

WHITE PAPER

OPENCHOICE
NVME-OF STORAGE
defy conventional thinking

INTRODUCTION

Modern cognitive applications are transforming entire industries. From eCommerce to AdTech, to Internet of Things (IoT) to Online Gaming to Security and 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

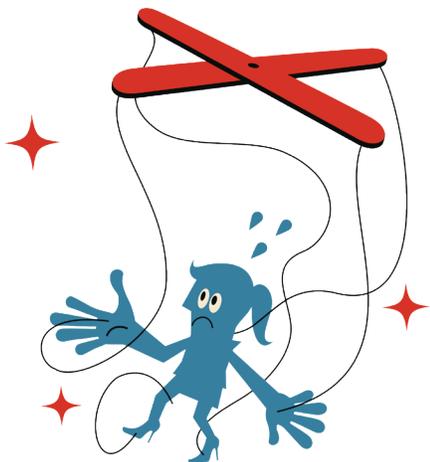
The dominant storage architecture for these modern applications is server-side storage, aka direct attached storage (DAS). When we asked our customers, “what is preventing them from going to a rack-scale design and composable/disaggregated infrastructure,” they gave us two key reasons.

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 IO requirements of an entire rack of servers. We address the performance density in spades with our Pavilion NVMe-oF Storage Platform.

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?”

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..."

Storage array manufacturers quite deliberately and completely lock those SSDs to the 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

"I already have my supplier relationships, and I can buy the same SSDs at less than a quarter of the price compared to what the enterprise storage systems AKA 'Big Storage' manufacturers are selling it for. 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!"

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 Big Storage at a 4x markup on drives they bought in the open market?

WHY, YOU ASK?

Well, it's simple. Big Storage wants to have their cake and eat it too!

Big Storage simply wants 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 TB do you need?" After all, their revenue and sales reps' compensation are directly tied to them selling you more capacity at huge markups. SSDs are fast becoming a commodity, and prices are coming down every six months.

Yet, Big Storage wants 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.

Not just the massive markup on SSD media, their software licensing and support/maintenance is also tied to array capacity.

This is the predatory business model that Big Storage has 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 going to composable/disaggregated storage for modern applications.

In fact, our customers have asked us for freedom of choice.



Choice 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 3D-NAND 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.



Choice to Reuse

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

Different applications have different IO 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 Flash.

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.



Choice to Save

The cost of NAND is projected to decline while capacities and performance is expected to double every twelve months.

Customers want to arbitrage freely on this supply chain dynamic and buy storage media on spot market at the best price and/or by leveraging strategic relationships with drive manufacturers or 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 Big Storage's 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 already, 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 the SSD drive. In fact, we have no IP there (and neither does Big Storage, 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. 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 price per Line card. Did we say our NVMe-oF Storage Platform 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 NVMe-oF Storage Platform. 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.paviliondata.com.

Contact us today

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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 has 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.