IDC MarketScape

IDC MarketScape: Worldwide All-Flash Array 2017 Vendor Assessment

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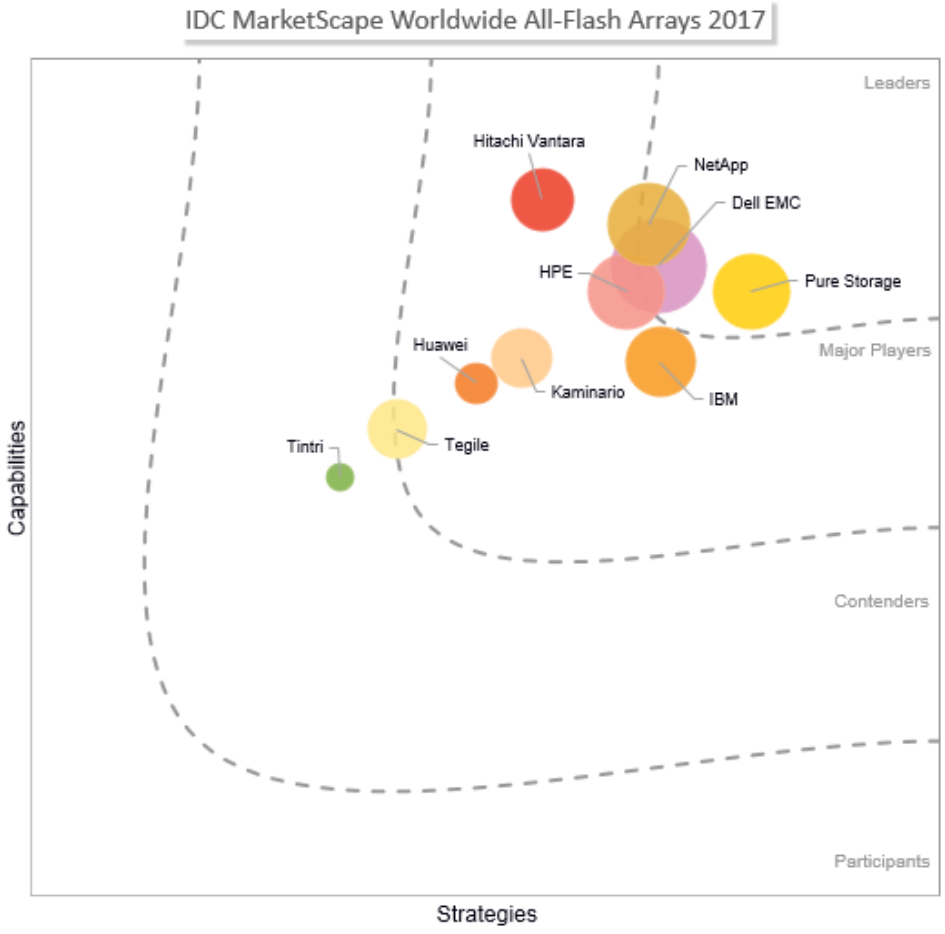
THIS IDC MARKETSCAPE EXCERPT FEATURES NETAPP

IDC MARKETSCAPE FIGURE

FIGURE 1

IDC MarketScape Worldwide All-Flash Array Vendor Assessment



Source: IDC, 2017

Please see the Appendix for detailed methodology, market definition, and scoring criteria.

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IN THIS EXCERPT

The content for this excerpt was taken directly IDC MarketScape: Worldwide All-Flash Array 2017 Vendor Assessment (Doc #US43310017). All or parts of the following sections are included in this excerpt: IDC Opinion, IDC MarketScape Vendor Inclusion Criteria, Essential Guidance, Vendor Summary Profile, Appendix and Learn More. Also included is Figure 1.

IDC OPINION

The all-flash array (AFA) market has undergone significant maturation over the past two years. A high percentage of customers have already committed to an "all flash for primary storage" strategy, and every customer interviewed for this study was among those. In 2017, AFAs will drive over 80% of all primary storage revenue. All of the established storage vendors have entered this space, and there are several start-ups with over $100 million in revenue. With this level of market maturation, multiple segments have developed within the primary flash array space. There are systems targeted for dedicated application deployment, there are systems specifically for web-scale applications, and there are systems intended for dense mixed workload consolidation. These latter systems are driving most of the AFA revenue, and they aspire to become the primary storage platforms of record for enterprises of all sizes. This study evaluates the suitability of 10 vendors' AFA platforms for dense mixed enterprise workload consolidation that includes at least some mission-critical applications.

The successful vendors in this space have all basically determined what is required for dense mixed workload consolidation and, for the most part, have delivered it. Any of the AFAs evaluated in this study is appropriate for this use case, but some are better geared for specific requirements (dual-controller or scale-out designs, block or file storage or both at the same time, virtual only or mixed physical/virtual, etc.). They all offer adequate performance (in terms of throughput and latency), capacity, and functionality to consolidate workloads, although a few are still missing support for advanced replication configurations like stretch clusters. Platform maturity is another important consideration, and several of the vendors entered the AFA market in only the past couple of years (although their storage operating systems may have been shipping for several years before that on hybrid flash arrays [HFAs]).

The areas where the most differentiation between vendors was noted were in their strategies around NVMe and cloud-based predictive analytics, how they track and manage customer experience (CX), and how they handle technology refresh. For most customers looking for a reliable platform for mixed enterprise workload consolidation, these may all be secondary considerations today, but the more forward-thinking vendors in these areas are driving industry transformation in a way that will significantly benefit customers over the long run.

IDC MARKETSCAPE VENDOR INCLUSION CRITERIA

This IDC study assesses the capabilities and business strategies of key suppliers in the AFA market, the fastest-growing segment of the external enterprise storage market. This evaluation is based on a comprehensive framework and a set of parameters that gauge the success of a vendor in delivering an enterprise storage platform intended for dense mixed workload consolidation that includes at least some mission-critical applications. This study includes analysis of the 10 most notable players in this space today, which (in alphabetical order) are Dell EMC, Hitachi Vantara, Hewlett Packard Enterprise (HPE), Huawei, IBM, Kaminario, NetApp, Pure Storage, Tegile, and Tintri.

To make this list, vendors need to have a platform that meets the following criteria:

- **Meets IDC's definition of an AFA.** IDC defines an AFA as any external storage array that supports only all-flash media as persistent storage and is available under a unique SKU. Systems that can support a mix of solid state disks (SSDs) and hard disk drives (HDDs) are considered by IDC to be hybrid flash arrays, even if they can ship in all-flash configurations. These arrays are not included in this IDC MarketScape. Candidate arrays must be targeted for primary storage workload consolidation even if in practice customers may also host some secondary storage workloads on them. For more information on the AFA taxonomy, see *IDC's Worldwide Flash in the Datacenter Taxonomy, 2017* (IDC #US42214317, January 2017).
- **Is developed and owned by that vendor.** The vendor needs to be the owner of the intellectual property (IP) associated with the candidate array and is responsible for developing the platform going forward.
- **Was generally available by June 30, 2017.** System functionality for this study was compared based on what was actually shipping by June 30, 2017. Candidate arrays must also have generated at least $50 million in end-user revenue by June 30, 2017, for the 2017 calendar year to be considered for this study.

IDC recognizes at least three different kinds of AFAs: primary flash arrays, big data flash arrays, and rackscale flash arrays. This study focuses on primary flash arrays, but vendors of all primary flash array types (types 1, 2, and 3) were considered before the 10 most relevant vendors were selected. The purpose of this IDC MarketScape is to specifically evaluate candidate arrays for their ability to be used as storage platforms for the dense consolidation of mixed enterprise workloads that include at least some mission-critical applications. With this focus, the breadth of enterprise-class functionality is important, but so are overall availability and reliability, scalability, platform maturity, manageability, and ability to integrate into preexisting datacenter workflows (among others). Other areas of strategic importance include the vendor's approach to cloud-based predictive analytics, the availability of the IP through multiple consumption models, programs around standardized customer experience management, and the vendor's plans with respect to NVMe.

Note that some vendors offer a single AFA, while others have a very broad portfolio of AFAs. For this study, vendors needed to select a single AFA platform that would be evaluated for its ability to host mixed enterprise workloads. There can be significant value, however, in a vendor offering a portfolio of AFAs, each of which may be targeted for different deployment models (e.g., mixed workloads, dedicated single workload, and web-scale workloads). For that reason, some weight is given to the availability of an AFA portfolio in the strategies criteria.

In the AFA market, there are at least 30 different AFA products, although not all are specifically targeted for dense mixed workload consolidation. There were a number of available AFA products that did not make the list because they did not meet one or more of the selection criteria.

ADVICE FOR TECHNOLOGY BUYERS

This study evaluates candidate arrays against a specific use case: dense mixed workload consolidation that includes at least some mission-critical workloads. While all AFAs provide much higher performance than HDD-based arrays, the AFAs in this study span a wide range of performance and capacity scalability, exhibit different architectures, and take different approaches to the efficiency of resource utilization. They all offer a pretty complete set of enterprise-class data services, good datacenter integration capabilities, and multitenant management features. It is safe to say that any of

these AFAs could be used to handle enterprise workload consolidation, but there are differences between them of which customers should take note. Some of the questions customers can ask themselves to help determine which of these AFAs might be a better fit for them are:

- Do I want to consolidate block- and file-based workloads on the same platform, or do I want to use separate platforms for those workloads? Do I want to consolidate both physical and virtual workloads on the platform, or am I just interested in virtual workloads?
- Do I want to get the next generation of an incumbent array (because of preexisting management expertise or other issues), or do I want to move to a new vendor that shows distinct differences in focus from the incumbent?
- Do I need synchronous replication and/or stretch cluster support now, or do I just need to know that the AFA will support it in the near future?
- How important is platform maturity to me?
- What is the proven reliability in actual usage based on customer references? All vendors pretty much claim to support at least "five-nines plus" availability, and many of them guarantee that, but anecdotal evidence indicates that reliability can still be a significant differentiator between platforms.
- Am I looking for vendors that are strong proponents of modernized ways of doing business (cloud-based predictive analytics, standardized CX management programs, and an updated technology refresh model), or have I been happy with existing approaches?
- How important are design attributes to really fine-tune the efficiency of resource utilization?
- In considering failure domains, what are my "performance" and "storage density" sweet spots? For example, to hit a requirement for 5 million IOPS, some customers want to purchase multiple smaller platforms, while others want a single platform for that.

One other area to consider is your comfort level with "self-driving storage." Some AFAs are very far down this path, and while they provide minimal opportunity to manually tune the array, they are much easier to manage, a consideration very important for customers that have delegated storage management tasks to information technology (IT) generalists (like more and more shops of all sizes are doing). Others offer all the manual tuning capabilities of the arrays of the past but layer templates and automated workflows into their GUIs to improve ease of use.

In the area of design efficiencies, these features tend to have less of an impact on smaller capacity configurations but more of an impact on larger ones. If you are installing a 150TB AFA, then you would likely care less about these issues than if you're installing a 1.5PB AFA. These features include the obvious considerations, like architecture, storage density (TB/U), and energy consumption, but they also include a number of other less obvious considerations:

- Does the AFA use fixed or variable block sizes? In widely varying workloads, the use of variable block sizes can lower the IOPS required to handle any given mix of workloads by as much as 10–15%.
- How is metadata handled? This can affect capacity consumption, addressable storage on the back end, latencies (particularly at scale), and other considerations.
- Do I have different RAID options so that I can select the data protection scheme that best balances my need for low latency, rapid recovery, and capacity overhead with my workload?
- Does the system use redirect-on-write or copy-on-write snapshots? If snapshots will often be written to (like is common in evolving copy data management use cases), redirect-on-write snapshots are more efficient and can be higher performing.

- Are data services selectable at a low level of granularity, or are they always on?
- For block-based arrays, has the vendor actually shipped Virtual Volumes (VVOLs) integration, which improves the efficiency of space and bandwidth utilization for operations involving snapshots and replication, or does the vendor just support the VVOLs API? VVOLs integration can also have significant ease-of-management benefits, depending on exactly how the vendor did the integration.
- For vendors that support cloud-based predictive analytics, exactly how are they using the telemetric data they collect to drive value for their customers?
- Does the vendor natively support replication to HFA platforms (which can be less expensive remote location targets for disaster recovery purposes), or does the vendor only support replication to another AFA of the same type?
- What are the total cost of ownership (TCO) implications of the vendor's technology refresh model?

This is not an exhaustive list, but it does point out the types of less obvious distinctions IDC noted between the AFAs evaluated in this study.

One of the key criteria in selecting AFA vendors for this study was whether or not they were pursuing a "flash first" sales strategy and when that started. From IDC's point of view, a vendor makes the shift to a "flash first" sales strategy when it markets either a type 1 or a type 2 AFA, leads with AFA offerings for primary storage opportunities, and has trained both its own direct sales force and channel providers on that sales strategy. For each of the established enterprise storage providers covered in this analysis that also sell HFAs, IDC noted a distinct upward surge in AFA revenue growth for that vendor in the wake of its commitment to a "flash first" sales strategy. At this point, all the majors have made that leap, and several of the smaller AFA vendors that have evolved over time out of HFA backgrounds have done that as well. The "pure play" AFA vendors have obviously been following "flash first" sales strategies since their inception. For prospective buyers, it may be of interest to take note when a vendor initially committed to a "flash first" sales strategy as part of the vendor evaluation process.

There is no "best" AFA for all needs. Factors that positively contributed to an AFA vendor's position on the IDC MarketScape figure included the vendor's range of scalability, the extent of data services support, platform design efficiencies, ability to integrate into preexisting datacenter workflows, overall platform maturity, and the vendor's strategies around cloud-based predictive analytics, CX management, and technology refresh. Once a customer has created a short list based on higher-level considerations like architecture (dual controller or web scale), block and/or file, synchronous replication/stretch clusters or not, performance and storage density sweet spots, and incumbent vendor or new, any of the remaining AFAs will likely be a good fit.

A Note on Failure Domains

Although we are looking at overall system scalability, some customers are specifically interested in limiting the size of their failure domains and are willing to take on a little bit more management complexity to achieve their goals in this area. Note that while this analysis does comment on AFA scalability, many vendors offer multiple models to let customers determine what size of platform best meets their needs. For example, for NetApp, while much of the analysis is done around the All Flash FAS (AFF) A700 platform, NetApp fields smaller platforms that use that same architecture but offer lower entry price points and smaller failure domains (the A200, the A300, and the A700s). This flexibility is taken into account as part of a vendor's portfolio strategy.

Storage density (TB/U) is another consideration here. The highest storage density, while it may result in the most efficient energy and floor space consumption, also has potentially the biggest impact with the failure of an entire disk shelf. Vendors are clearly consciously aware of this, and some even claim to have limited their storage densities because of working with customers to define a "sweet spot" storage density. Many vendors offer multiple SSD or CFM device sizes, letting the customer mix and/or match to meet its own density requirements. This study does take storage density into account, but the most flexible systems in it will offer customers multiple device size options to hit their own storage density requirements rather than just offering the highest storage density period. For those systems on the lower end of storage density, however, this detracts from the value the system provides. Clearly, one of the benefits that flash media–based devices offer relative to HDDs is an ability to achieve much higher storage densities with relatively lower energy and floor space consumption.

VENDOR SUMMARY PROFILE

This section briefly explains IDC's key observations resulting in a vendor's position in the IDC MarketScape. While every vendor is evaluated against each of the criteria outlined in the Appendix, the description here provides a summary of the vendor's strengths and challenges. This IDC MarketScape for AFA should be considered on its own rather than in comparison with the previous IDC MarketScape for AFA, which was published in December 2015. Relatively few AFAs were available in the market for the 2015 IDC MarketScape, but the market has matured considerably, and it was necessary to focus this document on a specific use case for AFAs (dense mixed enterprise workload consolidation) to keep the number of vendors manageable.

NetApp

NetApp is positioned in the Leaders category in this IDC MarketScape for AFA.

NetApp committed to a "flash first" strategy in 2H15, and its revenue (which prior to that point barely had the company in the top 10 of AFA revenue) rocketed it to the number 2 market share spot by the end of 2016. NetApp has a strong AFA portfolio strategy that works to its benefit: the EF-Series AFAs are targeted for dedicated applications that require sustained low latencies, the All Flash FAS (AFF) AFAs are targeted for mixed enterprise workload consolidation, and the SolidFire AFAs are sold to those customers that specifically want an AFA built around a web-scale architecture (with its associated flexibility and economics). While NetApp has historically been a network-attached storage (NAS) vendor whose products supported file-based storage (NFS and SMB), it has had a unified storage offering (block/file) for over a decade and has seen its SAN attach rates skyrocket over the past two years. This growth has been tied to its AFA revenue growth. Today, over 70% of new AFF sales are based around SAN environments.

The primary revenue-generating products of NetApp are based on its ONTAP storage operating environment featuring the Write Anywhere File Layout (WAFL), available on all its AFF and FAS products. The company claims that the way ONTAP handles read and write I/O matches very well with flash media performance characteristics. The design leverages wide striping, along with QoS and performance headroom management, to promote consistent performance even when workloads are highly variable – key features when customers care about predictable latencies in densely consolidated environments. All of the FAS systems (HFA and AFA) run ONTAP, and more than 90% of NetApp's revenue overall comes from the company's FAS-based business. The EF-Series and SolidFire systems run separate operating systems (SANtricity and Element OS, respectively).

Strengths

The ONTAP operating environment provides considerable advantages, given its comprehensive and proven set of enterprise-class data services. While the FAS arrays have supported data reduction for years, few customers used deduplication for high-end workloads because of performance impacts in HDD-based environments. The use of flash as persistent storage has changed all of that, and almost all of NetApp's AFF customers use ONTAP's broad storage efficiency features (inline compression, inline deduplication, inline compaction, thin provisioning, pattern recognition, write minimization, and space-efficient snapshots and replication) on the company's all-flash platforms, increasing effective storage capacities and densities while lowering overall cost per gigabyte. Deduplication can be configured to run either in line or post-process. In addition, the AFF AFAs support triple-parity RAID, multiple encryption options with external key management options, and multiple forms of replication (including stretch clusters) and have an excellent cloud integration and data mobility strategy based around NetApp's Data Fabric offerings (which include FabricPool, a feature that eases the use of hybrid cloud tiering).

The significant maturity of the FAS platform fuels characteristics of the AFF offering, putting it in the class with Dell EMC VMAX, Hitachi Vantara, and HPE 3PAR StoreServ in this respect. Through ONTAP, the AFF supports excellent datacenter integration with a full set of APIs covering all key environments (except for mainframe). NetApp has a large installed base of FAS systems that are upgrading to AFF systems during the technology refresh cycle, but they also generate competitive takeaways to drive all-flash revenue. While the performance of NetApp's system for both block and file is good, the company has particularly high performance for file-based environments. Its ability to field a unified storage offering with very strong SAN and NAS capabilities in one platform is a differentiator for the company.

NetApp has done a good job of making its AFF IP available through multiple consumption models, an approach that maximizes the appeal of its offerings across different customer types. The AFF A200/A300/A700/A700s systems evaluated in this study are available as storage appliances, in software-only configurations (ONTAP Select) and in converged infrastructure offerings (FlexPods), and offer storage utility pricing models (NetApp OnDemand Consumption Model). Although it is not based on the ONTAP IP, NetApp sells the hyperconverged AFA platform as well based on the SolidFire software operating environment.

A single A700 supports up to 480 SSDs, and NetApp offers multiple SSD options including 960GB, 3.8TB, 7.6TB, and 15.3TB SSDs and 3.8TB self-encrypting drives, so the system can be configured to offer high storage density based on the AFF's use of off-the-shelf 2U24 disk shelving hardware. A base A700 configuration includes an 8U controller chassis and a 2U24 disk shelf for a total of 10U (36.7TB/U using 15.3TB SSDs), while a maximally configured A700 includes an 8U controller chassis and 20 2U24 disk shelves for a total of 48U (153TB/U using 15.3TB SSDs but requiring two floor tiles). The 2U24 disk shelf is a standard that many of the vendors using off-the-shelf SSDs are adopting.

In addition to the A200, the A300, and the A700, NetApp also sells a more compact version of the A700 (the A700s), which is targeted at service provider customers for whom infrastructure density is a critical issue. While the A700 has an 8U footprint with a bladelike chassis for better serviceability, the A700s is a 4U model that can deliver the same 600,000 IOPS and includes 24 embedded SSDs. (Note that the ONTAP 9.3 release in October 2017 increased this to 850,000 IOPS.) The 4U configuration supports up to 367TB using the 15.3TB 3D NAND-based SSD (roughly 92TB/U) but supports only a maximum of eight disk shelves (compared with the standard A700's 20).

Finally, NetApp offers an excellent toolset for multitenant management, with quality-of-service controls, nondisruptive scalability in a clustered environment, good integration with a variety of third-party orchestration tools, scriptable APIs, and both FC and Ethernet host connection options. The vendor supports 16/32Gb FC and 40GbE. Data services are selectable at the file or volume level and include some features (like SnapLock for WORM compliance) not found on other AFA platforms. Over the past several years in particular, the FAS systems have evolved more in the direction of a software-defined storage platform, locating most of the system functionality in software. This allows them to take advantage of next-generation technologies more quickly (NetApp was one of the first AFA vendors to support 3D NAND-based SSDs) and has also enabled the introduction of a software-only ONTAP product that NetApp sells called ONTAP Select.

Challenges

NetApp's challenges are more in the program rather than in functional product areas with two possible exceptions: scalability and architecture. ONTAP supports up to 24 nodes in a cluster but cannot increase performance for a single file system beyond the capability of a single node. Single-node performance on the A700 is fixed and not among the industry front-runners, supporting somewhere in the range of 600,000 IOPS, whereas some other single-node offerings top out at close to 5 million IOPS. Scale-out benchmarks like SPC-1 evaluate combined throughput across nodes, an area where NetApp does very well. From an operational standpoint, however, there are few customers running mixed enterprise workloads today that actually need 600,000 IOPS in a single system, but this is likely to change over the next several years as next-generation applications proliferate and workload consolidation onto AFAs progresses.

The AFF systems are built around a traditional dual-controller architecture. With the increasing availability of web-scale architecture systems targeted for mixed enterprise workload consolidation, vendors using this traditional architecture need to address potential concerns around forklift upgrades, limited performance scalability, and investment preservation on technology refresh. With NetApp's data mobility capabilities and support for clusters, the company can perform technology upgrades to next-generation platforms nondisruptively, but this can be a time-consuming process. To increase storage performance on a single application, customers cannot just add more processors to a system — they must add a new, more powerful system to the cluster and migrate the workload to it. Investment preservation during this process is dependent upon what types of trade-in credits customers have access to, but it is an area that customers looking to upgrade to more powerful NetApp AFF nodes can explore.

While NetApp has worked with PCIe and NVMe technologies on its systems in the past and it is currently using single-ported NVMe SSDs as FlashCache in its AFF arrays, it has yet to make any sweeping public announcements about its strategic use of those technologies in next-generation arrays (as of June 30, 2017). Certain other vendors have already made those types of statements. IDC believes that by 2021, NVMe-based arrays will be driving over 50% of all primary storage revenue, so this is an area customers will want to understand before they make their next array purchase. Now that AFAs are dominating primary storage platform shipments and customers want to move to denser workload consolidation, the efficiencies of NVMe for flash and storage-class memory will be an important consideration going forward. Over the next three years, SCSI will be increasingly relegated to less performance-sensitive storage platforms.

As of the cutoff date for functionality evaluation in this study (June 30, 2017), NetApp was a bit behind the market when it comes to leveraging cloud-based predictive analytics tools to improve system ease

of use and planning. IDC does note, however, that NetApp announced Active IQ, a cloud-based predictive analytics offering, in October 2017, so it is moving in the right direction but has a very new offering in this space today. It is also among those vendors that are still managing customer satisfaction with older, less efficient approaches. These are secondary considerations for most customers though, but it is still good to be aware of them.

Consider NetApp When

Existing NetApp FAS customers will find everything they like about ONTAP available on much higher performance and more scalable hardware with the AFF offerings, and NetApp has a nondisruptive migration path to get customers to the newer hardware. Customers that want proven six-nines availability, very comprehensive data services including support for stretch clusters, a strong ability to integrate with preexisting datacenter workflows, a multicloud strategy backed by automation tools, and a strong unified storage offering to enable the consolidation of more types of workloads will see much to like with the new AFF systems. Customers for which scale-out file system performance for commercial workloads (not high-performance computing [HPC]) is critical will not find a more scalable and complete file system offering.

APPENDIX

Reading an IDC MarketScape Graph

For the purposes of this analysis, IDC divided potential key measures for success into two primary categories: capabilities and strategies.

Positioning on the y-axis reflects the vendor's current capabilities and menu of services and how well aligned the vendor is to customer needs. The capabilities category focuses on the capabilities of the company and product today, here and now. Under this category, IDC analysts will look at how well a vendor is building/delivering capabilities that enable it to execute its chosen strategy in the market.

Positioning on the x-axis, or strategies axis, indicates how well the vendor's future strategy aligns with what customers will require in three to five years. The strategies category focuses on high-level decisions and underlying assumptions about offerings, customer segments, and business and go-to-market plans for the next three to five years.

The size of the individual vendor markers in the IDC MarketScape represents the market share of each individual vendor within the specific market segment being assessed.

IDC MarketScape Methodology

IDC MarketScape criteria selection, weightings, and vendor scores represent well-researched IDC judgment about the market and specific vendors. IDC analysts tailor the range of standard characteristics by which vendors are measured through structured discussions, surveys, and interviews with market leaders, participants, and end users. Market weightings are based on user interviews, buyer surveys, and the input of IDC experts in each market. IDC analysts base individual vendor scores, and ultimately vendor positions on the IDC MarketScape, on detailed surveys and interviews with the vendors, publicly available information, and end-user experiences in an effort to provide an accurate and consistent assessment of each vendor's characteristics, behavior, and capability.

Market Definition

Under IDC's AFA taxonomy, any external storage array that supports only all-flash media as persistent storage and is available under a unique SKU will be considered an AFA. System pedigrees are important, however, in helping customers understand differentiating functionality between platform types. Under the current taxonomy, there are three types of AFAs:

- **Type 1.** These are arrays that were originally "born" as AFAs, and they include products such as the Huawei OceanStor Dorado V3, the IBM FlashSystem A9000, the Kaminario K2, and the Pure Storage FlashArray//M.
- **Type 2.** These are arrays that originally began life as hybrid designs but have undergone significant flash optimization, do not support HDDs, and include at least some unique, high-performance hardware (typically controllers that are faster than those included in the vendor's HFAs) unique to the all-flash configuration. Examples are the Hitachi Vantara Virtual Storage Platform (VSP) F Series, the HPE 3PAR StoreServ 9450 and 20850, and the Tintri EC6000 Series.
- **Type 3.** These are arrays that originally began life as hybrid designs but have undergone significant flash optimization, do not support HDDs, and do not include hardware (other than the flash media) that is any different from the hardware the vendor ships on its HFA products. Examples are the Dell EMC VMAX All Flash and the NetApp All Flash FAS (AFF).

Note that some vendors have arrays that they will ship in either all-flash or mixed configurations. If an array is allowed by the vendor to support HDDs (regardless of whether it is shipped from the factory without them), then it is considered to be an HFA.

Flash media options for AFAs include CFMs and SSDs, and some vendors offer customers the option to configure either in the same system. For more information on the differences between CFM- and SSD-based options and the pros and cons associated with each, see *Flash Media Packaging Decisions Secondary to System-Level Considerations in the All-Flash Array Market* (IDC #US41735716, September 2016).

LEARN MORE

Related Research

- *INFINIDAT Bucking External Storage Market Trends with Continued High Revenue Growth and Profitability* (IDC #US43193317, November 2017)
- *IDC FutureScape: Worldwide Enterprise Infrastructure 2018 Predictions* (IDC #US43137417, October 2017)
- *Rack-Scale Flash Vendor Excelero Leverages Performance and Efficiency Advantages to Drive Compelling Customer Value* (IDC #US43168917, October 2017)
- *Western Digital Strongly Furthers Its Play in the Enterprise Space with the Acquisition of Tegile* (IDC #US43028617, September 2017)
- *An Enterprise Storage Consumption Model-Based Strategy Maximizes Vendor Return on Investment* (IDC #US42762617, June 2017)
- *A Framework for Evaluating Storage Efficiency Technologies in Enterprise-Class All-Flash Arrays* (IDC #US42464717, April 2017)
- *HPE Hits a Home Run with the Acquisition of Midmarket Enterprise Storage Vendor Nimble Storage* (IDC #US42389717, March 2017)
- *Worldwide All-Flash Array Market Shares, 3Q16: Top 5 Market Share Holders Consolidate Gains* (IDC #US42374817, March 2017)

Synopsis

This IDC study provides an evaluation of 10 vendors that sell all-flash arrays (AFAs) for dense mixed enterprise workload consolidation that includes at least some mission-critical applications.

"All-flash arrays are dominating primary storage spend in the enterprise, driving over 80% of that revenue in 2017," said Eric Burgener, research director, Storage. "Today's leading AFAs offer all the performance, capacity scalability, enterprise-class functionality, and datacenter integration capabilities needed to support dense mixed enterprise workload consolidation. More and more IT shops are recognizing this and committing to 'all flash for primary storage' strategies."

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