

I/O Monitoring and Load Balancing for Semiconductor Design Shared Storage

Essentials

- Real-time monitoring of compute and storage infrastructure
- Application I/O profiling to identify unexpected hotspots
- Understand how applications are using shared storage
- Optimize compute cluster performance
- Eliminate guesswork when triaging performance issues

Real-time Semiconductor Design Performance Optimization

As semiconductor organizations expand globally, design teams are increasingly geographically distributed. Coupled with shrinking geometries and fierce competitive pressures that lead to compressed time frames and cost constraints, hardware development continues to become more difficult. These factors create significant challenges for infrastructure management, where “do more with less” is increasingly the rule. This increased complexity can be addressed by choosing the right computing performance monitoring tools and the right storage to complement your semiconductor design tools. You need to select a storage platform that can be scaled easily as your semiconductor design compute workloads grow, that’s globally accessible, has robust data protection, and lowers overall TCO. And you need the right real-time file system monitoring and load balancing technology to keep your compute infrastructure performing at peak levels.

Dell EMC PowerScale and Altair Mistral

Dell EMC PowerScale scale-out NAS consolidates divisions, projects, teams, and entire semiconductor design workflows into a unified storage solution that reduces costs and improves operational efficiency. Developed on PowerScale, Altair Mistral™ helps you monitor application I/O, find hotspots on your live system, and identify applications as they overload your storage.

The Noisy Neighbor Problem

In a compute cluster with shared storage, it is possible for a few small jobs to overload the network or file system. This “noisy neighbor” problem can affect the performance of all the jobs on the cluster. In the most extreme cases, virtually all other jobs are starved for data, bringing hundreds of engineers to a standstill, and causing critical deadlines to be missed at a cost of tens or hundreds of thousands of dollars.

Real-Time Monitoring and Balancing

Altair Mistral solves the noisy neighbor problem by monitoring application I/O and cluster performance in real time. Running live on a PowerScale storage cluster, Mistral identifies I/O-heavy jobs by monitoring reads, writes, and meta data so that actions to reduce load on the storage can be taken quickly or automated. By deploying Mistral, a company gains an in-depth understanding of how users are accessing storage as well as preventing disastrous data access patterns.

How It Works: Cluster-Wide Monitoring

Mistral wraps its monitoring technology around every job on a compute cluster. Jobs with higher-than-expected I/O generate alerts and then can be suspended. Storage performance and load can be estimated from I/O patterns and I/O latency measurements visible to Mistral or by external monitoring.

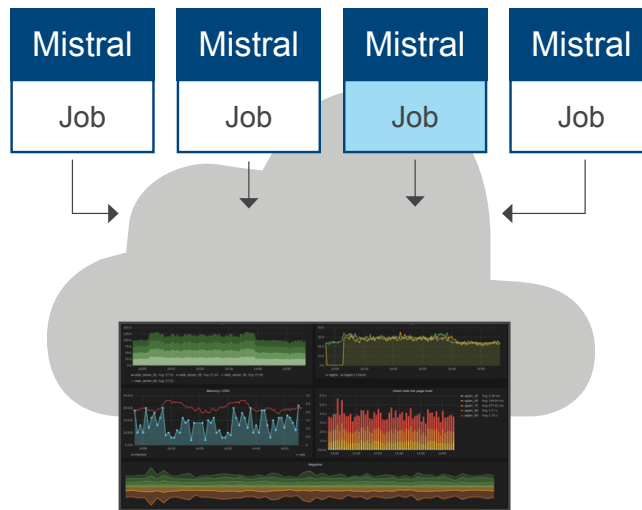


Figure: Mistral I/O Dashboard

Profiling and System Improvement

With lightweight job profiling, Mistral builds a history of I/O patterns that enable advanced tuning. I/O history can be used to educate users and improve infrastructure design. Expected I/O profiles can also be used to configure alerts when applications do not perform as expected.

Proven Solution

Mistral has been developed, tested, and validated on PowerScale for interoperability and performance. It is designed to provide a total solution for organizations with complex high-performance computing environments.

About Altair

Altair is a global technology company that provides software and cloud solutions in the areas of simulation, high-performance computing (HPC), and artificial intelligence (AI). Altair enables organizations across broad industry segments to compete more effectively in a connected world while creating a more sustainable future. To learn more, please visit www.altair.com.

About Dell EMC PowerScale

Dell EMC PowerScale provides the leading enterprise-grade, scale-out NAS platform that scales from terabytes to 10s of PBs of capacity in a single file system. PowerScale's OneFS® file system has unmatched storage efficiency with high utilization capacity and enterprise features such as data deduplication to save even more space to further lower overall TCO. PowerScale has industry-leading data protection with the ability to lose up to four nodes and still operate with no loss of data, and PowerScale stays simple to manage regardless of how your environment grows — allowing you to manage your business and not your storage.