

Utilizing Hybrid File Mapping for High-Performance I/O

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Abstract : As the technology of NAND flash memory rapidly grows, SSD is becoming an excellent alternative for storage solutions, because of its high random I/O throughput and low power consumption. These SSD potentials have drawn great attention from IT enterprises that seek for better I/O performance. However, high SSD cost per capacity makes it less desirable to construct a large-scale storage subsystem solely composed of SSD devices. An alternative is to build a hybrid storage subsystem where both HDD and SSD devices are incorporated in an economic manner, while employing the strengths of both devices. This paper presents a hybrid file system, called hybridFS, that attempts to utilize the advantages of HDD and SSD devices, to provide a single, virtual address space by integrating both devices. HybridFS not only proposes an efficient implementation for the file management in the hybrid storage subsystem but also suggests an experimental framework for making use of the excellent features of existing file systems. Several performance evaluations were conducted to verify the effectiveness and suitability of hybridFS.

Keywords : hybrid file mapping, data layout, hybrid device integration, extent allocation

Conference Title : ICCSIT 2015 : International Conference on Computer Science and Information Technology

Conference Location : Paris, France

Conference Dates : January 23-24, 2015