

# Symantec™ Storage Foundation 6.1: SmartIO

## Overview: Storage Management

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SmartIO in Symantec™ Storage Foundation 6.1 for Linux enables customers to ensure storage Quality of Service (QoS) at the application level while optimizing storage footprint through high-performance, in-server storage. SmartIO achieves up to 400% performance gains, while reducing costs by over 80% over traditional Storage Area Network (SAN).

### A Physics Problem

The laws of physics have put a limit on the performance characteristics of the 15,000 RPM (rotations per minute) drive. To keep up with increasing capacity and performance demands, storage administrators turn to complex and costly methods with diminishing returns.

Solid-state storage, on the other hand, is increasing in performance, capacity, and longevity, leading to adoption in all aspects of a Storage Area Network (SAN). The proximity of in-server solid state requires intelligent software to maximize performance and ROI, while ensuring high availability of mission critical data. Combining intelligent software with in-server solid state will increase the performance of both the front-end application and the back-end storage arrays.

### What is SmartIO

Integrated into the core components of Storage Foundation, SmartIO brings granular, online caching to application architects, server administrators, and database administrators to move reads and writes inside the server. SmartIO can be enabled at the Block or File level to meet the SLAs and performance characteristics of the application, without the need to manipulate the architecture or, in a worse case scenario, require downtime.

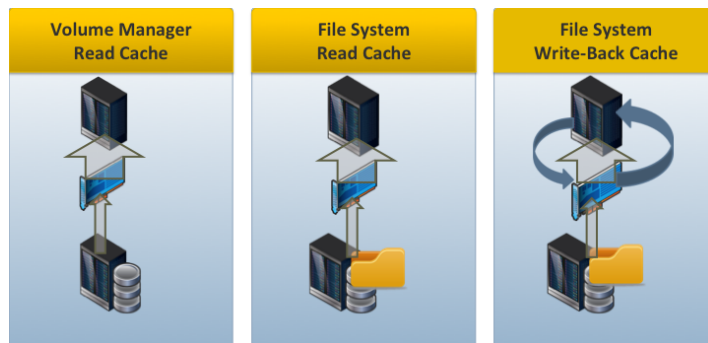


Figure 1: SmartIO modes

SmartIO offers two modes of caching, read and writeback, in both single node and multi-node configurations in Symantec™ Storage Foundation Cluster File System and High Availability (CFSHA) to ensure high performance and high availability of the most mission critical data. Cache reflection in Cluster File System ensures data coherency and application performance in the event of hardware outage. SmartIO cached data is also persistent across a server reboot, which reduces the cache “warm” period and brings applications back to optimal states in shorter time.

Deep, transparent application integration, combined with advanced caching heuristics, enables SmartIO to target the most relevant data based on different workload patterns.

### CAPEX and OPEX Gains

Despite the continuing increase in data generation and higher IOPS (Input-Output Operations Per Second) demand from virtualization technologies, information management and storage budgets are flat or shrinking<sup>1</sup>, meaning storage admins are stretched to meet the needs of the latest applications with yesterday's technology. With SmartIO, the majority of read and write requests can be handled within the server. This reduces the performance needs of that back-end array, so those same platters and needles spin and seek less.

1. “Software-Defied Storage Will Sound The Death Knell for Traditional Storage Provisioning,” Forrester Research, Inc., May 2013

What that really means is:

- The combination of SmartIO and slower disk brings equal or better performance to a “Tier-1” array at **39%** of the cost
- Storage administrators get more out of existing arrays as techniques to get more IOPS are no longer required
- Increased utilization and application stacking on arrays, reduced footprint requirements, and data center costs
- SmartIO has a cascading performance impact on other servers in the SAN

### Benefits in Mixed Workloads

SmartIO brings application insight through integrated APIs, such as Oracle® Disk Manager (ODM), to automatically tune the cache based on workload types and activity patterns. OLTP (Online Transaction Processing) and OLAP (Online Analytical Processing) also have different I/O characteristics on the back-end disk. Where OLTP is more random, OLAP is more sequential. Understanding those patterns is not only critical to placement of cached data, but smarter caching can increase the lifespan of Solid State devices through reducing the number of write operations.

For a mixed OLTP workload, SmartIO provides more than **2.5** times the transactions per minute when compared to a traditional “Tier-1” array.

### Summary

SmartIO in Storage Foundation and High Availability Solutions 6.1 brings customers complete, online control of performance for their mission-critical applications. Caching in single and multi-node environments reduces the needs of expensive tier-1 storage, while increasing performance and utilization of legacy storage. SmartIO is integrated directly into our File System (VxFs) and Volume Manager (VxVM) technologies to allow customers to ensure availability of their applications and data with no downtime.

### Additional Features of Storage Foundation 6.1

- Flexible Storage Sharing for true DAS clustering
- RDMA support for cluster interconnects
- Primary De-duplication and Compression
- Thin-reclamation
- Global replication

### Free eLibrary

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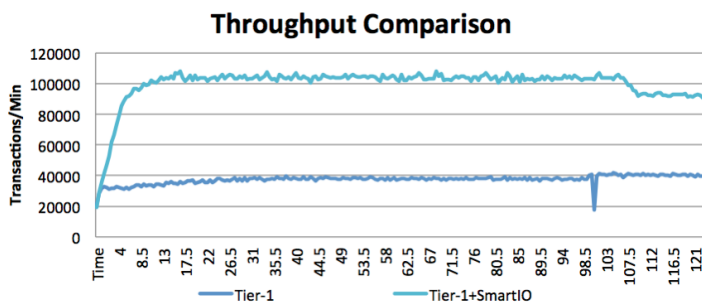


Figure 2: OLTP throughput comparisons

## More Information

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