

The Philippine e-Science Grid: Status and Ongoing Researches

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A year after the approval of the P*Si*Grid program, ASTI has acquired a total of 256 cores and 9TB of storage. Partnerships have been forged with Ateneo de Manila University (AdMU), Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) and University of the Philippines (UP). ASTI has joined international collaborations like PRAGMA, EUAsiaGrid and PANDA Grid. ASTI has been helping PAGASA in their numerical weather prediction activities and now, UP BIOTECH and PhilRice have expressed their intent to utilize ASTI's facilities for bioinformatics researches.

One ASTI research is the implementation of the Agrep algorithm in FPGA. The functionality of the hardware-based Agrep was verified using the software implementation results. Several advantages are offered by this design. First, an increase in the error sensitivity can be handled by simply cascading the Agrep modules thereby achieving scalability. Second, significant improvement in throughput can be attained by connecting several Agrep cores in parallel. The hardware developed speeds up the operation of a normal PC setup by 6 to 20 times with respect to the virus probe database of DNA microarray sequences. Lastly, the design effectively demonstrated that substantial computing resources can be freed by off-loading simple and iterative processes from the CPU to an auxiliary computing node.

Having successfully implemented the Agrep algorithm on a reconfigurable hardware, works are currently on-going for its integration with a computing cluster using several FPGA cards to function as parallel auxiliary processors. It is anticipated that a cluster + FPGA platform will yield a much higher speedup in the algorithm's execution and allow for a provision to port the application on a Grid computing environment.

Because of the increasing need for greater computing power, diverse bioinformatics tools, updated bioinformatics data, and user-friendly Web-based interface, the Bioinformatics Solutions team came up with the idea of setting up a Web portal. This portal will give access to popular bioinformatics software which run on the Grid or cluster while hiding all the complexities of high-performance computing.

The Philippine e-Science Grid Portal aims to provide an easy-to-use Web interface to bioinformatics tools and data. Biology students and bioinformaticians can execute the applications and retrieve sequences from databases without learning new technologies and commands. The portal is separate from the cluster to minimize downtimes. The portal contains custom portlets for GenBank sequence access and bioinformatics job submissions via Torque, Globus or gLite.

Hands-on training in bioinformatics job submission to clusters, Grids or FPGA boards via the portal will be provided for students, researchers and software developers. Manuals will also be downloadable and viewable from the wiki.