

ACTIVESTOR PARALLEL STORAGE FOR STAR-CD STAR-CD With the Panasas Storage Solution Delivers Breakthrough Performance Advantages Over NFS

Automotive, aerospace, and other manufacturing industries are striving to reduce design cycle times and costs; satisfy global regulations on safety and environmental concerns; develop military advancements; and respond to customers who demand high-quality, well-designed products.

"We are delighted with our Panasas alliance that has led to improvements in simulation scalability and workflow efficiency. It has helped us meet the expanding CAE objectives of our customers."

Steve MacDonald, President and Co-Founder of CD-adapco

The availability of powerful and cost-effective Linux clusters has made it possible for companies to use advanced CAE simulations to address these challenges. Yet for advanced CAE simulations on Linux clusters, I/O requirements have increasingly become a bottleneck that often impedes overall simulation scalability and performance. The Panasas® ActiveStor parallel storage solution enables commodity cluster environments to be more efficient in two ways: 1) Achieve the highest application scalability for both computation and I/O, and 2) Maximize data movement for rapid post-processing of large-scale CAE results.

The Panasas and CD-adapco strategic alliance ensures that STAR technology and its user community achieve their ongoing CAE simulation, engineering and business objectives. Companies who deploy STAR-CD and Linux clusters for high-fidelity CFD simulations, design optimization, fluid-structure coupling, and other complex requirements can be more productive, more profitable and attain greater market leadership when they deploy the CD-adapco and Panasas solution.

UNPRECEDENTED PERFORMANCE

As CFD model sizes grow and CPU core counts increase, serial I/O can limit overall scalability and application performance. Recent results for 2 million and 4 million cell cases demonstrate that STAR-CD with parallel I/O, combined with Panasas storage, can provide up to a 43% performance advantage at 32 cores over conventional NFS and serial I/O. That means 43% more utilization of a STAR-CD software license investment and faster time to results. As model size grows, Panasas storage delivers higher performance and even more value.

FEATURES AND BENEFITS

Panasas DirectFLOW Protocol:

- **Maximizes Performance**
Parallel I/O enables faster CFD solutions from STAR-CD.
- **Maximizes Productivity**
Drives STAR-CD efficiency for single job scalability and multiple job throughput, and simplifies the coupling of STAR-CD with FEA software.

Unified Storage Infrastructure:

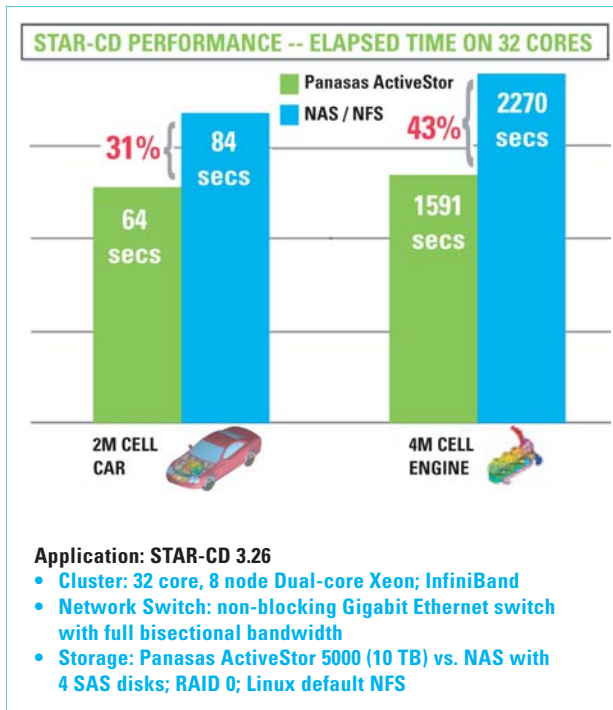
- **Empowers Collaboration**
Engineers can speed-up collaboration tasks of pre- and post-processing because of shared data and storage for all platforms.

Single Global Namespace:

- **Reduces IT Overhead**
Simplifies storage and data management to provide seamless scalability as STAR-CD model sizes and number of jobs grow.

NFS and CIFS Support:

- **Easy to Integrate**
Supports heterogenous CAE environments with Unix or Windows.



UNIFIED STORAGE EMPOWERS COLLABORATION

Often CAE workgroups have separate storage infrastructures for various stages in a CAE workflow such as separate storage for computation vs. pre- and post-processing. This can create unnecessary data duplication, requirements for large-scale data migration and significant increases in the complexity of managing a storage infrastructure.

With Panasas' unified storage infrastructure, the ActiveStor storage solution can serve all elements of the CAE workflow without data duplication or migration. Lost productivity from typically long transfer times of large files over a network can be eliminated to improve collaboration among CAE workgroups.

ARCHITECTED FOR FASTER TIME TO RESULTS

The Panasas ActiveStor parallel storage solution allows for a single namespace of shared storage. This leverages a unified CAE workflow including both CAE computation and collaboration tasks.

Panasas' object-based storage architecture allows data to be managed in large virtual objects rather than small blocks or files. This drives parallel I/O directly between cluster compute nodes and the storage system, eliminating bottlenecks that arise with NFS and NAS (network attached storage) architectures.

This gives CFD simulations with heavy I/O (unsteady, LES, etc.) the ability to scale I/O and deliver overall faster turn-around times.

SIMPLIFIED MANAGEMENT LOWERS OVERHEAD

Panasas storage systems seamlessly install in minutes and do not require production downtime during installation or upgrades. A single console interface monitors and manages an entire cluster and automatically incorporates storage capacity as it is added. This simple and straightforward administration approach reduces IT overhead and enhances system administrator productivity.

The following provides details of the STAR-CD 3.26 performance tests run on 32 cores:

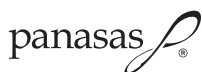
- **Car Aerodynamics - 2M cells, segregated AMG solution scheme for 10 iterations, 220MB saved at each iteration to simulate unsteady conditions.**

NOTE: 30% or 19 seconds of time spent in I/O for PanFS, 48% or 40 seconds spent in I/O for NFS. Panasas achieves 2x performance advantage (40/19) vs. NFS at an I/O rate of 116 MB/sec.

- **Engine Cooling - 4M cells, segregated AMG solution scheme for 200 iterations, 330MB saved at each iteration to simulate unsteady conditions.**

NOTE: 23% or 360 seconds of time spent in I/O for PanFS, 47% or 1059 seconds spent in I/O for NFS. Panasas achieves 3x performance advantage (1059/360) vs. NFS at an I/O rate of 183 MB/sec.

For more information on STAR-CD and CD-adapco, go to www.cd-adapco.com



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