

# Pavilion NVMe-Over-Fabrics Storage Platform

## Highlights

### Performance

- 120 GB/s Read, 60 GB/s Write
- 100 us Latency
- 20m 4K Random Read IOPS

### Resiliency

- Up to 20 Active/Active controllers

### Capacity

- 14 TB - 1 PB in 4U

### Modular

- Up to 40 100 Gbe Ports

### Data Management

- Dual-Parity RAID
- Thin Provisioning
- Snapshots & Clones

### 100% Standards Compliant

- Up to 72 U.2 NVMe SSDs
- Inbox NVMeOF Support
- TCP and RDMA Transports Supported Simultaneously

### Standard Components

- x86 Processors
- No FPGAs
- No Custom ASICs

### Disruptive Economics

- Lowest \$/IOPS
- Purchase Your Own SSDs

## Pavilion delivers the true benefits of NVMe flash for today's modern massively-parallel data applications

Pavilion Data is Industry's only NVMe Over Fabrics Storage Platform. It is a true end-to-end NVMe solution, from the host all the way down to the media. The platform is 100% standards compliant with zero host-side presence or dependencies. It is built for the modern massively parallel and clustered web and analytics applications.

### The Power of Parallelism

NVMe is a new storage technology and it is inherently parallel. It is 250 times more parallel than SAS and 2000 times more parallel than SATA. In addition, modern web (transactional) and Machine Learning/AI (real-time analytics) applications are also built upon massively parallel and clustered databases and filesystems because of the performance requirements of these applications. Examples include Cassandra, MongoDB, HDFS, GPFS, etc.

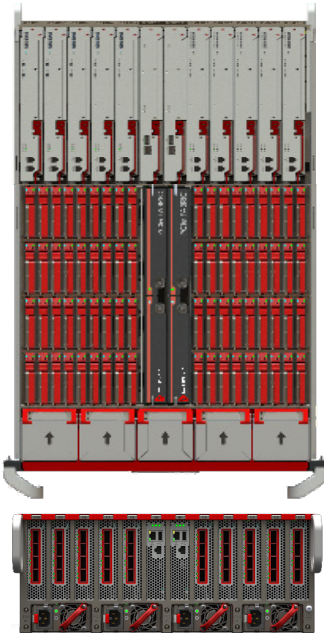
The Pavilion Memory Array can power the next generation of cloud era infrastructure by disaggregating storage so that compute and storage resources can scale and grow independently, allowing today's large-scale environments to become much more agile by delivering the exact amount of resources required flexibly and dynamically as needs change.

### An New Type of Data Platform

To take advantage of this massive parallelism of the storage media, and to deliver this raw, parallel performance to modern data applications, Pavilion had to completely challenge the decades old scale-up or scale-out enterprise storage architectures. We had to rethink how storage platforms of tomorrow should be built, with not just the technology but also the applications of tomorrow in mind. We had to design a new platform, from ground up, one that can exploit this parallelism and then provide that natively to the modern data applications.

NVMe protocol vastly simplifies host stack and that leads to massive reduction in host CPU utilization. So we wanted to make sure we are able to provide that performance, without encumbering the host with additional proprietary drivers or SW. Doing so would negate this key advantage of NVMe technology. We therefore needed to rely on standards based NVMeOF protocol that is native and inbox to most modern server OSes.

The result was an ultra-modular 4 Rack Unit Chassis platform which enables seamless and independent performance and storage capacity expansion. Of course, we realize that an Enterprise storage array is not a JBOF or an appliance and data availability and resiliency and availability was of paramount importance to us while designing this. The platform burnishes its enterprise credentials with no single point of failure design, true N:1 redundant controllers, Dual-Parity RAID, Redirect-on-block-write Snapshots and clones, and thin provisioning.



## OPENCHOICE Storage

Pavilion **OPENCHOICE** Storage allows customers to purchase their own SSDs to use in the Pavilion chassis. This allows customers to enjoy several benefits:

- Freedom to Innovate by embracing and upgrading to the next generation SSDs at the customer's pace, based upon the customer's business needs
- Freedom to Repurpose by reusing and repurposing storage media and capacity to/from anywhere in a customer's environment, as often as needed
- Freedom to Save by leveraging direct NVMe SSD supplier relationships

Next Business Day support is included with **OPENCHOICE**, although Pavilion does not provide warranty on customer-owned SSDs. **OPENCHOICE** allows customers to purchase a variable number of controllers and network ports, packaged in IO Line Cards that contains 2 controllers and 4 x 100 GbE ports each. NVMe SSD Drive Slots are licensed per year, and the customer can populate them as they see fit.

### OPENCHOICE Supported NVMe SSD Families

Micron 9200	HGST SN200	Samsung 1725b	Intel P4800X, P4510, P4610
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	RF108	RF120	RF140
Raw Capacity (TB)	14 TB - 57 TB	28 TB - 115 TB	115 TB - 1 PB
Usable Capacity (TB, post-RAID6)	12 - 50 TB	24 - 101 TB	101 - 810 TB
IO Line Cards	2	5	10
Storage Controllers	4	10	20
100 Gbe Network Ports	8	20	40
System Read Bandwidth (GB/s)	20	60	120
System Write Bandwidth (GB/s)	10	30	60
4K Random Read IOPS	4,000,000	9,000,000	20,000,000
Mixed 4K Random IOPS (70:30)	1,600,000	3,200,000	8,000,000
Power Consumption (Nominal - Max)	870 - 1050 W	1440 - 1800 W	2480 - 3200 W
Heat Dissipation (Max BTU)	3584	6143	10922
System Height (Rack Units)	4		
Expansion Options	Single IO Line Cards		
Operating Temperature Range	10C to 35C		
Non-Operating Temperature Range	-40 to 70C		
Humidity Range	8 to 90% (non-condensing)		
Non-Operating Humidity Range	5 to 95% (non-condensing)		
Dimensions	17.5 in W x 31.1 in D x 6.9 in H		
Weight	Full System - 147 lbs (66.7 kg); Half System - 116 lbs (52.6 kg)		
Agency Approvals			
Safety	IEC/EN 60950, CB Certificate, UL60950-1 CAN/USA-C22.2 No. 60950-1, CE Mark		
Emissions	EN55022/CISPR 22, FCC Part 15 Class A, ICES--003 Issue 5 Class A, VCCI Class A, AS/NZS CISPR22:2009 Class A BSMI CNS 13438 Class A		

\*All performance measurements taken in fully-sustained mode with RAID6 enabled