SOLUTION BRIEF

Atos and Western Digital Partner to Deliver Accelerated Storage that is Fundamental to HPC System Performance

Atos leverages Western Digital's Ultrastar® Data102 storage platform to deliver the performance and capacity needed by HPC systems

Highlights

- **Increased Performance:** Boosts performance and reliability with an integrated solution built for the most demanding High-Performance Computing (HPC) environments.
- **Simple Scalability:** Enables simple expansion of capacity in the future as needed to keep pace with rapid data growth.
- **Breakthrough Economics:** Offers a cost-effective solution that reduces power, cooling, and rack space to cut OPEX and CAPEX costs.

Challenges

- **Increasing Demands:** Exploding data rates are pushing HPC environments to store more data for longer periods of time, while simultaneously requiring high performance for data-intensive HPC workloads.
- **Management Difficulties:** As HPC becomes more pervasive, the ability to manage data efficiently becomes a critical factor.
- **Skyrocketing Costs:** Keeping pace with explosive data growth is driving up OPEX costs related to powering, cooling, and managing storage systems.

Solution

The Atos BullSequana Xstor solution based on Western Digital's Ultrastar Data102 storage platform delivers scalability, high performance, and efficiency in a cost-effective storage system designed to handle intense HPC workloads.

The Data Management Challenge of High-Performance Computing

With the expansion of data-intensive applications, storage has been highlighted as a critical factor in High-Performance Computing (HPC). Data management is key to optimizing your entire system's speed and performance. High-performance storage enables you to take full advantage of highly parallel applications and thus harness the power of supercomputing.

The massive and relentless growth of data, along with the increased complexity it brings, pushes organizations to redesign their compute and storage solutions to be prepared for future needs. The HPC storage segment represents the highest growth rate among all the HPC system components in the coming 3 years. Machine learning and data analytics are creating many of the most challenging HPC workloads as we move inexorably towards the exascale era. Hybrid workloads and new business models (e.g., HPC-as-a-Service) coupled with unceasing demand on capacity are adding new pressure on storage and data management. At the same time, new capabilities, such as scalability, modularity, and cost optimization in storage, are enabling customers to exploit the power of mixed workloads.

Atos' Strategy for Designing Storage for HPC Environments

Atos understands how critically important storage is for HPC. It is all about managing massive amounts of data generated by highly parallel applications, which while requiring high-capacity media, can be a lengthy and cumbersome task if speed and performance are not optimized.

Therefore, Atos has designed its BullSequana Xstor solution, a Hybrid Accelerated Storage Solution, to offer:

- A unified solution of servers and external storage
- A high level of performance
- The ability to scale up or out as you grow
- Modular architecture

Breaking Down HPC Storage Barriers

As a leader in storage, Western Digital is working with Atos to deliver innovative solutions that modernize HPC storage environments to enable complete protection and rapid delivery of data to intensively data-hungry HPC applications.

Atos's BullSequana Xstor is a high-performance, scalable, and flexible storage appliance that delivers powerful, reliable, and scalable data storage for HPC. Western Digital's Ultrastar Data102 storage platform delivers the reliable capacity and performance needed for data-intensive environments.

The combined solution of Atos BullSequana Xstor with Western Digital's Ultrastar Data102 storage platform delivers scalability, high performance, and efficiency in a cost-effective storage system designed to handle intense HPC workloads.

BullSequana Xstor – A Powerful Yet Flexible Storage Appliance

BullSequana Xstor is dedicated to supercomputing solutions with high-performance storage features, including high-speed Interconnect and the highest level of density. The most recent hardware technologies in terms of PCI bus and caches have been integrated to provide hundreds of gigabytes per second of data transfer when necessary. It has an extreme high level of performance, scale as you grow. Thanks to its modular architecture, BullSequana Xstor supports both scale-out capabilities, using the most scalable filesystems, and scale-up capabilities by connecting multiple JBOD extensions that are available to match customers' needs.

Viking Main Enclosure – The Brains Controlling BullSequana Xstor's Strength

Viking controllers are part of the BullSequana Xstor storage appliance reference architecture. Viking contributes to this solution with a dual server as BullSequana Xstor's base brick. Using this hardware, BullSequana Xstor offers a full SPOF-less high-availability system working around the two controller nodes. The solution focuses on maximizing the performances of the drives, as well as handling the failover automatically when one of the two node fails, keeping the filesystem running.

Those servers will drive IOs to either flash or rotating disks, creating various pools of storage, with different characteristics (e.g., latency performances, prices, capacity, endurance, integrity). The architecture enables the implementation of technologies like caches, and dealing efficiently with small files, metadata, objects, or bulk HPC files.

Thanks to the AMD CPU architecture, the servers offer a large PCIe® network by extending the PCIe network to dual-attached 24x gen4 NVMe™ drives. BullSequana Xstor leverages the inter-server NTB PCIe links for storage communication or synchronization.

The extension to the JBODs SAS network is done using Broadcom PCIe HBAs connecting to the SAS ports through copper cables. This technology delivers line-rate bandwidth connection to 2x Ultrastar Data102 JBODs in the current basic offer. Daisy-chaining more JBODs is an option if more capacity is needed. In the reference architecture, InfiniBand technology is used to connect to an HPC network. Each server is equipped with a dual-port HDR OCP 2.0 HCA. BullSequana Xstor software offers device drivers to handle volumes, failures, and fine-grain tuning of all those sub-systems to reach maximum levels of performance.

A Winning Partnership for HPC Storage

Data storage is critical for HPC. By combining BullSequana Xstor with the Ultrastar Data102 storage platform, you can add scalable, high-performance, and highly reliable capacity to your environment easily and affordably. Western Digital Ultrastar storage platforms provide the perfect direct-attached storage (DAS) for the Viking controller nodes. This family of "just a bunch of disks" (JBOD) platforms combines excellent density, strong performance, and flexible capacity in a simple, affordable solution. Ultrastar storage platforms connect directly to BullSequana Xstor high-tech controllers. Within seconds, you can store and manage data reliably and with boosted performance—no complicated configurations or complex architectures required. And, if you find you need even more capacity, attach up to 16 Ultrastar platforms together to expand to multi petabytes of storage at a fraction of the cost of other solutions. Atos and Western Digital help you meet your performance needs and keep pace with rapid data growth within the limits of your IT budget.

An Industry Leader in JBOD Storage

Direct-attached storage platforms don't have to be complicated, but you wouldn't know it looking at other solutions on the market. Western Digital's Ultrastar storage platforms include unique technologies not found in any other storage platform: patented IsoVibe™ and innovative ArcticFlow™. IsoVibe reduces vibration-induced performance degradation, while ArcticFlow overcomes the cooling issues by introducing cool air into the middle of the platform. Combining these technologies with HelioSeal® hard drives provides a solution designed for long-term reliability and reduced drive returns, enabling the safekeeping of all the digital content stored on the platform.

Great Minds Think Alike

Atos and Western Digital both recognize that High-Performance Computing for a long time was a field only scientists, research institutions, and the largest of enterprises were privy to. Nowadays the need for more compute power in an enterprise IT environment with leveraging technologies like AI, machine learning, and automation spans across most organizations of various sizes. More HPC workloads are now created. Exponentially growing amounts of data are crunched. Whether the data are generated in research centers or by artificial intelligence or machine learning, storage needs to be there to welcome the data and store it in the most flexible, scalable, practical, and cost-effective way. BullSequana Xstor powered by Western Digital is the right solution for the growing data-intensive HPC workloads.

For more information on how Atos BullSequana Xstor paired with Western Digital's Ultrastar storage platforms can turbocharge your HPC storage infrastructure, visit BullSequana Xstor on www.atos.net.

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[1] One GB is equal to one billion bytes and one TB equals 1,000GB (one trillion bytes). Actual user capacity may be less due to operating environment.