

Behind The Scenes of Flash based SSD Performance

Project in Concurrent and Distributed Systems 236371¹

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NAND flash based Solid State Drives (SSDs) are used to replace hard disk drives in many large scale, mission critical storage systems, due to their fast read latency. However, they may suffer long write response times due to their physical properties. In addition, flash memories exhibit complex error patterns that depend on the flash organization, management and use.

While a lot can be learned through simulation and testing with of-the-shelf devices, some aspects of SSD behavior are best explored by using specialized hardware platforms. The [Jasmine OpenSSD Platform](#) is a widely used tool for analyzing SSD performance and characteristics. The [SigNAS Board](#) is an analysis platform for low level flash properties and phenomena.

The goal of this project is to design and perform a set of experiments that provide a deep understanding of a certain flash property, by using an existing setup of the Jasmine and/or SigNAS Boards on Windows.

Examples:

- Bit errors and failures
- Advanced coding techniques
- Performance characteristics

Requirements:

Part I

The students will review literature relevant to the specific flash property they analyze, and familiarize themselves with the lab set up.

Part II

In coordination with the project supervisor, the students will define a set of experiments that can demonstrate the flash behavior in the relevant context, perform them, and analyze the results.

Prerequisites:

- Operating systems course – advantage for some analyses.
- The project is designed for one or two students.

¹ Also available as Project in Operating Systems (236366)