

April 2007

NVIDIA Storage Performance Optimization

Andrei T. Vasilescu
Worcester Polytechnic Institute

Christopher P. Freeman
Worcester Polytechnic Institute

Nikki Lynn Brandt
Worcester Polytechnic Institute

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Repository Citation

Vasilescu, A. T., Freeman, C. P., & Brandt, N. L. (2007). *NVIDIA Storage Performance Optimization*. Retrieved from <https://digitalcommons.wpi.edu/mqp-all/773>

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NVIDIA Storage Performance Optimization

A Major Qualifying Project Report

submitted to the Faculty of

WORCESTER POLYTECHNIC INSTITUTE

in partial fulfillment of the requirements for the

Degree of Bachelor of Science

by

Nikki Benecke

Christopher Freeman

Andrei-Tudor Vasilescu

Date: March 2nd, 2007
Project number: DXF-NV07

Sponsor: NVIDIA
Liaison: Allen Martin

Professor David Finkel, Advisor

Abstract

For the NVIDIA Disk Optimization project, the goal was to create a way for users to improve the performance of their hard disks via an easy-to-use test suite. The test suite that was created centers around taking advantage of NVIDIA's proprietary disk technology, and was designed to be part of NVIDIA's existing nTune software. Benchmark tools run before and after the execution of the created software show an increase in disk I/O performance.

Executive Summary

From entertainment to business life, information technology relies on increasing storage capabilities, such as capacity and speed. While not the only option available, hard disks are the most commonly used devices for quick access to large amounts of data. NVIDIA is one of the leading developers of motherboard chipsets and their motherboard products are responsible for communicating with the hard disks on a system.

NVIDIA has set the standard with graphics performance by continually providing the fastest and most reliable graphics cards with their well-known Geforce series. NVIDIA aims to provide the best performance with their motherboard products as well. To help accomplish the goal of letting users get the best performance out of their NVIDIA components, NVIDIA provides a performance optimization application called nTune. One of nTune's components is an automated tuning system that users may run to determine the optimal values for system clock speeds and other settings.

Similar to nTune's automated tuning suite, our application deals with determining optimal settings for hard disk performance. The NVIDIA storage team has found that they can provide improved performance over their default settings by running a test and calibrating the settings as a result. They found that these settings varied between hard disk, manufacturer, and firmware.

To cope with the complexity of testing every drive model and firmware version, we were asked to create an end-user tool that automated the testing procedure and calibrated the driver settings appropriately. While the details and the specifics of the testing and

calibration are to remain confidential to NVIDIA, we can disclose that testing the performance of a couple of different driver policies allowed us to determine and configure an optimal policy.

The result is a possible increase in hard disk performance for users. While it is sometimes the case that the default settings are optimal, most users should notice a substantial increase in benchmarking scores after running our test. By running PC Mark, a respected benchmarking tool, before and after our optimization tool on a variety of hard drives, we confirmed the significance of our tool.

To be appropriate for public release, we provided an informative, stable graphical user interface to perform our testing. The interface, contained within the NVIDIA control panel, conformed to NVIDIA's standards and styling. Users are allowed to run our tests on a specified disk, determine whether one of their disks has been optimized yet, or restore a disk back to its default settings.

Our application is being considered by NVIDIA as an addition to their nTune application.

Thus, there is a possibility our tool may see public use in a future version of nTune.