



SWISS
VAULT

Performance Summary

Benchmark Performance Analysis for VaultFS

In partnership with



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Summarized Evaluation Introduction

This whitepaper, conducted in partnership with the Center for Energy Smart Electronic Systems at Binghamton University, provides an in-depth analysis of the **Vault File System (VaultFS)** developed by Swiss Vault Global. The **IOR** benchmarks, performed using **MPI (Message Passing Interface)**, highlight the performance and scalability of VaultFS in high-performance computing (HPC) environments, particularly when managing parallel processes and data distribution across multiple computing nodes.

Key Findings:

1. Test Environment:

- **Hardware:** The tests were conducted on **HP DL380 Gen 8** servers equipped with Intel Xeon E5-2660 v3 CPUs and 64 GB DDR4 memory. Each server had five SAS 1.2 TB disks installed, configured using **VMan** for flexible disk management.
- **Networking:** The servers were connected through a 10 Gigabit network, configured with RDMA (Remote Direct Memory Access) for efficient data transfer.

2. IOR Benchmark Performance* (Important):

- For the IOR Benchmarks, we have accounted for 6 parameters to judge the performance, which are Max Read and Write Speeds, Read and Write Latencies and Read and Write Open Times.
- The tests evaluated different data and parity configurations: **4+2** and **10+2**, alongside a single disk setup. The results clearly demonstrated the superior performance of the **10+2 configuration**, with an average performing superiority of **7% & 13%** in **Max Read & Write Speeds**, with a **minimal 2% overall average Read and Write Latency Overhead** for incremental thread size 10 to 100, and an astonishing average **70% faster Read and Write Open Time**.

3. Scalability and Flexibility:

- **VaultFS's flexibility in supporting various D+P configurations** (e.g., 4+2, 10+2) was highlighted as a significant advantage, offering a level of **scalability and data protection** that surpasses traditional *RAID systems*. This adaptability is crucial for HPC environments requiring robust, scalable solutions for large-scale data management.

4. Network Performance:

- The **iperf3 tests** demonstrated consistent network throughput across all configurations, with average bitrates ranging between **9.08 Gbits/sec to 9.82 Gbits/sec**. These results indicate a reliable network foundation, critical for maintaining high data transfer rates in HPC tasks.

5. Latency and Operational Efficiency:

- While the **4+2 configuration** showed slightly lower latency in specific scenarios due to more efficient distribution across servers, the **10+2 configuration** excelled in overall throughput and data handling capacity, making it the preferable choice for high-demand environments.

Conclusion:

The benchmarking results validate **VaultFS's** robustness and efficiency in high-load HPC environments. The system's ability to handle both **single-disk** and **multi-disk** configurations with **remarkable scalability** makes it a reliable and versatile file system choice for demanding workflows. The demonstrated increase in number of thread and nodes, with marginal latency overhead, signifies VaultFS as a compelling solution for organizations looking to optimize their HPC infrastructure.

VaultFS not only meets but exceeds the performance requirements for modern data-intensive environments, ensuring **high data throughput**, **low latency**, and **superior data integrity**. This makes it a highly effective solution for HPC systems, offering a **future-proof** approach to data management and storage.

For further review or in-depth analysis please visit us at [VaultFS](#)

Get in touch with us:

VaultFS values its customers and has dedicated resources to ensure the best quality experience when demoing the product. Businesses can discover how VaultFS can serve their needs.

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