"A NOVEL DESIGN TO IMPROVE SOLID STATE DRIVE LIFETIME" VCU # 12-068

Applications

- Electronic Data Management Systems
- Flash based storage
- Solid State Drives

Advantages

- Improved reliability
- Improved lifetime

Inventors

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Market Need

Solid state drives (SSD) have several advantages over traditional hard disk drives (HDD). They have no movable disks, which translates to faster, quieter operation without being susceptible to mechanical wear or shock from handling. SSDs are also less hindered by data fragmentation because of the way they store and retrieve data. One drawback of SSDs, however, is that they have a limited number of writes and, thus, a limited lifetime. SSDs use NAND flash memory systems. The NAND chip the SSD uses determines the lifetime of the drive. Chips and lifetimes are being improved, yet they are still not able to compete with traditional drives in some areas.

Technology Summary

Inventors at VCU have proposed a solution to extend the lifetime of SSDs by reducing the number of writes to the flash. Flash translation layers (FTL) are the memory managers in flash based storage. The FTL determines where data should be saved and creates space for it by erasing the stale data. The proposed solution operates by finding the differences in content locality, between the new write and the old version of the analogous data in flash. By doing this, the system can keep the old version and store the compressed difference, which reduces the number of overall writes used by the system.

Technology Status

Patent pending: U.S. rights are available.

Guanying Wu, Xubin He, "Delta-FTL: improving SSD lifetime via exploiting content locality" EuroSys '12, Pages 253-266.

This technology is available for licensing to industry for further development and commercialization.