

Magic Quadrant for General-Purpose Disk Arrays

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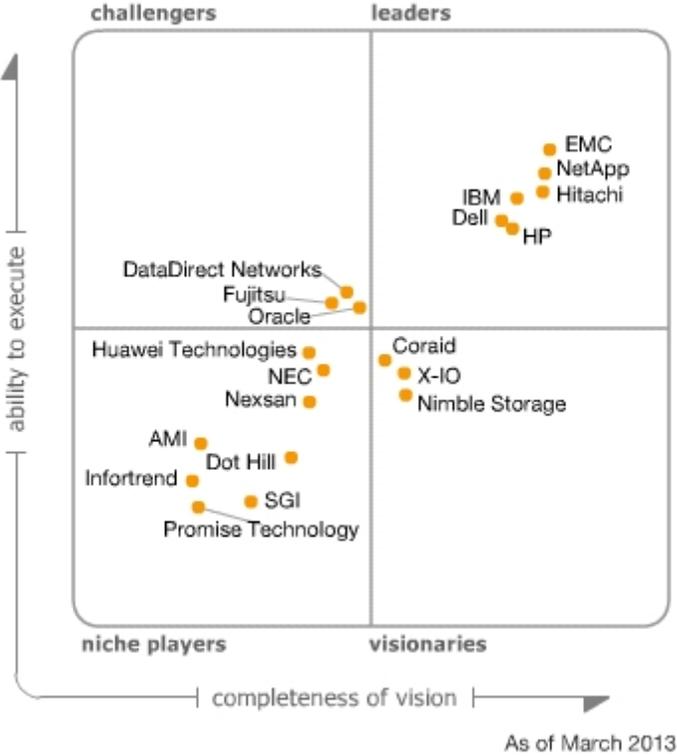
Improvements in scalability, availability, performance and functionality of midrange storage systems have blurred the boundaries between network-attached, midrange and high-end storage systems. This Magic Quadrant will help IT leaders understand storage vendors' strategies and market strengths.

Market Definition/Description

General-purpose disk storage systems are designed to address shared storage requirements within a single system that can support multiple virtual or physical servers, hosted virtual desktop infrastructures, multiple databases, and applications such as, but not limited to, SAP, Microsoft Exchange and Microsoft SharePoint. This Magic Quadrant (see Figure 1) includes midrange, high-end and network-attached storage (NAS) systems as defined in Gartner's market definitions and methodology (see Recommended Reading).

Magic Quadrant

Figure 1. Magic Quadrant for General-Purpose Disk Arrays



Source: Gartner (March 2013). No special credit has been given to vendors serving all market segments.

Vendor Strengths and Cautions

AMI

American Megatrends Inc. (AMI) is a privately held company with a 27-year history of bringing IT products to market. AMI is a leading provider of basic input/output system (BIOS) firmware and remains well-known for its broadly distributed MegaRAID PC interface (PCI) host-based redundant array of independent disks (RAID) controllers. Leveraging its engineering expertise in RAID storage, AMI released its midrange StorTrends 3400i in April 2011. Featuring the 64-bit StorTrends iTX OS, the 3400i is a primary storage platform that can be deployed to support midtier mission-critical applications or as part of a tiered storage infrastructure. AMI is selling into the small or midsize business (SMB) market via its channel-centric go-to-market model.

Strengths

- AMI's value pricing model includes an all-inclusive hardware/software pricing structure, free installation services and free product training, which enhance the competitive position of its StorTrends 3400i against vendors that price these items separately.
- Featuring dual-controller active/active architecture, the StorTrends 3400i IP-SAN storage appliance supports auto failover/failback and includes a rich set of integrated data management service software, such as redirect-on-write snapshots, as well as synchronous and asynchronous replication with wide-area data services (WDS).
- StorTrends 3400i storage efficiency features include thin provisioning and automated data tiering/life cycle management, as well as deduplication and compression data-reduction functions.

Cautions

- The StorTrends 3400i installed base is relatively small, particularly outside the U.S., which can potentially encumber responsive sales and service support for customers in remote locations.
- StorTrends 3400i is certified with VMware ESXi 5.1, including a VMware vSphere client plug-in, allowing the 3400i to be managed directly within the vSphere client. However, AMI has yet to implement vStorage API for Array Integration (VAAI) and vStorage APIs for Storage Awareness (VASA).
- An NAS gateway is required for use cases that necessitate the StorTrends 3400i to support both block and file access, slightly diminishing ease of use.

Coraid

Coraid is a relatively new vendor whose general-purpose arrays are priced up to 50% less than traditional storage arrays sold by the large incumbent vendors. In July 2012, Coraid added a ZX Series NAS head, for which Oracle was the OEM, to provide Network File System (NFS) and Common Internet File System (CIFS) support, and thereby offer a unified storage array. Coraid is the only vendor that uses the ATA over Ethernet (AoE) protocol instead of traditional block protocols — such as FC, FCoE or Internet SCSI (iSCSI) — to connect to host servers. This innovative approach, which presents storage to servers as the familiar C drive, is an advantage and a disadvantage. Where low-cost, simple and quick implementation and operations using existing or dedicated Ethernet switch infrastructures is a requirement, AoE is an advantage. However, limited market awareness and customer understanding of AoE often make Coraid prospects susceptible to fear, uncertainty and doubt (FUD) sales attacks from competitors. Coraid is one of a new group of storage vendors offering aggressive pricing (low cost), good performance and good reliability.

Strengths

- The AoE protocol implemented by Coraid simplifies implementation and configuration, making Coraid arrays easier to configure and manage than iSCSI, file and FC protocol-based arrays.

- High-performance/throughput, automatic load balancing as new VSX nodes or input/output (I/O) paths are added to the configuration and nondisruptive data migration between SRX arrays configured behind the VSX.
- The arrays are simple to purchase and upgrade, with all software options — such as thin provisioning, wide striping, clones and reservationless snapshots — included in the base price of the VSX and no hidden license upgrade costs when expanding array storage capacity.

Cautions

- Clients cannot use the Coraid storage as boot disk because the AoE protocol does not support it.
- Coraid supports multiple device types (solid-state drive [SSD], SAS and SATA) with SSDs that can be deployed as primary targets or in "flash cache" mode. The platform does not support autotiering at this time.
- In large WAN environments, the Coraid VSX is required to provide routing but can also be used to provide thin provisioning, snapshots and replication and migrate data between geographically dispersed SRX arrays.

DataDirect Networks

The DataDirect Networks (DDN) midrange and NAS/unified storage arrays have strong positions in the high-performance computing, entertainment and surveillance markets. DDN is expanding its target markets to include big data applications. DDN has demonstrated an ability to support large environments and a willingness to invest in its vision by making major investments in marketing, sales and support; expanding R&D; and developing an acquisition strategy to enable it to better compete in targeted vertical markets. These investments so far have resulted in a growing market interest in DDN's Web Object Scaler technology, an In-Storage Processing capability that improves application performance by running applications in the arrays holding their data, and DirectMon, a common management tool for DDN's Storage Fusion Architecture (SFA) block and Scaler file storage systems.

Investments in marketing, sales and support have improved DDN's ability to support large customers; improve channel partner sales efficiency; and add technical and service capabilities in EMEA, where DDN has had a relatively small presence.

Strengths

- DDN is a financially successful, privately held storage company. It is expanding into new high-growth markets with internally developed storage systems that are competitive and differentiated.
- DDN's early support of erasure codes that reduce data rebuild times and storage protection overheads and its In-Storage Processing strengthen its position in the big data and private cloud markets.

- DDN storage systems are supported by a large software ecosystem.

Cautions

- DDN's target markets are attracting the attention of large established storage vendors, which could limit its ability to allocate marketing and sales resources to new target markets.
- Users should ensure that DDN's installed base growth is not adversely affecting support effectiveness.
- Some large organizations are reluctant to do business with privately held vendors that lack financial transparency.

Dell

The analysis below ignores Dell's recent decision to take itself private because it does not affect Dell's past performance, and the implications of Dell's decision to take itself private are not yet understood.

Dell is a storage vendor whose portfolio has been created through a series of acquisitions. Dell's sales force has not learned to sell value, but leads and sells on features, performance and price. It does not lead from a business solution perspective. Historically, this behavior has not been successful in the enterprise, but may be successful as array features become standardized and buyers become more price sensitive; however, this transactional selling technique is a risk for customers who require a closer consultative solution-based relationship. Dell is simultaneously trying to grow system sales in enterprise data centers with its Compellent storage line, while offering the EqualLogic series to SMBs. Compellent storage systems span the midrange and enterprise markets, and have been upgraded to scale in performance and capacity. Dell also offers the Exanet-based Fluid File System, which is used with the EqualLogic and Compellent arrays to provide a multiprotocol file and block storage array. Gartner believes Dell's commitment to developing and owning new innovative storage technologies will improve its ability to provide highly competitive storage arrays.

Strengths

- Dell offers customer-orientated pricing, upgrade and support models, such as inclusive software pricing with the EqualLogic perpetual licenses and specialized "Copilot" technical support for the Compellent storage arrays.
- For customers wishing to use converged server and storage fabric-based systems to reduce operational tasks, Dell has integrated EqualLogic storage into its blade systems.
- Across its entire product line, Dell storage is competitively priced in the market. Although not always the lowest-priced solution, it is rarely overpriced relative to its competitors.

Cautions

- Dell's lack of presence in the traditional high-end storage market and its relative lack of success in the fast-growing NAS and object storage market segments are limiting its appeal as a storage vendor.
- Although the Compellent storage array was one of the first to have the autotiering features, customers need to be aware that data movement between tiers does not occur in real time, but is driven by monitoring data collected in default 24-hour monitoring windows.
- Clients report that support and help desk calls for Compellent have deteriorated slightly since Compellent's acquisition by Dell.

Dot Hill

Dot Hill is a storage system company that has little brand awareness, despite its OEM customers selling more than 500,000 storage systems built with its controller technology. To expand its market opportunity further, Dot Hill entered the midrange storage market with two new storage systems sold through indirect channels assisted by Dot Hill's marketing and sales organizations. These new storage systems, AssuredSAN 4000 and AssuredSAN Pro 5000, have the Dot Hill logo and are built on a proven Dot Hill hardware platform that delivers solid price/performance. The AssuredSAN Pro 5000 is a feature-rich array built on Dot Hill intellectual property that includes thin provisioning, autotiering, reservationless snapshots and asynchronous remote replication. The success of these storage systems will depend on Dot Hill's product claims being market-validated; on Dot Hill building marketing and sales organizations that can effectively support, manage and motivate its indirect channels; and on Dot Hill scaling the support organization to support end-user inquiries.

Strengths

- Dot Hill-branded storage systems benefit from the additional certification work done by its OEMs before they launch their private-labeled versions of the Dot Hill systems.
- Dot Hill's focus on price, availability, performance/throughput and functionality align well with SMB storage priorities.
- Dot Hill's reliance on indirect channels with vertical industry expertise should provide verticals, such as telcos, media and entertainment, and the military, with high-availability requirements with attractive alternatives to their current storage vendors.

Cautions

- Dot Hill has not yet demonstrated long-term profitability.
- Dot Hill has limited brand awareness.
- Dot Hill's focus on the SMB market will require it to scale its support organization and require users to do support reference checks.

EMC

EMC is the disk storage market leader. EMC management has a vision for improving disk storage, understands the power of effective marketing and sales, and is willing to invest heavily in internal development activities, acquisitions, marketing programs and events to ensure that it can set market expectations. EMC has tightly integrated its VPLEX with VMware to enhance the attractiveness of the EMC VMAX and VNX storage systems in virtualized server environments. EMC is positioning itself to benefit from growth in the cloud. Customers need to be aware that the VPLEX layer is an extra cost and can provide more vendor lock-in than traditional arrays, but does support heterogeneous storage environments. EMC is continuing to enhance VMAX, VNX and Isilon series performance, functionality, software agents and management tools to improve ease of use and value.

Strengths

- New VMAX models, VNX performance and functional enhancements, such as increasing the number of snaps/logical unit number (LUN), and Isilon security and ease-of-use improvements, are recent examples of high-impact announcements.
- EMC is effective at building ecosystems and partnerships that increase EMC storage system attractiveness by improving ease of use.
- VPLEX and RecoverPoint are complementary products that enable EMC to deliver stretched clusters over distance, continuous disaster protection (CDP) and disaster recovery (DR).

Cautions

- The VNX system is a dual-controller design that lacks the automatic controller load balancing and scalability available with some competitive products.
- Isilon, which is a true scale-out NAS solution, still lacks native data compression and/or deduplication that may increase its cost as a big data solution.
- The overhead and limitations of various value-add features, such as thin provisioning and autotiering (Fully Automated Storage Tiering for Virtual Pools [FAST VP]) and architectural holdovers, require storage administrators to have high skill levels to ensure optimal performance and the use of new features.

Fujitsu

Fujitsu has a broad line of storage array products with models to cater to the smallest-capacity storage arrays to multipetabyte storage arrays. In this Magic Quadrant, we are specifically referencing Fujitsu Technology Solutions, a subsidiary of Fujitsu. Fujitsu Technology Solutions (referred to as Fujitsu) has extensive, deep and significant IT engineering and R&D skills, and a reputation for high reliability and good support. Except for its file-based NetApp-supplied unified storage systems and Violin-based SSD storage arrays, Fujitsu designs and produces the remainder of its storage systems. Nevertheless, its engineering prowess does not translate into similar

marketing and sales success, as it seems unable to continuously and significantly grow its market share. However, recent improvements due to new model launches are encouraging. During 2011 and early 2012, Fujitsu's sales increased, compared with previous years and quarters. Fujitsu is trying to transition and change the focus of its sales force to sell Fujitsu storage instead of competing OEM products. Therefore, customers have more investment protection if they purchase Fujitsu-developed storage arrays.

Strengths

- Fujitsu storage systems are aggressively priced, high-quality, well-designed, fully featured systems with thin provisioning, autotiering and synchronous replication.
- Fujitsu storage systems preserve investments in procedures by sharing a common management interface for their block storage arrays.
- Fujitsu provides list and forward pricing and is open with its customers when discussing solutions, including potential and actual problems.

Cautions

- Fujitsu outside of Japan does not have the brand awareness or sales coverage needed to make it onto many customers' shortlists.
- Fujitsu is reliant on NetApp for NAS solutions.
- Fujitsu does not have a coherent unified (file and block) storage strategy, and competitors are coalescing their block and file storage array offerings into unified storage products.

Hitachi

Hitachi is a large multibillion-dollar company with diverse global activities and is responsible for selling and supporting its disk storage solutions in Japan. Hitachi Data Systems, headquartered in Santa Clara, California, is a wholly own subsidiary of Hitachi, and is responsible for selling and supporting Hitachi disk storage platforms in all countries outside of Japan. Hitachi Data Systems uses a combination of direct and indirect go-to-market models to reach its target markets. Hitachi Data Systems' core disk storage offerings include the Hitachi Virtual Storage Platform (VSP), a leading high-end disk storage platform, the Hitachi Unified Storage (HUS) platforms for the midrange markets, the Hitachi NAS (HNAS), an emerging offering for the NAS market, and the recently announced HUS VM entry-level enterprise system that blends the modular HUS hardware and VSP-compatible software. To simplify management of mixed infrastructures, the Hitachi Command Suite consolidates management of Hitachi Data Systems disk storage platforms under a common tool.

Strengths

- The high-end VSP platform is distinguished by its performance scalability, capacity scalability, utilization efficiency software, data protection and replication software, and its widely used virtualization function.

- The symmetric active/active controller architecture with automatic load balancing sets the richly featured HUS platform apart from competing dual-controller midrange disk array systems, because each controller can access all the LUNs with equal performance.
- Active/active clustering (two to eight nodes), cluster namespace, multiprotocol file services, 256TB volumes, virtualized file systems and expansive scalability make HNAS a competitive solution for deployment to support big data workloads, as well as consolidating multiple NAS filers.

Cautions

- The widely deployed Hitachi VSP, released in September 2010, is due for a hardware refresh within the next six to 12 months, incorporating the latest Intel CPU technologies.
- The HUS platform is composed of discrete components that utilize disparate provisioning, data protection and replication software to support block-, file- and object-access protocols.
- The lack of controller-based data deduplication and compression inhibits HNAS competitiveness in applications that benefit from these data reduction functions.

HP

HP is managing a diverse portfolio of storage systems. The portfolio includes the P4000 (aka LeftHand Networks); the older P6000 Enterprise Virtual Array (EVA) series that still has a large installed base; the 3PAR StoreServ series that, with the addition of new entry-level models, is providing users with a common architecture growth path that stretches from entry-level two-node to large eight-node configurations; the XP P9000 series, for which Hitachi is the OEM; and an NAS business that is still dominated by solutions based on Microsoft Storage Server.

HP's decision to concentrate its R&D investments on fewer competitive products does not appear to be a reaction to the company's financial difficulties. Instead, the move recognizes the need to keep the 3PAR StoreServ and StoreOnce/StoreAll architectures competitive in a rapidly evolving marketplace by focusing R&D resources on executing faster against HP's much improved product road map. The results of this concentration of R&D resources on HP's two strategic architectures are mixed. 3PAR feature and functional enhancements are being announced with some regularity, but the R&D investments have not yet resulted in a cadence of NAS feature enhancements, and P4000 enhancements have focused primarily on repackaging to run on blade servers and in virtual machines.

Strengths

- 3PAR successfully competes with products from other vendors, and is the cornerstone and foundation for HP's storage business. The 3PAR model range is easy to manage, performance is good, it spans the traditional midrange and the high-end storage segments, and it has replaced many competitors' high-end storage arrays at a lower acquisition price.

- HP's channel provides a competitive advantage by providing extensive sales coverage and route to market, compared with its storage competitors, making all products and services easily accessible to existing and potential customers.
- The StoreVirtual 4000 (aka LeftHand Networks) and the StoreAll 9000 (aka Ibrix) storage systems are offered with all software included in the base price of the sold product, thus enabling fast sales cycles and avoiding extra software license expenditure when upgrading or expanding these storage arrays.

Cautions

- The EVA series is not HP's strategic offering in the midrange storage market; rather, it is intended to give the EVA users one more technology refresh before they move onto 3PAR storage systems. Gartner expects the EVA products will be discontinued, and for product development and support to wind down over the next three years.
- The slow integration of StoreOnce data reduction technology into various disk array products and additions to the compatibility matrix require additional due diligence by prospective users.
- Overlaps between HP's various storage offerings require users to tightly manage the bidding process to ensure that the solution being bid best matches forecast growth rates, performance/throughput, availability and budget needs.

Huawei Technologies

Huawei Technologies (referred to as Huawei in this research) entered the enterprise storage market five years ago with the R&D and financial resources that come from being China's top telecom solution provider. It is now the third-largest disk storage system vendor in China and is growing its customer base outside China. While not well-known in the U.S. and Western European markets, approximately 50% of its storage revenue is now generated outside China. Regions where Huawei has market visibility include India, Southeast Asia, Eastern Europe, the Middle East, South Africa and Latin America.

Huawei has a limited marketing and sales presence in the U.S. It recognizes the problem and intends to grow its presence in the U.S. and EMEA by targeting midsize businesses and large enterprises, and media and entertainment, where its ability to compete on price gives it competitive advantages.

Strengths

- Huawei is a large profitable vendor with the resources needed to develop competitive storage systems and expand its market presence in North America and Western Europe.
- The OceanStor T and N series are delivering competitive performance and functionality. NAS functional highlights include a unified storage pool, distributed file system, global namespace management and nondisruptive upgrades.

- Huawei is prioritizing its development resources on improving storage system scale, ease of use and integration with important middleware offerings, such as databases, server virtualization and hosted virtual desktop (HVD).

Cautions

- Huawei has weak global brand awareness in the storage market and limited presence in North America, Japan and Western Europe. This can negatively affect its attractiveness as a storage partner and its ability to quickly detect shifts in market conditions.
- End users implementing Huawei solutions will most assuredly have to invest in training their storage administrators, because the pool of storage administrators with Huawei experience is small.
- Huawei's ability to build a marketing and sales organization capable of selling its concept of "Smart Data" and its value-add data services in the U.S. and EMEA is to be determined, because it will require attracting top talent and bridging cultural issues.

IBM

IBM is the second-largest vendor in the storage market. It has chosen to concentrate on high-growth vertical industries (healthcare, government, finance, telco), midsize and enterprise users where it has advantages in knowledge and professional services, and emerging high-growth markets, such as Africa, China, India, Russia and the Middle East. IBM is also entering the appliance market with its Pure Systems appliances that combine server, software, storage and networking into an integrated pretested solution. It is entering the cloud market with its SmartCloud initiatives.

Like other companies with large portfolios, IBM has decided to sell storage arrays containing its own intellectual property. This will help it better control its business, lower the cost of goods and work with partners in smaller markets, such as high-performance computing. IBM's current storage portfolio includes the high-end DS8870 series; the scale-out XIV; the midrange Storwize V7000, which supports SAN and NAS protocols and in-line data compression that is often performance neutral to positive; and two NAS offerings: the Scale Out Network Attached Storage (SONAS) and N-series. While these systems are competitive by most measures, their positions in the marketplace have been hampered by IBM's slowness in supporting important non-IBM software offerings, such as those from VMware and Oracle, and the reused hardware and software that make conveying a sense of freshness surrounding new product announcements more difficult.

Strengths

- The combination of recently refreshed storage offerings and new marketing and sales strategies should reward IBM storage customers with improved operational efficiencies and help non-IBM storage customers negotiate more competitive pricing and receive more attentive service.
- Storwize V7000 in-line data compression is a potential game changer, because it can shrink capacity demands by up to 80%.

- IBM is well-positioned to participate in the rapidly growing business analytics market because of its participation in the high-performance computing (HPC) market as a server, storage and software provider, and its technical expertise in basic research and vertical markets.

Cautions

- IBM's inability to build sales revenue momentum makes it very difficult for the company to claim technical or product leadership in the storage market.
- IBM's slow and corporate-focused, decision-making process can delay certification of new software releases and increase the perceived risk of choosing IBM storage solutions.
- Improvements in Storwize V7000 scalability and XIV performance are increasing product overlap between these block storage systems.

Infortrend

Headquartered in Taipei, Taiwan, Infortrend has established a successful technology innovation and financial track record providing storage technology to OEMs, system integrators (SIs), distributors and value-added resellers (VARs). Targeted to meet the requirements of private and public cloud storage infrastructures, ESVA is Infortrend's flagship midrange storage platform. The entry-level EonStor and EonNAS round out Infortrend's storage offerings, enabling it to participate in the broader SMB and NAS markets. While Infortrend has been particularly successful in penetrating the Chinese and Taiwanese markets, it is facing serious competition from China-based Huawei and Sugon. In North America, the Asia/Pacific region and Japan, Infortrend employs a direct and indirect channel go-to-market strategy; while in EMEA, Infortrend reaches end users solely via indirect channels.

Strengths

- Infortrend ESVA is a modern feature-rich midrange storage system that offers thin provisioning, autotiering, snapshot and volume copy, synchronous and asynchronous replication, and distributed load balancing.
- Beyond providing functions necessary to discover, configure, administer and monitor the ESVA midrange disk storage system, the Infortrend SANWatch Storage Management Suite enables ESVA's to be configured into virtual pools of storage.
- The Infortrend ESVA Cluster File System is a comprehensive solution that offers high-speed file access and sharing to specifically support media production, archiving and HPC applications.

Cautions

- ESVA market penetration outside China and Taiwan is relatively small, which may hamper responsive sales and technical support.
- Infortrend has yet to implement a VMware vSphere Plugin for its SANWatch storage management suite or VASA.

- Infotrend's external marketing programs lack the maturity and robustness to create the necessary awareness and mind share required to convince potential channel partners to offer ESVA as an alternative to competing midrange disk array systems.

NEC

NEC is a relatively new entrant into the worldwide storage market. It has little customer or brand awareness and a small market share outside of Japan. To date, it has concentrated on its domestic Japanese market. Since 2012, however, it has been expanding outside Japan. NEC does not have a high-end enterprise storage array that can scale to petabytes of storage capacity, and NEC predominantly competes in the midrange storage segment. The vendor is transitioning from the smaller-capacity D-Series storage arrays to the newer and higher-capacity M-Series arrays. Addressing this dichotomy between high-quality and full-featured products, but with few sales and little marketing expertise or success, is the challenge facing NEC.

Strengths

- NEC has taken into account product life cycle ownership issues, such as the simple migration between arrays and automated redistribution of data onto expansion units.
- Reliability is high, and the storage is competitively priced for customers that require a full-featured storage array with all the mainstream storage data services, such as autotiering, thin provisioning, snapshots, replication and VMware VAAI support.
- NEC has focused on technical and engineering features, such as detailed power consumption monitoring, control and disk power-off using MAID techniques, plus the ability to provide customer-optional destructive, nondestructive dynamic firmware upgrades.

Cautions

- The text- and table-based device management graphical user interface (GUI) is not as easy to use or as sophisticated as the latest icon-driven management GUIs.
- NEC products do not have the leading-edge data services — such as primary data reduction features (e.g., deduplication and compression) — within their storage arrays.
- NEC has limited geographic sales and support coverage.

NetApp

NetApp has two unified storage offerings, the FAS and V Series, that are built on a common software architecture and marketed as general-purpose storage. The FAS Series makes up the majority of NetApp's sales. The V Series is an in-band virtualization appliance that enables users to provision their NAS storage requirements with SAN storage and use the same management interface, features and replication services across NAS and SAN storage.

NetApp is focused on improving FAS and V Series' competitiveness in large mission-critical environments. Early signs are promising, but this is still a work in progress that requires ongoing improvements in marketing, sales, product features and professional services. NetApp bases its appeal as a channel and technology partner on the following: It holds double-digit market share, which makes it an attractive technology and VAR partner; it does not threaten to compete against its technology partners; it works with ISVs to build and maintain a large ecosystem; it is quick to integrate with important middleware from vendors such as Oracle, Microsoft and VMware; and it continues to invest in keeping its storage arrays competitive.

Strengths

- Clustered Data Ontap adds a horizontal scale-out capability to FAS and V Series systems, which enables these configurations to have characteristics that are almost indistinguishable from traditional enterprise arrays.
- Out-of-band deduplication and NetApp Flash Pool cache reads and writes without the complexity normally associated with autotiering, keeping the FAS and V Series cost-effective in many environments.
- NetApp has simplified its hardware/software pricing model by creating software bundles and including the Essentials Bundle in the basic system pricing.

Cautions

- The use of professional services is strongly recommended when converting from Data Ontap 7-Mode to clustered Data Ontap.
- Customers planning to convert from Data Ontap 7-Mode to clustered Data Ontap v8.1 should be aware that SnapVault will not become available until v8.2 becomes available, sometime in 2013, and that MetroCluster support will only be available in the release after v8.2.
- Clustered Data Ontap v8 volumes do not span high availability (HA) node pairs and, therefore, their performance does not scale with the addition of HA node pairs to the cluster.

Nexsan

Nexsan specializes in offering densely packaged storage arrays, such as the E-series and NST models, that target low-cost, high-capacity disk-based storage requirements. The NST series is a unified file and block storage array that supports iSCSI, CIFS, and NFS, does not support FC, and provides an extensive range of software features, such as synchronous replication, thin provisioning and autotiering, for use with primary data. Nexsan has a track record of providing quality storage arrays and support. However, only customers with a strategy to exploit the latest innovations and a larger risk appetite than conservative leading-brand-orientated buyers can benefit from the innovative technology from smaller vendors such as Nexsan. Nexsan was purchased by Imation on 2 January 2013. Since there is no product overlap, channel or business conflicts between these vendors, we are neutral to positive that this will help grow the Nexsan storage business.

Strengths

- Nexsan is one of the few vendors that offers Massive Array of Idle Disks (MAID), which reduces power and cooling requirements because it can power-off unused disks and enclosures and save environmental costs for clients that want to store large amounts of inactive data on disk drives.
- The NST series, which can compete with all general-purpose storage arrays, uses the FASTier product to exploit SSDs to improve performance while continuing to provide low-cost disk storage based on slower SATA hard-disk drives (HDDs).
- For a small storage vendor, Nexsan has an extensive and mature channel program, which enables clients to purchase Nexsan products worldwide.

Cautions

- The changes associated with Imation's acquisition of Nexsan are likely to have a negative impact on sales productivity until reorganizations are completed and new roles and responsibilities are defined.
- Imation must expand its marketing and sales channel bandwidth by training Imation channel partners to sell Nexsan storage systems.
- Existing Nexsan users should discuss the impact of Imation acquiring Nexsan on service support and product road maps.

Nimble Storage

Nimble Storage is a venture-funded, privately held storage company that builds hybrid iSCSI SAN systems. Recognizing the performance advantage of SSD technology, Nimble Storage designed the CS-Series to take optimal advantage of SSD performance and throughput, and HDD price/capacity as an alternative to traditional disk array storage that was initially designed to the performance attributes of HDDs. The Nimble Storage CS-Series platforms (released in 2H10) incorporate the Cache Accelerated Sequential Layout (CASL) file system that has specifically been designed to accelerate data and metadata reads from SSD, while accelerating writes by coalescing many small random writes into large sequential writes on the high-capacity HDDs. Nimble Storage's go-to-market strategy uses an indirect channel, and relies on alliances with independent software vendors (ISVs), such as VMware, Microsoft, Citrix, CommVault and Oracle, to create integrated solutions.

Strengths

- The CS-Series CASL-based hybrid storage system embodies performance and capacity optimization with integrated functionality, including thin provisioning, in-line compression, unlimited instant snapshots, WAN-efficient replication and nondisruptive firmware upgrades under a single SKU.

- Postsales support via remote automation software coupled with a real-time analytics engine enables Nimble Storage to quickly identify configuration problems and component failure patterns, and proactively advise customers of the appropriate corrective action to take, as well as to dispatch field replaceable unit (FRU) components.
- Nimble Storage's integration investments with the VMware View Rapid Desktop Program (RDP) for prevalidated, hosted virtual desktop configurations and the integration of CS-Series snapshots with CommVault's backup catalog and indexing capabilities for single-item restores are gaining increased market traction.

Cautions

- Nimble Storage's CASL-based software has only been shipping for a little over two years.
- Nimble Storage is not yet profitable or cash-flow positive.
- Customers express concern about the company's sustainability as the user installed base grows.

Oracle

Oracle's general-purpose stand-alone disk storage portfolio consists of the Sun ZFS Storage Appliances and the Pillar Axiom 600 Storage System. Even though both systems support block- and file-access protocols, Oracle positions the Sun ZFS Storage Appliances as its flagship NAS offering, while the Pillar Axiom 600 Storage System is positioned as its flagship FC SAN offering. Oracle has made substantial R&D investments to harden the Sun ZFS Storage Appliances into platforms that can support enterprise mission-critical applications. Oracle has taken steps to integrate the Sun ZFS Storage Appliances and the Pillar Axiom 600 Storage System with the Oracle Database, middleware and OS software stack to deliver what it considers to be the best performance and optimization attributes when used with Oracle software. Indeed, the Sun ZFS Storage Appliances are Oracle's primary storage for Oracle VM and are the backup for Exadata systems. While the Sun ZFS Storage Appliances and Pillar Axiom 600 Storage System may be sold into any environment, Oracle's principal go-to-market strategy is to focus on the Oracle software installed base.

Strengths

- The Sun ZFS Storage Appliances embrace hybrid storage pools, combining SSDs and SAS-2 HDDs to provide cost-effective price/performance with a proven package of data reduction, storage utilization efficiency, data protection and replication, and granular storage performance and utilization analytics software.
- The Pillar Axiom 600 Storage System delivers predictable performance via I/O queues controlled by quality of service (QoS) settings, has high-capacity utilization, supports storage domains for multitenancy, provides an integrated suite of data protection and data mobility management software, and can scale from midrange to high-end market segments.

- To optimize performance, efficiency and competitiveness when deployed with Oracle's database, the Oracle Hybrid Columnar Compression function has been integrated into the Sun ZFS Storage Appliances and the Pillar Axiom 600 Storage System offerings.

Cautions

- Even though both the Sun ZFS Storage Appliances and the Pillar Axiom 600 Storage System are deployed in VMware infrastructures, Oracle has yet to certify VMware ESXi 5.1, implement a VMware vSphere Plugin or VAAI and VASA for either platform.
- Users must log in to DTrace Analytics software for each ZFS Storage Appliance node to make full use of this analytic tool in clustered configurations.
- Customer checks continue to report that Oracle's support can be spotty, and that field operations remain inefficient and somewhat difficult to deal with when finalizing a formal relationship for the Sun ZFS Storage Appliances and the Pillar Axiom 600 Storage System disk storage products.

Promise Technology

Promise Technology caters to customers that have high-performance data requirements, but are price-sensitive. Largely deployed in applications such as HPC, streaming video for surveillance, video editing, content creation and image enhancement, as well as for backup and archiving, the Promise VTrak Ex30 is a solid storage platform with basic functionality. Promise's go-to-market strategy is to customize disk storage solutions to fit a particular partner use case and to leverage the larger market presence of its partner to gain branded market traction. The most visible example of this strategy is the successful relationship with Apple, where Promise VTrak Ex30 is positioned as a storage platform of choice to support the Apple MacPro with OS X Server and OS X Mountain Lion.

Strengths

- There is timely certification with Apple's latest software, including OS X Mountain Lion, as well as support for asymmetric logical unit access (ALUA) to enhance availability and load balancing in a SAN infrastructure.
- Promise is gaining traction as a vendor that provides highly cost-effective midrange disk storage that is reliable and easy to use.
- Apple likely would not place Promise VTrak Ex30 disk storage system on its website if it did not fully meet Apple's performance, reliability and quality specifications.

Cautions

- Promise has yet to implement a VMware vSphere Plugin or VAAI and VASA for either platform.

- Customer access to find the correct firmware upgrade notice for a specific class of systems is cumbersome.
- The Promise VTrak Ex30 disk storage system offering does not include capacity utilization efficiency, or local and remote replication functionality.

SGI

SGI's disk-based storage is targeted at vertical markets with data-intensive computing and performance-oriented data storage requirements that can scale performance and capacity. SGI's disk storage portfolio sold under the InfiniteStorage brand ranges from external "just a bunch of disks," to storage servers, to midrange and high-end disk storage platforms. The InfiniteStorage-branded midrange and high-end storage systems are sourced from DataDirect Networks and NetApp under OEM agreements. Emphasizing high-bandwidth performance and dense packaging characteristics, the SGI InfiniteStorage midrange and high-end modular disk arrays are purpose-built platforms that are suited best for data-intensive applications with large datasets including, among others, full motion video, data analytics, HPC, rich media and life sciences research, and/or capacity-intensive applications. Defense, weather and climate, life sciences, energy, media and entertainment, aerospace, and automotive design are representative vertical markets that benefit from SGI's lineup of InfiniteStorage midrange and high-end disk array storage systems.

Strengths

- Featuring dual active/active controllers with SFA acceleration and up to 16 InfiniBand Fourteen Data Rate (FDR or 56 Gbps) ports, the high-end InfiniteStorage 17000 model is able to support throughput performance of up to 40 GB/sec and 1.4 million IOPs.
- SGI's professional and customer service organizations possess competencies in deploying and supporting complex storage infrastructures for the vertical markets that SGI targets for penetration.
- By allowing multiple users to share one version of content at FC or InfiniBand speeds in a SAN infrastructure, the CXFS optional host software enhances the product attractiveness of the SGI midrange and high-end modular disk array systems.

Cautions

- SGI has yet to implement VAAI and VASA or embrace the Microsoft Hyper-V Cloud Fast Track program for its midrange and high-end disk storage systems.
- SGI sources the InfiniteStorage 17000, 16000 and 15000 systems from DataDirect Networks, and the InfiniteStorage 5500 and 5000 systems from NetApp. SGI must rely on these enabling vendors to provide the necessary features, functions and performance to sustain product competitiveness.
- The SGI InfiniteStorage midrange and high-end disk storage systems do not support thin provisioning, automated sub-LUN data tiering, controller-based data reduction, unlimited

snapshots and multitenancy, which impede their competitiveness in general-purpose storage infrastructures.

X-IO

X-IO has simplified its marketing messages, improved sales efficiency and concentrated development resources on fast-growing market segments. These changes in direction are improving sales efficiency by enabling them to quickly identify competitive situations that maximize Intelligent Storage Element (ISE) advantages and ignore those situations where ISE is missing features. X-IO is focused on high-performance database management system (DBMS) and big data applications, server virtualization and server hosted desktop infrastructures (aka VDI), private and public cloud, universities, and government agencies.

X-IO is offering its customers two versions of ISE: ISE-2, which is an all-HDD version of ISE; and Hyper ISE, which is a hybrid SSD/HDD storage system that uses a controller-based Continuous Adaptive Data Placement (CADP) algorithm to move LUN pages between SSDs and HDDs that exhibit operational characteristics similar to second-level caching and autotiering SSD implementations. Both versions of ISE use the same management tools, have the same rack form factor (3Us) and are very energy efficient, as low as 28.8TB/600 watts.

Strengths

- Revenue growth driven by repeat business and new customer wins highlights strong customer satisfaction and the effectiveness of ISE messaging.
- ISE's self-repair capabilities give it an order-of-magnitude improvement in frequency of repair activities over other storage systems that replace disks when problems are detected and make it possible for X-IO to offer a standard five-year warranty. This self-repair capability improves ISE attractiveness for deployments in remote locations with limited access to Field Engineers (FEs) and spares.
- CADP enables very rapid responses to changes in workload profiles and requires very little storage administrator attention.

Cautions

- X-IO has yet to demonstrate long-term management stability or profitability.
- X-IO needs to invest more in marketing, sales and development to maintain revenue growth in the face of increased competition from established and emerging storage companies that are shifting resources onto the same market segments on which X-IO is focused.
- ISE's reliance on hypervisors' server resident software to provide missing features reduces the strength of X-IO lock-ins and could make X-IO more vulnerable to competitors' product improvements.

Vendors Added or 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 appearing 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. This may be a reflection of a change in the market and, therefore, changed evaluation criteria, or a change of focus by a vendor.

Added

New Magic Quadrant

Dropped

New Magic Quadrant

Inclusion and Exclusion Criteria

The criteria enumerated below are intended to include established and emerging vendors selling midrange and high-end disk storage systems that support block-access, file-access, or converged (block and file) protocols. Commonly supported protocols include FC, iSCSI, CIFS and NFS. Less commonly used, but still qualifying protocols, include InfiniBand, FCoE and AoE. These systems are configured with HDDs and, optionally, with SSDs.

Product Criteria:

- Bundle all the hardware and software needed to store and retrieve data using industry-standard block and/or file host connection protocols into a storage array.
- Implement architectures with no single points of hardware failure.
- Sold through indirect or OEM channels, maintain brand awareness with end users and have an average selling price of more than \$24,999.

Vendor Criteria:

- \$25 million or more in annual company revenue.
- A multinational presence and 24/7 support capabilities.

Notes:

- z/OS support is no longer used as a boundary separating midrange from high-end storage arrays.

- Inclusion of dual-controller, scale-out and high-end storage systems in the same Magic Quadrant does not imply that the differences in usable availability, scalability, performance/throughput and functionality of these different architectural approaches are insignificant.

Evaluation Criteria

Ability to Execute

The Ability to Execute axis highlights the change in vendor positioning directly attributable to vendor actions. Criteria that provide relatively high levels of vendor and product differentiation are more highly weighted than those that have relatively little ability to provide differentiation (see Table 1).

Table 1. Ability to Execute Evaluation Criteria

Evaluation Criteria	Weighting
Product/Service	High
Overall Viability (Business Unit, Financial, Strategy, Organization)	Standard
Sales Execution/Pricing	High
Market Responsiveness and Track Record	Standard
Marketing Execution	High
Customer Experience	High
Operations	Standard

Source: Gartner (March 2013)

Completeness of Vision

The Completeness of Vision axis highlights the change in vendor positioning directly attributable to vendor actions. Criteria that provide relatively high levels of vendor and product differentiation are more highly weighted than those that have relatively little ability to provide differentiation (see Table 2).

Table 2. Completeness of Vision Evaluation Criteria

Evaluation Criteria	Weighting
Market Understanding	Low
Marketing Strategy	Standard
Sales Strategy	High
Offering (Product) Strategy	High
Business Model	High
Vertical/Industry Strategy	Standard
Innovation	High
Geographic Strategy	Low

Source: Gartner (March 2013)

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

A vendor in the Challengers quadrant participates in the broad general-purpose disk array market and executes 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 are often narrowly focused on specific market or vertical segments, such as data warehousing, HPC, low-cost disk-based data retention and other areas that are generally underpenetrated by the larger disk array vendors. This quadrant may also include vendors that are ramping up their disk array or larger vendors having difficulty in developing and executing upon their vision.

Context

This Magic Quadrant represents vendors that sell into the end-user market with branded disk arrays. An insatiable demand for storage, coupled with HDD price increases caused by flooding in Thailand, tight budgets, difficult economic conditions and skills shortages have prompted users to focus on storage efficiency and ease-of-use features. This will enable them to keep pace with a more stringent regulatory environment and the need to take advantage of big data analytics to create advantages by identifying new product opportunities and new marketing and sales strategies before competitors; speeding product development; and improving the quality of business decisions by doing more realistic "what if" analysis.

Market Overview

Historically, Gartner has segmented the storage market by architecture, protocol support and price bands to facilitate a better understanding of storage market dynamics and assist clients in designing infrastructure refreshes. However, improvements in midrange storage system availability, scale, performance/throughput and functionality, including multiprotocol support, have altered user-defined behaviors and, therefore, the value of this approach. Today, users without the need for backward compatibility often allow high-end, midrange, and NAS/unified storage solutions to compete against each other during technology refreshes. Similarly, storage vendors with significant high-end storage revenue and markets to protect are introducing lower-capacity high-end models positioned to compete with larger midrange storage examples of these entry-level high-end storage systems, including EMC's VMAX 10K and Hitachi Data Systems' HUS VM. Where there is no need for niche or legacy server support, allowing scale-out midrange storage solutions to be offered against high-end storage systems is gaining acceptance, although high-end storage systems retain small advantages in availability, performance/throughput, recovery point objectives (RPOs) and software ecosystem support.

This Magic Quadrant reflects these changes in user buying behaviors by combining the Magic Quadrant for Midrange and High-End Modular Disk Arrays, the Magic Quadrant for Midrange and High-End NAS Solutions, and the MarketScope for Monolithic Disk Arrays into this Magic Quadrant for General-Purpose Disk Arrays. Therefore, comparisons between vendor positioning on this Magic

Quadrant and retired Magic Quadrants are invalid and misleading. In evaluating each vendor, Gartner analysts used a methodology that weighed the importance of each segment to that vendor's strategy. This allows vendors that prioritize their participation in various markets to be positioned in a way that more accurately reflects their marketing, sales and development strategies.

Gartner expects the advantages of the traditional high-end enterprise storage arrays to disappear over the next three to five years, because the pace of innovation is occurring faster in the larger and more dynamic midrange segment of the storage market. This change is driven, in large measure, by the proliferation of emerging disk and SSD storage companies. Gartner does not expect any new storage vendors to enter the traditional high-end segment. The barriers to the entry in this market segment are high, and its share of the overall storage market over the long term is declining. We are also witnessing changes in pricing and sales models as new vendors that don't need to protect legacy software revenue streams are offering inclusive pricing for all storage software and data services. Established vendors are responding with relatively small changes to their pricing models and more variations of bundling, but not full-scale inclusive pricing.

Recommended Reading

Some documents may not be available as part of your current Gartner subscription.

"Magic Quadrants and MarketScopes: How Gartner Evaluates Vendors Within a Market"

"IT Market Clock for Storage, 2012"

"Hype Cycle for Storage Technologies, 2012"

"Recommendations for a Storage Array Dashboard"

"How to Negotiate Lower Storage Acquisition Costs"

"New Options for Low-Cost Storage Systems"

"Users Are Gaining Agility and Lowering Costs With New Storage Technologies"

"Increases in Disk Capacity Are Affecting RAID Recovery; Start to Purchase New RAID Technologies"

"How Much and What Type of Disk Storage Do IT Departments Need?"

Evaluation Criteria Definitions

Ability to Execute

Product/Service: Core goods and services offered by the vendor that compete in/serve 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 (Business Unit, Financial, Strategy, Organization): 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 and Track 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 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.

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