

The Flash Revolution Advances as the All-Flash Array Market Reaches a Tipping Point

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Introduction



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Flash memory has already redefined the consumer technology experience: Not only does it power mobile phones, tablets and laptops, but it is used extensively in the data centers of large consumer websites because it is so much faster, denser, more power efficient and more reliable than hard drives. With recent breakthroughs in cost and compatibility, this same flash revolution is poised to sweep through business data centers. All-Flash Arrays (AFAs) or what Gartner calls Solid-State Arrays (SSAs) are no longer just for ultra performance intensive niche applications, which is why Gartner's inaugural Magic Quadrant for Solid State Arrays is so important. Within Pure's customer base we are already seeing this transition:

For every 250TB of Tier 1 mechanical disk-based storage, the SSA alternative can:

- Save businesses more than 1 year of cumulative latency every month. (That's the average time databases and virtual machines spend idly waiting for mechanical spindles to seek and rotate). Consider: what would eliminating a year of cumulative wait time each month allow your business to accomplish? How much richer would your analytics be? How much greater your customer satisfaction? How much improvement to employee productivity?

- Save businesses \$500K in IT operational costs, like power, cooling, licensing and product investments;
- Save businesses nearly 50% a storage administrator's time – time that can be repurposed toward strategic activities that deliver business value, rather than the care and feeding of multi-decade old storage architectures and swapping failed spindles.

In its 2014 Magic Quadrant for Solid-State Arrays report, Gartner projected that the SSA market will continue along a strong growth trajectory, and outlined its predicted timeline for the replacement of traditional high-end storage arrays:

- "By 2019, 20% of traditional high-end storage arrays will be replaced by dedicated solid-state arrays (SSAs)."
- "By 2017, the SSA market is expected to grow approximately five times in revenue, compared with 2014."

Having pioneered the market for "flash below the price of disk," Pure Storage is even more bullish. Over the course of the next 4-5 year storage refresh cycle, we believe the number of end users replacing Tier 1 storage mechanical disk-based storage arrays with SSAs will increase sharply – and only continue to accelerate.

Thus, we are thrilled to have been identified as a Leader in the 2014 Gartner Magic Quadrant for Solid-State Arrays for our ability to execute in the SSA market, a distinction we're honored to share with two of the storage industry's most venerable brands. Our mission is to provide storage that customers truly love, the simplest and most robust products, fanatically proactive support and uniquely customer and partner-friendly business practices. We are deeply encouraged that the completeness of our vision for the SSA category aligns with Gartner's as well, as we continue to define the next-generation of storage technologies and build the next great storage company.

If you are considering making the move to all-flash storage to transform your business and IT operations, we encourage you to review the following report, which offers a comprehensive overview of vendors in the SSA space and invaluable insights to support your deliberations.

Source: Pure Storage

Source: Gartner RAS Core Research note G00260420 Magic Quadrant for Solid-State Arrays, Valdis Filks, et al, 28 August 2014

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From the Gartner Files:

Magic Quadrant for Solid-State Arrays

Solid-state arrays provide performance levels an order of magnitude faster than disk-based storage arrays at competitive prices per GB, enabled by in-line data reduction and lower-cost NAND SSD. This Magic Quadrant will help IT leaders better understand SSA vendors' positioning.

Strategic Planning Assumption(s)

By 2019, 20% of traditional high-end storage arrays will be replaced by dedicated solid-state arrays (SSAs).

By 2017, the SSA market is expected to grow approximately five times in revenue, compared with 2014.

By 2017, the total number of vendors and products will increase by 50%, but 20% of the current vendors will exit the market.

Market Definition/Description

This Magic Quadrant covers SSA vendors that offer dedicated SSA product lines positioned and marketed with specific model numbers, which cannot be used as, upgraded or converted to general-purpose or hybrid storage arrays. SSA is a new subcategory of the broader external controller-based (ECB) storage market.

Considering the potential disruptive nature of SSAs on the general-purpose ECB disk storage market, Gartner has elected to report only on vendors that qualify as an SSA. We do not consider solid-state drive (SSD)-only general-purpose disk array configurations in this research. To meet these inclusion criteria, SSA vendors must have a dedicated model and name, and the product cannot be configured with hard-disk drives (HDDs) at any time. These systems typically (but not always) include an OS and data management software optimized for solid-state technology.

Magic Quadrant

A vendor's position on the Magic Quadrant should not be equated with its product's attractiveness or suitability for every client's requirements. If the solutions better fit your needs, have the appropriate support capabilities and are attractively priced, then it is perfectly acceptable to acquire solutions from vendors that are not in the Leaders quadrant.

FIGURE 1

Magic Quadrant for Solid-State Arrays



Source: Gartner (August 2014)

Vendor Strengths and Cautions

Cisco

Cisco entered the SSA market through the acquisition of Whiptail in 2013. Whiptail had launched its product family in 2012. Cisco has incorporated the product family and re-engineered into the Cisco UCS Invicta Series. The portfolio consists of the UCS Invicta appliance and UCS Invicta Scaling System products. The UCS Invicta is a 2U array, while the scaling system can scale up to six nodes. Through the acquisition of Whiptail, Cisco is aiming to deliver a tightly coupled, high-performance flash-memory-based technology to complement UCS fabric-based infrastructure. Whiptail customers will continue to be supported by Cisco. However, the new product is undergoing a significant refresh that standardizes on Cisco hardware designs and administration software to better integrate with UCS compute and management tools.

Strengths

- The Invicta product line has a modular and extensible scale-out architecture, which provides implementation flexibility to customers in consolidating and converging workloads.
- The Cisco UCS Director integration for the Invicta product family will enable Cisco customers to gain better operational simplicity.
- Whiptail customers will benefit from Cisco's deep technology partnerships with key independent software vendors (ISVs) that will result in more validated designs and reference guides.

Cautions

- Product delays and changing position statements are expected with the Invicta product, because it is going through a transition and conflicts with Cisco alliances, such as the EMC VCE and NetApp FlexPod.
- Cisco currently has a relatively small professional services and support team dedicated to SSAs, with a limited presence outside the U.S.
- Cisco has been slow and reticent in providing guidance on how these products will integrate and be managed within the UCS fabric postacquisition.

EMC

EMC has two SSD-based products in the SSA market: (1) the XtremIO scale-out technology, which EMC acquired in May 2012; and (2) the VNX-F array, which is based on the traditional general-purpose VNX unified storage array and exploits the proven VNX HDD-based hardware controllers and software. Both offerings are positioned and sold as dedicated SSAs. EMC has a large and relatively loyal installed base for the XtremIO products. EMC has a significant and broad, but overlapping, SSD product portfolio. The portfolio will be enhanced by EMC's acquisition of DSSD and its technology, which will initially be positioned as an extreme performance networked appliance. EMC has been a vocal visionary concerning SSD for more than a decade, but its market-leading messaging has outpaced some of its product introductions. Compared with competitor SSAs, the XtremIO product was late to market and became generally available only in November 2013. With a concrete offering, XtremIO, together with VNX-F, has enabled EMC to grab the No. 4 market share position in the SSA segment for 2013. EMC has gained traction for the XtremIO product, and has continued its momentum through 1H14 via concerted sales efforts and competitive pricing.

Strengths

- EMC has a highly successful global sales force, exceptional marketing, and highly rated support and maintenance capability.
- Large and loyal EMC customers have been provided with early products and attractive competitive introductory pricing. These customers can expect beneficial purchase terms.
- XtremIO offers inclusive software pricing, and customers do not have to budget, track or purchase extra licenses when capacity is upgraded.

Cautions

- EMC is offering XtremIO at competitive prices to its installed base, but transparency of information (such as list prices, discount levels and independent performance benchmarks) is unavailable. To avoid hidden future costs, customers should fix all XtremIO purchases and upgrades at these competitive introductory prices.
- VNX-F includes data reduction in the base system price. Unlike XtremIO and most competitors' offerings, VNX-F still uses a traditional licensing structure, which requires customers to pay additional support and license charges for other upgrades and extra features (such as data protection suite).
- While XtremIO's product integration with ViPR has been announced, it is not currently available. Given the product overlap between the XtremIO and VNX-F products, operational and administration complexity is an issue.

HP

HP is one of the late entrants into the SSA market, with availability of its HP 3PAR StoreServ 7450 model in June 2013. While HP is relatively new to the SSA market with its own product, it had an OEM partnership with Violin Memory, which ended in late 2011, in favor of HP's organic approach. The 3PAR storage architecture is sufficiently flexible to exploit SSD media, complete with purpose-built SSA features. Compared with EMC and IBM, HP has not aggressively marketed, sold and generally mined its installed base. HP has almost entirely leveraged its 3PAR hardware architecture and management platform, but has made some important enhancements centered on efficiently maximizing the resident SSD technology. This affords HP a cost-effective approach, as well as robust reliability that can be supported with solid warranty terms, including a five-year SSD warranty and six 9s (99.9999%) of availability guarantees for four-node deployments.

Strengths

- HP has leveraged its hardware and storage software design, which are sufficiently modern and flexible enough to accommodate the nuances of solid-state technology and to implement new data reduction services.
- HP 3PAR StoreServ 7450 offers a proven compatibility matrix for a broad variety of application workloads, cost-effective thin provisioning, and a familiar interface for customers, as well as a scale-out architecture.
- HP has an extensive channel presence, global sales ability and a substantial customer base that is complemented with worldwide support and service capabilities.

Cautions

- Customers need to request more evidence to demonstrate the ROI to distinguish its product functionality and capability from other SSA and general-purpose arrays.
- Despite the familiarity gained by HP's leveraging its storage architecture, its media reporting abilities need further refinement.
- Some client references have had limited visibility into HP's SSA product strategy, and HP and its partners have limited mind share in the market.

Huawei

Huawei was an early entrant in the SSA market, with the launch of OceanStor Dorado in mid-2011, when it was a joint venture with Symantec. Since then, Huawei has acquired Symantec's stake, announced successive generations, maintained the investment and expanded the product line. Huawei has an aggressive sales approach, offering steep discounts off the list price for qualified enterprise customers. Its maintenance and support pricing (as a percentage of capital expenditure [capex]) tends to be lower than many competitors' pricing and is backed by a large postsales support team concentrated in Asia/Pacific. To further improve the transparency and competitiveness of its SSA products, Huawei has been aggressive in submitting performance details to public performance benchmarks (such as the Storage Performance Council SPC-1).

Strengths

- Huawei is a large, profitable enterprise storage vendor, offering customers a well-rounded storage portfolio in emerging markets.
- Huawei has committed significant R&D dedicated to SSAs, which has resulted in the design and development of its application-specific integrated circuit (ASIC)-based SSD controllers, SSDs and software capabilities.

- The Dorado product family delivers competitive pricing and performance, and supports a large ecosystem of ISVs, including commonplace hypervisors and VMware APIs.

Cautions

- Huawei's reseller network, professional services and support capabilities in the U.S. tend to be weak, due to brand perception and execution challenges.
- Pricing is still on an a la carte basis, charging for individual data service modules, while most other vendors are gravitating toward unified, all-inclusive base pricing.
- Huawei's channel partner ecosystem continues to be weak, which presents challenges for enterprise customers looking for detailed workload profiling, multisite implementations and best-practice guidance.

IBM

IBM acquired Texas Memory Systems (TMS) in September 2012, and subsequently announced in April 2013 that it would invest \$1 billion into all aspects of flash (SSD) storage technology. IBM has leveraged its storage technology, specifically Storwize compression software and the IBM SAN Volume Controller (SVC) layer, which has been placed on top of the FlashSystem array to provide high-level data services. TMS had a successful track record of producing low-latency storage using DRAM for over 30 years, and using flash-based storage for nearly 10 years. The IBM-engineered FlashSystem products are available as a stand-alone storage enclosure — the FlashSystem 840 — which has limited software features. In March 2014, IBM made available the FlashSystem V840, which is the storage enclosure combined with the FlashSystem control enclosure, to provide data services such as compression, mirroring, thin provisioning and replication. This usage of the SVC for the FlashSystem control enclosure follows a pattern within IBM's storage division, where the SVC is placed on top of many IBM products (such as the DS8000, Storwize V7000 and XIV storage arrays) to provide a common and interoperable platform abstracting the diverse products beneath it, an approach that has internal cost and reuse advantages. However, with such a diverse number of devices, the complexity of managing compatibility, fixes, and software and hardware regression testing between an exponentially increasing number of software and hardware platforms increases dependencies among product lines. Basic storage controller features — such as redundant array of independent disks (RAID), hot code load, controller failover, port failover, caching and administration software — are duplicated in the storage enclosure (FlashSystem 840) and the control enclosure (SVC). Compared with competitors, IBM charges separately for higher-level features such as compression.

Strengths

- Within the SSA market, the TMS platform has one of the longest proven track records with respect to array performance.
- There is a quick and short learning curve for IBM Storwize V7000 and SVC customers, because the same SVC-based management interface is used on many other key IBM storage product lines.
- IBM has successfully exploited its system company advantage and has cross-sold the FlashSystem into its customer base through direct and indirect channel incentives and bundling discounts with SVC.

Cautions

- Compared with the FlashSystem V840, the FlashSystem 840 has limited data services and will require IBM or non-IBM virtualization products for data services.
- The FlashSystem 840 is dependent on the SVC product line to provide data services, such as compression, thin provisioning, snapshots and mirroring, among other features, for additional costs.
- Clients starting with the FlashSystem 840 that later decide they require extra storage features will need to purchase extra SVC-based hardware. This increases the operating expenditure (opex) considerations (such as wiring, power, cooling and physical rack space requirements) compared with the FlashSystem 840 by itself.

Kaminario

Kaminario was founded in 2008 and is headquartered in Newton, Massachusetts, but product development is concentrated in Israel. Kaminario is one of the more resilient SSA vendors, and has been in the market with a shipping product for more than three years. It is on its fifth-generation product. The Kaminario K2 product has undergone several reincarnations of its system features in hardware and, most recently, data management software, as it has migrated from its initial DRAM appliance approach in 2011. Kaminario performs well across many public benchmarks, which is appealing given its ability to scale out and scale up. With only recent successful marketing efforts, many companies are unaware of Kaminario, because it lacks market awareness and mind share compared with the established storage vendors and some of the new startups.

Strengths

- Kaminario has an advantageous scale-up/scale-out architecture that utilizes flexible storage efficiency and resiliency technologies to maximize cost structure and SSD longevity.

- The vendor has been providing customers with a guarantee program for an average of \$2 per GB effective capacity and a seven-year unconditional SSD endurance warranty, which has helped promote customer confidence in Kaminario.

- Kaminario offers strong R&D and engineering support, with key technologies protected by 34 patents as of June 2014.

Cautions

- The vendor's presence is concentrated in the U.S. and Europe for sales and support coverage.
- As a relatively small organization, Kaminario has limited marketing ability to gain mind share, which is important in order to expand its sales channel bandwidth and long-term viability.
- Like most startups, Kaminario is not currently profitable, and will require another round of funding to sustain itself.

NetApp

NetApp announced the first EF array model in February 2013, and updated it with the EF550 in November 2013, helping continue its product momentum. Compared with smaller SSA startups, NetApp was a late entrant to the SSA market. However, NetApp was able to reuse existing products and technology, as the EF Series is based on the mature E Series hardware and the SANtricity platform acquired from the acquisition of LSI's Engenio business. This has led to an intricately managed positioning and sales challenge between the EF and FAS products. The EF Series is targeted at workloads that need high performance. Unlike the FAS Series, the EF Series is primarily sold through a direct sales force. NetApp's customers and prospects can elect to deploy the EF Series, choose the recently productized All-Flash FAS offerings, or wait for the launch of FlashRay in late 2014. Although FlashRay has been delayed thus far, NetApp claims it will be a dedicated SSA product built from the ground up and optimized for SSD technology.

Strengths

- NetApp has a deep understanding of SSDs. Its diverse portfolio of SSD offerings features good workload analysis tools that can profile applications and match them to the right products, helping customers rightsize their environments from several perspectives: reliability, availability, serviceability, manageability and performance.

- With the EF Series, NetApp has changed its pricing structure to an all-inclusive one, which simplifies license management during upgrades and long-term budgeting.
- The EF Series provides support for a wide variety of high-speed interconnect protocols, including FC, Internet SCSI (iSCSI), SAS and InfiniBand.

Cautions

- With the scheduled launch of FlashRay, which has been in development for more than two years, the EF Series needs to compete for product development, marketing and sales dollars within NetApp, which raises questions about the long-term viability of the EF Series product line.
- The EF Series uses more reliable, but more expensive, enterprise-grade SSD (single-level cell [SLC] and enterprise multilevel cell [eMLC]) and, given the lack of any data reduction capabilities, it may not be cost-competitive for diverse workloads.
- The EF Series has a complex graphical user interface (GUI), compared with newer designs from competitors, and Ontap/FAS customers will require new skills to operate and administer the EF Series.

Nimbus Data

Nimbus Data was founded in 2006, and is headquartered in San Francisco, California. The vendor has taken a vertically integrated approach in terms of hardware and software to deliver dense, cost-effective arrays that appeal to a variety of customers and application workloads. Many of the vendor's initial deployments came from a concentrated customer base that included several hyperscale customers. Nimbus Data doubled its revenue in 2013 year over year, but has suffered from high employee churn and skepticism among some companies in the market. It continues to deliver public case studies and references to improve customer perception. Ultimately, it will need to be more transparent about its business operations, and to scale its business to capably meet future customer needs for sales and support across key geographies.

Strengths

- Nimbus Data has an aggressive pricing strategy predicated on advanced SSD memory and density enabled by a vertically integrated hardware approach.
- Its offering has broad workload applicability, with multiprotocol support, all-inclusive software pricing and a comprehensive data service feature set appealing to a diverse customer set, ranging from Web scale to conventional data center environments.

- Nimbus Data claims to have a profitable business since 2013, and, with no external funding, has been able to navigate its direction without influence from investors.

Cautions

- The vendor has a thin (streamlined) management team, with limited scalability, succession resources and responsibility-sharing abilities, and executive decision making driven from a highly centralized top-down approach, which is problematic for long-term viability.
- Sales and product support and services are limited, and provided from a relatively small organization with selective geographic penetration.
- Nimbus Data's business model is based on large, performance-oriented accounts with a limited ability to grow into a diversified customer base in terms of revenue share, creating viability concerns due to customer concentration.

Pure Storage

Pure Storage was founded in 2009 with a business plan to create a new, dedicated SSA and to grow organically, rather than to achieve quick wins or the largest market share. The vendor's business model was not to be first to market, but to be a more financially stable and sustainable long-term business. This business model has been successful to date, and Pure Storage has managed to gain significant investments, thereby achieving financial stability. It signed a cross-licensing deal with IBM to protect itself with key storage system intellectual property (IP), and has a go-to-market strategy stimulated by an aggressive channel partner program. Pure Storage has a relatively mature platform — the FA-400 Series — and a proven data reduction implementation. A transparent attitude toward pricing and guaranteed efficiency has achieved significant mind share and attention in the SSA market, promoted via creative, but poignant, marketing campaigns. Similarly, innovative and competitive inclusive software licensing and inclusive controller upgrade programs (offered when customers pay full support and maintenance costs) have proven to be a fresh and welcome approach that challenges and disrupts the established incumbent SSA and general-purpose disk array vendors' license schemes and forklift product replacement cycles.

Strengths

- Pure Storage has a solid financial base supported by funding totaling more than \$470 million to date. Its success and growth, combined with a unique culture, help attract world-class talent, with head count exceeding 680 as of August 2014 — all of which helps negate near-term viability concerns.

- The vendor has an efficient product cost structure based on low-cost consumer MLC (cMLC) PC SSDs.
- Innovative marketing, purchasing, trial and product renewal programs create a product that is simple to buy, install and manage.

Cautions

- Data reduction is not selectable, and there is relatively low usable capacity if the workload and data is not suitable for data reduction.
- The vendor can be outperformed in the highest input/output (I/O) and low-latency environments.
- The vendor takes a traditional scale-up approach, with limited raw capacity scalability and a large physical footprint.

Skyera

The single-controller Skyera skyHawk platform became available in April 2014. Because Skyera is not using existing enterprise SSDs or components and has had challenges delivering products to market on time, it still does not have a standard high-availability dual-controller array. However, the vendor has been a thought leader, challenging the established incumbent disk array hegemony, and is an innovative visionary in the industry, creating a purpose-built system designed from the SSD chip level upward by exploiting the most cost-effective, advanced SSD memory technology. This unique hardware approach enables Skyera to drive down SSA costs to levels that compete with general-purpose disk arrays. Data reduction is in the form of compression, which further improves storage utilization and the usable cost per GB. The next-generation skyEagle system will have more high-availability data center hardware architecture, such as dual-power supplies and controllers. Skyera is a probable acquisition target, even though it has considerable strategic investment, including public investors Dell and Western Digital (WD), among others.

Strengths

- Skyera has a low-cost-oriented value proposition that debunks the premise of expensive SSAs.
- The vendor provides a solid value proposition, with good remote support and high precompression density per form factor, with 57TB raw capacity, which is 44TB formatted, but before data reduction, per 1 rack unit at half depth.
- Skyera offers an unconditional warranty for system replacement.

Cautions

- The skyHawk can only be used in high-availability environments if a storage virtualization layer is used to provide high-level abstraction features to mirror data and to provide failover between two separate skyHawk arrays.
- Data management software is limited in the skyHawk. Most software features are included in the base price, except for compression, which is separately licensed.
- Companies looking for long-term viability should realize that Skyera has a limited customer base and limited product revenue, and is actively pursuing another round of funding since its last round in February 2013.

SolidFire

SolidFire is a privately held, venture-capital-funded company that makes scale-out SSAs. SolidFire is an emerging company that is not yet profitable and with a product that has been in general availability for less than two years. Its SF Series product line became available in November 2012. SolidFire's initial focus was on service providers offering high-performance infrastructure as a service (IaaS) and, while this segment still continues to be a key focus, recent product launches and go-to-market initiatives have widened the focus toward enterprise buyers. SolidFire is highly differentiated from its competitors through its scale-out capabilities, rich software features and ability to guarantee storage performance. Management of the platform is built around the Web-scale principles of automation, quality of service (QoS) and API-based access. The product has close integration with cloud management platforms, such as OpenStack, CloudStack and VMware vCloud suite. Pricing is simple, all-inclusive and appeals to traditional enterprise users.

Strengths

- SolidFire's ability to deliver high scalability in capacity and performance makes it an attractive platform for running next-generation cloud and big data workloads.
- SolidFire puts a high degree of emphasis on keeping costs low through usage of cMLC-based PC SSDs and no-charge data reduction features, such as compression and deduplication that are always turned on, and operating in-line.
- The QoS and multitenancy allow customers to run multiple workloads in isolation with guaranteed performance, eliminating disruption or degradation from unwieldy workloads.

Cautions

- The initial acquisition costs are high, even for SolidFire's low-end platforms, given that there needs to be at least four nodes in a cluster.
- SolidFire has limited field services and support personnel outside the U.S. and the U.K.
- Given that a high portion of its revenue is generated from a direct sales force, enterprise customers need to be cautious regarding the availability of reseller partners for implementation and support.

Violin Memory

Violin Memory is a pioneer in the SSA industry. Founded in 2005, it has earned revenue since 2010. The vendor's foundation has been through its hardware approach, predicated on SSD-chip-level system expertise founded on aggregating removable Peripheral Component Interconnect Express (PCIe) dual in-line memory modules (DIMMs). This approach enables Violin Memory to offer a high-performance, resilient system featuring one of the most competitive pricing structures on the market, due to its strong relationship with SSD memory manufacturer Toshiba. However, Violin Memory had financial challenges since its initial public offering (IPO) in September 2013, when its disappointing sales and financial outlook forced the company to take drastic action. A fresh, new management team has been in place since early 2014. It has refocused on its core customers by paring back its sales force and pursuing a channel approach targeted at key geographies. Violin Memory has been trying to exploit software from its acquisition of GridIron Systems in 2013, in an effort to complement its hardware with a portfolio of native data management software features that debuted in late June 2013. Violin Memory divested its PCIe SSD business for \$23 million in June 2014.

Strengths

- Violin Memory sources directly from SSD memory suppliers and its lead investor Toshiba to exploit hardware in terms of performance, density and price that translates to aggressive, final system prices for customers.
- The 6000 series is available via several partnerships, such as reseller relationships with Dell, Fujitsu, Toshiba and NEC, and at the application level with Microsoft to deliver an optimized Windows Flash Array with software features tuned to Microsoft database, Server Message Block (SMB) and Network File System (NFS) environments.
- The new management team is executing on a clear vision that eliminates distractions and proactively addresses customer, partner and investor needs.

Cautions

- Violin Memory recently debuted a more cohesive data management software service strategy with its Concerto release, which appears promising, but relatively untested.
- Violin Memory has capable U.S. sales, support and services, but limited direct international sales. It will have to realign with channel partners to expand, which will take time and could complicate efforts for small or midsize businesses (SMBs).
- Violin Memory's financial stability, primarily the rate that it is burning cash, is a reason for caution. The vendor is likely to be an acquisition target if its profitability does not improve in 2015.

Vendors Added and Dropped

We review and adjust our inclusion criteria for Magic Quadrants and MarketScopes as markets change. As a result of these adjustments, the mix of vendors in any Magic Quadrant or MarketScope may change over time. A vendor's appearance in a Magic Quadrant or MarketScope one year and not the next does not necessarily indicate that we have changed our opinion of that vendor. It may be a reflection of a change in the market and, therefore, changed evaluation criteria, or of a change of focus by that vendor.

Added

This is a new Magic Quadrant

Dropped

This is a new Magic Quadrant

Inclusion and Exclusion Criteria

To be included in the Magic Quadrant for SSA, a vendor must:

- Offer a self-contained, SSD-only system that has a dedicated model name and model number (see Note 1).
- Have an SSD-only system. It must be initially sold with 100% SSD and cannot be reconfigured, expanded or upgraded at any point with any form of HDDs within expansion trays via any vendor's special upgrade, specific customer customization or vendor product exclusion process into a hybrid or general-purpose SSD and HDD storage array.
- Sell its product as a stand-alone product, without the requirement to bundle it with other vendors' storage products in order to be implemented in production.

- Provide at least five references that Gartner can interview. There must be at least one client reference from Asia/Pacific, EMEA and North America, or the two geographies within which the vendor has a presence.
- Provide an enterprise-class support and maintenance service, offering 24/7 customer support (including phone support). This can be provided via other service organizations or channel partners.
- Have established notable market presence as demonstrated by the amount of PBs sold, number of clients or significant revenue.

The product and a service capability must be available in at least two of the following markets — Asia/Pacific, EMEA and North America — via direct or channel sales. Availability does not include hybrid (SSD, HDD) storage arrays.

The SSAs evaluated in this research include scale-up, scale-out and unified storage architectures. Because these arrays have different availability characteristics, performance profiles, scalability, ecosystem support, pricing and warranties, they enable users to tailor solutions against operational needs, planned new application deployments, and forecast growth rates and asset management strategies.

While the SSA Magic Quadrant represents vendors whose dedicated systems meet our inclusion criteria, ultimately, it is the application workload that governs which solutions you should consider, regardless of any criteria.

Other vendors and products were considered for the Magic Quadrant but did not meet the inclusion criteria, despite offering SSD-only configuration options to existing products. These vendors and/or specific products may warrant investigation based on your application workload needs for their SSD-only offerings:

- American Megatrends (AMI)
- Dell Compellent Storage Solutions
- EMC VMAX
- Fujitsu Eternus DX200F
- Fusion-io ION (acquired by SanDisk)
- Hitachi Unified Storage (HUS) VM
- IBM DS8000

- NetApp FAS
- Oracle ZFS
- Tegile T-Series

Evaluation Criteria

Ability to Execute

We analyze the vendor's capabilities across broad business functions. Vendors that have expanded their products across a wider range of use cases and applications, improved their service and support capabilities, and focused on improving mission-critical applications will be more highly rated in the Magic Quadrant analysis. Ability to Execute reflects the market conditions and, to a large degree, it is our analysis and interpretation of what we hear from the market. Our focus is assessing how a vendor participates in the day-to-day activities of the market.

Product or Service evaluates the capabilities of the products or solutions offered to the market. Key items to be considered for the SSA market are how well the products and/or services address enterprise use case needs, the critical capabilities of the product (see "Critical Capabilities for Solid State Arrays") and breadth of product and/or solutions.

Overall Viability includes an assessment of the organization's financial health, the financial and practical success of the business unit, and the likelihood that the individual business unit will continue to invest in the product, offer the product and advance the state of the art in the organization's product portfolio.

Sales Execution/Pricing looks at the vendor's capabilities in all presales activities and the structure that supports them. This includes deal management, pricing and negotiation, presales support and the overall effectiveness of the sales channel.

Market Responsiveness/Record focuses on the vendor's capability to respond, change direction, be flexible and achieve competitive success as opportunities develop, competitors act, customer needs evolve and market dynamics change. This criterion also considers the provider's history of responsiveness.

Marketing Execution directly leads to unaided awareness (i.e., Gartner end users mentioned the vendor without being prompted) and a vendor's ability to be considered by the marketplace. Vendor references, Gartner's inquiries and end-user client search analytics results are factored in as a demonstration of vendor awareness and interest.

Customer Experience looks at a vendor's capability to deal with postsales issues. Because of the specialized nature of the cloud storage market and the mission-critical nature of many of the storage environments, vendors are expected to escalate and respond to issues in a timely fashion with dedicated and specialized resources, and to have relevant detailed expertise. Another consideration is a vendor's ability to deal with increasing global demands. Additional support tools and programs are indications of a maturing approach to the market.

Operations considers the ability of the organization to meet its goals and commitments. Factors include the quality of the organizational structure, including skills, experiences, programs, systems and other vehicles that enable the organization to operate effectively and efficiently on an ongoing basis.

Table 1. Ability to Execute Evaluation Criteria

Evaluation Criteria	Weighting
Product or Service	High
Overall Viability	High
Sales Execution/Pricing	Medium
Market Responsiveness/Record	High
Marketing Execution	Medium
Customer Experience	Medium
Operations	Medium
Source: Gartner (August 2014)	

Completeness of Vision

Completeness of Vision distills a vendor's view of the future, the direction of the market and the vendor's role in shaping that market. We expect the vendor's vision to be compatible with our view of the market's evolution. A vendor's vision of the evolution of the data center and the expanding role of SSAs are important criteria. In contrast with how we measure Ability to Execute criteria, the rating for Completeness of Vision is based on direct vendor interactions, and on our analysis of the vendor's view of the future.

Market Understanding looks at the technology provider's capability to understand buyers' needs, and to translate those needs into an evolving road map of products and services. Vendors show the highest degree of vision, listen to and understand buyers' wants and needs, and can shape or enhance those wants and needs with their added vision.

Marketing Strategy relates to what vendor solution message is described, how that message is communicated, what vehicles are used to effectively deliver it, and how well the buying public resonates with and remembers the message. In a market where many vendors and/or products can sound the same, or sometimes not even be known, message differentiation and overall awareness are vital.

Sales Strategy considers the strategy for selling products that uses the appropriate network of direct and indirect sales, marketing, service and communication affiliates that extend the scope and depth of market reach, skills, expertise, technologies, services and the customer base.

Offering (Product) Strategy looks at a vendor's product road map and architecture, which we map against our view of enterprise requirements. We expect product direction to focus on catering to emerging enterprise use cases for solid state arrays.

Business Model assesses a vendor's approach to the market. Does the vendor have an approach that enables it to scale the elements of its business (for example, development, sales/distribution and manufacturing) cost-effectively, from startup to maturity? Does the vendor understand how to leverage key assets to grow profitably? Can it gain additional revenue by charging separately for optional, high-value features? Other key attributes in this market are reflected in how the vendor uses partnerships to increase sales. The ability to build strong partnerships with a broad range of technology partners and associated system integrators demonstrates leadership.

Vertical/Industry Strategy measures the vendor's strategy to direct resources, skills and offerings to meet the specific needs of individual market segments, including vertical markets.

Innovation measures a vendor's ability to move the market into new solution areas, and to define and deliver new technologies. In the SSA market, innovation is key to meeting rapidly expanding requirements and to keeping ahead of new (and often more-agile) competitors.

Geographic Strategy measures the vendor's ability to direct resources, skills and offerings to meet the specific needs of geographies outside the "home" or native geography, either directly or through partners, channels and subsidiaries as appropriate for that geography and market.

Table 2. Completeness of Vision Evaluation Criteria

Evaluation Criteria	Weighting
Market Understanding	High
Marketing Strategy	Medium
Sales Strategy	Medium
Offering (Product) Strategy	High
Business Model	High
Vertical/Industry Strategy	Low
Innovation	High
Geographic Strategy	Medium
Source: Gartner (August 2014)	

Quadrant Descriptions

Leaders

Vendors in the Leaders quadrant have the highest scores for their Ability to Execute and Completeness of Vision. A vendor in the Leaders quadrant has the market share, credibility, and marketing and sales capabilities needed to drive the acceptance of new technologies. These vendors demonstrate a clear understanding of market needs; they are innovators and thought leaders; and they have well-articulated plans that customers and prospects can use when designing their storage infrastructures and strategies. In addition, they have a presence in the five major geographical regions, consistent financial performance and broad platform support.

Challengers

Vendors in the Challengers quadrant participate in the SSA market and execute well enough to be a serious threat to vendors in the Leaders quadrant. They have strong products, as well as sufficient credible market position and resources to sustain continued growth. Financial viability is not an issue for vendors in the Challengers quadrant, but they lack the size and influence of vendors in the Leaders quadrant.

Visionaries

A vendor in the Visionaries quadrant delivers innovative products that address operationally or financially important end-user problems at a broad scale, but has not demonstrated the ability to capture market share or sustainable profitability. Visionary vendors are frequently privately held companies and acquisition targets for larger, established companies. The likelihood of acquisition often reduces the risks associated with installing their systems.

Niche Players

Vendors in the Niche Players quadrant often excel by focusing on specific market or vertical segments that are generally underpenetrated by the larger SSA vendors. This quadrant may also include vendors that are ramping up their SSA efforts, or larger vendors having difficulty in developing and executing upon their vision.

Context

This Magic Quadrant represents vendors that sell into the enterprise end-user market with specific branded SSAs. An insatiable demand for storage also demands a more capable high-performance tier that can deliver low-latency storage more reliably in order to create tangible benefits. As high-performance storage demand explodes, it will require even more storage administration, emphasizing the perpetual need for storage efficiency, resiliency and manageability to counter this trend.

Market Overview

There has been a growing demand for SSAs to meet the low-latency performance requirements of enterprise- and Web-scale applications. Over the last decade, CPU performance has improved by an order of magnitude, while the performance of HDD within general-purpose storage arrays stagnated, an increasingly accentuating divergence. SSAs have corrected this imbalance by temporarily satiating the demand for storage performance. This has led to the quick and successful adoption of SSA, evidenced by the fact that the total revenue for SSA in 2013 was \$667 million, with a huge year-over-year growth of 182%.

The SSA market witnessed a considerable uptake in adoption in 2013, fueled by significant and continued investments in startups and with established vendors opting to acquire emerging vendors, although some are still pursuing an organic approach to growth. Large incumbent system vendors, such as EMC, HP, IBM and NetApp, have been focused on cross selling their new SSA products to their established customers, thereby quickly obtaining large market shares. However, once this captive segment has been mined, a vendor's ability to grow market share in the long term will be predicated on overall product ability, sales bandwidth and execution as it competes outside its installed base. Nearly half of the vendors in this Magic Quadrant have pursued a vertically integrated approach based upon direct procurement of SSD memory, with the remaining vendors choosing to outsource the SSD storage and procure functionality from external suppliers to focus on an SSD-optimized data management software strategy.

Between 2010 and 2012, most customers were interested primarily in high-performance and low-latency SSAs. Given the lack of available data management features, customers tolerated the feature shortcomings in favor of raw performance. As initial storage performance issues were capably addressed, customers wanted to address multiple application workloads that required a rich data management software portfolio consisting not only of storage efficiency and resiliency technologies purpose-built for SSAs, but also the underlying SSD memory technology. During 2013, we witnessed the advent of comprehensive data management software features, such as deduplication, compression, thin provisioning, snapshots and replication technologies that, when specifically tailored to SSD, can provide compelling benefits, particularly in application workloads that see favorable data reduction ratios. This trend of innovative and comprehensive data management software on the more mature SSA platforms has continued into 2014, and has started to permeate at the application level, which will drive the industry in 2015 and beyond. It is through the synergy of cost-effective hardware and purpose-built software that the industry will see further consolidation in order to reach maturation.

As this market matures and SSAs gain feature equivalency with general-purpose arrays, we expect decreasing differentiation between general-purpose storage arrays and SSAs. Vendors of general-purpose arrays product lines and server SSD cards have created specific array models full of SSD media. These models are tactical implementations that enable the vendors to market directly into the SSA segment, while they create longer-term strategies or create purpose-built SSAs. If these vendors maintain their investments in these general-purpose array SSD variations over a longer period and they prove not to be a viable tactical stopgap, they may need to create specific SSAs. The SSA market is distinct. It has matured from the early solid-state appliance offerings, because the data services provided are equivalent and, in certain cases (such as data reduction and administration), offer richer and improved features than general-purpose storage arrays. SSAs have matured to levels competitive with general-purpose storage arrays in all but scale. The average usable capacity of the SSA purchased is approximately 38TB. The preferred connection protocol is Fibre Channel: 63% of all SSAs attach to servers use Fibre Channel, and 33% use the iSCSI protocol. NFS and Common Internet File System (CIFS) attach are, therefore, rarely used. Online transaction processing (OLTP), analytics and server virtualization are the top three workloads that customers consider for SSAs, with virtual desktop infrastructure (VDI) being the fourth most popular workload. While a majority of SSA deployments are for a single workload, Gartner is seeing interest in converging multiple workloads on the same product, which, in many cases, are being enabled by features such as QoS.

Evidence

- More than 1,000 Gartner client inquiries in 2013 and 1H14
- Vendor interviews and product demonstrations in 2013 and 1H14
- Surveys of included vendors
- Customer reference surveys in 1H14
- Dedicated SSA market share process in 2012 and 2013
- Public information, such as U.S. Securities and Exchange Commission filings, press releases, vendor websites and community support forums

Evaluation Criteria Definitions

Ability to Execute

Product/Service: Core goods and services offered by the vendor for the defined market. This includes current product/service capabilities, quality, feature sets, skills and so on, whether offered natively or through OEM agreements/partnerships as defined in the market definition and detailed in the subcriteria.

Overall Viability: Viability includes an assessment of the overall organization's financial health, the financial and practical success of the business unit, and the likelihood that the individual business unit will continue investing in the product, will continue offering the product and will advance the state of the art within the organization's portfolio of products.

Sales Execution/Pricing: The vendor's capabilities in all presales activities and the structure that supports them. This includes deal management, pricing and negotiation, presales support, and the overall effectiveness of the sales channel.

Market Responsiveness/Record: Ability to respond, change direction, be flexible and achieve competitive success as opportunities develop, competitors act, customer needs evolve and market dynamics change. This criterion also considers the vendor's history of responsiveness.

Marketing Execution: The clarity, quality, creativity and efficacy of programs designed to deliver the organization's message to influence the market, promote the brand and business, increase awareness of the products, and establish a positive identification with the product/brand and organization in the minds of buyers. This "mind share" can be driven by a combination of publicity, promotional initiatives, thought leadership, word of mouth and sales activities.

Customer Experience: Relationships, products and services/programs that enable clients to be successful with the products evaluated. Specifically, this includes the ways customers receive technical support or account support. This can also include ancillary tools, customer support programs (and the quality thereof), availability of user groups, service-level agreements and so on.

Operations: The ability of the organization to meet its goals and commitments. Factors include the quality of the organizational structure, including skills, experiences, programs, systems and other vehicles that enable the organization to operate effectively and efficiently on an ongoing basis.

Completeness of Vision

Market Understanding: Ability of the vendor to understand buyers' wants and needs and to translate those into products and services. Vendors that show the highest degree of vision listen to and understand buyers' wants and needs, and can shape or enhance those with their added vision.

Marketing Strategy: A clear, differentiated set of messages consistently communicated throughout the organization and externalized through the website, advertising, customer programs and positioning statements.

Sales Strategy: The strategy for selling products that uses the appropriate network of direct and indirect sales, marketing, service, and communication affiliates that extend the scope and depth of market reach, skills, expertise, technologies, services and the customer base.

Offering (Product) Strategy: The vendor's approach to product development and delivery that emphasizes differentiation, functionality, methodology and feature sets as they map to current and future requirements.

Business Model: The soundness and logic of the vendor's underlying business proposition.

Vertical/Industry Strategy: The vendor's strategy to direct resources, skills and offerings to meet the specific needs of individual market segments, including vertical markets.

Innovation: Direct, related, complementary and synergistic layouts of resources, expertise or capital for investment, consolidation, defensive or pre-emptive purposes.

Geographic Strategy: The vendor's strategy to direct resources, skills and offerings to meet the specific needs of geographies outside the "home" or native geography, either directly or through partners, channels and subsidiaries as appropriate for that geography and market.

Note 1

Product Feature Qualification

Product features considered for inclusion must have been in general availability by 30 July 2014 to be considered in the vendors' product rating.

Source: Gartner Research, G00260420, Valdis Filks, Joseph Unsworth, Arun Chandrasekaran, 28 August 2014



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Pure Storage, the all-flash enterprise storage company, enables the broad deployment of flash in the data center. When compared to traditional disk-centric arrays, Pure Storage all-flash enterprise arrays are 10x faster and 10x more space and power efficient at a price point that is less than performance disk per gigabyte stored. The Pure Storage FlashArray is ideal for high performance workloads, including server virtualization, desktop virtualization (VDI), database (OLTP, real-time analytics) and cloud computing. For more information, visit www.purestorage.com.

