nimblestorage

Issue 1

Nimble Storage Vision Drives to Leadership Position in Gartner Magic Quadrant

Pioneering the use of predictive analytics and machine learning capabilities across the infrastructure stack

Contents

Welcome

Once again, it's a great accomplishment to be recognized as a Leader in the Gartner Magic Quadrant for General-Purpose Disk Arrays, 2016. In the 2015 Magic Quadrant we made our initial entrance into the Leaders quadrant as the youngest vendor among well-established storage vendors. This year we've been positioned furthest on the visionary axis in the Leaders quadrant among those same legacy vendors. Our efforts to combine predictive analytics with flash storage are transformational, enabling IT teams to radically simplify their operations. To date, over 9,000 enterprises and cloud service providers rely on Nimble Storage to underpin their critical business applications.

More than six years ago, executives and data scientists at Nimble developed a strategy to leverage big data and machine learning to optimize our customers' environments. The ultimate goal: infrastructure that operates flawlessly, informs you when something is about to go wrong, and prevent problems from occurring in the first place. The Nimble Storage Predictive Flash platform gives IT teams radical simplicity, a transformed support experience and ease of scalability.

InfoSight Predictive Analytics was created based on the premise that monitoring infrastructure – from the cloud, in real-time – enables us to predict and prevent disruptions. Though storage is our bread-and-butter…we didn't stop there. Monitoring across the infrastructure stack (storage, networks, servers, VMs) delivers root-cause analysis for hard-to-diagnose issues.

By combining the vast amount data collected with advanced data science analytics we've revolutionized infrastructure management. Need proof? Nine out of 10 support cases are automatically detected by InfoSight. When they ask for support, our customers go straight to a

Gartner

level 3 support engineer, skipping the traditional multi-tiered support structure. We have fundamentally transformed the customer support experience. This is all made possible by the industry's most advanced use of predictive analytics and machine learning capabilities.

Nimble Storage is single-minded in delivering efficiency for IT teams. Enterprises manage hybrid and All Flash arrays under a single consolidated architecture, and replicate from all-flash to cost-effective hybrid arrays for data protection. Support pricing does not increase over the life of the array. The products are straightforward to deploy, and can be upgraded from the base model to the top-of-the-line without application disruption.

We have pioneered the use of predictive analytics and machine learning capabilities across the infrastructure stack, and will continue to leverage vast amounts of data and sophisticated analytics tools to improve customer experience and simplicity to the data center of the future.

Rod Bagg
Vice President
Analytics and Customer Support
Nimble Storage

Magic Quadrant for General-Purpose Disk Arrays

Storage vendor consolidations, acquisitions and competition from nontraditional sources are changing the storage market. I&O leaders who understand how vendors are changing their marketing, sales and storage portfolios increase their ability to optimize storage refreshes.

Market Definition/Description

General-purpose disk storage systems are designed to satisfy the storage needs of files and applications running on physical and virtual servers. This market segment includes hybrid and solid-state arrays (SSAs) that support storage area network (SAN) and network-attached storage (NAS) protocols. SSAs and object storage are not included in this Magic Quadrant because we view them as distinct markets with their own Magic Quadrant and/or Critical Capabilities research.

Magic Quadrant

■ **FIGURE 1**
Magic Quadrant for General-Purpose Disk Arrays

Source: Gartner (October 2016)

Vendor Strengths and Cautions
DDN

DataDirect Networks (DDN) is a profitable, privately held company with a large stable customer base. DDN has expanded from its initial focus on media, high-performance computing (HPC) and analytics to include big data, finance, life sciences and private cloud storage use cases. Its Storage Fusion Architecture (SFA) series supports 32 Gbps FC, Ethernet 100GbE, and 100Gb IB (EDR) and provide EXAScaler and GRIDScaler NAS storage systems with their back-end storage. EXAScaler, built on the Lustre file system, is positioned for HPC use cases. GRIDScaler is built on IBM's Spectrum Scale (formerly known as General Parallel File System [GPFS]) and is positioned for big data use cases. The SFA (Storage Fusion Architecture) series currently consists of the high-end SFA14K and the entry-level SFA7700, which are gradually replacing the SFA12K, which is in the process of being withdrawn from active marketing. Moving to an all-inclusive software pricing model, improving management tools and embracing open-source frameworks are all maintaining product attractiveness.

Strengths

- DDN's position as a leader in the HPC market is validated by its reseller agreements with Hewlett Packard Enterprise (HPE), Dell, IBM and Fujitsu, and technology integration partnerships with Intel, Mirantis and Ctera, a cloud storage gateway company.

- With its SFA14K and SFA7700, DDN now has a product portfolio that includes high-end and midrange storage arrays, and scale-out NAS and object storage systems.

- DDN has vertical market solution specialists in life sciences, manufacturing, media, oil and gas, and finance, giving it expertise within its target verticals.

Cautions

- DDN's ability to expand its share of the virtualized server and virtual desktop infrastructure (VDI) markets will remain limited until its EFA (Enterprise Fusion Architecture) offering gains market acceptance.

- The SFA series's lack of native compression and deduplication, as well as lack of VMware Virtual Volumes (VVOLs) support, limits its appeal in virtualized environments.

- The lack of SFA consistency group support complicates application-level recovery and disaster recovery (DR) testing by increasing user reliance on scripting.

Dell EMC

EMC has its own position in the Magic Quadrant for General-Purpose Disk Arrays (labeled Dell EMC) because the research and customer reference checks for EMC were completed before Dell was able to finalize its acquisition of the EMC Federation, forming Dell Technologies. While we expect organizational reorganizations and product rationalizations to occur, we do not expect them to be announced or become market-visible until at least six to 12 months after the September 2016 completion of the acquisition, and the first round of reorganizations is done.

EMC has woven its portfolio of storage systems into an extensible infrastructure that preserves prior investments in EMC technology, training, and procedures by enabling replication between VMAX, VNX, Unity and XtremIO arrays. VMAX features that support EMC's "better together" vision include FAST.X, which virtualizes third-party storage systems, and ProtectPoint, which provides direct backup to Data Domain backup appliances. SRDF/Metro provides VMAX3 users with a need for read/write access to replicated volumes from both the production and DR sites with an alternative to deploying VPLEX. The new Unity series is mostly new microcode, combined with new hardware that delivers higher performance than the VNX 5000 series models it replaces, as well as a unified snapshot feature that can create a constant timeline across block and file storage. The VMAX3 eNAS and the Unity File System share the same software, and are therefore fully interoperable with each other. Competition between eNAS, Unity File System and Isilon is minimized by positioning Isilon with its scale-out architecture as the NAS platform of choice for big data applications.

Strengths

- EMC's market share leadership and a steady cadence of product and software enhancements make Dell EMC a safe choice.

- Innovative and agile marketing that creates financial incentives, coupled with aggressive sales, keeps Dell EMC on many end-user shortlists.

- A broad portfolio of storage arrays that are competitive within their respective market segments enables customers to choose storage solutions that optimally align with application needs without complicating vendor management.

Cautions

- Many EMC customers will be impacted by the Dell acquisition because of the loss of talented staff and customer focus, and changes in go-to-market priorities (for example, a flash-first strategy), along with the changes in sales and support relationships that are likely to follow.

- Managing a disparate collection of EMC storage systems adds management and administration complexity.

- Dell EMC customers frustrated by high maintenance costs and the relative lack of third-party maintenance alternatives are exploring lower-cost alternatives.

Dell Technologies

Dell Technologies has its own position in this Magic Quadrant because the research and customer reference checks for Dell were completed before Dell was able to finalize its acquisition of the EMC Federation, forming Dell Technologies. While we expect organizational changes and product rationalizations to occur, we do not expect them to be announced or become market-visible until at least six to 12 months after the September 2016 completion of the acquisition, and the first round of reorganizations is done.

The Dell SC Series and PS Series are mature general-purpose storage systems with established track records. Dell's storage R&D investments focus on incremental hardware and software improvements, and maintaining compatibility with leading independent software vendors' (ISVs') offerings, including VMware, Microsoft, Oracle and SAP. The recently released Dell Storage Center Operating System 7 (SCOS 7) adds important new functionality to the SC Series, such as data reduction across solid-state drive (SSD) and hard-disk drive (HDD) tiers, and support for VVOLs. To support Dell's strategy of consolidating the PS- and SC Series stacks, SCOS 7 provides bidirectional replication between the SC and PS Series platforms. In addition, the companion release of the Dell Storage Manager (DSM) provides a common management platform for Dell's SC, PS and FS Series storage platforms. The SC Series software pricing model is different from all-inclusive and capacity-based pricing models in that it is based on the number of drives configured, rather than capacity, with a drive number cap after which there are no further license fees. Dell's storage go-to-market strategy employs direct and indirect channels, with revenue contribution essentially even (51% direct; 49% indirect).

Strengths

- SC Series and PS Series software licenses are perpetual, enabling existing software licenses to follow hardware upgrades without additional charges, enhancing end-user investment protection.

- The SCOS 7 Live Volume function provides seamless movement of volumes between two SC Series platforms, facilitating workload balancing in addition to strengthening platform availability.

- The SCOS 7 Live Migrate feature, along with Volume Advisor and DSM (Dell Storage Manager), supports the deployment of a federated, multi-SC Series storage infrastructure, improving data center flexibility.

Cautions

- R&D and go-to-market investments in Dell storage solutions may become subordinate to EMC solutions with larger revenue.

- The FS Series does not measure up to the functional or performance requirements of the midrange and above general-purpose NAS market.

- The PS Series supports only the iSCSI host protocol, limiting product attractiveness in environments requiring or considering an FC protocol.

Fujitsu

The Fujitsu Eternus DX S3 series includes the midrange DX500 and DX600, as well as the high-end DX8700 and DX8900 series, which were released in July 2015. The midrange and high-end series share the same architecture and management software, with the primary differences between midrange and high-end systems being the number of controllers and scale. Midrange DX500 and DX600 systems are configured with dual controllers, while the high-end systems may be configured with up to 24 controllers. The Eternus DX S3 series supports all major hypervisors and backup vendors, and also offers a storage volume driver for OpenStack. The DX S3 gives customers the flexibility to choose among four different snapshotting capabilities, depending on their data protection requirements. The DX S3 also provides a comprehensive set of security features, including native AES 256-bit encryption as well as encryption key life cycle management software. All arrays except the DX8000 series have inclusive nonchargeable in-line deduplication and compression.

Strengths

- Controller-based software licensing offers simplicity and reduces costs in large-scale deployments.

- The Eternus DX S3 offers a built-in migration tool that facilitates seamless data transition across multiple product generations, as well as replication and clustering across DX products.

- Effective postsales support and competitive pricing are delivering high levels of customer satisfaction.

Cautions

- Data reduction features, such as compression and deduplication, are nonchargeable and currently available in the DX500 and DX600, but not in the high-end DX8000 S3 series.

- There is lack of a significant presence and overall brand awareness as a storage supplier in North America.

- The Eternus DX S3 series does not allow the creation of virtual storage domains or the creation of partitions, which may limit its appeal in shared IT environments.

Hitachi (Hitachi Data Systems)

Hitachi Data Systems (HDS) offers one complementary family of competitive hybrid storage arrays in the Virtual Storage Platform (VSP) family (G200, G400, G600, G800 and G1000) for the general-purpose disk array market. HDS has a large global customer base, and is providing users with price-competitive storage by selling storage arrays on an operational cost basis via capacity on demand, or storage-as-a-service programs. HDS has a highly regarded and effective worldwide support capability. The new G series arrays are backward-compatible with earlier-generation HUS VM and VSP arrays; they have compatible replication features and can virtualize earlier-generation arrays to simplify infrastructure refreshes. All arrays are hybrid and support HDS-engineered flash drives (FMDs), but also offer industry-standard SSDs within all arrays. The G series arrays are unified storage arrays that offer both block and file protocols, which can tier storage to the cloud via Hitachi Data Migrator to Cloud, plus the G series provides broad and comprehensive integration into VMware APIs. Customer satisfaction is high, especially in the areas of reliability, availability and serviceability. In October 2016, the G series product enabled support for compression and deduplication in its FMD modules. A larger G1500 with faster controllers also became available.

Strengths

- HDS has a common hardware platform and common software across the product portfolio, with common administrative, operational GUIs and compatible replication features.

- The G series interfaces with the cloud to enable transparent tiering of storage to cloud vendors such as Amazon and Microsoft Azure cloud services.

- Nondisruptive microcode updates that require little planning and a low frequency of hardware repair activities translate into high usable availability.

Cautions

- Extra options, such as the HDS Automation Director, which automates storage provisioning, are extra cost items and, therefore, will increase purchase and licensing costs.

- The administrative and operational GUI is not as intuitive, nor as graphically advanced, as those of many competitors.

- While HDS's storage arrays can be priced competitively, the discount level offered to customers fluctuates considerably.

HPE

The Hewett Packard Enterprise (HPE) general-purpose storage portfolio is a collection of independent architectures that are positioned to address specific target markets. With a rich data service software library, its flagship 3PAR StoreServ platform addresses the requirements of a broad range of mission-critical applications. Its common architecture and software stack span from midrange to high-end price ranges, setting the 3PAR StoreServ offering apart from most competing general-purpose storage systems. However, the 3PAR StoreServ offering lacks simple inclusive purchase options and needs to complete its data reduction feature set with compression capabilities. The scale-out StoreVirtual 4000 Storage series is targeted at the lower end of the midrange and entry storage market. Featuring provisioning and management simplicity, the StoreVirtual 4000 Storage series comes with an all-inclusive software pricing model to simplify the acquisition process. Sourced from Hitachi Ltd., Japan, under a joint technology development and OEM arrangement, its XP7 Storage is focused on HPE's XP installed base. HPE makes material R&D investments to ensure that its 3PAR StoreServ and StoreVirtual 4000 Storage series support leading hypervisors, including Citrix XenServer, Red Hat KVM, Microsoft Hyper-V and VMware vSphere.

Strengths

- The HPE 3PAR StoreServ Remote Copy and Peer Motion Storage Federation features enable the nondisruptive movement of virtual volumes between 3PAR arrays.

- The HPE 3PAR StoreServ hybrid models share the same software stack with the HPE 3PAR StoreServ all-flash models, simplifying primary storage architecture and management when the infrastructure requires the performance of flash and the economics of hybrid storage systems.

- StoreOnce Recovery Manager Central (RMC) facilitates backup directly from a 3PAR StoreServ platform to a StoreOnce Data Protection appliance, streamlining the backup process while reducing infrastructure costs.

Cautions

- The multiplicity of HPE 3PAR StoreServ software suites complicates final configuration selection, and it is time consuming to manage the contracts once deployed.

- HPE is expected to focus the majority of its R&D and go-to-market resources on 3PAR StoreServ, subordinating R&D and go-to-market investments for the StoreVirtual 4000 Storage appliance and the HPE XP7 platforms.

- The HPE 3PAR File Persona Software Suite lacks the maturity to be deployed as a broad-based stand-alone NAS platform.

Huawei

Huawei is a technology conglomerate with a comprehensive portfolio of storage solutions that includes midrange and high-end hybrid and solid-state SAN storage arrays, and scale-out NAS storage. Huawei has leveraged its large telecom industry presence to develop solutions that cater to industries such as video surveillance and media and entertainment. It is one of the few storage vendors that manufactures both SSDs and controllers, and is willing to leverage this to lower SSD prices. It has been aggressive in promoting SSD-based configurations to its existing customer base, as a replacement to hybrid configurations. In September 2015, Huawei entered the software-defined storage (SDS) market with the introduction of OceanStor DJ, an SDS controller that aggregates multiple storage systems and provides storage as a service to enterprises, as well as extending on-premises to the Huawei's public cloud. Huawei continues to strategically engage with technology partners for sourcing and co-development opportunities in areas such as NAND flash and large-capacity disks. China, the second largest consumer

of enterprise storage globally, continues to generate the majority of Huawei's revenue, although it is increasingly being challenged by emerging and local vendors in the region.

Strengths

- Huawei has been able to consistently address customer needs by delivering products that address hybrid, flash, SDS and hybrid storage requirements.

- Huawei supports Mode 2 enterprise requirements by supporting OpenStack and Apache Hadoop, as well as container technologies such as Docker.

- Software licensing is made simple as Huawei offers an option to consume data services as a bundle.

Cautions

- Geopolitical situations continue to hamper Huawei's ability to sell in North America, which may concern some enterprises in the region.

- Many enterprise customers do not consider Huawei an innovative company because of ineffective marketing.

- Huawei has fewer Tier 1 global system integration partners relative to its competitors, thus reducing enterprise customer exposure to its storage product portfolio.

IBM

IBM has a disparate storage portfolio consisting of three separate product families: the IBM DS8000, IBM Storwize V7000 Gen2, IBM Storwize V5000 Gen2 and the IBM XIV Storage System. The DS8000 series was updated in October 2015 with newer, faster processors in the controllers. This updated series consists of the smaller DS8884 and the larger DS8886 high-end arrays that support z/OS for mainframe connectivity. The DS8888 is available only as an SSA and is, therefore, not included in this research. The DS8000 series only supports block protocols, and does not support data reduction technologies such as data compression and/or deduplication. Within IBM's storage portfolio, the Storwize V7000 Gen2 and Storwize V5000 Gen2 systems are the newest unified block and file arrays, as they were updated in May 2016 with Spectrum Virtualize Software version 7.7. The very simple-to-use block-only storage XIV Storage System was updated in November 2015 with an increased usable capacity of 485TB and a new compression feature that can increase effective capacity, depending on the data being stored. The DS8000 series has a simplified capacity-based licensing scheme that is composed of

three bundles: a Base functions license, a Copy Services license and a z-synergy Services license.

Strengths

- IBM offers a customer migration program from the older DS8870 to the DS8886, which can simplify DS series migration projects.

- IBM XIV Storage System and Storwize V5000/V7000 systems have low-latency in-line compression that can be enabled or disabled at the volume level.

- IBM guarantees a 2:1 compression ratio in XIV and Storwize Storage Systems, and an XIV sustained response time of 4 ms or less with compression enabled.

Cautions

- The DS8000's lack of native virtualization, compression and deduplication requires customers to buy an SVC, with its accompanying cost and complexity, if they need these capabilities.

- While IBM does have some large-scale XIV implementations, Gartner has seen limited adoption of XIV Hyper-Scale, which may indicate limited appeal for XIV among large and high-growth environments.

- The Storwize V7000/V5000's and XIV Storage System's lack of data deduplication and the lack of Storwize V5000 multicontroller configurations mean that they are disadvantaged when competing against hybrid arrays implementing these capabilities.

Infinidat

Infinidat is a relatively new general-purpose storage vendor, founded in 2011. Infinidat offers the InfiniBox F1000, F2000, F4000 and F6000 series of unified high-end storage arrays, which have been sold in stealth mode since the end of 2013, with an official announcement and general availability in April 2015. Differentiation centers on high availability, autonomic operation and multiprotocol support, and InfiniBox's claim that it can deliver near SSA at the cost of disk. InfiniBox's architecture consists of a scale-out architecture with three controllers per system and data flows that use DRAM and SSD for cache and parallelism across a large number of high-capacity HDDs for low-cost back-end storage. Together with inclusive storage software features in the array purchase price, this translates into a low purchase price relative to other high-end array alternatives. Nonstorage professionals can provision storage because Infinidat has taken advantage of starting with a completely new array design to create an array with a modern intuitive web GUI and broad

automation capabilities that include software development kits (SDKs) and nonblocking RESTful API support. The array reporting features also provide extensive real-time and historic performance, and capacity utilization information.

Strengths

- The InfiniBox is a simple-to-use, enterprise-class, low-cost general-purpose storage array.

- Infinidat is expanding into new areas with Network File System (NFS) support, VMware, OpenStack, SAP Hana, and Cisco UCS and networking certifications, as well as partnerships with Brocade, Commvault and Red Hat.

- Infinidat provides direct sales and technical specialist teams to help its channel partners engage with customers.

Cautions

- InfiniBox does not yet offer native Server Message Block (SMB; aka CIFS), synchronous replication, compression or quality of service (QoS).

- InfiniBox only provides older 8 Gbps FC and 10GbE NFS V3 connections, which can increase connectivity costs and reduce performance.

- Until InfiniBox is able to scale out beyond a single system consisting of three nodes, the promise of its architecture will only be partially fulfilled.

Infortrend

Infortrend is an enterprise storage vendor traded on the Taiwan Stock Exchange. In June 2016, Infortrend expanded its storage portfolio with the announcement of its EonStor GS series and EonServ 5000ML. These systems complement the already shipping EonStor DS and EonNAS series with new capabilities. The EonStor GS is a unified storage platform that offers direct integration with public cloud providers such as Amazon Web Services (AWS), Microsoft Azure, Google Cloud Platform, as well as China's Alibaba Cloud. The EonServ 5000ML is a video surveillance appliance that is available preconfigured with Milestone XProtect Video Management Software. Infortrend generates 100% of its revenue from indirect sales via distributors, value-added resellers and system integrators, and has sales and support offices in the U.S., U.K., China and Japan. Infortrend proactively engages its partners and offers them comprehensive product training to ensure competent customer support in different geographical areas. Most of Infortrend's revenue is generated from the Asia/Pacific region and Japan, specifically in the media and

entertainment vertical and from video surveillance use cases.

Strengths

- The Infortrend EonStor GS Series can leverage cloud storage as a storage tier or for backup via a native cloud gateway.

- The EonStor GS offers four different levels of tiering depending on disk type and computing resources required for the process, which can be allocated based on application criticality.

- Infortrend regularly provides industry-verifiable benchmarks that provide performance transparency to the extent practical without actually running customer benchmarks.

Cautions

- Both EonStor DS and EonStor GS do not have data reduction features such as compression and deduplication, and do not support QoS.

- Infortrend relies on partners for Level 1 and Level 2 service and support for most regions outside the Asia/Pacific region and Japan, which could introduce unpredictability into a user's support experience.

- The Infortrend DS and GS series have limited integration with Tier 1 backup vendors such as Dell EMC, IBM and Veritas Technologies.

NEC

NEC is an established Japan-based technology and service provider. In the last two years, NEC has made efforts to increase its brand awareness in the U.S. and is working with channel partners to expand its reach in this market. Over the past year NEC has made several updates to its flagship storage product line, the Mx10 Series. NEC entered the SSA market with the release of the Mx10-F Series. It has established key technology partnerships with Commvault, Veritas Technologies' NetBackup and Veeam for backup, and Milestone for video surveillance solutions. From security and compliance standpoints, it supports audit trails, RBAC capabilities and integration with third-party antivirus scanning engines such as Trend Micro ServerProtect for Windows, McAfee VirusScan Enterprise and Symantec Protection Engine. NEC is an active contributor to OpenStack and has regularly released OpenStack Cinder drivers for FC and iSCSI in the last year. It also provides verifiable and independent performance benchmarks by publishing SPC-1 benchmarks. Software licensing for the Mx10 Series is controller-based and does not depend on the capacity of the storage procured.

Strengths

- NEC offers deep integration with VMware environments and supports VVOLs, VMware Storage Replication Adapters and vCenter plug-ins.

- NEC is well-positioned to offer its integrated infrastructure solution, Nblock, consisting of servers, storage and networking products that are indigenous to the vendor particularly, and can target cloud use cases.

- The Mx10 Series integrates with NEC's disk-based backup and archive deduplication appliance, HYDRAstor, via disk data shadow software, thus streamlining the backup and archive process.

Cautions

- Compression and deduplication are supported via a third-party appliance, SANblox from Permabit, resulting in deployment complexity as these features are out-of-the-box and not native to the M-Series appliance.

- The lack of a significant presence outside Japan means those customers must carry out a more comprehensive due diligence of NEC's local postsales support capabilities.

- The Mx10-Series lacks support for native NAS capabilities.

NetApp

NetApp has a worldwide presence, a large customer base, and competitive hybrid and SSAs. While the clustered Data Ontap (cDOT) customer base is growing, converting the large 7-Mode installed base remains a major challenge that is hampering NetApp market share growth. The FAS and E-Series are available in hybrid and all-flash configurations. FAS systems provide multiprotocol support, storage efficiency features and a common architecture from entry-level to high-end configurations. NetApp has positioned its FAS series as suitable in all general-purpose/unified storage environments and its E-Series as a high-performance, low-cost, market-validated block storage that aligns well with the needs of big data, video surveillance, backup and technical computing workloads. This positioning makes it easy for users to choose between arrays when doing infrastructure refreshes or upgrades to support new application workloads.

The announcement of Ontap 9 has improved performance and partially addressed customer concerns about cDOT's operational complexity. With the announcement of Ontap Select, an infrastructure SDS implementation of Ontap, NetApp is continuing to fill out its Data Fabric strategy and is reducing the costs and risks to FAS users

that would otherwise be associated with customer changes in infrastructure strategy.

Strengths

- Ontap 9's ease-of-use improvements and the release of Ontap Select have improved NetApp's ability to serve the needs of customers supporting Mode 1 and Mode 2 application environments.

- Ontap 9 "in-line data compaction" and use-case templates have improved FAS product attractiveness regarding small block performance, agility and cost.

- E-Series SANtricity software updates have improved performance (IOPS, throughput and latency), added support for encrypted drives using FIPS-based encryption, and improved usable availability.

Cautions

- Even with the general availability of the 7-Mode Transition Tool (7MTT) and copy-free transition (CFT), migration to cDOT remains a disruptive process.

- NetApp's evolution into a portfolio vendor is forcing prospects to ensure that marketing, sales and field engineering are equally competent on all NetApp systems proposed.

- Similar to many other vendors branching into the SSA market, NetApp will often lead with SSAs rather than general-purpose storage arrays.

Nimble Storage

Nimble Storage provides one compatible family of storage arrays, the Adaptive Flash CS-Series arrays, which only provide block storage protocols such as FC and iSCSI. Nimble's success is based on competitive pricing, very simple ease of use, a common architecture/microcode base across all its hybrid and flash arrays, and InfoSight Predictive Analytics, a proactive and very user-friendly remote monitoring and support tool. Customers are especially satisfied with InfoSight-enabled proactive support that informs a customer of actual or anticipated problems. In August 2016, Nimble updated the whole CS-Series with the new CS1000/3000/5000 models and the option to have a scale-out/federated cluster mode, which increases the scalability of the system in terms of processing, capacity, connections and overall throughput. The previous CS-Series arrays had been available since May 2014. Both generations of CS arrays support the migration of data between nodes within an array cluster. The CASL file system manages the SSD tier as read cache and the HDD tier as

persistent storage. Writes are cached in nonvolatile storage (NVS) before committing writes to back-end HDDs. The cost competitiveness of the CS-Series arrays is achieved through software efficiency using low-cost, high-capacity HDDs, which store the majority of the data. The current maximum raw capacity of the system is 1.5PB per array, and 6.0PB per cluster, and the CS-Series has compression, but not deduplication or synchronous replication. Compared to the large established incumbent vendors, Nimble provides customers with detailed transparency concerning its R&D budgets. With approximately 28% of revenue being spent on R&D and product development, the vendor is investing heavily in its future.

Strengths

- CS-Series array integration with hypervisors and with products such as VMvision enables the array and server to share performance information and adapt to changing access patterns and workload profiles.

- Customer satisfaction is high due to simple administration and proactive support.

- Customers can and do perform their own firmware upgrades, which is an indication of the simplicity, modularity and resiliency of the array architecture and design.

Cautions

- Nimble, despite a successful IPO and growing revenue and customer base, has not yet achieved profitability.

- The CS-Series array active/passive controller architecture trades off the performance/throughput of an active/active controller architecture for the deterministic failover performance an active/passive architecture.

- While deduplication has been promised in a future microcode release, it is not available in the hybrid CS-Series arrays.

Oracle

Oracle's storage product portfolio mainly consists of its hybrid storage offering, the FS1-2 Flash series, positioned for SAN-based workloads and ZFS Storage Appliance, which caters to enterprise NAS, in addition to being positioned as a disk-based target backup. In the last 12 months, Oracle has made incremental investments to its FS1-2 Flash Storage System. It has introduced support for VMware vSphere APIs for Storage Awareness (VASA) and vStorage APIs for Array Integration (VAAI), as well as OpenStack Cinder. Oracle continued to improve on its ZFS product portfolio, and announced prevalidated,

rack-assembled ZFS Storage Appliance, as well as support for VMware VASA. ZFS Storage Appliance offers most data services, such as compression, deduplication and local replication, as part of the base software, while advanced features such as cloning, remote replication, encryption and snapshot management utilities can be procured as separately chargeable titles.

Strengths

- FS1-2 and ZFS Storage Appliance enable Oracle Database columnar compression, thus reducing the net storage footprint of Oracle Database environments.

- FS1-2 implements QoS and sub-LUN autotiering to deliver consistent performance and efficient use of physical back-end storage.

- Above-average DRAM and flash cache size for ZFS Storage Appliance facilitates caching of data in-memory, thereby increasing overall system performance.

Cautions

- Although Oracle positions both the FS1-2 series and ZFS storage products as general-purpose storage, its priority continues to be the sales of these products with Oracle applications and the Oracle cloud.

- Replication on Oracle FS1-2 requires a dedicated hardware appliance, the MaxRep replication engine, which needs to be procured in pairs to ensure redundancy, thus complicating deployment architecture and increasing acquisition and maintenance costs.

- Oracle FS1-2 lacks integration with leading backup vendors such as IBM Spectrum Protect and EMC NetWorker.

Promise Technology

Promise Technology, listed on the Taiwan Stock Exchange, is a storage technology vendor focused on media content production solutions and video surveillance. VTrak, its flagship product line, consists mainly of two products — the A-Class and Ex30 Series. The VTrak series is a dual-controller SAN system, providing a throughput of 6.4 Gbps, thus making it a suitable solution to serve parallel high frames per second (FPS) video streams. The A-Class can scale out by the use of additional Ex30 storage nodes, each containing a node head and up to nine expansion disk shelves. The solution can support NAS protocols and serve multiple clients via its NAS gateway product, the G1100. Unlike traditional storage architectures, Windows, Linux

and Mac OS X clients can directly access the A-Class system and allocate storage via a simple-to-use management interface that can be installed on the client. This is particularly useful to media houses for postproduction and distribution. The Ex30 Series is also positioned as a backup or archival solution. Promise continues to partner with Tier 1 channel partners and system integrators to increase its global footprint.

Strengths

- Promise provides timely certification with Apple's latest software, as well as support for asymmetric logical unit access (ALUA) to enhance availability and load balancing in a SAN infrastructure.

- The Ex30 Series partners with video ingestion and editing solutions, such as Adobe Creative Cloud and Apple's Final Cut Pro X, to provide comprehensive solutions for media content production use cases.

- The VTrak A-Class has built-in metadata controllers and Quad 8G FC ports per controller, thus making it suitable to serve multiple clients in video production houses.

Cautions

- Promise does not offer certified solutions with business applications such as SAP, Oracle and Microsoft, or system software such as leading backup vendors.

- The A-Class series lacks essential data services such as autotiering, snapshots and replication.

- The A-Class series requires the Ex30 Series for scalability and the G1100 gateway for enabling NAS capabilities, thus resulting in a complex deployment architecture.

Quantum

Quantum has a long heritage and disk-array-based product experience in the backup and archive storage markets, which it has leveraged and exploited with its QXS general-purpose storage arrays. Nevertheless, due to positive synergies from large-scale file system products, such as the StorNext file system, Quantum storage arrays are now successfully used in very large scientific, academic and R&D institutions. As the market moves to hybrid and solid-state storage, Quantum has developed the Quantum QXS-3 Series, 4 Series and 6 Series model range of hybrid storage arrays. These arrays are sold indirectly via Quantum channel partners, but with postsales support to customers provided directly by Quantum. The QXS storage arrays only support block storage, and are therefore not a unified,

file, block and object array. Consequently, due to Quantum's tiered storage heritage, the QXS has a robust tiering implementation, which analyzes usage patterns, and can move data quickly between tiers and pin or fix data to specific tiers as required by application service levels. The array controllers are active-active, which enables the full performance of the controllers to be utilized all the time.

Strengths

- The QXS series offers responsive and granular tiering features for a hybrid array.

- The vendor offers highly resilient array controllers and enclosures from a heat, dust and vibration perspective, which meet both NEBS and MIL-SPEC criteria.

- Quantum offers in-place migration of controller upgrades, which can considerably improve availability and operational agility.

Cautions

- Quantum has a noninclusive feature licensing scheme, with separate charges for SSD tiering, snapshots and replication.

- There are no synchronous replication or QoS features, other than data "pinning" or fixing to specific tiers.

- When used as primary storage, the QXS arrays lack snapshot integration with Veritas Technologies' NetBackup, Commvault, and TSM.

Tegile

Tegile is a privately held storage company that has been shipping its hybrid external controller-based (ECB) storage platform since 2012. With sales growing and support offices in the U.S., England, Germany and India, Tegile's marketing initiatives focus predominantly on opportunities in the U.S. and Western Europe. To date, Tegile reports that over 1,800 hybrid T-Series systems have been shipped to 1,500 customers, with 75% deployed in the U.S. Featuring a dual-controller active/active architecture, multiprotocol support, and a library of data services that conserve capacity, protect against data loss and enhance recovery, the hybrid T-Series storage array leverages high-speed DRAM and Flash SSDs to enhance performance. The hybrid T-Series is packaged as an appliance where hardware and software are priced as one to simplify contract management. To reach the end-user market, Tegile employs a 100% channel go-to-market strategy. The vendor's client care support infrastructure includes IntelliCare, a cloud-based analytics system that monitors and proactively reports hybrid T-Series performance, reliability and usage data to the client and Tegile's support center personnel.

Strengths

- The capability to simultaneously support SAN and NAS host protocols enables the Tegile hybrid T-Series to consolidate file and block applications, thus conserving space, power and cooling, and simplifying management.

- The hybrid T-Series architecture with in-line data reduction technology, along with its appliance pricing model, presents a favorable price/performance ECB storage solution.

- The hybrid T-Series integrated snapshot and remote replication functionality provide a viable alternative to legacy tape backup/recovery infrastructures, thus improving recovery time objectives and recovery point objectives while reducing costs.

Cautions

- Responsive on-site client care may be sparse in geographies where Tegile does not have an established support presence.

- The maximum raw capacity of a T-Series array is 508TB, which is small compared to competitors with expectations of effective capacity set after compression and deduplication ratios are established.

- The lack of synchronous remote copy limits the appeal of T-Series systems in campus and metro environments supporting applications that need to capture every last input/output (I/O).

Tintri

Tintri has successfully executed on a bold vision of near-zero administration for storage arrays. Tintri offers the VMstore T800 series of fully autonomous storage arrays, which are targeted at customers that do not want to manage or administer their storage arrays, but prefer to have greatly simplified storage administration tightly integrated with the hypervisor. Tintri successfully identified and exploited the trend to combine storage and server integration, which requires less technical administrative skill and offers higher-level system management. This vision has enabled Tintri to be one of the leading vendors among the next generation of storage array companies. Therefore, Tintri arrays are designed and produced to work with virtualized servers, not for direct attachment to physical servers. The arrays only require monitoring, not storage provisioning or configuration. All Tintri arrays provide in-line compression and deduplication, and virtual server environments are generally good data reduction candidates. To alleviate the monitoring overhead of many systems, Tintri offers the Tintri Global Center (TGC) product, which can manage up to 32 systems from a single management console. TGC Standard is included with each Tintri array; however,

compared to the all-inclusive software feature purchase model, TGC Advanced with VM scale-out software is an extra chargeable item. Tintri's systems are closely integrated with the hypervisors within virtualized server environments, performance data is shared between the server and storage, and customers can manage the whole stack from the VM level to the array. Features such as VM-based policy management, QoS automation and systemwide real-time storage analytics provide the ability to manage and meet service levels, even as systemwide server and storage performance changes.

Strengths

- A steady cadence of product enhancements, effective marketing and sales, and transparency of pricing have grown the installed base and revenue.

- VMstore T800 packaging and its active/standby controller design enable Tintri to sell the same array into small, midsize and large opportunities.

- Tintri has a diversified hybrid and SSA product portfolio running the same OS, with superb ease of use and competitive compression and deduplication features.

Cautions

- Tintri arrays only support VMs via NFS or SMB3 file protocol access, and containers via NFS to vSphere Integrated Containers for virtualized and cloud infrastructures.

- The move to more storage features in hypervisors and integrated systems competes directly with Tintri's value proposition.

- The VMstore T800's limited scalability is a sales impediment outside of the midrange segment of the market.

X-IO Technologies

X-IO Technologies is a privately held company that has been delivering general-purpose storage systems since 1995. Its Intelligent Storage Elements (ISE) and iglu blaze offerings include some of the most advanced, if not unique, features, such as in-place disk repair and a no-cost five-year warranty. To date, X-IO reports that it has shipped over 8,000 ISE and iglu systems to 1,200 customers. However, through the years, X-IO has been unable to produce the high rate of revenue growth and profit necessary for it to break out of the pack or to support an IPO. Against this backdrop, in May 2016, X-IO announced a major shift in go-to-market strategies. X-IO announced that it would focus on serving its existing customer and reseller channel base, and reduced its worldwide workforce from 120

to 50 employees, most of which are located in the Colorado Springs, Colorado, X-IO headquarters. Customer client care and engineering personnel were minimally affected. The vendor has focused new R&D and go-to-market investments on its rack mount hyperconverged server/all-flash storage platform, Axellio, while also planning the release of a fourth generation of ISE and iglu offerings for early 2017.

Strengths

- The ISE and iglu blaze platform prices include five-year no-charge warranty coverage.

- The ISE and iglu platforms detect and repair in-place HDD media errors and failures, thus reducing annual HDD failure rates and improving system reliability and availability.

- ISE Mirroring creates active-active data copies and the equivalent of synchronous replication between ISE platforms up to a distance of 40 kilometers, thus enhancing performance and availability.

Cautions

- Balancing R&D investments between the legacy ISE and iglu platforms with the to-be-announced Axellio will challenge X-IO funding resources.

- A lack of financial transparency heightens further uncertainty by end users of X-IO as a general-purpose disk array provider.

- X-IO's ability to maintain effective customer relationships with very limited marketing and sales resources will be challenging.

Vendors Added and Dropped

We review and adjust our inclusion criteria for Magic Quadrants as markets change. As a result of these adjustments, the mix of vendors in any Magic Quadrant may change over time. A vendor's appearance in a Magic Quadrant 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
- Quantum

Dropped
- AMI

- Imation

Inclusion and Exclusion Criteria

The criteria enumerated below include established and emerging vendors selling midrange and high-end general-purpose storage systems that support block, file, or both block and file protocols. Commonly supported protocols include FC, iSCSI, SMB (aka CIFS) and NFS. Less commonly used, but still qualifying, protocols include FCoE and InfiniBand. These systems are optionally configured with a mix of HDDs and/or SSDs.

Product Criteria:

- Bundled 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

- Implemented architectures with no single points of hardware failure

- Sold system through indirect or OEM channels, maintained brand awareness with end users, and had an average selling price of more than $24,999

Vendor Criteria:

- Annual company revenue of $25 million or more

- A multinational presence and 24/7 support capabilities

Notes:

- 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 in 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.

Table 1. Ability to Execute Evaluation Criteria

Evaluation Criteria	Weighting
Product or Service	High
Overall Viability	Medium
Sales Execution/Pricing	High
Market Responsiveness/Record	Medium
Marketing Execution	High
Customer Experience	High
Operations	Medium
Source: Gartner (October 2016)	

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.

Table 2. Completeness of Vision Evaluation Criteria

Evaluation Criteria	Weighting
Market Understanding	Low
Marketing Strategy	Medium
Sales Strategy	High
Offering (Product) Strategy	High
Business Model	High
Vertical/Industry Strategy	Medium
Innovation	High
Geographic Strategy	Low
Source: Gartner (October 2016)	

Quadrant Descriptions
Leaders

Vendors in the Leaders quadrant have the highest composite 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 sufficiently 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 yet 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 offerings, or larger vendors having difficulty developing and executing on their vision.

Context

This Magic Quadrant represents vendors that sell into the end-user market with branded disk and hybrid arrays. These arrays may be internally developed, or acquired through an acquisition or OEM agreement. Tight budgets and skills shortages have caused vendors and users to focus on technologies and features that lower acquisition and ownership costs while improving performance and throughput. This has resulted in thin-provisioning, autotiering, hybrid configurations (Flash and HDDs) and near-autonomic operation becoming ubiquitous general-purpose disk arrays. It is also driving the deployment of SSAs into I/O-intensive environments and creating opportunities for emerging storage companies that can refactor infrastructure designs to obtain incremental improvements in performance, economics and staff productivity. Examples include HCIS, SDS and cloud gateways that make it practical to implement hybrid on-premises/public clouds. Concerns with security exposures and meeting ever more stringent regulatory requirements are now making self-encrypting disks (SEDs) generally available.

Market Overview

The general-purpose disk array market is declining on a revenue and unit basis, even as capacity shipped continues to grow. This has made vendors ever more aggressive and innovative as they attempt to grow market share and expand into tangential markets, such as HCIS and hybrid cloud. Customer satisfaction is high, with 77% of customers completely satisfied and less than 6% unsatisfied with their general-purpose disk array, per reference checks conducted for this research. Visionary vendors such as Infinidat, Tegile, Tintri and Nimble Storage improve the customer experience and maintain pressure on the incumbent vendors with their new offerings, extensive features, and easy-to-use/purchase and support storage arrays. Not surprisingly, storage connection protocol usage remains essentially unchanged, with the top three used by customers being FC (47%), iSCSI (15%) and NAS (23%), with 15% using other protocols, such as FCoE, InfiniBand, etc. The virtualization of more than 80% of user applications and improvements in technology have led users to treat high-end, midrange and NAS systems as roughly equivalent. This practical parity, coupled with tight budgets, insatiable storage demand and improved DR capabilities, has led many users to allow them to compete against each other — even in business-critical environments.

Emerging storage vendors — particularly those in the Visionaries quadrant — are indirectly influencing the market by using their innovation to influence large established storage vendors. Many large established storage and portfolio vendors are using these emerging storage companies as their primary source of product innovative.

Gartner expects the advantages of traditional high-end enterprise storage arrays will continue to disappear over the next three to five years as scale-out storage arrays, integrated platforms and infrastructure SDS gain maturity, and market and mind share. However, we do not see the midrange and high-end market segments collapsing into a single market because of prior investments in troubleshooting capabilities and compatibility testing.

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.

About Nimble Storage

Nimble Storage (NYSE: NMBL) is the leader in predictive flash storage solutions. Any slow-down or disruption that occurs across the infrastructure stack (storage, networks, servers, VMs) causes an "app-data" gap that disrupts data delivery and makes users wait.

Nimble offers a predictive flash platform that closes the "app data gap," giving you the fastest, most reliable access to data. By combining predictive analytics with flash storage, we radically simplify operations. More than 9,000 customers across 50 countries rely on Nimble to power their businesses, on-premise and in the cloud. For more information visit **www.nimblestorage.com** and follow us on **Twitter: @NimbleStorage**.

Additional Resources:

– **Nimble Storage Predictive Flash Platform and InfoSight Analytics: Customer Testimonial - RaceTrac**

– **Infosight Report on Machine Learning**

– **The Prognosis is Good: Nimble Wins Award for Hutchinson Clinic Implementation**