e-Science Activities in the Philippines

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Outline

• Introduction
• The Philippine e-Science Grid Program
  • Grid Infra
  • FedGIS
  • PBS
• Conclusion
ICT R&D Priorities
(from DOST 8-Point Agenda)

- **Grid Computing**
- Open Source and Low-cost Computing
- Internet, Network and Wireless Technologies
- Applications and Digital Content Development
- Foundations of Computer Science and
- Emerging Technologies
Advanced Science and Technology Institute

- ICT and microelectronics R&D agency under the Philippines' Department of Science and Technology
- Based inside the University of the Philippines Diliman campus, located in Quezon City in northern Metro Manila
- Manage and operates the Philippine Research, Education and Government Information Network (PREGINET), the national research and education network of the Philippines (http://www.pregi.net)
- Implementing the Philippine e-Science Grid Program (PsiGrid) - http://psigrid.asti.dost.gov.ph
Philippine e-Science Grid Program

● Program Objective
  – Aims to establish a grid infrastructure in the Philippines that will:
    ● Enable collaborative research activities among local and regional educational and research institutions, and
    ● Provide distributed services to general users such as national institutions that will use the grid to deliver advanced services.

● There will be 3 projects under the program.
Philippine e-Science Grid Program

- **Project 1**: Boosting Grid Computing Using Reconfigurable Hardware Technology
- **Project 2**: Developing a Federated Geospatial Information System for Hazard Mapping and Assessment
- **Project 3**: Boosting Social and Technological Capabilities for Bioinformatics Research
Project 1: Boosting Grid Computing Using Reconfigurable Hardware Technology (Grid Infra)
Objective

To establish a national high-performance computing network that runs both grid and cluster applications as well as applications that use reconfigurable hardware.
Strategy: Setup a HPC Cluster

- Establish a high-performance computing cluster with reconfigurable devices
  - 16 general-purpose computing nodes + 16 reconfigurable/specialized nodes
    - $r_{\text{max}} \approx 2$ TeraFLOPS
  - 10 Terabytes of storage
- Provide basic computational services for Life Science and Physical Science researches
Strategy: Strengthen Linkages

Grid services available to national, academic and research institutes

International Research Network

Local Private Sector

Academic Institutions

DOST Agencies

Other Government Offices
Strategy: Install Reconfigurable Hardware

- Field-programmable Gate Array (FPGA) ⇒ auxiliary computing devices
- To accelerate the execution of computation intensive applications
- Exploit the synergies of grid computing and reconfigurable computing
Strategy: Participate in regional grid collaborations
Project 2: Developing a Federated Geospatial Information System for Hazard Mapping and Assessment (FedGIS)
Objective

Establish a web-based Federated Geospatial Informatics System for use in hazard mapping and assessment
Strategy

- FedGIS will use the Grid infrastructure to provide for its needs
  - Data grid for storage and retrieval
  - Computational grid for extracting information
  - Authentication among different agencies
Cooperating Agencies

- Lead Agency: Advanced Science and Technology Institute (ASTI)
- Co-lead Agency: National Mapping & Resource Information Authority (NAMRIA)
- Collaborating Agencies: Office of Civil Defense (OCD), Philippine Institute of Volcanology and Seismology (PHIVOLCS), Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), Mines and Geo-sciences Bureau (MGB)
Major Characteristics of FedGIS

- Database systems are autonomous but cooperating.
- In most cases, no physical downloading of files is implemented but only linking for data integration, display, analysis, rectification, etc.
- ASTI server is used for metadata buildup and display of integrated data.
Major Characteristics of FedGIS

- Interface with client (public, private, etc.) is through ASTI server.
- NAMRIA serves as base map clearinghouse for hazard mapping agencies (PHIVOLCS, PAGASA, MGB, OCD).
Major Characteristics of FedGIS

- NAMRIA server has interface with hazard mapping agencies for metadata search and hazard map geometric rectification.
- FedGIS will implement a one-base map policy.
Project 3:
Boosting Social and Technological Capabilities for Bioinformatics Research (PBS)
Objective

Provide rapid access to major biological databases and software applications to enhance the expertise of local researchers in bioinformatics.
Project Deliverables

- Web-based search engine
- Grid-accessible bioinformatics solutions
- 3D visualization facility
- Mirror of major biological sequence and structure databases
- Capability building for local researchers in bioinformatics
Conclusion

- The potential for the application of grid technology in various areas is limitless (i.e., agricultural biotechnology, medical bioinformatics, disaster mitigation, etc.)
- Local academic, government and research institutions are expected to benefit from these initiatives
- Enhancement of collaborative research activities
Thank You!