



Special Study

Worldwide All-Flash Array and Hybrid Flash Array 2014-2018 Forecast and 1H14 Vendor Shares

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IN THIS EXCERPT

The content for this excerpt was taken directly from Worldwide All-Flash Array and Hybrid Flash Array 2014-2018 Forecast and 1H14 Vendor Shares (Doc#252304). Tables in this excerpt are taken from the same data source as the report but provide less detail without changing market totals. Tables included within this excerpt are taken from the original report but show only a limited number of suppliers and time periods. Though fewer data points are provided, all totals align with the original report. Table numbers are left unchanged, but not all original tables have been included. From the original report: Table 5 is now Table 1, Table 7 is now Table 2, Table 1 is now Table 3, and Table 3 is now Table 4. These tables were renumbered to provide a smooth flow to this excerpt. All or parts of the following sections are included in this excerpt: IDC Opinion and In This Study, that relate specifically to EMC, and any figures and or tables relevant to EMC.

IDC OPINION

The flash-based array market, which includes both all-flash arrays (AFAs) and hybrid flash arrays (HFAs), is on fire. In the first half of 2014, the combined markets grew at noticeably higher rates than what IDC had forecast it to grow with previous projections. Individually, each market segment also outgrew our 2013 forecast projections. In addition:

- Across the board, vendors are aggressively flash optimizing their offerings to provide improved performance, longer endurance, higher reliability, and lower effective dollar per gigabyte. More flash-based array platforms are offering enterprise-class data services, which include snapshots, clones, encryption, replication, and quality of service (QoS), as well as storage efficiency features like in-line compression and deduplication and thin provisioning. This rich set of offerings is moving the deployment paradigm for flash-based arrays away from the traditional "dedicated application" model toward that of mixed workload consolidation.
- There is no question about the importance of flash's future in the datacenter. Although the initial market entrants with flash-optimized offerings were all start-ups, at this point, all the traditional enterprise storage vendors, ship all-flash configurations of their HFAs as well, and several, have AFAs. Start-up revenue leaders in the flash-based array space had their hegemony challenged as EMC and IBM entered the market with their own AFAs and grew their revenues at rapid rates.

- IDC's guidance is clear. If you are a flash-based array vendor, make sure you have a flash-optimized platform that offers in-line compression and deduplication as well as other enterprise-class data services. If you are an end user, you should be considering flash-based arrays when the time has come to retire your existing enterprise storage platforms.

IN THIS STUDY

This IDC study provides detailed insights into the rapidly growing market for enterprise storage systems that leverage flash storage media. This study segments this market into the following two technology segments: AFAs and HFAs. Insights into these two market segments are provided historically. Market shares and IDC analysis are provided for each of the top vendors in these two segments along with detailed market-level analysis.

Methodology

IDC has collected worldwide AFA and HFA sales (revenue) and raw terabytes sold between January 1, 2012, and June 30, 2014, for this study through a bottoms-up approach with the intention of reflecting the entire value of the enterprise storage systems (i.e., not just the value of the flash capacity). IDC worked from our historical tracker data and accepted guidance from vendors where provided. All public statements made by suppliers were also taken into consideration when sizing this market.

Note: All numbers in this document may not be exact due to rounding.

Taxonomy

IDC trifurcates the enterprise storage market into I/O-intensive, performance-optimized, and capacity-optimized solutions. I/O-intensive solutions include flash-based storage, performance-optimized solutions include 15,000 rpm and 10,000 rpm hard disk drives (HDDs), and capacity-optimized solutions include 7,200 rpm HDDs and lower.

I/O-intensive storage includes both server- and network-based options. Server-based flash options include flash cards and solid state disks (SSDs) that are internal to the server. To be forecast as part of "enterprise" storage, a server must include three or more internal SSDs. Network-based options include AFAs (like EMC XtremIO or Pure Storage FA Series), HFAs (like NetApp FAS or Nimble Storage CS-Series), all-flash configurations of HFAs (like HP 3PAR StoreServ 7200), and flash caching appliances (like Avere Systems' FXT Series). With these in mind, IDC makes no attempt to size the server-based flash market in this study. Thus all numbers in this study should be considered network-based arrays.

AFA revenue will include the value as well as the capacity of the entire system. Note that many of the AFAs include software like snapshots and replication that may be separately charged for or included with no SKU or assigned price (i.e., bundled as part of the system price). Any software that a supplier assigns a direct price to will be excluded from the revenue numbers in this study. Any software that is bundled into the base purchase of an array with no assigned price or SKU is considered to have no monetary value and thus not factored into the value of the market. HFA revenue will include the

combined flash storage, including either the flash storage modules or SSD values, and the HDD values (if applicable), shown as a single system-level number. HFA capacity will include both HDD and flash storage capacity, with splits for each. Upgrade revenue from additional components sold into existing AFAs and HFAs will also be incorporated into the final numbers, but not called out.

All-Flash Arrays

An AFA is defined as a network-based storage system that can only use flash media to meet performance and capacity requirements. There are two predominant AFA architectures: flash based and SSD based. Flash-based architectures utilize flash media that has not been packaged to appear as a standard drive, and vendors in this category include IBM (FlashSystem), Skyera (skyHawk), and Violin Memory (Concerto 7000). SSD-based architectures utilize SSDs, and vendors in this category include Kaminario (K2), Nimbus Data (Gemini), and SolidFire (SF). For more information on the differences between flash- and SSD-based architectures, see *Flash-Optimized Storage Architectures* (IDC #249295, June 2014).

Hybrid Flash Arrays

An HFA is defined as an external storage system that can (but does not necessarily) use a mix of SSDs and HDDs to meet performance and capacity requirements. Many vendors offer their HFAs in all-flash or mixed flash and HDD configurations. IDC counts both the flash and the HDD-based value of HFAs in this study, regardless of whether those are all-flash or mixed configurations. HFA vendors include Dell (Compellent), EMC (VMAX, VNXe), HP (3PAR StoreServ), and NetApp (FAS and E-Series). Some of these vendors ship all-flash configurations for their HFAs from the factory, such as EMC's VNX-F and Tegile's T3800. Note that many HFA vendors also have true AFAs and tend to target their all-flash HFAs for application workloads requiring millisecond latencies, whereas their AFAs are targeted at those that require sub-millisecond latencies.

This study considers all-flash configurations of HFAs to be HFAs, not AFAs. These systems are built using what IDC considers HFAs but ship from the factory with only flash media. Some vendors actually have SKUs on their price lists for these configurations, while others just configure them ad hoc based on customer requests. The addition of this new segment allows IDC clients to get a better understanding of the true value of arrays that ship in all-flash configurations by allowing them to add the AFA and HFA SSD (all flash) segments together.

It is interesting to note that over time, the distinction between AFAs and all-flash configurations of HFAs is blurring. Many of the flash-optimized features that were originally found only in AFAs have over time been added to HFAs. Some vendors offer all-flash trays with extensive flash-optimization features that can be integrated into their HFA offerings (e.g., HDS' Flash Module Drives or Nimble Storage's All-Flash Shelves). There is still generally a distinction between the two, particularly in their abilities to consistently deliver sub-millisecond performance even as configurations scale, but there is not as much of a performance difference between the two as there has been in the past.

Under this taxonomy for network-based flash arrays, IDC is sizing the system value to include flash media-based storage (flash, SSD) and HDDs (if they are present). The value of any software with a SKU/price is excluded from this study, and any software bundled as part of the system at no cost is considered to have no value or impact on the size of the market. This applies to any flash-based cache and to primary storage. Cache is defined as a nonpersistent copy that is used for performance

acceleration, whereas primary storage is defined as storage that contains a persistent copy of the data. Most storage systems include at least some RAM cache, but the type of cache we are sizing in this study is specific to flash delivered in the form of a card or a disk – it does not include main memory cache.

Vendor Shares

All-Flash Arrays

Tables 5–8 of the original document showed historical AFA sales and capacity shipments by vendor, and year-over-year growth rates are also provided. . Tables 1 and 2 (previously Tables 5 and 7) are included below and show only the most recent time period (1H2014), Totals are the unchanged from the original tables, but only the top 6 suppliers are shown. Tables 6 and 8 have been excluded as have 2012 & 2013 sales.

TABLE 1

Worldwide All-Flash Array Revenue by Vendor, 1H14

	1H14	
	Revenue (\$M)	Share (%)
EMC	112.3	22.6
Pure Storage	90.9	18.3
IBM	82.9	16.7
NetApp	45.0	9.1
SolidFire	35.6	7.2
Nimbus Data	34.3	6.9
Other	95.3	19.2
Total	496.3	100.0

Notes:

Data includes the value of the entire system but excludes channel markup.

Texas Memory Systems moved from the "other" category to IBM during CY13.

Source: IDC, 2014

TABLE 2**Worldwide All-Flash Array Raw Capacity Shipments by Vendor, 1H14**

	1H14	
	Shipments (TB)	Share (%)
IBM	22,773.0	27.3
EMC	13,404.5	16.1
Pure Storage	7,557.9	9.1
SolidFire	7,525.7	9.0
Nimbus Data	7,501.3	9.0
Violin Memory	5,583.9	6.7
Other	19,130.0	22.8
Total	83,476.3	100.0

Note: Texas Memory Systems moved from the "other" category to IBM during CY13.

Source: IDC, 2014

Hybrid Flash Arrays

Tables 1-4 of the original document showed historical HFA sales and capacity shipments by vendor, and year-over-year growth rates are also provided. Tables 3 and 4 (previously Tables 1 and 3) are included below and show only the most recent time period (1H2014), Totals are unchanged from the original tables, but only the top 6 suppliers are shown. Tables 2 and 4 have been excluded as have 2012 & 2013 sales.

TABLE 3**Worldwide Hybrid Flash Array Revenue by Vendor, 1H14**

	1H14	
	Revenue (\$M)	Share (%)
EMC	1,575.8	35.5
NetApp	891.8	20.1
Hitachi	521.2	11.7
IBM	408.7	9.2
Dell	211.3	4.8
HP	113.5	2.6
Other	715.6	16.1
Total	4,437.9	100

Note: Data includes the value of the entire system but excludes channel markup.

Source: IDC, 2014

TABLE 4**Worldwide Hybrid Flash Array Raw SSD Capacity Shipments by Vendor, 1H14**

	1H14	
	Shipments (TB)	Share (%)
EMC	45,273.7	22.6
Dell	44,637.7	22.3
Hitachi	37,490.3	18.7
NetApp	22,209.5	11.1
IBM	18,368.5	9.2
HP	7,511.9	3.8
Other	24,474.8	12.3
Total	199,966.4	100

Note: Data excludes HDD capacity.

Source: IDC, 2014

Vendor Profiles

EMC

Prior to the release of the XtremIO AFA in late 2013, EMC had shipped a significant amount of flash in its traditional block-and-file HFA product lines. By the time the XtremIO product began shipping in November 2013, EMC had also introduced a VNX-F model that, while still considered an HFA by IDC, shipped from the factory configured with all-flash storage (no HDDs). Although EMC was late to market with XtremIO compared with the amount of time start-up AFA suppliers had been selling their arrays, it grew revenue rapidly, surpassing \$60 million within 2Q14 hardware revenue. The XtremIO array features a scale-out, multi-controller architecture; a dual-stage metadata engine that, while memory intensive, minimizes the need for free space management tasks that impact performance; a data protection scheme called XDP that is more efficient than RAID 6 yet provides the same protection; and an entry-level configuration that offers the ability to deliver over 1 million IOPS despite its "always on" in-line compression and deduplication.

Although the company stumbled slightly in September 2014 with the issue of a disruptive upgrade to the XtremIO platform, as a company EMC does have a reputation for delivering reliable products that it stands behind. EMC clearly understands the importance of mixed workload consolidation to the future success of its all-flash storage platforms and has a wealth of experience delivering enterprise-class data services like thin provisioning, snapshots, clones, QoS, replication, and encryption on other enterprise storage platforms that IDC expects the company will leverage to its advantage going forward.

In May 2014, EMC also announced the acquisition of DSSD, a start-up designing server-based flash storage solutions. In 2012, EMC had announced Project Thunder, a server-based flash storage solution, but then cancelled that project in early 2013. EMC's purchase of DSSD shows that the company has reconsidered the market opportunity for very-low-latency server-based flash storage solutions, but EMC is now pursuing it with products that will look more like extensions to main memory rather than Project Thunder's PCIe card-based solution. The DSSD technology should pair nicely with EMC's 2013 purchase of ScaleIO, a software-defined storage platform that supports a scale-out server SAN.

With EMC's hybrid VMAX and VNX arrays, the XtremIO all-flash platform, and DSSD server-based flash, the company will offer a range of flash solutions in its portfolio that meet a wide set of requirements. EMC's VMAX and VNX arrays follow the legacy software-licensing model, charging extra for add-on software functionality, whereas XtremIO follows the newer AFA model where all (or most) software functionalities are bundled in with the base platform purchase.

About IDC

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