PAVILION

Healthcare Leader Boosts SQL Server Operations on VMware Accelerating Drug Efficacy Outcomes for Millions of Patients

Benefits

- SQL Server runs as fast as previous bare metal with internal NVMe drives
- Doubles the amount of SQL Server concurrent transactions
- Recovers 30% of server headroom by using NVMe/RDMA
- Dramatically simplifies the storage growth process
- Enables team to leverage VMware tools and ecosystem for management and backup

The healthcare environment is evolving rapidly, and scientific data matched with analytics is delivering unprecedented value in COVID-19 research, clinical trial outcomes, and sharing of insights across the globe.

The leader in connected intelligence needed to scale its newest analytics platform to share insights from drug interactions and side effects on millions of patients to improve drug efficacy and superior treatments. Unfortunately, NVMe SSDs inside their servers could not deliver the scale and speed required to meet business and customer expectations.

As SQL Server scales out by sharding data across servers with internal NVMe drives, network traffic increases proportionally to the number of servers and shards of the database. As a result, the load on server memory and CPU increases proportionally. In an 8-server SQL Server cluster, this customer had reached the limit. Performance for concurrent transactions peaked, limiting future data growth and current SQL Server operations. An infrastructure change was required.

The team planned a strategic move to VMware vSphere 7 as the architects learned that VMware's NVMe/RDMA support would eliminate CPU overhead with direct memory access for the SQL Server cluster. By making this move, the team would gain additional CPU cycles to SQL Server, reduce latency and boost IO performance, moving SQL Server's performance bottleneck away from the storage.

The experts considered NVMe storage array-based approaches. It became clear that fibre channel was a legacy technology, and NVMe-oF with Ethernet was 2x faster and ½ the cost of fibre channel. They evaluated multiple suppliers of NVMe-oF using 100Gbps Ethernet. The findings were astonishing. Most vendors published read latency metrics in the multi-millisecond range. However, none shared metrics for write latency which is the fundamental measure for SQL Server commit to disk.

After reviewing the VMware vSphere 7 Compatibility Guide, the team found the Pavilion HyperParallel Flash Array (HFA) and reached out to an old friend, now a Sales VP at Pavilion.

This group of storage experts learned that Pavilion offers the world's fastest storage for SQL Server. By taking advantage of vSphere 7 NVMe/RDMA, Pavilion delivers sub-millisecond read and write latencies that transforms SQL Server's performance.

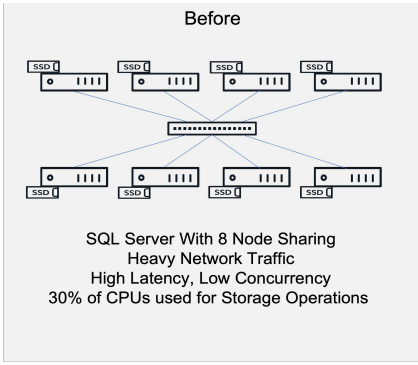
After a Proof-of-Concept evaluation, the customer found that Pavilion's latencies for read, and write at the standard 64KB block size for SQL server were significantly lower than they saw on bare metal servers with internal NVMe SSDs. To be precise, Pavilion read latency was .269 milliseconds and write latency was .142 milliseconds! This improvement, along with the benefits of NVMe/RDMA gave back more than 30% of server processing to double SQL Server concurrency (more users) at ½ the latency of server-based internal NVMe SSDs.

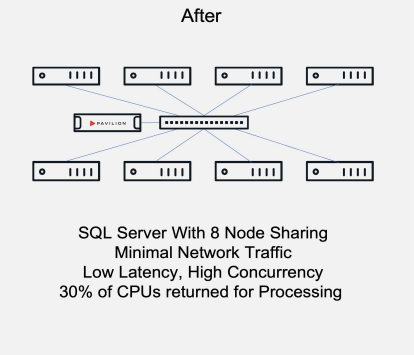
By deploying a 1/2 populated system with 10 storage controllers and 36 NVMe SSDs (30TB/each), they now have 1.1PB of capacity and 10M IOPs at their disposal.

"We needed an external storage platform that matched the performance we get from internal NVMe SSDs to support a mission critical SQL analytics use case running on VMware 7," said the Director Global Storage Management. "The Pavilion platform enabled us to meet this challenging requirement that could not be met with other options."

Powered by Pavilion HyperOS™

Designed for the most demanding environments, Pavilion HyperOS combines enterprise-class management, security, and data protection features with a highly intuitive GUI to ensure maximum availability and ease of use. In addition, an API-driven approach ensures that the Pavilion HyperParallel Flash Array integrates easily within the data center. Designed from the ground up for NVMe and NVMe-oF, the Pavilion HyperOS enables the Pavilion HyperParallel Flash Array to deliver unmatched storage performance without the cost and complexity of traditional storage arrays.





Results

The Pavilion HFA boosting SQL Server performance is proven in bare metal, Linux, and VMware 7 environments. With the VMware ESXi 7 NVMe/RDMA driver, the Pavilion HFA delivers similar, identical, or better performance than Windows running on a bare metal server. This customer used a very large SQL Server sharding process that takes a large SQL Server database and splits it evenly among eight different SQL Server instances. They had a very complex report that ran on SQL Server that accessed data from all eight databases. They ran this report on a bare-metal Windows environment with Pavilion HFA and then moved to a VMware environment and saw the same performance with SQL Server in a VMware environment as SQL Server in a bare-metal Windows Server environment. The sharding process worked precisely the same way, and the large query ran much faster, all due to the Pavilion HFA and certified NVMe-oF drivers.

About Pavilion Data Systems

Pavilion provides an analytics acceleration platform that enables enterprises to derive greater value from their data—faster, simpler, and at scale. The Pavilion HyperParallel Flash Array is the perfect complement for virtualized, containerized, or Windows applications, including SQL Server, AI/ML, HPC, analytics, edge, GPU-based computing, and other data-driven applications. Powered by NVMe-oF and NVMe SSDs Pavilion delivers DAS-like performance at scale, with the benefits of SAN. Learn why organizations from manufacturing, healthcare, financial services, and federal governments, have all chosen Pavilion, email info@pavilion.io, call 669-263-6900, visit www.pavilion.io, or follow the company on LinkedIn.

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