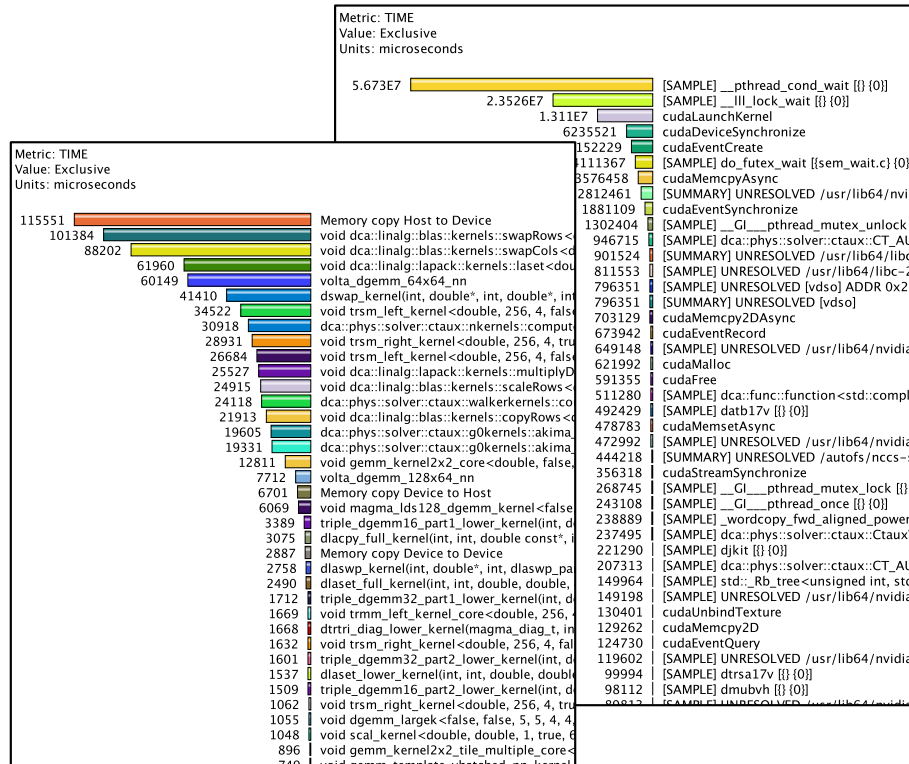


Co-designing DCA++ with TAU Performance System

Scientific Achievement

TAU's Scalable performance & visualization tools help scientists develop new algorithms and parallelization strategies for DCA++ on DOE leadership-class systems.



These graphs show DCA++ performance data on Summit using DCA++ for the problem size 50 and executing model beta. The graph on the left is a profile of one GPU thread, and the graph on the right is a profile of one CPU worker thread, showing considerable time spent waiting locks and semaphores.

(Image Credit: TAU/RAPIDS Team)

Significance and Impact

TAU's performance feedback is helping DCA++ design its new algorithms and parallelization strategies to exploit Summit's GPUs. TAU is also helping DCA++ to make the code more performance portable and improve its memory utilization of Summit's GPUs.

Research Details

- Helped tune DCA++ execution parameters (e.g. workers/accumulators) to run efficiently on Summit and Titan.
- Developed ideas with TAU team to visualize massive amounts of GPU performance data in a scalable way.
- TAU is helping the port and test of DCA++ to Summit by integrating DCA to a continuous integration performance system.
- DCA++ is helping port and test TAU on Summit with unique challenges with respect to modern C++/CUDA designs



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