Grid Activities in the Philippines

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Outline

- The Philippine e-Science Grid Program
  - Grid Infrastructure
  - Federated GIS
  - Bioinformatics Solutions
- Deployment Status and Plans
- Focus and Approach
- Infrastructure
- User Community
- Issues
Philippine e-Science Grid Program

- 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.
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)
Objectives

• To initiate the establishment of the Philippine e-Science Grid infrastructure that runs both grid and cluster applications as well as applications that use reconfigurable hardware

• To advocate grid technology usage

• To establish linkage with other grid communities
Strategies

- Build a high performance computing facility with reconfigurable hardware accelerators
- Establish the necessary infrastructure and community linkages to operate a national computing grid
- Develop applications that utilize reconfigurable hardware as auxiliary computing devices
- Offer basic computational and data grid services to national educational and research institutions
- Advocate and promote grid technology usage among national educational and research institutions
- Participate in regional and international grid communities
Grid Framework

Deploy and Develop Applications
- Life Science
- Physical Science
- Hazard Mapping & Assessment

Grid Infrastructure

Linkages, Contributing Partners, Users

Philippine e-Science Grid (National computing grid)

Grid and cluster applications
Applications that use reconfigurable hardware

High performance computing (HPC) facility
FedGIS Infrastructure
Affiliated with regional and international grid communities (PRAGMA, GEOGrid, EGEE, EUAsiaGrid)

NREN with connectivity to regional and international RENs (APAN, AI3, TEIN2)
PSiGrid Linkages

Grid services available to national, academic and research institutes

Philippine e-Science Grid
International Grid Collaborations

- eGEE
  - Enabling Grids for E-sciencE
- GEOGrid
- EUAsiaGrid

Philippine e-Science Grid
Project 2: Developing a Federated Geospatial Information System for Hazard Mapping and Assessment (FedGIS)
Objectives

• To establish a web-based Federated Geospatial Informatics System for use in hazard mapping and assessment
  – a precursor platform for the National Spatial Data Infrastructure (NSDI)

• To enhance the capabilities of concerned agencies to improve disaster management response
Strategies

- Develop **standards** for the build-up, exchange, sharing, and integration of data, and for the interoperability of the FedGIS components
- Design and develop a **web-based Federated Geospatial Information System**
- Buildup a **seamless spatial database**
- Provide **in-house training** for staff to equip them with needed skills to develop and operate a FedGIS
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)
Project 3: Boosting Social and Technological Capabilities for Bioinformatics Research (PBS)
Objectives

• To enhance local availability of bioinformatics services
• To contribute in improving research output of local bioinformatics experts
Strategies

- Provide **rapid access** to major biological sequences and structure database
- Provide **web hosting service** for bioinformatics programs to local researchers
- Enhance the **expertise** of local researchers in bioinformatics through **trainings**
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
Deployment Status and Plans

- Year 1
  - Quarter 1
    - Purchase new nodes
  - Quarter 2
    - Build new HPC facility
    - Connect with UP Diliman
    - Participate in EUAsiaGrid and PRAGMA
  - Quarter 3
    - Develop course materials
    - Install applications
  - Quarter 4
    - Connect with PAGASA
Deployment Status and Plans

- Year 2
  - Conduct trainings
  - Connect with AdMU
  - Publish paper

- Year 3
  - Conduct trainings
  - Secure and operationalize grid facility
  - Publish paper
Focus and Approach

• Network
  – PREGINET for the grid
    • Optical fiber connection to UP Diliman and PHIVOLCS
    • Optical wireless connection to PAGASA and AdMU
  – Gigabit ethernet for the cluster

• Middleware
  – Rocks Clusters 4.3 on CentOS 4.5
  – Xen 3.1 + Kernel-Xen 2.6.18
  – gLite 3.1 on Scientific Linux 4.6
Focus and Approach

- Current Applications
  - Bioinformatics
  - Meteorology
- Proposed Applications
  - Physics
  - Geoinformatics
  - Web Portal
Focus and Approach

- FPGA
  - BLAST
  - HMMER
  - Smith-Waterman
  - ClustalW
  - Genome Assembler
User Communities

• Bioinformatics
  – IRRI
  – UP Los Baños BIOTECH
  – UP Diliman CSRC

• Meteorology
  – PAGASA
  – AdMU
  – Manila Observatory
User Communities

• Physics
  – MSU-IIT
  – UP Diliman CSRC

• Biomedical Imaging
  – AdMU
User Communities

• Geoinformatics
  – NAMRIA
  – MGB
  – OCD
  – PAGASA
  – PHIVOLCS
  – AdMU
Issues

- Funding
- Human Resources
- Accountability
- Security
- Certificate Authority
Thank you!