREGI → EGEE: using NAREGI Workflow
- EGEE → NAREGI: using glite WMS commands

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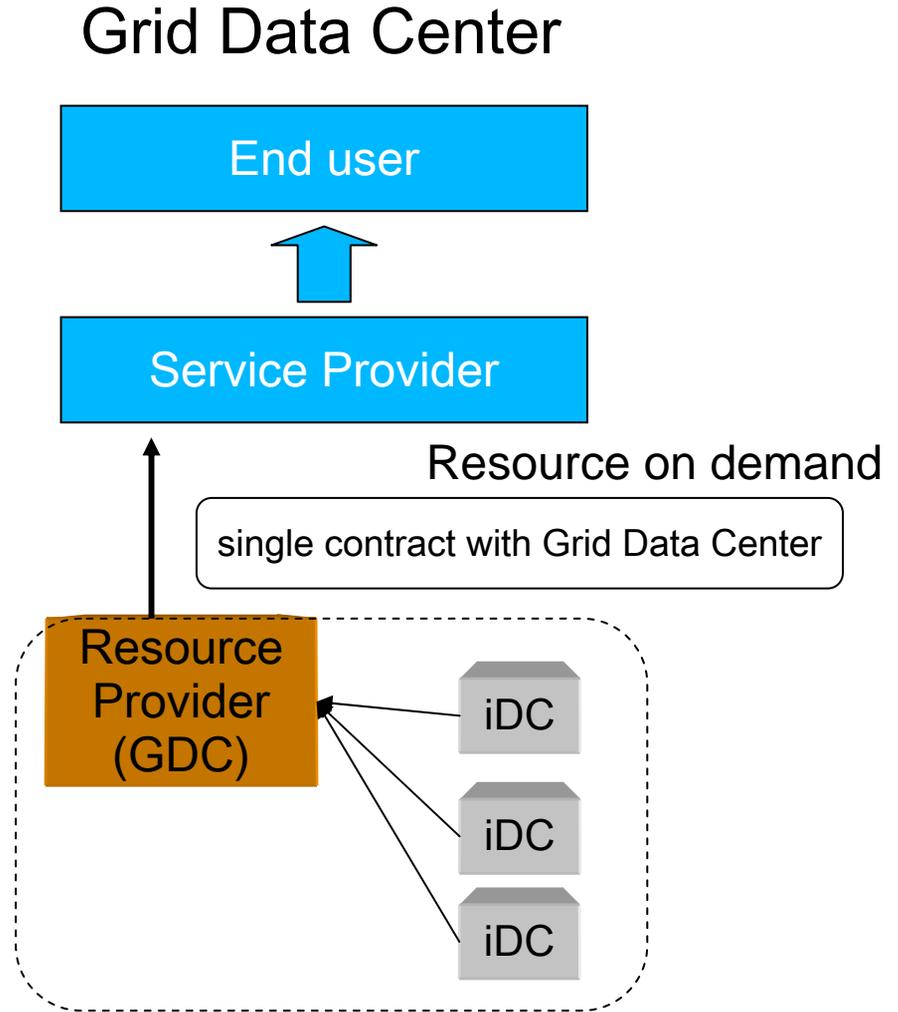
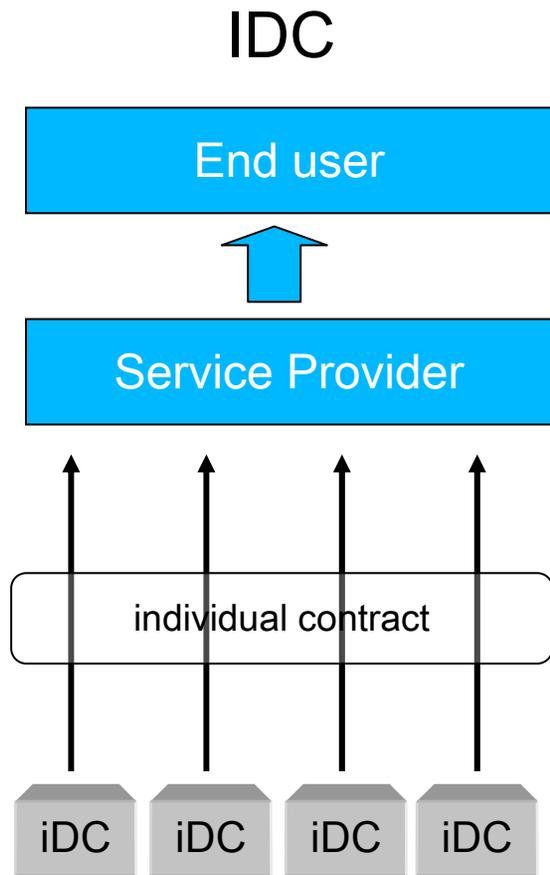
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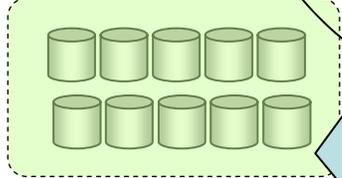
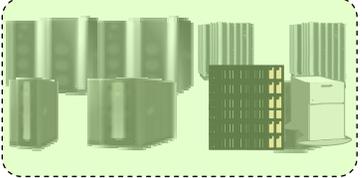
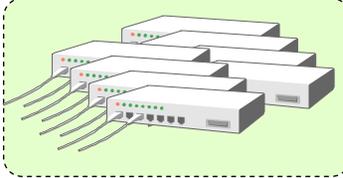
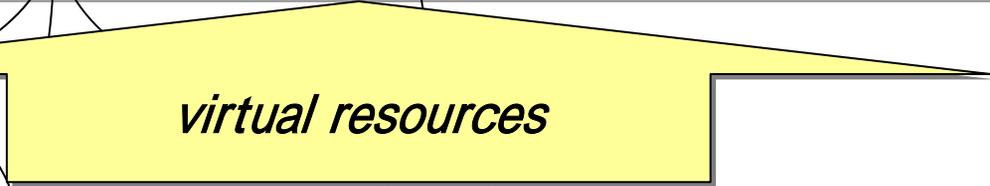
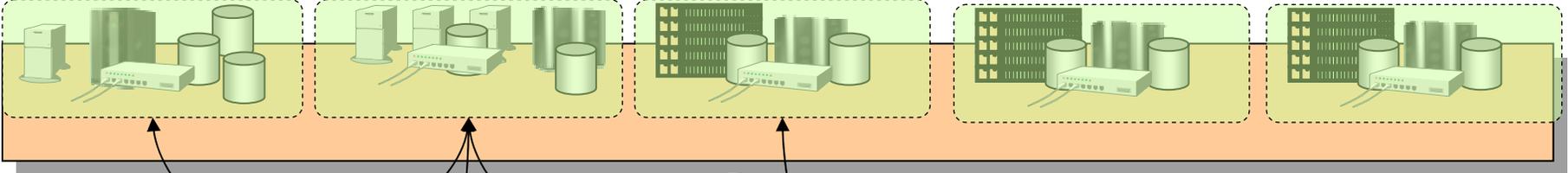
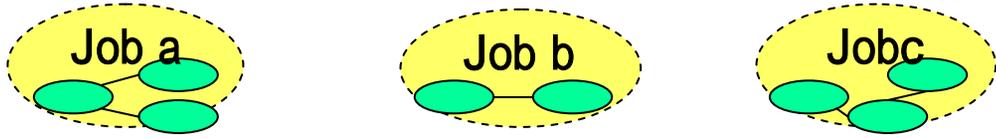
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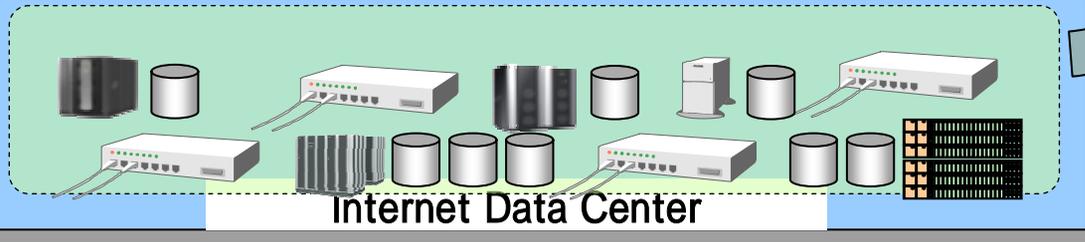
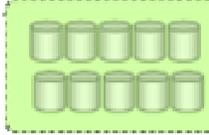
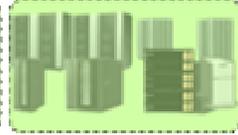
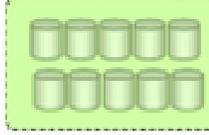
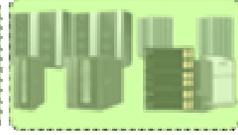
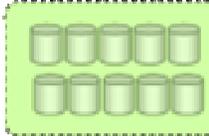
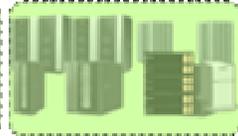




Virtual Network

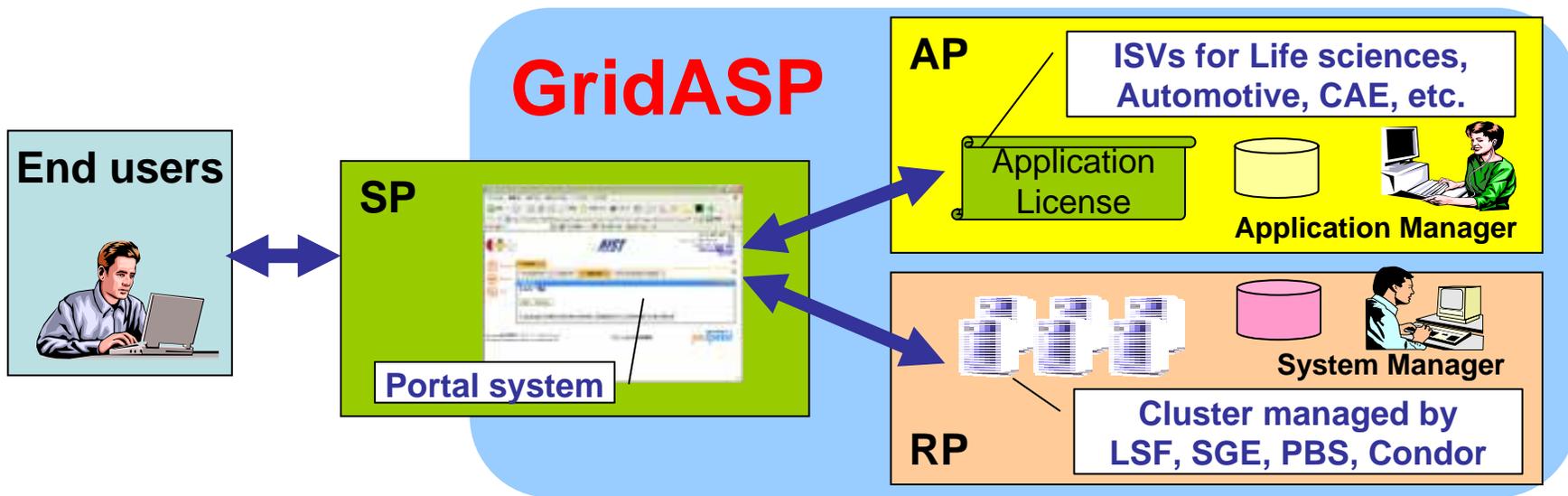
Virtual Server pool

Virtual Storage pool



Internet Data Center

- The GridASP is a utility framework for grid-enabled Application Service Providers (ASP) that supports technical enterprise applications
- Three independent organizations federate as the ASP
 - ▶ AP (Application Provider)
 - ⊗ Application packages and license management
 - ▶ RP (Resource Provider)
 - ⊗ Resource management and job execution
 - ▶ SP (Service Provider)
 - ⊗ Web portal and mediation between users and RP



Not just a PAPER WORK !

Proof-of-Concept experiment of GridASP business model

End users

Pharmaceutical company Sankyo Co., Ltd.

Construction company: Kajima Corp.

Copying machine company: Fuji Xerox Co., Ltd.

Telecom company: NTT Corp.



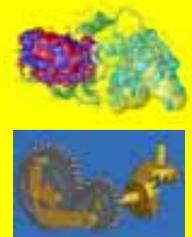
Application Provider

Altair Engineering, Ltd.

The Japan Research Institute, Ltd.

Platform Computing KK

Fluent Asia Pacific Col, Ltd.



Portal Company



NEC Fielding, Ltd.

NIWS Co., Ltd.

INTEC Web and Genome Informatics Corp.

Resource Provider

TOKYO LEASE Corp.



System Integrator

Business Search Technologies Corp.

Sumisho Computer Systems Corp.



- Menus
- NEWS List For USER
- Scenario List
- Template List
- Application List
- Cluster List For USER

Scenario parameter edit screen

ID	18
scenario name	povray-test
description	test scenario using povray

Scenario Option	Description	Value
File name hashing option	This option hides real names of your data files by hashing them. This option SHOULD NOT BE USED whenever the file names are handled off the command line; eg. the file names are explicitly specified inside the input parameter files.	<input type="checkbox"/>

PARAM NAME	PARAM DESC	PARAM TYPE	VALUE
			ID scenario name File Name Command
-i	Input File	Singleton input file	Select
-o	Output File	Single output file	<input type="text"/>
-w	Image Width(Pixel)	Singleton parameter	<input type="text"/>
-h	Image Height(Pixel)	Singleton parameter	<input type="text"/>
-q	Quality(9)	Singleton parameter	<input type="text"/>
-a	Anti-Alias Level(0.3)	Singleton parameter	<input type="text"/>

Save Cancel

Pharmaceutical company: Sankyo Co. Ltd.

● Trial use 2005/10 2006/2

- ▶ Use outside resource (outsourcing)
- ▶ Use quantum chemistry application which is required in pharma.
- ▶ Evaluate GridASP from user point of view

When in-house computers are fully utilized, they want to outsource

Organization	Role
Sankyo Co. Ltd.	●User of GridASP system
INTEC Web and Genome Informatics Corporation	●Operator of GridASP Portal
Business Search Technology Corporation	●Integrator of GridASP system
AIST	●Provider of GridASP Toolkit ●Provider of AIST super cluster as a resource

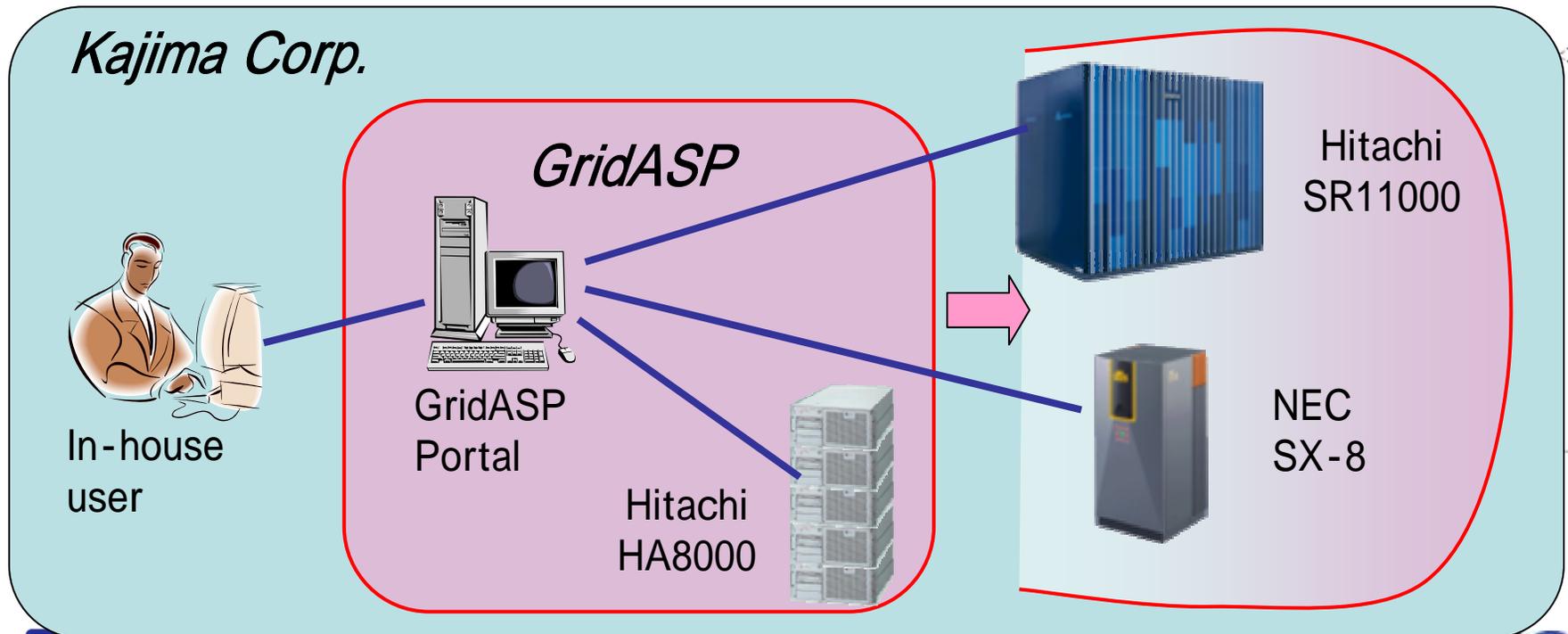


Construction company: Kajima

Improvement of user environment on in-house computing resources

Collaboration 2006/2-

- ▶ Integrate in-house resources in the same environment.
- ▶ Moved a part of the computing resources to GridASP environment
- ▶ Implemented in-house application and ISV software (Nastran) in GridASP
- ▶ Plan to move other computing resources to GridASP environment

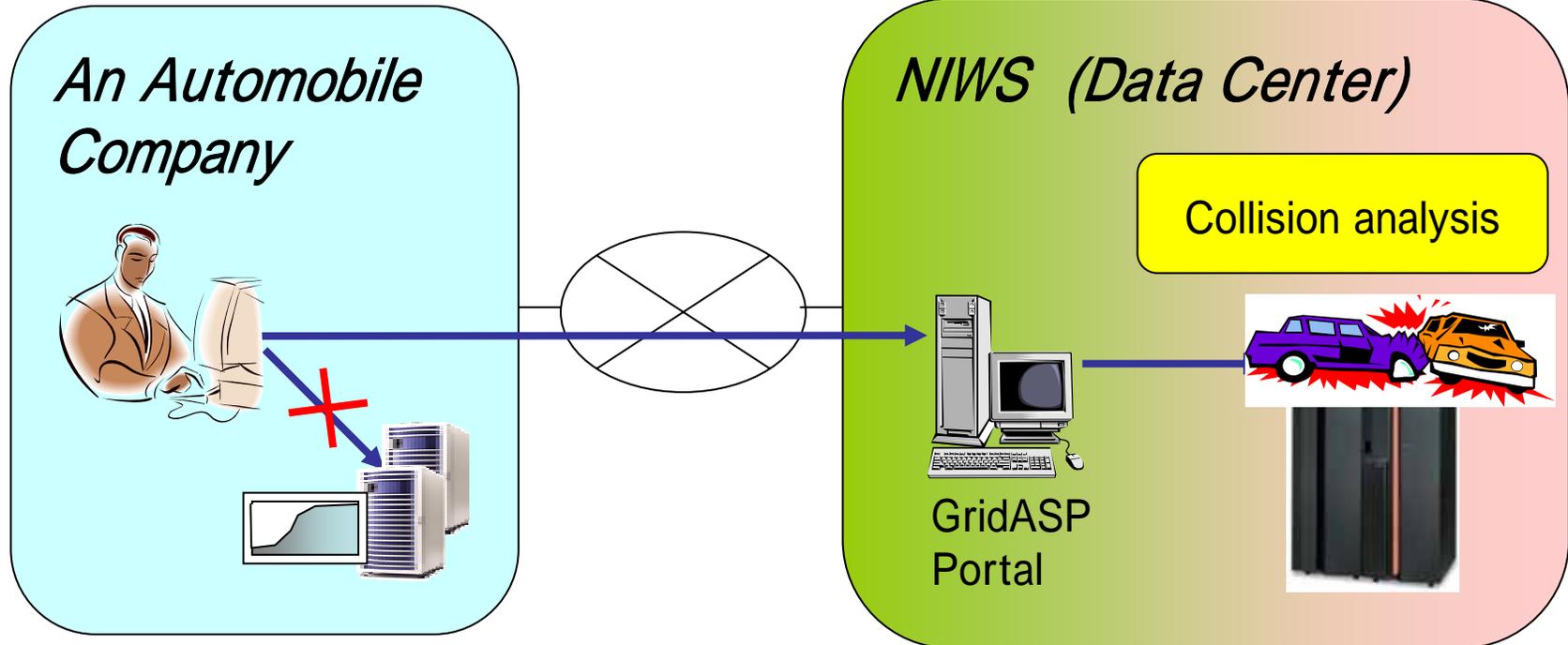


NIWS Co. Ltd.

In-house computing resources are fully utilized just before the time limit of product delivery, etc.

Collaboration 2005/10-

- ▶ Provide computing resources for a trial use of an Automobile company
- ▶ Aims to new business by practical use of Data Center



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For understanding the earth

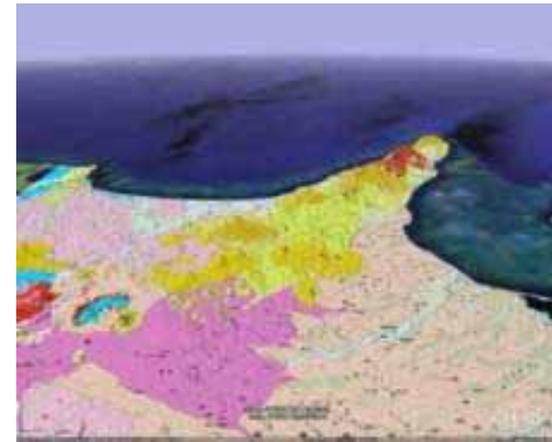
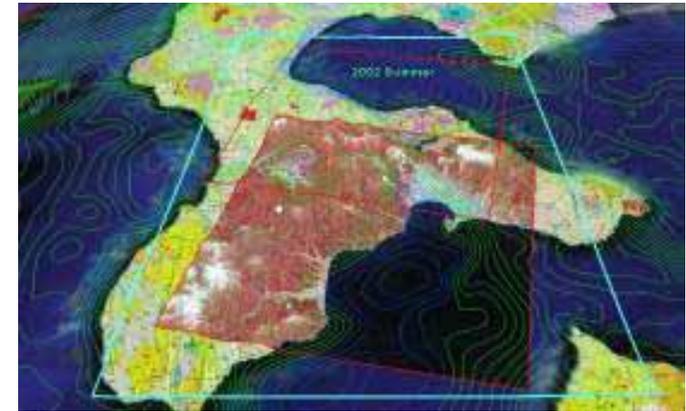
- Concept and System to integrate Global Earth Observation data -

**Grid @ ASIA
in Seoul**

December 12th, 2006

Objectives of the GEO Grid

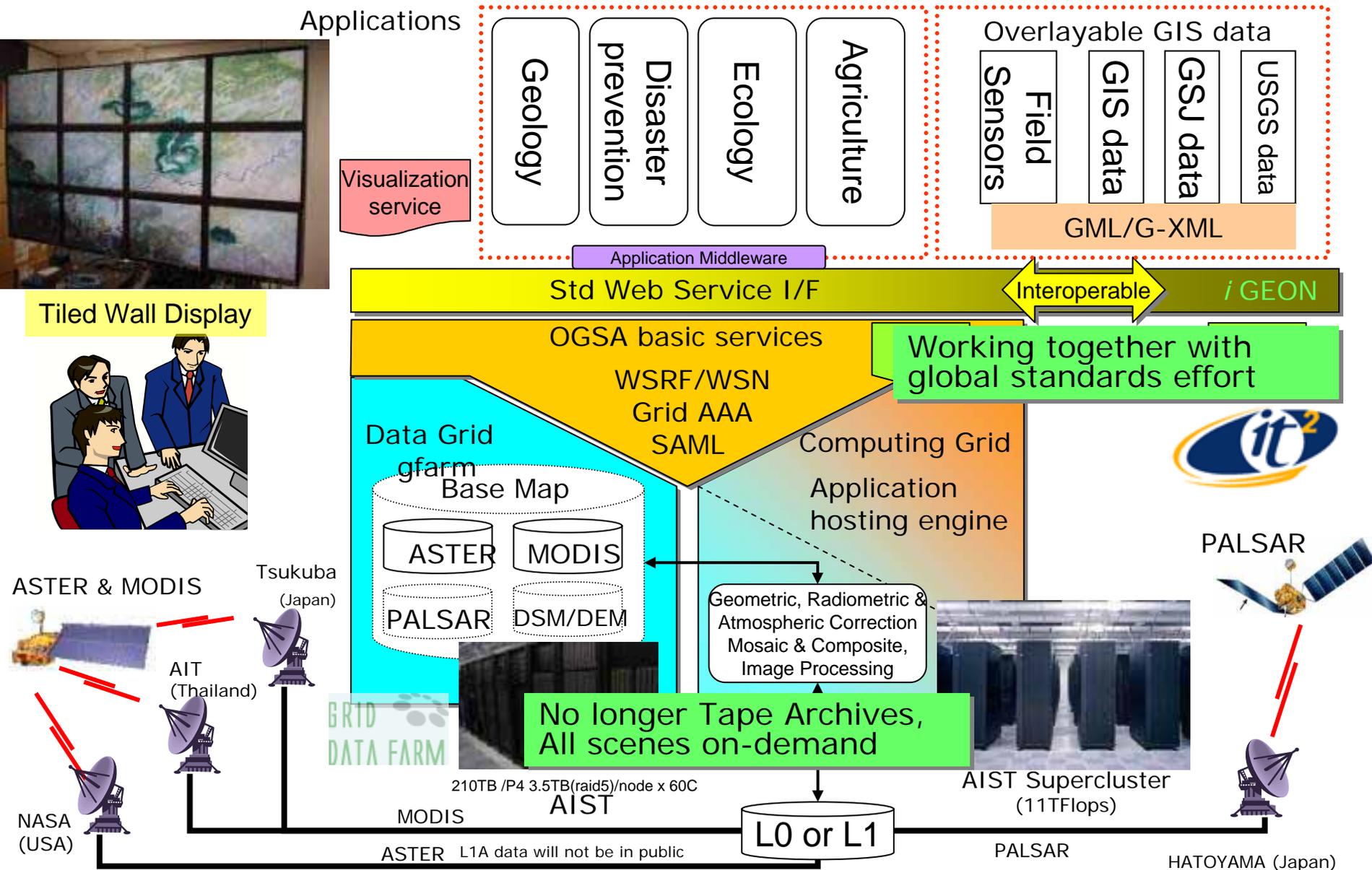
- Help Geo-* scientists to understand
 - ▶ Global warming, inventory of carbon dioxide
 - ⊗ Kyoto protocol, environmental burden
 - ▶ Alternate energy
 - ⊗ Biomass
 - ⊗ Wind-power generator network
 - ▶ Harvest yield prediction/estimation
 - ⊗ Weather, Soil, temperature, humidity, sunshine, etc.
- Help decision makers to plan
 - ▶ Hazard mitigation
 - ⊗ Earthquake, Landslide, Flood, Volcano eruption, Tsunami
 - ▶ Exploration of natural resources
 - ⊗ Oil, natural gas, mineral
- Unbeknown applications
 - ▶ Games, Amusements, Personal geo record/history, etc.
 - ▶ Social science apps



AIST activities for building GEO Grid

- Develop the prototype (initial) GEO Grid system
 - ▶ GEO* contents
 - ⊗ Provide **remote sensing data** on-demand as the base map generated from primary ASTER, MODIS, PALSAR, and etc.
 - ⊗ Provide Earth scientific information, such as **geological and environment data**, accumulated for a long period of time at AIST
 - ▶ IT Infrastructure
 - ⊗ Adopt **grid technology** to accommodate applications with workflow hosted by Data Grids for the base map and Computing Grids for applications, map on-demand
 - ⊗ Provide **standard web service** interface to compose applications including OGC service and working well with any OGC compliant browser
 - ⊗ Maintain GEON **interoperability**
 - ▶ Applications
 - ⊗ **Geological and environmental studies**

AIST GEO Grid Architecture (IT Infrastructure)



Why “GRID” ?

🌐 Data Grid capability

- ▶ large (>100TB) satellite imagery data
 - Ⓜ storage design, networking design
- ▶ loosely couple of a wide variety of geographically distributed data
 - Ⓜ meta data (access method, server location,), ontology,

🌐 Computing Grid capability

- ▶ on-demand generation of high level data products
 - Ⓜ adopt the most accurate geometric-, radiometric- and atmospheric-correction methods on-the-fly
- ▶ simulation jobs may consume computing resources
 - Ⓜ a “common” requirement of computing grid

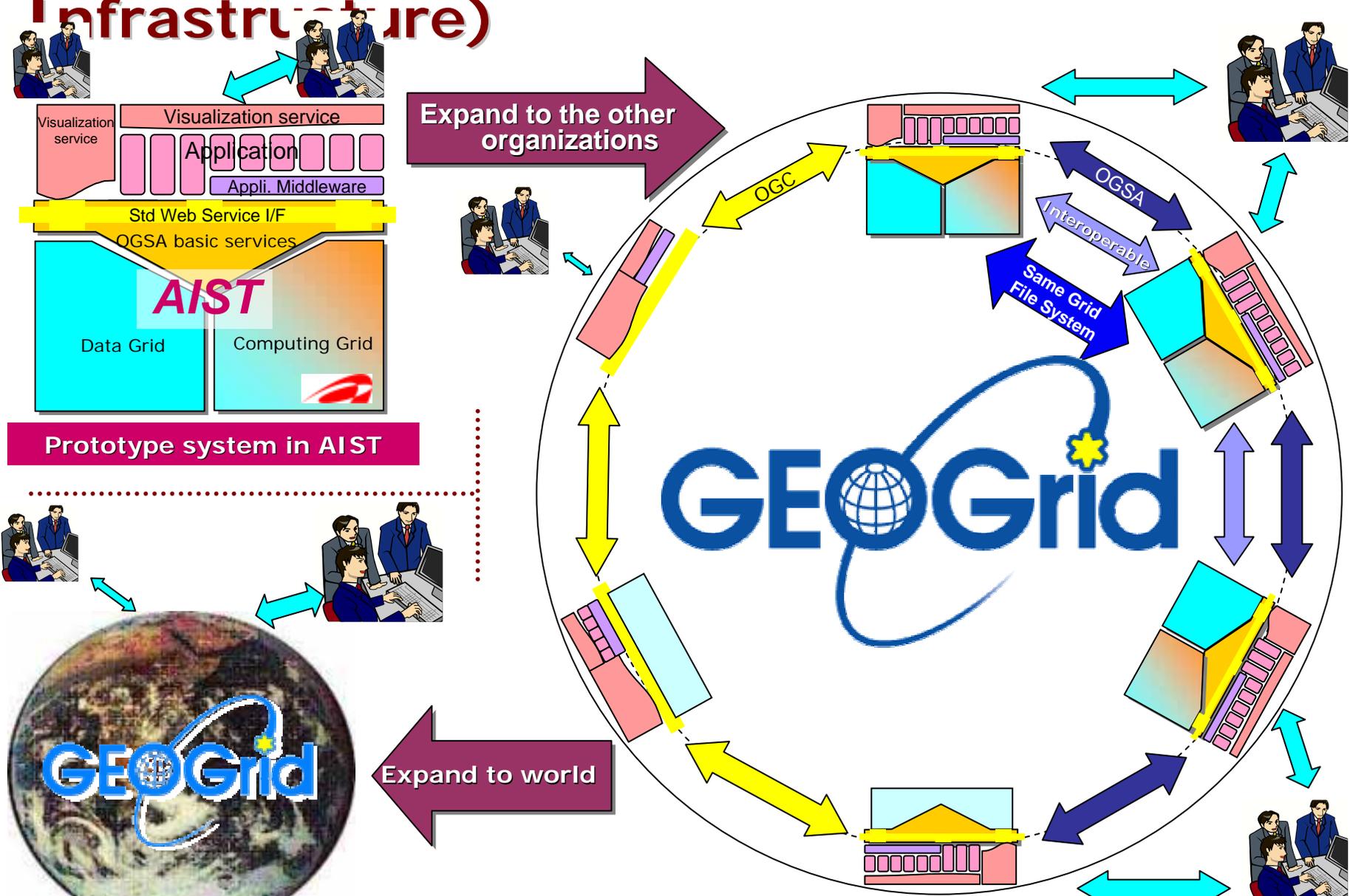
🌐 Grid Basic Service

- ▶ compliance with owners’ access control policy of data/service
 - Ⓜ Grid Security Infrastructure – AuthN, AuthZ, Accounting
- ▶ complex workflow support in portals incl. data access, simulation execution, visualization, etc.

Available Satellite Data

Sensor	Characteristic	Higher Level data	Original Data
ASTER	Global DEM generation (stereo pair), Excellent geo-location accuracy, Powerful spectral analysis.	JPEG images (Full resolution), Land-cover/Land-use map, Many kinds of Land Surface Map (Seamless DEM ?)	Only for Research Collaboration
MODIS	Daily Global observation. VIS-TIR 32bands for ocean, atmosphere and land		
PALSAR JERS/SAR	Synthetic Aperture Radar	?	?
JERS/OPS	DEM generation, VIS-SWIR spectral bands	?	?

GEO Grid in future (IT Infrastructure)



GridSphere Portal - Microsoft Internet Explorer

ファイル(F) 編集(E) 表示(V) お気に入り(O) ツール(T) ヘルプ(H)

戻る 進む 印刷 検索

アドレス http://www.geogrid.org/ gridsphere/ gridsphere?aid=Energy+Cone+Simulation&JavaScript=enabled



ログアウト
ようこそ, Satoshi
TSUCHIDA

ようこそ BEAMS Energy Cone Simulation ASTER data GeoGRID

Energy Cone Simulation

Simulation of Pyroclastic flows on volcanos

list of volcanos

Merapi (Indonesia)

select

2006/10/06

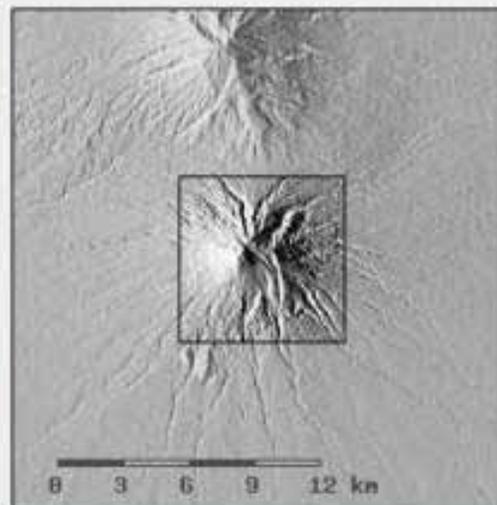
Simulation of Pyroclastic flows on volcanos

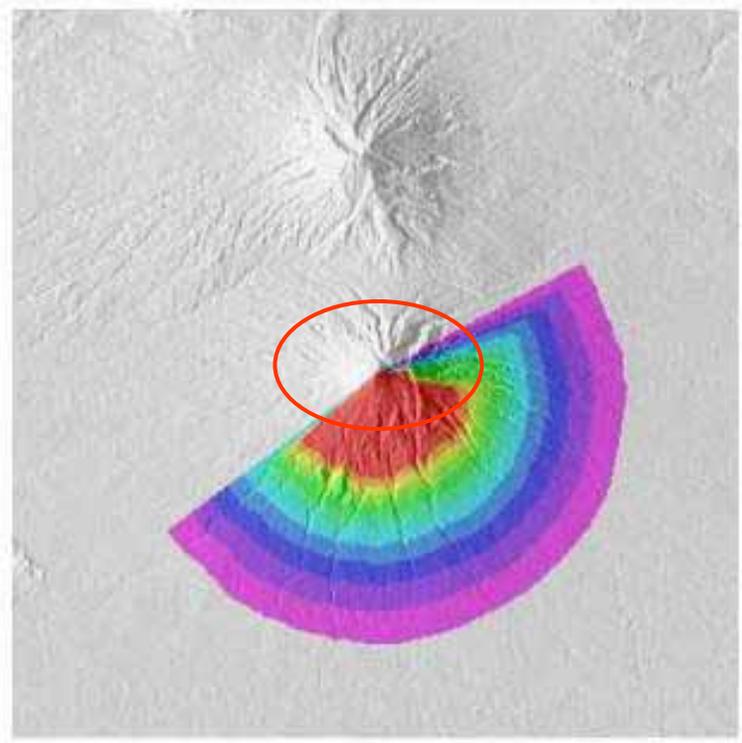
form numerical simulations of lave and/or pyroclastic flows on volcanos for prediction and mitigation of the hazard.



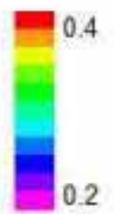
438815.547 UTM(x)
9166345.806 UTM(y)
Hc_height 10 [m] (>0; e.g. 10)
H/L min 0.2 (> 0; e.g. 0.2)
H/L max 0.4 (< 1; e.g. 0.4)
H/L interval 0.02 (e.g. 0.02)

show confirm window





0 3 6 9 12 km



Position: 438815.547, 9166345.806
Hc height: 10 m
H/L: 0.2 ~ 0.4 0.02 interval

79&gs_action=

canos

prediction and mitigation of the hazard.

438815.547 UTM(x)

9166345.806 UTM(y)

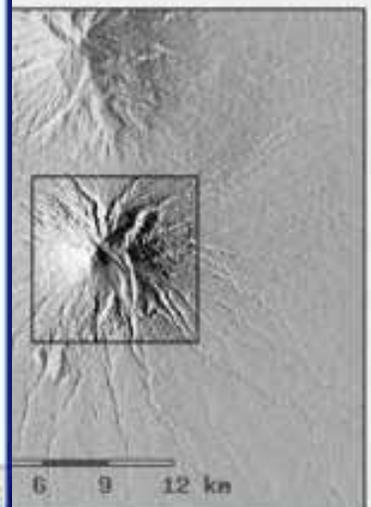
Height 10 [m] (>0; e.g. 10)

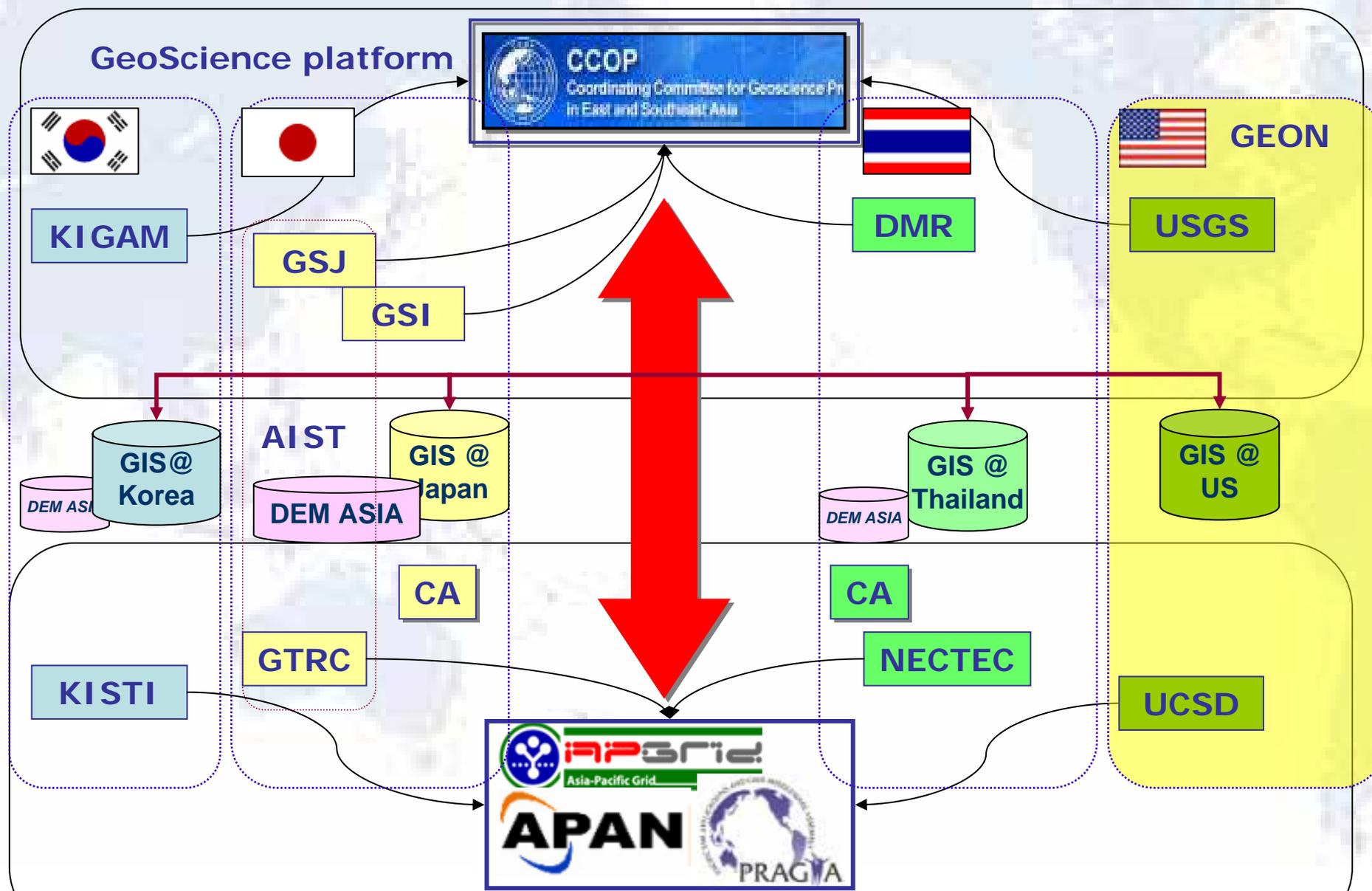
min 0.2 (> 0; e.g. 0.2)

max 0.4 (< 1; e.g. 0.4)

val 0.02 (e.g. 0.02)

show confirm window



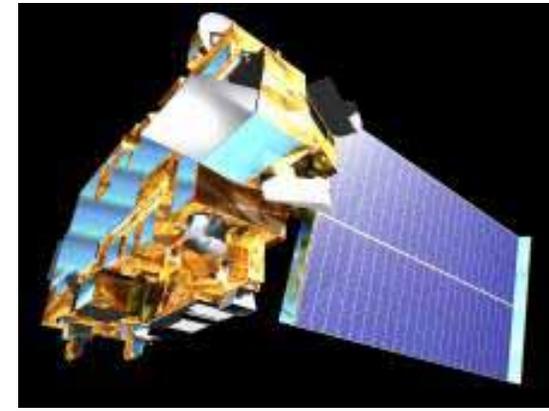
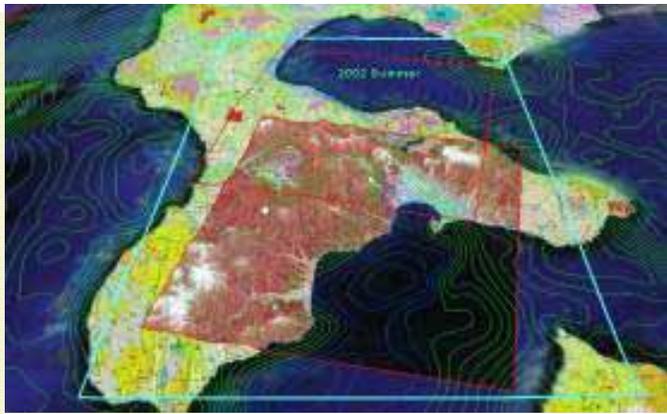


IT Infrastructure enabled by GRID



GEO Grid Workshop PR

- ▶ Date: March 19(MON)-20(TUE), 2007
- ▶ Venue: NECTEC campus in Bangkok, Thailand
- ▶ Program
 - @19th – Tutorial/Hands-on “GEO Grid”, “GEON”
 - @20th – Activity report from early adaptors
 - + Thailand, Vietnam, China, India, Japan, ..
- ▶ Host
 - @AI ST, NECTEC, PRAGMA/NSF
 - @with support of CCOP, etc.



**Thank you very much
for your attention !**



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