

Selective Compression Scheme for Read Performance Improvement on Flash Devices

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ABSTRACT

The increasing density and capacity of NAND flash memory leads to degraded reliability. To address the reliability issue, low-density parity-check code (LDPC) has been deployed in NAND flash memories due to its strong error correction capability. The drawback of LDPC is that, to correct data with high raw bit error rate (RBER), read latency will be amplified. To improve read performance, this paper proposes to apply lossless compression to reduce RBER on data pages. However, compression and decompression incur time overheads. Compressing all the data pages for RBER reduction will degrade write performance. In addition, the variation of compression ratio leads to variation of RBER reduction, thus varied read latency reduction. In this work, a selective data compression scheme is proposed for read performance improvement. Both read frequency and compression ratio of data are taken into consideration. Data in a flash page with high read frequency and good compressibility are prioritized for compression. Experimental results show that the proposed scheme can improve read performance without impacting write performance.

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Research Interests: Storage Systems; NAND Flash Memory

All are welcome!



In case of questions, please contact Dr XUE Chun Jason at Tel: 3442 9815, E-mail: jasonxue@cityu.edu.hk, or visit the CS Departmental Seminar Web at <http://www.cs.cityu.edu.hk/news/seminars/seminars.html>.

