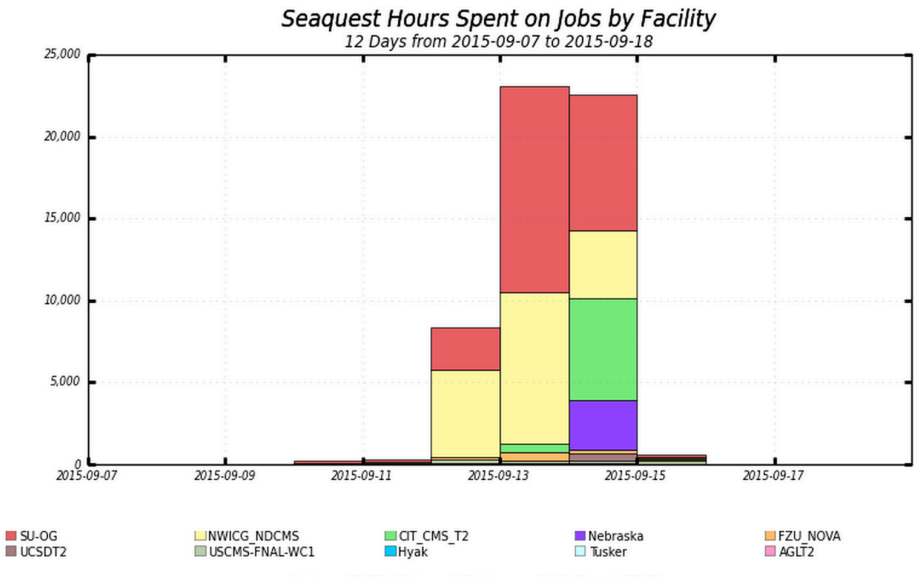
**A SeaQuest tale: the Quest for Open Science Grid**

SeaQuest was in a difficult situation this summer: a looming deadline for two fall conferences, a big crunch for data processing in preparation for them, the need for final tweaks to the tracker code with pressure on the few experts that could make it all happen. It became apparent that FermiGrid would not have enough opportunistic cycles to finish this computation. SeaQuest was running out of time and resources to deliver on key physics results. FIFE helped SeaQuest use resources available on the OSG.




*SeaQuest computing hours on OSG – Graph from http://gratiaweb.grid.iu.edu/gratia*

With FIFE support, SeaQuest was successful in running on OSG. Overall, the experiment ran 1,100,000 CPU hours for 185,000 jobs, transferring 7.5 TB of input data and 9.5 TB of output. About 10% of the computing was executed at 10 OSG sites, running for the last 3 days of the campaign at the level of 500-1,000 CPU slots continuously, with an overall 90% efficiency.

This computational campaign supported SeaQuest in achieving its physics goals for the fall conferences. The SeaQuest experiment continues a series of Drell-Yan measurements to explore the antiquark content of the nucleon. Measurements from high-energy scattering experiments are consistent with quantum chromodynamics (QCD) theory predictions where a sea of virtual gluons arises in the nucleon; these gluons radiate other gluons or pairs of quarks and antiquarks. Gluon splitting, for example into an u anti-u quark pair or a d anti-d quark pair, is a flavor symmetric process. As such, statistically the amount of anti-u and anti-d quarks is the same. However measurements have shown that this amount differs by up to 50% indicating that processes other than gluon splitting contribute to the nucleon sea. Extending the existing measurement of the anti-d / anti-u ratio to kinematic regions where the ratio has not been constrained is a key measurement of SeaQuest. This will help identify theories effective at describing the nucleon sea and exploring the origin of the nucleon sea.

The contribution of the Scientific Computing Division was crucial to enable SeaQuest to meet its deadlines. Particularly effective was the help of FIFE support in porting the computation to OSG by troubleshooting jobs, identifying areas in the code that needed modifications to be compatible with the OSG environment, and helping set up the software distribution system.Not only did SeaQuest obtain results in time for the

conferences, it also learned how to run on OSG, a practice that will be useful for the computing production campaigns to come.

- Gabriele Garzoglio