Fermi National Accelerator Laboratory
LDRD Project Data Sheet - FY16

Project ID: FNAL-LDRD-2016-032
Project title: Implement open source HEP NoSQL database
Principal investigator: Jin Chang

Project description: (short description and explanation of cutting edge, high-risk, high-potential science or engineering)

As an alternative to current file-based data storage now employed by most High Energy Physics (HEP) experiments, NoSQL databases (such as used by Google, Facebook, and others) offer an alternative that has the potential to speed the overall computational time required to handle large data sets.

Tie to Mission: (explain the project's relevance or anticipated benefits to Fermilab's and DOE's missions)

In order to advance HEP experimental work, new capabilities in handling large data sets are required. Thus, this LDRD project has the potential to open up new capabilities in how experiments are designed and optimized to produce new science results. There is also a DOE Office of Science emphasis on developing advanced computing including handling of big data. If successful, this project will help establish Fermilab as a contributing leader in this expanding area.

Previous year's accomplishments: (as applicable) A key issue has been identified that there is a lack of ready made indexing schemes. Work has begun with a CMS analysis to allow for comparisons. The next steps and detailed timeline has been presented.

Work proposed for current fiscal year and anticipated / desired results:

The project consists of three phases where the first phase will be to refine the selection of NoSQL tools that are available. A second phase will be to develop a framework to use these tools for HEP data analysis. A third phase will be apply the framework and tools to concrete problems encountered by the CMS experiment. In FY16, the first phase and beginning work of the second phase will begin where the focus will be on specification and design. Working out the implementation and subsequent testing and development will continue in FY17 and into FY18.

Project funding profile: (costs, budgets, projected budgets, and total)

Prior year(s) costs	FY16	FY17	FY18	Total
N/A	46,205.54	150,000	198,794	395,000

Project Start Data: 1/01/2016   Total Approved Project funds: $ 395,000