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Solution Brief

NVME-OF STORAGE FOR MYSQL

Deploy Disaggregated Storage to MySQL environments.

MySQL databases provide seamless scalability, availability, and performance for the most demanding scale-out applications. The flexibility to run various Arrays whilst providing strong data protection and management ease makes a choice many modern IT organizations.

It's rich set of features allow it to be deployed for high-traffic websites as well as large data warehouses. It's high performance because of the very high-performance query engine, and is also used to power big data warehouses in either scale up or scale-out architectures. As a result, MySQL can meet the most demanding performance expectations of any application.

Direct-Attached Storage Challenges

While it offers the flexibility of being able to deploy distributed resources in a scale-out fashion, it's expensive when it comes to storage and storage management. Typically, storage is deployed as direct-attached SSDs in individual servers but this leads to significant problems that admins must deal with.

- Storage is not shared effectively since it is stranded in a single server and results in underutilization of NVMe; in some cases as low as 25%.
- Storage provisioning decisions are made at procurement time, meaning that determining the size of the storage in each server is done before the requirements of the application are known. This leads to inflexibility and higher costs over time.
- When scaling for either performance or capacity reasons, more server nodes need to be deployed to accommodate more direct-attached SSDs, effectively expanding the infrastructure unnecessarily.

And whilst MySQL offers data protection mechanisms, it relies on making copies of data on other database server nodes, leading to more capacity being required and bloating cost of infrastructure even more.

Pavilion's NVMe-oF Storage Array

We deliver up to 40 million Transactions Per Minute (measured by SysBench) and up to 1PB of capacity to a MySQL Cluster. With a density of 1.66 TPM per RU and up to a petabyte of capacity in a single appliance, it is now possible to deploy shared storage in place of direct-attached SSDs in cloud-scale SAAS and PAAS environments. The Array requires no custom software to be installed on application servers and includes important data management and availability features, including thin provisioning, instant zero-space snapshots and clones, and no single point of failure.

Features

MySQL Benefits

- Reduce the cost of deploying large cloud-scale MySQL deployments in terms of both CAPEX and OPEX
- Simplify database provisioning, deployment and protection.
- Deliver orders of magnitude better application performance in high-scale cloud, web, and SAAS environments
- Lower TCO by leveraging scale-out architecture
- Scalability and Flexibility
- High Performance and High Availability.
- Scale Compute and Storage Seperately.

Pavilion Benefits

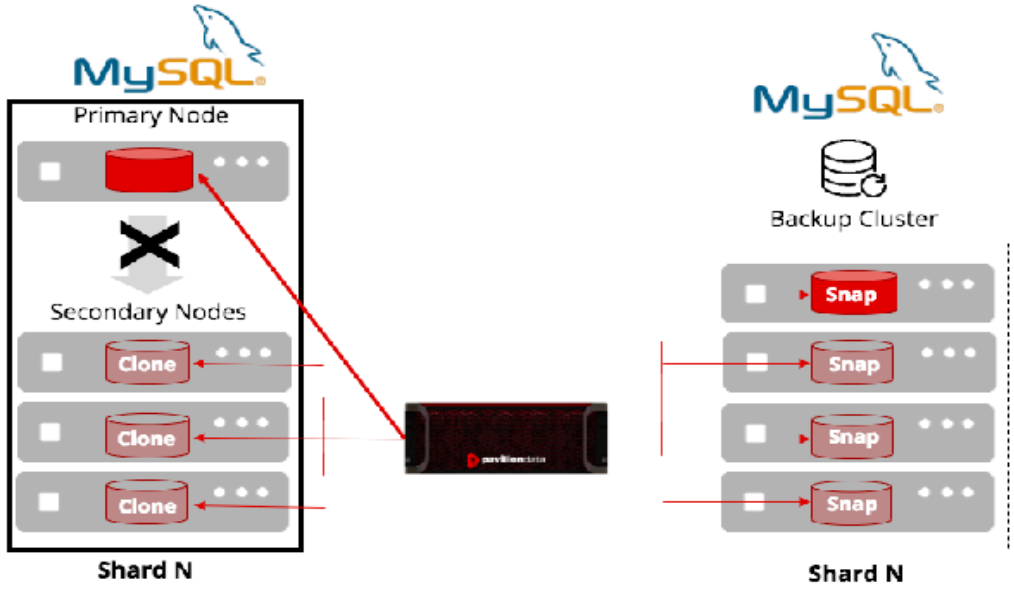
- 40 µs Latency
- 14TB - 1 PB in 4U
- Frictionless Deployment
- Data Resiliency & High Availability
- Space-Efficient, Instant Snapshots and Clones
- Thin Provisioning
- Standard Ethernet
- **OPEN**CHOICE Storage

Deliver Disaggregated NVMe-oF Storage for MySQL Deployments:

Until now, MySQL clusters were deployed on DAS SSDs because of the performance and fault isolation requirements. The absolute lowest latency requirement, in particular, drove the need for DAS due to its latency fulfillment.

However, with new high-speed RDMA-capable networking and efficient storage protocols like NVMe-oF, it is now possible to get the same performance advantages with shared storage.

The Pavilion Array offers low-latency logical NVMe storage from a disaggregated 4RU appliance, allowing racks of database nodes to be supplied low-latency storage capacity from a central storage appliance. It delivers up to 120 GB/s bandwidth and 20 million 4K Read IOPS and provides the data management features that lower the cost of deploying MySQL clusters significantly.



Pavilion's Storage Array provides the following key benefits to MySQL deployments:

Deploy up to 4X+ less flash deployed:

By leveraging thin-provisioned logical flash storage, our Array delivers the required needs of the applications. You can decide at application deployment time how much storage to provision to any given node and are no longer are constrained by the size of the SSDs that were purchased and installed in any given server. Thin Provisioning allows the application to use the required amount of storage at any given time, regardless of how much capacity has been advertised to that specific database node. This greatly reduces the amount of raw flash storage deployed in these cloud-scale environments.

Simplify data protection and reduce server overhead:

Instant snapshots and clones allow an entire clustered database to be backed up or copied for test/dev purposes and on the fly without any performance impact. Our Array provides no single point of failure, ensuring maximum application uptime and data availability. This removes the need for multiple copies of each node's data on other nodes, lowering the storage capacity requirements whilst reducing application and network processing overhead required to distribute that data to additional nodes.

Increased Compute Density per Rack by deploying Disk-less server nodes:

By provisioning high-speed logical flash storage volumes to each server in a rack, you no longer need to purchase servers that accommodate SSDs. This provides the ability to increase the compute density of a rack by leveraging 1U servers instead of 2U servers with front-loading drive bays. Pavilion also requires no custom software to be installed on database nodes, allowing MySQL to take full advantage of the application host processing resources as well as simplifying deployment complexity.

The result? The power, simplicity, and density offered by the Pavilion NVMe-oF provides the first flexible service for scale-out MySQL deployments, increasing agility and flexibility and lowering TCO in the process.

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