

LQCD Project May 2006 Review Response

On May 26, 2006, a project progress review of the Lattice QCD Computing Project was held at Fermilab, chaired by Dan Hitchcock of ASCR. The final report of the review committee was issued on October 23, 2006. This document contains the written response of the project team. It is organized in the same sequence as the Hitchcock review report.

Progress Relative to FY 2006 Plan

Recommendation 1: In the most recent FNAL procurement the timing of the RFP may not have allowed a full consideration of the new Socket F processor boards from AMD. In a number of other applications these new boards have provided significant benefit. The LQCD Project should carry out a more detailed analysis of the potential performance improvement of Socket F AMD processor boards for LQCD because the projected six-week delay is a small impact relative to the overall potential performance benefit.

Response: The project asked all vendors in the competitive range of the first RFP response to rebid and include, at their option, Socket F systems. The project benchmarked representative Socket F systems remotely. The result of the new bids was that Opteron Socket 940 remained the best value (best price/performance, least schedule risk). The award was made to a vendor for a Socket 940 cluster. The award to the vendor (Koi Computers) occurred on June 19, 25 days after the date of the project review (May 25, 2006). Although the rebidding caused a 4-week slip in delivery of the systems, the Kaon cluster was released to production on Oct 3, a slip of 3 days from the original milestone (Sept 30).

Recommendation 2: Consider adding contingency to the FY06 project schedule now so that they can manage a delay in the acceptance of FY06 system, which has been named “Kaon” systems.

Response: In light of the Socket F rebid, the project considered adding contingency to be of increased importance. After approval by the Change Control Board, the original milestone date of Sept 30 was moved to Nov 1. Acceptance and release of the “Kaon” cluster occurred on Oct 3.

Recommendation 3: Consider further augmentations to FNAL facilities to improve the cluster environment and insure that they have appropriate housing for the FY08/09 cluster.

Response: In their comments, the reviewers cited concerns over the magnetic field in the FNAL Lattice Computing Center (LCC), excessive amounts of dust, and restrictions on power density because of the 1-foot raised floor. Subsequent to the review, FNAL removed the large electromagnet from the high bay adjacent to the computer room; the project is arranging with the

FNAL technical division to do a magnetic field strength survey of the computer room; the project will monitor the reliability of systems as a function of position on the survey map. Following completion of the computer room upgrade project, a thorough cleaning of all areas occurred. Periodic cleanings occur, and access to the rooms is restricted, limiting the amount of dust and dirt exposure by the computing systems. Because of the low power consumption of the Opteron systems on “Kaon”, higher power density systems can be used in the FY08/FY09 cluster if it is housed at LCC (12 KWatt/rack, instead of the 8.5 KWatt/rack limit imposed on “Kaon”). The project will work with Fermilab in FY08/FY09 to ensure that LCC or an alternate computer room supplies appropriate housing.

Evaluation of the FY 2007 Proposed Plan

Recommendation 1: Document the science-based and change-based reasons and requirements for the proposed LQCD metafacility, the data environment, and a common computing environment across the three LQCD sites.

Response: The project, working in concert with the SciDAC-2 Lattice QCD Computing Project, will refine and document the requirements for the metafacility, the data environment, and the common runtime environment. Software development is out of scope for this project and is the responsibility of the SciDAC-2 project. Discussions on the runtime environment were held at a SciDAC-2 software committee workshop in Boston Oct 27-28, and discussions about data access were held at an ILDG meeting at JLab Dec 11-13. The SciDAC-2 Software Committee meets weekly and has frequent discussions of these areas.

Recommendation 2: Provide a plan showing the planned milestones for the metafacility, common computing environment and data environment for the three project sites.

Response (also see response to previous recommendation): Software development in support of the metafacility, the common runtime environment, and the data environment is out of scope of this project. Such development is the responsibility of the SciDAC-2 LQCD Computing Project and is an external dependency for this project. The LQCD project will work with the SciDAC-2 LQCD Computing Project to develop and maintain plans for these areas. Milestones include the deployment and maintenance of SciDAC-2 software libraries and environments.

Recommendation 3: Request shifting the FY09 procurement funding to FY08 to support the combined FY08/FY09 procurement with a minimization of extra costs. The proposed FY 2009 procurement funding is approximately \$500k and the ability to combine this funding with the larger FY 2008 hardware procurement funding would deliver the maximum capability almost 1 year earlier and avoid the fixed costs of doing the FY 2009 procurement. In addition, the larger FY 2008 procurement would give the project more leverage in negotiations with vendors.

Response: LQCD is working with the Federal Project Manager to move the FY09 procurement into a combined FY08/FY09 procurement. A final decision on this will not occur until after the

FY08 budget situation for the HEP is clearer. Alternatively, the project could either seek to use a lease arrangement to procure all FY08/FY09 nodes in FY08, with lease payments in FY09, or structure the purchase contract such that an FY08 cluster is extended with identical systems as soon as FY09 funds are available. The overriding consideration for the structuring of this procurement will be maximizing the science production.

Project Management

Reviewers' comment: Coordination of procurement planning and analysis across the sites appears to be informal and infrequent. The major project procurements could likely benefit by more coordination.

Response: For the FY07 (current) JLab procurement, the LQCD project has held biweekly meetings of the project manager, the three site managers, the metafacility manager, and the chairman of the executive committee to coordinate all aspects (discussion of candidate processors and motherboards, structure of the RFP, benchmarking to understand the cluster hardware and the potential IBM BlueGene/L bid). Meetings with vendors at SuperComputing'06 were jointly attended by JLab and FNAL representatives. A committee convened by JLab consisting of JLab and FNAL personnel evaluated the vendor bids and made the recommendation for the purchase.

Recommendation 1: The committee recommends that system utilization be improved. The LQCD project should analyze usage data and user patterns, and reach out to other HPC facilities for workload optimization suggestions.

Response: The three sites (FNAL, JLab, BNL) now use a common scheduler (Torque) and so now track utilization and user patterns uniformly. The project will work with the LQCD collaboration to encourage full utilization of the facilities.

A subproject of the LQCD SciDAC-2 project is seeking to create an automated workflow environment tailored to LQCD calculations. Such an environment would enable more efficient system utilization. This subproject involves the three labs, plus two universities (IIT, Vanderbilt); the subproject is consulting with HPC sites and literature for the best tools for adoption, reuse and/or extension.

Recommendation 2: The committee recommends that the LQCD project carefully analyze FY07-FY09 staffing requirements and consider modifying the plans for further manpower in this same change that is being requested for FY07 should the analysis support this conclusion.

Response: The Project Manager presented a proposal to modify staffing in FY07-FY09 to the Change Control Board in June 2006. The CCB approved the FY07 manpower modification and declined to support modifications in FY08-FY09.