



Ultra-Sized Storage Challenges Demand Ultra-Dense Storage Solutions

Faced with a perfect storm of skyrocketing data growth, static budgets, and limited floor space, data center managers are increasingly turning to compact, high-capacity storage arrays for relief. **By Rich Freeman**

Introduction

According to analyst firm IDC, IT leaders today face three brutal realities. First, data volumes are exploding. In fact, IDC expects the “digital universe” of global data to double in size every two years between now and 2020, when it will reach 44 zettabytes.¹ In more familiar terms, that’s 44 trillion gigabytes. It’s coming not just from traditional structured sources like databases and unstructured data like documents and videos, but also from a new breed of emerging workloads such as analytics, surveillance, and the Internet of Things (IoT) that demand more scale and longer data retention times.

Second, floor space in global data centers is expanding too, but at a far slower 8.4 percent compound annual growth rate,² forcing customers to store more data in less space. And third, IT and telecommunications spending is growing more slowly still, and will rise just 3.8 percent in 2015,³ forcing customers to find more cost-effective solutions to data growth.

Together, those trends leave today’s

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hard-pressed technology executives caught in the middle of a perfect storm of storage in which available resources are falling behind capacity requirements.

In their search for a path out of that trap, companies large and small are increasingly turning to a new class of “ultra-dense” storage arrays. With their massive capacity, compact footprints, and budget-stretching efficiency, ultra-dense arrays are offering IT managers exactly what they most need: a way to store more data in less space without going over budget.

Data downpour

Ultra-dense arrays are also providing companies with an ideal tool for coping with some of IT’s most storage-intensive trends, such as increased use of video. Businesses and government agencies alike are increasingly employing digital video surveillance solutions to keep their people and facilities safe. Large deployments routinely feature hundreds or even thousands of cameras. Storing all of that footage requires the immense quantities of

economically priced capacity that ultra-dense arrays can supply.

Furthermore, surveillance systems aren't the only reason video is piling up fast in data centers these days. "Corporations, universities, and not-for-profits are using video more and more as a basic communication tool" and for functions like employee training, says Sam Bogoch, CEO of Boston-based media management software maker Axle Video LLC. The quality of all that video is climbing fast too, he adds, resulting in larger and larger files. "Companies very quickly transition from needing tens of terabytes of storage to needing hundreds of terabytes," Bogoch notes. Ultra-dense arrays are a more efficient way to keep pace with those demands than deploying conventional storage solutions.

Ultra-dense arrays are a great fit for tiered storage environments as well. Designed to help companies optimize performance and total cost of ownership (TCO), tiered storage architectures can employ high-speed flash for storing high-I/O data and lower-cost, high-capacity drives for storing less active data. With their enormous capacity and low price per terabyte, ultra-dense arrays are ideally suited for use in that secondary or tertiary storage tier.

For similar reasons, ultra-dense arrays are also a winning option for companies in the many industries coping with data retention burdens. In healthcare, for example, increased use of electronic medical record applications and digital imaging solutions has hospitals and clinics overflowing with patient information. According to IDC, in fact, the global volume of healthcare data will grow over 1,400 percent between 2013 and 2020, from 153 exabytes to 2,314.⁴ Organizations required by law to retain data face the same pressures, as do media and entertainment companies with swelling digital content libraries.

Another relevant storage trend is the rise of big data analytics solutions and

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the diverse enterprise data sets they collect and retain. Those include IoT data flows, which are expanding fast. According to Gartner Inc., the global population of Web-enabled devices is expected to balloon from nearly 4.9 billion in 2015 to more than 25 billion just five years later.⁵

"What all of those users share in common is a need to store larger amounts of data, without knocking out data center walls and without blowing away the IT budget," observes Travis Vigil, executive director of product management for Dell Storage in Round Rock, Texas. "In situations like that, an ultra-dense array is going to be a very attractive solution." Moreover, ultra-dense arrays are an increasingly appealing option even for companies without specialized workloads. "Just being able to consolidate a general virtualized compute environment into a smaller footprint is a big win for a lot of our customers. For example, businesses seeking to save space and money are rapidly virtualizing and consolidating a wide range of mega-sized solutions with diverse requirements, ranging from ERP applications and email stores to SQL databases and content management repositories," Vigil notes.

Must-have functionality

To capitalize fully on the advantages of ultra-dense storage, however, businesses must choose an ultra-dense array with all of the features and capabilities they need.

"The first issue is capacity," Bogoch observes. "Any ultra-dense array worth having should be part of a NAS or SAN solution that is capable of scaling to multiple petabytes. It should also provide a flexible range of high-capacity drive options, including hybrid configurations that combine disk-based and flash-based drives."

In addition, an ultra-dense array isn't truly ultra-dense unless it packs all of that capacity into a small form factor. Doing so not only conserves floor space but reduces power consumption and cooling requirements as well, resulting in lower operating expenses. "Everyone wants to stretch their data center dollar as far as it'll go," Vigil says. "Using energy-efficient, ultra-dense storage arrays definitely helps to keep OPEX low."

Capacity and efficiency alone are only starting points, however. Applications such as surveillance and big data need strong performance as well as large capacity. Such solutions generate so many I/O requests that a storage system with insufficient throughput won't be able to keep up, which in some cases can lead to dropped packets and lost data.

Any storage solution leveraging ultra-dense arrays should also include advanced monitoring tools, automated management functionality, and integrated load balancing and performance optimization systems. To keep mission-critical data safe, industry-leading models come with heavy-duty data protection features including snapshots and replication. They also collect real-time and historical statistics on capacity, performance, and other matters that administrators can export to analytics and reporting applications and then scrutinize for bottlenecks and inefficiencies.

Together, all of those features combine to yield low TCO and high return on investment (ROI). "Density,

efficiency, performance, and easy manageability are all must-have qualities in an ultra-dense array," Vigil says. "Leave out any of them and one way or another it'll wind up costing you money or consuming IT resources."

Outstanding options

As Vigil is quick to note, Dell offers a range of ultra-dense storage solutions with all four of those qualities and more. "To accommodate new workloads such as video surveillance and IoT data streams, dense, cost-effective arrays are suddenly a critical tool to improve data center efficiency," he says. "That's why Dell has delivered dense-array capabilities for every one of our NAS and SAN solutions."

For example, the new Dell Storage SCv2080 is an outstanding entry-level array for small and midsize businesses looking for both low price per terabyte and superior performance. Equipped with as many as 84 solid-state and hard-disk drives, the SCv2080 can also expand the total number of drives to 168 in a single SAN/DAS environment when coupled with a Dell Storage SC180 expansion enclosure, which provides up to 504 terabytes of data. It also comes with powerful data protection and RAID tiering capability, as well as multiprotocol connectivity.

Designed for midsize data centers with somewhat more complex requirements, the new Dell Storage PS6610 also offers up to 504 terabytes of capacity but can also provide over 8 petabytes of scale-out iSCSI SAN capacity when deployed in a 16-unit cluster. That's 3.5 times more storage space⁶ than comparable previous PS Series arrays in a footprint up to 50 percent smaller, thanks to onboard compression for data reduction of snapshots and replicas.⁷ Better yet, the PS6610's load balancing, performance optimization, and 10GbE iSCSI networking technologies provide stellar performance too.

To rev up operating speeds, the PS6610's three drive configurations include a hybrid flash/disk option that provides up to seven times better

data tiering, compression, robust data protection, and powerful management, monitoring, and reporting tools.

Both the PS6610 and the SC280

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performance⁸ than earlier-generation products. The array automatically tiers data from HDDs to SSDs to make sure the hot data is on the fastest tier for quick access. "That allows you to accommodate both a performance-optimized flash storage layer and a capacity-optimized disk storage layer in the same array," Vigil notes. To simplify management at large scale, the PS6610 also comes with automated load balancing functionality, as well as powerful data protection, monitoring, and reporting software.

Tailored to the needs of larger data centers, the Dell™ Compellent™ SC280 expansion array features equally impressive capabilities. A disk-only solution, the SC280 provides up to 4 petabytes of raw capacity per 48U rack when deployed across two Dell Compellent Storage Center SC8000 SAN systems, which offer intelligent self-optimizing

can be combined with Dell's Fluid File System NAS offering for unified block and file storage, supporting large amounts of file data. Dell Fluid File System and NAS appliances decrease the capacity needed to store common data by up to 48 percent⁹ with data reduction technology that can automatically deduplicate and compress data to reduce your data footprint and TCO. In addition, Fluid File System offers advanced data protection through snapshots and replicas, SMB anti-virus support, and NDMP for backup and disaster recovery.

According to Bogoch, all of Dell's ultra-dense arrays offer an additional, easily overlooked benefit: They're backed by Dell. "Dell has global reach and support in place, and the ability to warranty, install, and configure arrays anywhere in the world," he says, not to mention the kind of solid reputation,

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history of innovation, and deep industry roots that give IT leaders peace of mind. "You know your storage vendor is going to be around for a while," Bogoch says.

Compelling ROI

Dell storage solutions share one more trait in common, though: eye-popping ROI. Indeed, on average businesses indicated a 513 percent return on their storage investments and achieved 100 percent payback in 6.2 months, according to a Dell-sponsored IDC survey of real-world data center customers.¹⁰ "Payback in 6 to 9 months is normally considered to be very rapid, so the 6.2-month payback for Dell storage in this study should be considered an exceptional performance," IDC writes.¹¹

The IDC survey credits several factors for those results. By empowering organizations to optimize and expand their storage environments cost-effectively, Dell storage solutions produced an average savings of \$71,516 a year per 100 users, according to the survey. They also contributed \$14,368 in annual savings per 100 users by enhancing administrative efficiency and \$31,008 per 100 users by slashing unplanned downtime. Furthermore, that

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IDC survey

availability spike resulted in 31 hours a year of additional employee productivity and \$374,000 in incremental revenue, IDC reports. Surveyed customers also experienced a 32 percent drop in IT infrastructure costs and a 34 percent jump in storage system performance.¹²

In addition, the IDC paper showed that Dell SC Series installations tended to have a 66 percent longer productive life span than non-Dell storage solutions.¹³ Organizations in the study replaced Dell SC Series or PS Series solutions every 6.75 years on average compared with 4.08 years for other storage environments.¹⁴ "This is especially important for dense-array customers who are retaining large amounts of data for longer periods of time and would be especially challenged by data migrations," Vigil observes.

A separate study from Enterprise Strategy Group Inc. (ESG) generated comparably compelling results. In a head-to-head comparison with similarly provisioned SAN arrays from other manufacturers, ESG found that Dell Storage PS Series solutions delivered the lowest TCO over a five-year time span, saving users up to 58 percent versus the competition.¹⁵ "ESG Lab has confirmed that Dell [PS Series] storage is not only easy to configure and manage, but also offers a significant cost savings compared with other vendors," the study asserts.¹⁶

All the more reason for companies struggling with skyrocketing data growth, static budgets, and limited floor space to give ultra-dense storage arrays from Dell a serious look. They're an efficient, affordable, high-capacity escape route from today's colliding storm fronts of storage.

^{1,4} IDC, *The Digital Universe of Opportunities: Rich Data and the Increasing Value of the Internet of Things*, April 2014.

² IDC, *Worldwide Datacenter Census and Construction 2014-2018 Forecast: Aging Enterprise Datacenters and the Accelerating Service Provider Buildout*, October 2014.

³ IDC, *IDC Predictions 2015: Accelerating Innovation—and Growth—on the 3rd Platform*, December 2014.

⁵ Gartner, *Gartner Says 4.9 Billion Connected 'Things' Will Be in Use in 2015*, November 2014.

⁶ Based on internal Dell analysis of total capacity in October 2014 comparing PS6610 arrays to PS6510 arrays.

⁷ Based on September 2014 internal Dell analysis of the EqualLogic Array Software 8.0 compression feature with PS6210 arrays, using real-world home share environment comprised of snapshots and replicas. Requires a PS6210 or PS6610 in the environment. Results will vary based on configuration, data types, and usage.

⁸ Based on January 2015 Dell performance testing the PS6610ES hybrid-flash arrays and the PS6510ES hybrid-flash arrays using IOMeter with 4KB block and 70/30 read/write random IOs. Actual performance will vary depending on the workload and drive type.

⁹ Based on May 2013 internal Dell analysis of the FS8600 NAS appliance with Fluid Data Reduction, using real-world home share environment comprised of Office files (21%), .GZ (19%) and .flate (19%) files, among others.

^{10, 11, 12, 13, 14} Based on Dell EqualLogic and Dell Compellent customer interviews from the January 2015 Dell-sponsored IDC Whitepaper: *Driving Business Value with Flash-Optimized Dell Storage Solutions*.

^{15, 16} Enterprise Strategy Group, *Dell EqualLogic PS Series Storage and TCO Analysis*, January 2014.