



Benefits

- Increase rack density 2X
- 50% reduction in storage TCO
- Frees up over 20% of a server's resources compared to SDS
- Future-proof design halves networking costs
- 50% of the rack size of the nearest competitor
- Protects MySQL and the business
- Reduce the cost of deploying large cloud-scale MySQL deployments
- Deliver over 10X better application performance in high-scale cloud, web, and SaaS environments
- Enterprise design and data integrity validation ensures MySQL can reliably access data
- Rack scale management via Web GUI, vCenter, Kubernetes, RESTful API, OpenStack, DTMF/Redfish, and Swordfish
- Pavilion's NVMe-oF doubles the number of queries, increases transactions 7-fold, and has ½ the latency of a server using DAS NVMe SSDs

Features

- Up to 2.2PB of NVMe SSDs per system
- Performance of up to 120GB/s, 20M IOPS, with ultra-low latency of 25µs
- Data integrity validation for MySQL applications
- Multi-Platform
- VMware certified NVMe/RDMA (RoCE v2), NVMe/TCP drivers, iSCSI, and NFS drivers
- iSCSI, NFS, S3, SMB, and Kerberos CSI protocols for other Linux, Windows, and VMware applications
- NFS & S3 Global Namespace
- Intuitive management via Web GUI, vCenter, Kubernetes, REST API, OpenStack, DTMF/Redfish, and Swordfish

NVMe-oF Storage for MySQL

Double performance, cut spine network traffic by 50%, lower costs with the most performant, dense, scalable, and flexible data storage platform for MySQL

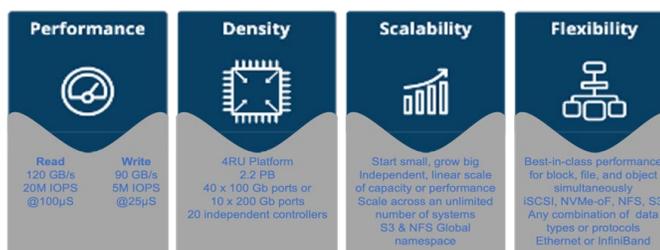
MySQL is a powerful Open-Source database being deployed in some of the largest mission-critical environments, for things like content management, OLTP transactions, eCommerce, and more. Many configurations use Direct Attached Storage (DAS) with NVMe SSDs inside servers for MySQL. This configuration is easy to deploy but is complex, hard to scale, and lacks enterprise features and centralized storage management requiring IT to perform enterprise operations and storage management. Over 50% of the NVMe SSDs space is wasted due to a DAS server being a single point of failure with over half the storage is used to store data from another server. This drives-up storage TCO, increases networking traffic, and consumes server resources that could be directed to MySQL.

Moving to software-defined storage (SDS) is not the answer. It provides enterprise storage services and centralized storage management. But it consumes up to a fifth of each server's resources to do so, impacting MySQL performance.

An alternative to SDS is a SAN-attached all-flash array (AFA). Most have NVMe SSDs, enterprise features, and centralized storage management, making AFAs the predominant MySQL storage solution in most data centers today. But most AFAs also limit MySQL's parallelism and performance with their dual controller architecture. In addition, most AFAs are also derived from legacy architectures or based on fibre channel technology that is double the price of Ethernet and lacks the future growth and performance of the Ethernet-based design used by Pavilion

Many customers use multiple MySQL databases requiring the underlying storage systems to provide high IOPS and very low latencies. Adding NVMe drives to the dual controller platform in many AFAs did not unlock the full performance of NVMe SSDs since these AFAs cannot provide the parallelism that MySQL requires. This raises challenges in scaling and consolidating MySQL, requiring businesses to use multiple AFAs to support their multiple MySQL databases.

Scalable and Flexible Performance Through NVMe-oF



Pavilion offers a better way.

The Pavilion HyperParallel Flash Array (HFA) uses NVMe-over-Fabrics (NVMe-oF) for MySQL. Pavilion leads the industry in its support of NVMe-oF and is built for NVMe from the ground up. NVMe is not shoe horned-in like many other vendors. The Pavilion HFA is superior to DAS, SDS, and AFAs and provides near-native NVMe performance to MySQL applications like OLTP, BI, and analytics. Pavilion speeds these applications both on Linux and VMware, enabling customers to derive actionable insights in a short amount of time from big and fast data workloads.

The patented architecture of the Pavilion HFA provides its high-performance and ultra-low latency in a compact form factor that is more than twice as small as the nearest competitor, and its ultra-low latency and ultra-high performance lets you better use server resources, reducing rack space, power, and HVAC costs. Its multi-controller design enables MySQL customers to architect their databases to avoid hot spots, support more users/processes, achieve continuous operations, and shatter backup windows. This revolutionary storage system offers the most performant, dense, scalable, and flexible storage in the universe.

The Pavilion HFA provides MySQL applications with the performance of locally attached NVMe SSDs with its 72 NVMe SSDs and multiple concurrent block and file protocols with NVMe-oF/RDMA, NVMe-oF/TCP, iSCSI, NFS (v3, v4, pNFS, and RDMA), the Kubernetes CSI driver), and S3. VMware 7U2/7U1/7.0 has certified native drivers for NVMe/RDMA (RoCE v2), iSCSI, and NFS. VMware 7U3 adds a certified driver for NVMe/TCP. This allows customers to change between Linux and vSphere without having to swap out their storage platform.

An identical configuration that used 6 internal NVMe drives on Linux (CentOS 8.5.2111) with MySQL 8.0.26 and Sysbench v1.0.2 with and without VMware (ESXi 7.0 u2) was tested. All scenarios used the EXACT same server, operating system, MySQL Version, and dual parity RAID 6. Testing showed that both bare metal and virtualized MySQL-based application using the Pavilion HFA's NVMe-oF support delivered better results than the same server using INTERNAL NVMe drives. MySQL applications get double the queries per second (QPS), more than 6 times the transactions per second (TPS), and half the latency, speeding results. For full results contact Pavilion at info@pavilion.io.

Pavilion eliminates the need for a separate storage appliance for block, file, and object applications. It supports all three simultaneously and provides the highest performance per data center rack unit to every application. Now users can combine and analyze relational, unstructured data and S3 object data for AI/ML and other data analysis accelerating time to results

Disaggregate MySQL infrastructure and achieve optimized levels of processing, storage and network bandwidth that can be scaled independently. Using servers that don't have DAS storage can double the density of a rack. In addition, the Pavilion HFA reduces storage management costs by 50% over DAS and saves money by reducing server hardware and paring data center space reducing the cost of deploying MySQL clusters significantly. No custom software needs to be installed on the nodes, enabling them to take full advantage of host processing resources and reduce risk.

Protect MySQL SSDs with RAID-6 and the Pavilion Swarm capability, which can rebuild a failed SSD at the rate of 5 minutes per TB. It also provides MySQL applications with self-healing bit-rot support, to assure every application gets uncorrupted data.

Security is a must for MySQL applications. Pavilion uses a FIPS-compliant data at rest encryption and ensures its always-on encryption does not impact performance. Use consistent snapshots, encrypt those snapshots, and use standard backup and restore utilities with confidence that MySQL data is safe and secure.

Instant snapshots and clones with a consistency group feature allow an entire clustered database to be backed up or copied for test/dev purposes and on the fly without any performance impact.

Get end-to-end data integrity, a robust and modular chassis, and redundancy throughout the storage array to protect your containers as infrastructures grow. All features come in-the-box, including thin provisioning, snapshots, clones, data at rest encryption and more.

Support concerns won't delay the deployment of MySQL applications. Pavilion provides 24/7 proactive support and can act as an extension of your IT organization for MySQL deployments.

Learn More

Pavilion shatters customer expectations and resulting organizational outcomes by revolutionizing data processing for modern AI/ML, HPC, Analytics, Enterprise Edge, and other data-driven applications. The Pavilion HyperParallel Data Platform™, powered by Pavilion HyperOS™, delivers unmatched performance and density, ultra-low latency, unlimited scale, and flexibility, providing customers unmatched choice and control. Learn why Fortune 500 companies and federal government agencies choose Pavilion. To schedule a demo, visit www.pavilion.io. Follow the company on LinkedIn.