G2M RESEARCH

Enterprise Storage
Market Pulse Newsletter

July 2020

Is Data Storage Dead, or Has Data Storage News Just Become Really Boring?

If you were to look at any of the mainline storage periodicals over the past several months, you might conclude that nothing big is happening in enterprise data storage. For instance, most the headlines in Storage Newsletter (which I have a lot of respect for, by the way) in the past month have focused on (in order of occurrence) company earnings, the size of the storage market, or acquisitions. Other data storage periodicals (including ours) suffer from the same lack of content. While this does not necessarily make for interesting reading, it should not be surprising. With COVID-19, there hasn't been a "live" tradeshow in nearly eight months (the tradeshow with storage content being SC '19, which was in November 2019. And while there have been a lot of virtual tradeshows and conferences, it is not quite the same level of energy.

Certainly, the storage market is both maturing and consolidating. The last big technology "inflection point" in storage was Non-Volatile Memory Express™ (NVMe™), which only produced a couple dozen startups, of which only a handful still survive. That is not to say NVMe isn't (or wasn't) important – it is a huge sea change for both storage media, storage networking, and storage architecture.

So where is all of the excitement happening in storage? Unsurprisingly, a lot of the startup excitement in storage is in software, and much of that is in software for cloud storage. These include companies like Clumio, which is focused on cloud-based backup as a service and has raised a total of $186M, and Lightbits Labs, which utilizes NVMe/TCP to share direct-attach NVMe SSDs in a common pool (Lightbits has raised $50M).

Other "up-and-coming" startups in enterprise storage include Vast Data, which has raised $180M in funding to date to build an NVMe-oF distributed hardware platform to render storage arrays obsolete, and MemVerge, which has raised $43.5M in funding and uses server memory to scale and accelerate applications.

If nothing else, the lack of recent "exciting" new probably underscores the importance of live tradeshows from a marketing perspective, and how difficult it is to replace live tradeshows with virtual events. With the recent spike in the number of COVID-19 cases over the last few months, it may be a stretch to hope that we will see a "return to normal" even by 2021, but one can only hope 😊.

The Latest in Enterprise Storage Earnings

Given the last article, it might seem anticlimactic to talk about company earnings, but here we go anyway:

- SK Hynix grows revenues 33% year-to-year based on NAND flash, which is now 50% of revenue. Quarterly revenue in 2Q 2020 was 8.6T KRW, or roughly 7.16B USD.
- IBM FQ2 2020 storage system revenue is up 2%, mainly driven by mainframe storage. Total system revenue (including hardware and software) was $1.9B for the quarter.
- Michael Dell and SilverLake will maintain shareholder control of VMware when it spins out, with 53% ownership of VMware's shares.
- Qumulo raises $125M in funding, for a total of $351M in funding.
- Quantum's quarterly revenue for FQ4 2020 down by 16%.

While COVID-19 has disrupted the operations of most enterprise data storage customers, the need for storage appears to hit different companies unevenly, and the market in general seems to be starting back up.

NVMe over Fabrics™ Adoption Trends

One of the questions that I get a lot as a research analyst is "Is NVMe over Fabrics getting adopted in the storage industry?" It is a great question, and requires a bit of context to answer accurately. To start with, the purpose of NVMe over Fabrics (NVMe-oF™) was to provide a remote networking protocol that encapsulates NVMe commands. In a sense, NVMe-oF is analogous to SCSI network protocols such as FC and iSCSI, except NVMe-oF is purpose-build for flash storage, and provides much higher performance and lower latencies. There are five different flavors of NVMe-oF across three different physical fabrics: NVMe over

InfiniBand (NVMe/IB); NVMe over Fibre Channel (NVMe/FC), NVMe over RDMA over Converged Ethernet (NVMe/RoCE); NVMe over TCP (NVMe/TCP; Ethernet-based); and NVMe over iWARP (NVMe/iWARP; also Ethernet-based). Of the five, NVMe/iWARP was stillborn, and NVMe/IB is largely confined to high-performance use cases (though NVIDIA's acquisition of Mellanox Technologies could change that).

All of the remaining three NVMe-oF protocols have widespread support from I/O adapter companies. All Gen5+ and later Fibre Channel host bus adapters (HBAs) support NVMe/FC, as do all modern FC switches. Similarly, nearly every enterprise Ethernet NIC built in the past several years supports NVMe/RoCE or NVMe/TCP. For Ethernet switches, the story is a little more complex since NVMe/RoCE requires data center bridging (DCB) capable switches, but this is supported in most enterprise switches. Storage array support for NVMe-oF is also increasing – nearly all of the large enterprise storage array companies have NVMe-oF support in large numbers of their products. And NVMe-oF is becoming widespread as a back-end fabric for distributed storage arrays.

So when will end-users start adopting NVMe-oF? Interestingly, a large part of the reason has been the lack of

support (or ambiguous support) for NVMe-oF by the storage array vendors, who did not start adopting it until late in 2018. Since big storage array vendors such as Dell/EMC, Hitachi Vantara, HPE, NetApp, IBM, and Pure Storage are often the greatest influence on enterprise storage customers AND enterprise storage customers tend to be fairly conservative, this has translated into slow end-customer adoption. Now that the big enterprise array companies are pushing NVMe-oF, we can probably expect to see an uptick in storage adoption in 2021.

Flash Memory Summit 2020 Goes Virtual!

Flash Memory Summit (FMS) 2020, which was originally scheduled for a physical event in early August in Santa Clara, CA, has announced that they are now going virtual. FMS 2020 is now scheduled for November 10-12, 2020. The lineup for the conference has not yet been announced, but expect the same leading flash storage companies to be a part of FMS 2020. Stay tuned for more details.

Upcoming G2M Research Webinars for the Rest of 2020

We just hosted our webinar on "AI, Self-Driving Cars, and Advanced Storage", which was sponsored by NVIDIA, Weka, and b-plus. If you would like to view the recording and/or download a PDF of the slides, you can access them here.

As our industry continues to be "virtual" during the rest of 2020, webinars can be a good way to stay up-to-date. G2M has several webinars scheduled for this year on hot topics in our industry. Interested in attending our webinars? Register by clicking on the dates of interest. Interested in Sponsoring a webinar? Contact **G2M** for a prospectus.

August 25:	**Gen4 PCIe SSDs, SmartSSDs, and ESDFF – Where Do SSDs Go Next?**
Sept 15:	Edge Computing/Storage – Get (and Keep) Your Data Off Of My Cloud
Oct 20:	AI and Storage Use Cases in Healthcare
Nov 17:	NVMe-oF™ - Using Telemetry to Improve Network Latency

Upcoming 2020 Enterprise Storage Events

- SNIA SDC, now virtual, September 22-23.
- Microsoft Ignite, September 21-25, more info soon.
- VMworld US, September 28- October 2, may have regional gatherings this fall as well.
- NetApp Insight 2020, October 26-28 (still a live event at Mandalay Bay, Las Vegas NV).
- Flash Memory Summit, now virtual, scheduled for November 10-12.
- SC 20, Nov 15-20, Georgia World Congress Center, Atlanta GA.

Effective Marketing & Communications with Quantifiable Results

Enterprise Storage Newsfeed

[Commvault's mix-and-match **data** and **storage** targets hybrid, multicloud use cases](#)
SiliconANGLE

So when it comes to **solutions**, customers no longer expect to be tied down to a package that comes with a finite number of **solutions** — some necessary ...

[Sage Microelectronic achieves high reliability and performance with **SSD** controllers](#)
Digitimes

... of about US$90 million, Sage Micro's product line covers mobile **flash** controllers, **SSD** controllers, and aggregator/RAID/port-multiplier controllers.

[Screaming fast **NVMe** controllers blur line between storage and memory](#)
ZDNet

NVMe (Non-Volatile Memory express), the latest and greatest storage interconnect, is based primarily on PCIe, a standard undergoing rapid evolution.

[**NVMe** over Fabrics startup Lightbits Labs adds clustering](#)
TechTarget

Lightbits Labs' LightOS now enables application servers to access **NVMe** flash SSDs in a cluster of servers -- not just a single box -- over standard ...

[Sabrent is selling the world's first 4TB **NVMe** PCIe 4.0 SSD for $750](#)
TechSpot

Sabrent has once again grabbed a world-first in the solid-state drive market. Following on from its 8TB **NVMe** SSD that ran on the PCIe 3.0 interface, the ..

[IBM **data storage** revenues hold steady in Q2](#)
Blocks and Files

Operating **system** software declined 13 per cent while **cloud**-based revenues in the **systems** business grew 22 per cent. Global Financing — revenues of ...

[Radian completes integration and testing of Zoned **Flash SSD** with SPDK](#)
PRNewswire

Radian's RMS-350 U.2 Zoned **Flash SSD** that is targeting compliance with the NVM Express™ specification for Zoned Namespaces (ZNS) was utilized ...

[KIOXIA **SSDs** Gain Compatibility Approval with Broadcom Tri-Mode Adapters](#)
Business Wire

... supplier of **flash** memory and **solid state drives** (**SSDs**). From the invention of **flash** memory to today's breakthrough BiCS **FLASH**™ 3D technology, ...

[2020 CRN SSD and Flash **Storage** Products: 5 Vendors to Consider](#)
Solutions Review

Dell EMC enables digital transformation through hybrid **cloud** and big **data solutions** built on a **data** center infrastructure that brings together converged ...

[AI Enabling IBM Elastic Storage, **Cloud** File Storage And Optane **Storage Systems**](#)
Forbes

This piece looks at a number of recent announcements concerning digital **storage** and memory for **data** center and **cloud** applications, including IBM's ...

[News Bits: Rackspace, AMD, Plugable, Nasuni, Catalogic, TerraMaster, Panzura, & Others](#)
StorageReview.com

... announced that its ECX copy **data** management (CDM) solution now supports the HPE Nimble Storage all flash and hybrid array **storage systems**.

Carahsoft and Pavilion **Data Systems** Partner to Bring High Performance Computing and **Storage** ...
HPCwire

Pavilion **Data Systems** is the leader in the third wave of **storage**, delivering unmatched performance, density, and ultra-low latency at scale, without the ...

The 10 Hottest **SSD** And **Flash** Storage Products Of 2020 (So Far)
CRN

Flash storage continues to mature as vendors including Dell EMC, HPE, Hitachi Vantara, and Pure Storage adopt the latest technologies including ...

NVMe Support Likely Coming to Raspberry Pi
Tom's Hardware

The upcoming Compute Module 4 will probably support **NVMe** storage. A Pi 4A might also. Shares. Comments (0).

StorCentric's Nexsan Division Adds 2 Unity Unified **Storage Systems**
Channel Futures

A big plus is that Nexsan Unity customers can also now move their **stored data** to the **cloud** on demand. The previous **device** versions did not offer that ...

Kioxia demonstrates new high-capacity **SSD** form factor
Network World

EDSFF has been designed from the ground up to support **SSDs** in all-**flash** arrays for both cloud and enterprise data centers using a new form factor ...

Hitachi Vantara joins WekaIO fast filer OEM fan club
Blocks and Files

The scale-out HCP object **system** supports NFS and CIFS file access and tiers **data** to public **cloud** object **stores**. Weka delivers the fast file access ...

HPC Integration Specialist Boston Limited Releases Certified Panasas ActiveStor Ultra to Its Global ...
Odessa American

ActiveStor Ultra features PanFS®, the fastest parallel file system at any ... computing (HPC) **data storage solutions** that support industry and research ...

World's Largest **SSD** Is Nimbus Data's ExaDrive 100TB & Costs $40000
Screen Rant

World's Largest **SSD** Is Nimbus Data's ExaDrive 100TB & Costs $40,000 ... Nimbus Data now now announced pricing for its ExaDrive **SSD** solutions ... up to 114,000/105,000 IOPS, owing to the enterprise-grade MLC 3D NAND **flash** ...

IBM Unveils New All-Hard-Disk **Data Storage System**
Channel Futures

Eric Herzog, chief marketing officer for IBM **Storage**, told Channel Futures that the company built ESS5000 for **data** lake use. The new arrays are great for ...

Pavilion adds object storage to **NVMe** Hyperparallel Flash Array
ComputerWeekly.com

"We started with the [**NVMe**-over-fabric] network and built the storage platform on top of it," said co-founder and vice-president Sundar Kanthadai in a ...