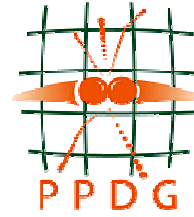


# Particle Physics Data Grid: From Fabric to Physics

## Selected Science Benefits

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## Distributed Computing helps resolve Top quark mass in CDF

Collaboratory: Particle Physics Data Grid ([www.ppdg.net](http://www.ppdg.net))

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CDF Experiment: [www-cdf.fnal.gov](http://www-cdf.fnal.gov)

The CDF experiment at Fermilab is undergoing an aggressive Trigger and DAQ upgrade which will increase the maximum event rate out of the detector from 80Hz to 360Hz by 2006. The rationale for this increase is to be able to maximize physics output at any luminosity by dynamically filling the bandwidth with low threshold triggers. The most important physics measurement that benefits from the dynamically filled bandwidth is the measurement of Bs mixing. However, a broad range of other physics topics will also benefit. The increased data volume translates into a doubling of computing needs which had previously not been budgeted for. To satisfy those needs, CDF has embarked on an ambitious global computing program with the goal of having 50% of all of CDF's computing outside of FNAL by Summer 2005.

Professor Marjorie Shapiro from UC Berkeley says "Large samples of simulated data are essentially for understanding the backgrounds and systematic uncertainties for processes such as top quark production. The increased computing available through the grid allows detailed studies that will eventually reduce the uncertainties in the key physics measurements such as the top quark mass." These studies rely entirely on the distributed computing resources outside of Fermilab and are an example of a new physics capability enabled with help from PPDG in the CDF transition to globally distributed computing.

Future directions are focused in the US on SAMGrid within the context of the Open Science Grid. However, as 50% of future CDF hardware funding presently appears to be located outside the US, interoperability between and federation of grids will be a primary concern for CDF in the future.

