

Supporting High Performance Computing Applications over gLite

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Describe the scientific/technical community and the scientific/technical activity using (planning to use) the EGEE infrastructure. A high-level description is needed (neither a detailed specialist report nor a list of references).

Being WLCG Tier-1 site in Asia, ASGC not only fulfill the commitment to WLCG but also provides reliable and stable computing resources supporting variant e-Science applications in this region. In order to attract the more scientists to take the advantage of grid technology, one of our focuses is to engage high performance computing users in grid. This is very important for development and deployment of e-Science applications since HPC is essential to many research disciplinary.

Report on the experience (or the proposed activity). It would be very important to mention key services which are essential for the success of your activity on the EGEE infrastructure.

We build and evaluate HPC environment from the building blocks, especially in parallel computing. For this purpose, high bandwidth and low latency of data communication is very important. We install high performance network device – Infiniband (IB). There is another important issue is the high performance IO, especially global file system. We survey nfsRDMA, GPFS and GPFS over IB, and evaluate a better solution for HPC users in Taiwan.

Most of the user should prepare job description language (JDL) for job submission, transfer large inputs to resource broker (RB) by gridftp and retrieve results by edg commands. In order to reduce end-user's effort, we set a convenient wrapper to help HPC users. Therefore, the users can choice the IB or GbE communication channel to execute parallel job in one argument. In our setting, user submit jobs from UI which can map the same user id in CE, the UI and CE share a global file system. This will help system become more suitable for HPC users.

With a forward look to future evolution, discuss the issues you have encountered (or that you expect) in using the EGEE infrastructure. Wherever possible, point out the experience limitations (both in terms of existing services or missing functionality)

In the future, the more HPC patterns of different applications and requirements will be elaborated. Grid portal would be devised to be the major user interface in our plan. Workflow management for process optimization, such as the best inter-connection selection, I/O management and compiler coordination etc., would be developed and integrated with gLite.

Describe the added value of the Grid for the scientific/technical activity you (plan to) do on the Grid. This should include the scale of the activity and of the potential user community and the relevance for other scientific or business applications

User interface is the first hurdle in comparison to traditional batch or interactive cluster computing mechanism. Other key factors such as the requirements of heavy I/O, user home directory management, application deployment, real-time job monitoring, compiler and library, and the user support are all vital to the successful migration to Grid. The objective of our works is to improve the Grid computing environment and even the middleware and fabrics to have better support for generic MPI HPC applications.

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Session Classification: Experience with application domains