

Fermi National Accelerator Laboratory

LDRD Project Data Sheet - FY14

Project ID: FNAL-LDRD-2014-038

Project title: Application-Oriented Network Traffic Analysis based on GPUs

Principal investigator: Phil DeMar

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

The project is to design a computer-based architecture to move computer network information into a graphical processing unit (GPU) based system for analysis and recognition of network traffic patterns in a manner that allows for dynamic network reconfiguration for targeted traffic. The architecture will be implemented into a complete system to allow for evaluation.

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

Network traffic such as distributing the next phase of LHC experimental data will potentially run into several bottlenecks even with planned improvements to network infrastructure. A system that is able to dynamically customize the network would enable certain types of data to be allocated prioritized resources. With the power of a novel GPU-based solution, the identification of the type of network traffic and its allocation of network resources could happen all with application-driven reconfiguration. Beyond the test case of LHC data, this project is expected to have wider applicability for a variety of network traffic flows designated to be of "special interest" including computer security.

Previous year's accomplishments: (as applicable)

The packet capture engine (WireCap) with a provisional patent works. GPU processing and analysis libraries have been developed. The integration work between WireCap and GPU processing is complete and it works at 40GE. Output is currently a log file. There is interest from a silicon valley startup company from the outreach component of the project.

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

This LDRD project is complete. A Final Report will be included in Fermilab FY16 LDRD Annual Report.

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

Prior year(s) costs	FY14	FY15	FY16	Total
	48693	236,271	190,222	475,186

Project Start Date: 7/15/2014

Total Approved Project funds: \$ 515,600