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The D0 Virtual Center and planning for large scale computing

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The D0 experiment relies on large scale computing systems to achieve her physics goals. As the experiment lifetime spans, multiple generations of computing hardware, it is fundamental to make projective models in to use available resources to meet the anticipated needs. In addition, computing resources can be supplied as in-kind contributions by collaborating institutions and countries, however, such resources typically require scheduling, thus adding another dimension for planning. In addition, to avoid over-subscription of the resources, the experiment has to be educated on the limitations and trade-offs for various computing activities to enable the management to prioritize. We present the metrics and mechanisms used for planning and discuss the uncertainties and unknowns, as well as some of the mechanisms for communicating the resource load to the stakeholders.

In order to correctly account for in-kind contributions of remote computing, D0 uses the concept of a Virtual Center, in which all of the costs are estimated as if the computing were located at solely at FNAL. In contrast to other such models in common use, D0 accounts for contributions based on computer usage rather than strictly on money spend on hardware. This gives incentive to achieve the maximum efficiency of the systems as well as encouraging active participation in the computing model by collaborating institutions. This method of operation leverages a common tool and infrastructure base for all production-type activities.

Primary authors: BOEHNLEIN, A. (FERMI NATIONAL ACCELERATOR LABORATORY); FOR THE, D0 Computing Planning Board (D0 Collaboration)

Presenter: BOEHNLEIN, A. (FERMI NATIONAL ACCELERATOR LABORATORY)

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