

WHITE PAPER

OpenChoice NVMe-oF Storage

Reduce TCO, Avoid Vendor Lock-In

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Introduction

Modern cognitive applications are transforming entire industries. From eCommerce, AdTech, Internet of Things (IoT), Online Gaming, Risk assessment, and Security/Fraud prevention. The list goes on.

These applications provide real-time, actionable insights that organizations rely on to make better decisions faster. The consumers of these insights are often not human beings; instead, they are other systems and applications that affect the desired outcome.

To make better decisions requires access to massive amounts of data. And in the era where the bar for speed is real-time, these decisions need to be made faster and faster, this data needs to be ingested, processed and served in real-time.

What Users Want

The dominant storage architecture for these modern applications is server-side storage, aka direct attached storage (DAS). When we asked our customers, “what is preventing them from going to a rack-scale design and composable/disaggregated infrastructure,” they gave us two key reasons.

The first is the applications insatiable need for performance density and the fact that there isn’t an efficient enterprise storage system that can meet the I/O requirements of an entire rack of servers. The Pavilion Hyperparallel Flash Array (HFA) address the performance density issue in spades.

The second key objection is about the lack of agility and flexibility in All-Flash Arrays (AFAs). While feature-rich, shared storage platforms are extremely inflexible when it comes to procurement and deployment. They have always suffered from these afflictions. Our customers tell us directly that these issues stem from the following root causes:

Locked-In Refresh Cycles

Enterprise storage systems vendors have quite cleverly “trained” their customers into a very tightly controlled 3-year technology refresh cycle. But the application demands are changing all the time, as are the technological solutions to address these demands.



Why is it that I (Storage User) am beholden to OEM's refresh cycles, instead of the speed of available technology and my needs?

Storage OEMs call this 'Innovation' but why do I have to 'innovate' at their speed and technology cadence?

Lead Storage Administrator

Great points. Just think about the 3-year period between refreshes: CPU and memory would have gone through two or three technological generations during that time. We are just beginning the second wave of NVMe adoption and SSD technology is evolving at an even faster rate (than CPU and Memory). Yet, to upgrade to that newer, faster, denser, more power efficient and cheaper SSD, users will have to wait for the OEM’s “refresh cycle” and at that time, they are better off throwing away the entire array.

Think about car tires. Do you replace your car each time you need to replace tires? Why can't SSDs be upgraded on their own? Why is the tech upgrade cycle so inflexible?

Trapped Capacity

Our customers say, "my projects change over time. Workloads and their requirement for storage change frequently. Why can't I respond to these changing workload and storage requirements by moving unused storage media from one SSD product to another? Why do I have to re-purchase the capacity I already bought, every time from my array manufacturer for each of their different products? At the end of the day, it is the same media sold by the same set of SSD OEM vendors..."



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Storage array manufacturers quite deliberately and completely lock those SSDs to their specific products so that customers are not able to move those across platforms sold by the same vendor. Why is the use of storage capacity that customers have already paid for so inflexible?

Predatory Business Model

Many customers already have supplier relationships, and can buy the same SSDs at less than a quarter of the price compared to they have to pay to leading storage vendors. Since there is no technology difference between either SSDs, these customers want to know "What gives?"



"Why do I have to pay incremental fees for software licensing, support and maintenance based on capacity when the marginal cost of running and supporting an array for each additional GB of storage is minuscule?"

"Feels a lot like extortion in the name of 'upgrade' to me!"

Lead Application Architect

Servers and network switches are not priced based on a number of computations conducted or bandwidth (bytes) pushed through their ports.

Why then, does the industry force customers to pay per GB to most storage vendors resulting in a 4X markup on drives they could have bought in the open market for much less?

Why, You Ask?

Well, it's simple. Most storage vendors want to have their cake and eat it too!

Storage vendors simply want to sell you more capacity. The entire enterprise storage systems business model is tied to capacity. Their sales reps start with this question: "How many TBs do you need?" After all, their revenue and sales reps' compensation are directly tied to selling you more capacity at huge markups. SSDs are fast becoming a commodity, and prices are coming down every six months.

Yet, many storage vendors want to sell you the same SSDs at 400% markup and lock you into their media. Keep in mind, they typically have zero innovation or intellectual property in the SSD. They source their drives from the same four or so, SSD vendors in the world.

They don't just have a massive markup on SSD media, their software licensing and support/maintenance is also tied to array capacity.

This is the predatory business model that many storage vendors have perpetuated. Or rather, perpetrated is a better word to describe their actions.

And that is exactly what has been preventing these enterprise IT, web-scale organizations from moving to composable/disaggregated storage for modern applications.

In fact, our customers have asked us to give them the freedom of using their own SSD media with the Pavilion HFA. So we did, we call it OpenChoice and it disrupts conventional selling practices and avoids vendor lock-in by providing customers the...



Freedom To Innovate

SSD drive technologies are evolving rapidly with new product introductions weekly. From SLC to eMLC to MLC to TLC to QLC, from NAND to storage class memory (SCM) and from SCSI to SAS to SATA to NVMe. Each successive generation of storage controllers uses less power while at the same time offering more performance, services, and control to OS and applications. Customers want the choice to refresh and upgrade their storage media-on-demand, based on their needs, budgets and technology availability.



Freedom To Repurpose

Workloads change over time and so do their requirements on storage.

Different applications have different I/O requirements. For instance, streaming, analytics and backup workloads need high read bandwidth. Transactional database workloads, on the other hand, thrive on low latency access to storage media. IoT workloads are typically characterized by millions of small-block size writes, hence rely on heavy write endurance from the SSD.

On the other hand, a wide variety of storage media at different price points is available today. If you want to optimize for read performance, for instance, the drives will have less RAM and consequently will be cheaper. You can optimize for capacity – from 800GB (IoT/DB) to 30TB in for cheap and deep storage. Heavy write endurance drives have overprovisioned NAND flash and hence are more expensive.

Suffice to say, one size does NOT fit all when it comes to storage media.

Customers want the choice to reuse, repurpose and redirect storage media based on their application's requirements, and, as they vary over time.



Freedom to Save

SSD cost is projected to decline while capacity and performance is expected to double every twelve months.

Customers want to leverage this dynamic and buy storage media on spot market at the best price or by utilizing existing strategic relationships with drive manufacturers and their distributors.

Introducing OpenChoice Storage™

Here at Pavilion, we say to our customers, we heard you, loud and clear. Our OpenChoice Storage, is an industry disruptor. Quite possibly the most unique model to procure and deploy storage.

OpenChoice defies the conventional models by giving YOU, the storage user, the ultimate control by breaking other storage vendors' predatory business models.

It has three key components.



B.Y.O.M.

Yes, you read it right. Bring Your Own Media. Leverage your relationships with your suppliers or buy directly on the spot market. Media is the single largest spend item in storage, and ultimately, we want you to shop around and save big. We support most major NVMe SSDs, and we are always qualifying new SSDs as they are released.



Flat Pricing, NOT Tied to Storage Capacity

We don't build SSD drives. We don't sell customized SSD drives. In fact, we have no IP there (and neither do most storage vendors, but they won't openly admit that). So we don't believe it is fair for us to charge by the gigabyte. Not for storage, not for software, and not for support. We guarantee our price will NEVER be tied to how much storage capacity is in the Pavilion HFA. You buy capacity from whoever you like at the lowest price you can get it. You expand capacity independent from performance on your timeline. That is the core architecture of our product. OpenChoice makes it ultra-simple to procure, deploy and scale, just-in-time.



All-inclusive, Cloud-like Subscription Price

Fixed annual price per Line card. Did we say the Pavilion HFA was built like a network switch? Annual subscription-to-innovation price is guaranteed not to change for the life of the array, regardless of capacity. The subscription price is for the Media Slot License, but it also includes all HW Warranty + Support + Maintenance + all SW features and future SW upgrades, FOREVER. And YES, we support the entire system, even if we don't sell the storage media. The buck stops with us. Period. And when needed, license more media slots to add more drives. Any capacity drives for that matter.

OpenChoice Storage™

With OpenChoice, our customers save over 50% in cost of acquisition alone over traditional AFAs. That, plus at least a 10X performance increase compared to legacy AFAs.

Customers reduce storage media spend by up to a third compared to (DAS) through better storage utilization on the Pavilion HFA. Net-net, we want our customers to save money.

OpenChoice puts the choice of right type of storage at the right price point for the right workload at the right time in the hands of users.

OpenChoice protects IT organizations existing and future investments in storage while providing ultimate flexibility to scale up/down performance and capacity independently just-in-time.

OpenChoice is THE disruptive business model that you have been waiting for. A truly composable/disaggregated NVMe-oF Storage Platform. To learn more about how Pavilion Data and OpenChoice Storage can help you in your rack-scale designs and NVMe-oF deployments, visit www.pavilion.com.

Contact us today, visit Pavilion at <http://www.pavilion.io/>, call (663) 263-6900, or email info@paviliondata.io.

About the author:

Gurpreet Singh is the CEO of Pavilion Data Systems. He has over 20 years of broad cross-functional leadership experience in the technology industry in roles ranging from strategic business planning and management, business development, product development, management and marketing.

Gurpreet was the first Product Manager on board at Pure Storage as the company went from near zero revenue to more than \$500 million in annual revenues during the three and half years that he was there. During his time there, he built out the product management and technical marketing functions at Pure Storage and was responsible for overall Product Strategy, Roadmap and Core Positioning, Strategic Business Planning, Business Models, and GTM Programs amongst other things.

Prior to that he served in various capacities at companies like Riverbed, Brocade, Microsoft and Cisco.

Gurpreet holds an MBA from Haas School of Business, UC Berkeley and an MSEE from UCLA.