Gartner.

Magic Quadrant for Primary Storage

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Primary storage users are embracing infrastructure consumption-based services for hybrid, multidomain, mission-critical applications, and to align costs to business demands. I&O leaders should use this research to automate operations, reduce complexity and churn, and transform IT operations.

Strategic Planning Assumptions

By 2026, storage consumption-based platform SLA guarantees will replace over 50% of traditional on-premises IT capacity management, budgeting, assessment, sourcing and fulfillment activities, up from less than 10% in 2023.

By 2027, less than 30% of the IT storage infrastructure budget will be spent on hardware management and support IT skills, down from 85% in 2023.

By 2028, consumption-based storage as a service (STaaS) will replace over 35% of enterprise storage capital expenditures (capex), up from less than 10% in 2023.

Market Definition/Description

Gartner's view of the primary storage market is focused on innovative storage technologies and hybrid platform initiatives, IT cloud operating models, and as-a-service deployment and fulfillment methods that will shape the future needs of end users. It is not focused on the market as it is today. As outlined in Leverage Storage as a Service Platform SLAs and Capabilities To Transform IT Outcomes, the primary storage market is entering a period of accelerated innovation. End users are shifting away from traditional capex financing and budgeting to the adoption of a hybrid platform strategy that embraces the on-premises cloud operating model and new vendor storage asset financing and management methods. Vendors' advancements in platform capabilities, data and cyberresilience, and new storage operating system architectures provide on-premises I&O leaders with SLAs targeted at IT operating model outcomes. The most fundamental question facing I&O leaders is how to gain access to cloud-like benefits while preserving high levels of resiliency and control over central-services-based IT operations infrastructure.

Gartner defines the primary storage market as vendors that offer dedicated products or services that pool capacity across storage media devices to present logical unit numbers (LUNs) to business applications over block interface protocols like Fibre Channel or Internet Small Computer System Interface (iSCSI). At the same time, the vendors provide high availability and data protection. Primary storage products can be delivered as solid-state arrays (SSAs), software-defined storage (SDS) or hybrid storage arrays. SDS software abstracts storage resources from the dependency to the underlying vendor's hardware appliance for improved flexibility, cost-effective and efficient scalability, and linear performance in scaling to dozens of storage-compute nodes across the hybrid platform. SDS software is designed to operate on industry standard hardware, either on-premises, via hybrid cloud or on the public cloud. Hybrid storage arrays include both solid-state drive (SSD) and hard-disk drive (HDD) configurations. SSA products are 100% solid-state-technology-based systems that cannot be combined or expanded with HDDs. SSAs and hybrid storage arrays must have both a dedicated product name and associated model number.

A primary storage product's foremost purpose is to support response time and input/output per second (IOPS)-sensitive structured data workloads. Additionally, primary storage functionality will integrate with and support the independent use of a centralized control plane for automated infrastructure management, data services and data movement, and for storage-as-a-service hybrid infrastructure platform offerings. Typical use cases include:

- Mission- and business-critical database workloads

- Application consolidation

- Support for virtualization and virtual desktop infrastructure environments

- Persistent storage and data protection for container environments

- Hybrid cloud IT operations that span on-premises, colocation, edge and public cloud infrastructure

Core Capabilities

The core capabilities of the primary storage market include:

- Host interface protocols that are block-based, such as Fibre Channel; iSCSI; Serial Attached SCSI (SAS); file-based, such as Network File System and Server Message Block; or a combination of block and file protocols.

- Data services to pool capacity across storage media devices (HDD or Flash) and present LUNs to business applications.

- Data services that conserve capacity utilization, deliver high levels of efficiencies and resilience, protect against data loss and ransomware, and enable recovery via local and remote replication.

- Block-based STaaS offering that is available as service-provider-managed in partnership with the end-user client as an IT-managed offering.

- AIOps software that includes operational monitoring for prescriptive health, customer support, and support for proactive capacity management, nondisruptive workload simulation, data placement and migration, storage asset utilization cost optimization, performance optimization, and both full- and cross-stack and fleetwide telemetry observability, alerting and reporting.

- An SDS product architecture that separates the vendor's storage hardware from the storage operating software. The SDS product supports on-premises storage, and/or one or multiple public cloud platform(s) that is accessible via a marketplace. It integrates with cloud provider's server, storage and networking hardware, and deploys the same storage operating system as found in its on-premises appliance solution. It is also integrated with vendor AIOps functionality.

- Nondisruptive migration of data from current array to future array with a 100% data availability guarantee.

- Cyber storage protection and resilience, including support for ransomware detection, data protection and recovery capabilities.

Optional Capabilities

Additional primary storage capabilities include:

- SSAs with nonvolatile memory express over fabrics (NVMe-oF) as a host interface to provide support for both Fibre Channel and Ethernet connectivity.

- Advanced AIOps real-time event streaming capabilities in support of monitored SLA threshold conditions that require automated, system-level (for example: nonhuman intervention) actions to critical IT operational situations, such as storage asset management, cyber liability resilience, and productivity.

- A multi-infrastructure domain and a hybrid-platform-wide, central control plane with multitenant, multivendor AIOps for ITOps-as-a-service capabilities, in support of advanced IT operating model SLA outcomes.

- Multiprotocol, disaggregated storage-compute architecture that supports nondisruptive, asymmetrical elastic scaling of capacity and compute, independent of each other, by maintaining performance through the addition of storage nodes from a small number of compute and storage nodes to dozens.

- Hybrid infrastructure platform offerings that integrate, manage, and support centralized IT data services infrastructure solutions, including but not limited to backup as a service, disaster recovery

as a service, ransomware recovery or protection as a service, and database as a service.

- Published carbon emissions, as measured by total kilograms of CO_2 per terabyte per year, of a fully loaded system, as measured in at least two major geographies.

- Special-purpose SSD or captive NVMe SSD drive for enhanced performance, endurance, management and data services.

- An array form factor that can be scale-out and based on SSDs or HDDs, or a combination of the two.

Magic Quadrant

Figure 1: Magic Quadrant for Primary Storage
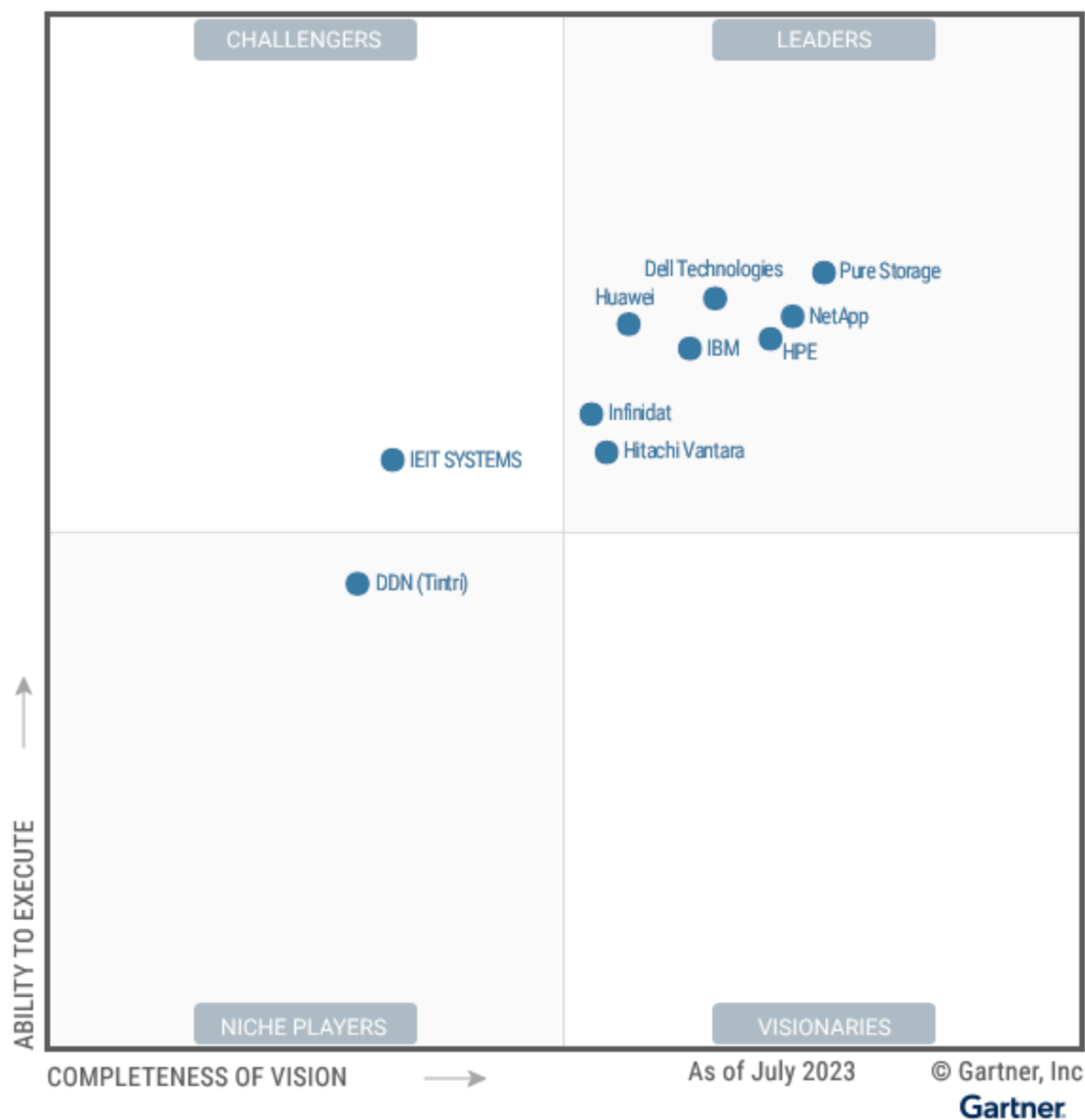
Vendor Strengths and Cautions

DDN (Tintri)

Tintri by DDN is a Niche Player in this Magic Quadrant. Tintri is operated as a subsidiary of DDN. Tintri's products include the Tintri VMstore T7000 Series all-NVMe drive platform and TCE1000 VMstore, the SDS version of VMstore. The TCE1000 VMstore runs on public cloud or on-premises. Tintri offers a partially populated drive expansion array that allows clients to acquire additional capacity after initial procurement in the same array for growth purposes. Tintri is geographically diversified in the small and midsize business to midsize enterprise segments. Over the past 12 months, Tintri added SSO support, NFS 4.1, Direct Upgrade, Tintri Cloud Engine (TCE) and upgrades to its Tintri storage operating system.

Strengths

- Application-level AIOps capabilities provide proactive workload classification and resource optimization that allows customers to substantially reduce storage administration costs.

- Tintri offers a patented drive-by-drive expansion unit to minimize upfront capex and support costs, allowing customers to pay as they grow their capacity with very fine granularity.

- Tintri Global Center provides a common provisioning and management capability that integrates its on-premises VMstore storage array with the TCE1000 SDS in Amazon Web Services (AWS), providing customers with a hybrid cloud modernization plan.

Cautions

- Tintri lags the primary storage market leaders in supporting as-a-service consumption plans with SLA guarantees, due to its lack of a product and set of offerings for an on-premises hybrid platform for centralized IT operations.

- Tintri lags market competitors in not offering or supporting ransomware detection capabilities, only recovery from integrated backup support.

- Tintri's TCE1000 SDS cloud engine lags leading competitive offerings in its breadth of public cloud options that it supports.

Dell Technologies

Dell Technologies is a Leader in this Magic Quadrant. Its PowerMax product is positioned in the high-end primary storage market, and its PowerStore is in the midrange storage market. PowerFlex is a scale-out SDS offering that is also available in the AWS Marketplace as APEX Block Storage. Dell APEX Data Storage Services offers block, file and data protection STaaS. The vendor's operations are geographically diversified. Its clientele ranges from small to very large global enterprises, with a presence in all vertical markets. During the last 12 months, all three products were updated with new hardware models for increased performance and capacity, along with software updates focused on security and storage management. PowerFlex added support for network-attached storage (NAS), multisite replication and FIPS 140-2 certification.

Strengths

- Dell Technologies is one of the few vendors in this market that can offer a full stack of infrastructure solutions, along with a comprehensive set of product capabilities to address all primary storage market segments.

- APEX Data Storage Services provides flexibility in deployment locations, and offers either self-managed or Dell-managed operations with support for all major use cases.

- Dell's cyber vault enables customers to do forensics, analysis and surgical recovery from a secured copy in an operational, air-gapped vault in case of a cyberattack.

Cautions

- Dell has four different block storage products with different feature sets, drive types (all-flash or hybrid) and types of cloud support, making it complex for Dell prospects to select the right product.

- Dell's block storage presence in the public cloud is presently limited to AWS and is based on PowerFlex, which does not currently have as large of an installed base as PowerMax or PowerStore.

- Dell lags the leading vendors in supporting QLC flash, which can enable higher capacities of solid-state drive (SSD) with lower costs and to reduce energy and carbon emissions.

Hitachi Vantara

Hitachi Vantara is a Leader in this Magic Quadrant. Its storage portfolio consists of Hitachi Virtual Storage Platform (VSP) and Hitachi Virtual Storage Software Block, which include some industry-specific applications with a common NVMe-optimized storage OS. Hitachi EverFlex offers a managed pay-per-use STaaS consumption model solution. Hitachi Vantara's operations are geographically diversified, and its clients tend to be global enterprise, open systems and mainframe customers, and are in the large and midsize enterprise segments. Over the past 12 months, Hitachi launched Hitachi Cloud Connect for Equinix for fast access to the public cloud without moving data into the public cloud. In addition, it added many enhancements to Hitachi Ops Center and AI Ops software for simplicity in management.

Strengths

- Hitachi's VSP and VSS Block offerings can withstand multiple simultaneous hardware failures without disruption to data services, and offers a written 100% availability guarantee.

- Hitachi VSP offerings are certified under the Carbon Footprint of Products (CFP) program and the VSP 5600 product has one of the lowest carbon footprint of only four kilograms of CO_2 per terabyte per year.

- Hitachi Vantara bundles Lumada software with its storage arrays to provide customers with a digital innovation platform that works with business data and IT field assets to collect, catalog, analyze, visualize and relay digital information.

Cautions

- Hitachi Vantara's AIOps lacks the ability to perform predictive workload simulations and placements.

- Hitachi Vantara's support for public cloud hosted storage is currently limited to AWS Japan.

- Hitachi Vantara does not have support for NVMe-oF over TCP, which will limit certain use case deployment options for customers who have made strategic investments in NVMe technologies.

HPE

Hewlett Packard Enterprise (HPE) is a Leader in this Magic Quadrant. HPE's storage portfolio includes HPE Alletra 9000 and HPE Primera for mission-critical applications, as well as HPE Alletra 6000, HPE Alletra 5000 and Nimble Storage for business-critical and general-purpose applications. HPE's operations are geographically diversified, and its clients tend to be in enterprise and small to midsize enterprise markets. In the past 12 months, HPE enhanced HPE GreenLake for Block Storage with SDS combined with a disaggregated architecture using HPE Alletra MP for different storage protocols, including block and file storage, and the HPE Alletra 5000 series for HPE Nimble Storage Hybrid Array clients.

Strengths

- HPE GreenLake users have expressed high customer satisfaction, and the company is recognized among IT clients as a platform provider that leverages AIOps to deliver advancements in hybrid IT platform management that simplify onboarding, provisioning and storage asset life cycle management for STaaS.

- HPE InfoSight is an integrated, application-centric, full-stack AIOps tool that provides proactive and predictive telemetry-based capabilities that underpin advanced IT SLA guarantees, including a standard written 100% data availability guarantee.

- HPE Financial Services (HPEFS) provides flexible investment solutions, financing and storage asset management programs to free up capital and to streamline the transition to an as-a-service platform.

Cautions

- HPE GreenLake managed services will face operational challenges as it scales and as HPE supports a growing volume of large-scale IT platform demands.

- There is the potential for confusion among channel partners and customers with HPE pricing as HPE shifts from selling products through traditional capex transaction methods to HPE GreenLake

consumption-based, as-a-service offerings.

- HPE Primera and HPE Alletra 9000 series arrays do not support NVMe-oF over TCP, which will limit deployment options from customer investments in NVMe technologies over Ethernet.

Huawei

Huawei is a Leader in this Magic Quadrant. Its product portfolio consists of the all-flash and hybrid OceanStor Dorado Series and SDS OceanStor Pacific Series. Huawei mainly operates in China, Latin America, Europe, the Middle East and Africa, and its clients tend to be in the large enterprise and public clouds in China. Huawei's products target a range of entry-level, midrange and high-end storage array use cases. In the past 12 months, Huawei released a highly reliable, four-data-center, active-active storage, support for NVMe-RDMA, a NAS ransomware detection solution, and ElasEver to satisfy STaaS requirements.

Strengths

- Huawei has simplified and accelerated client onboarding through use of a discovery and AIOps tool that digitally discovers critical infrastructure elements for improved IT control.

- Huawei provides the capability to schedule, dynamically adjust and maximize replication bandwidth in alignment with host workload activities, therein maximizing infrastructure benefits.

- Huawei's ransomware detection solution includes a storage-network approach that integrates a rule-based AI model with frequent updates to the ML analysis, reducing overall threats within the storage environment.

Cautions

- Huawei lags other industry leaders in providing storage asset financing and management capabilities that simplify and streamline STaaS onboarding and time to value.

- Huawei lacks a competitive SDS offering that enables hybrid cloud storage use cases with the following cloud infrastructure platforms: AWS, Microsoft Azure and Google Cloud Platform (GCP).

- Huawei OceanStor Dorado array series products do not support NVMe-oF over TCP, which will limit specific deployment options for customers who have made strategic investments in NVMe technologies over Ethernet.

IBM

IBM is a Leader in this Magic Quadrant. IBM Storage Virtualize is the common storage controller software on FlashSystem solid-state array (SSA) and hybrid appliances. IBM Storage Virtualize for Public Cloud is available on AWS, IBM Cloud and Microsoft Azure. The DS8900F platform is focused on the IBM mainframe infrastructure market and all offerings are available as STaaS. IBM offers a global reach and positions its products primarily in midsize to very large enterprises. During the last

12 months, IBM introduced improved asynchronous replication, snapshot management capabilities, NVMe-over-TCP support and block storage as a service.

Strengths

- IBM's unique FlashCore Module technology enables leading price/performance and security advantages for the FlashSystem SSA portfolio.

- IBM Storage Virtualize software data management flexibility extends across on-premises, in public cloud or in colocation to enable a standardized customer experience and services across platforms.

- IBM Storage Sentinel's advanced scanning abilities for detection and prevention of ransomware provides a more cyber-storage-resilient capability beyond standard protection and recovery methods.

Cautions

- IBM's storage offerings, core technology capabilities and STaaS solution are relatively unknown outside of its customer base, making it difficult to assess the competitive value of its offerings for non-IBM customers.

- Without IBM Storage Expert Care coverage, older products may see steep price increases or fee adjustments for extended support and maintenance.

- IBM Storage Virtualize for Public Cloud is limited in the number of storage nodes in each of the public cloud offerings, lagging some of the industry leaders in scale-out, linear performance.

IEIT SYSTEMS

IEIT SYSTEMS is a Challenger in this Magic Quadrant. IEIT SYSTEMS has a broad portfolio of primary storage products, including the NVMe all-flash array HF Series and a new SDS AS13000 ICFS product to address entry-level, midrange and high-end market requirements. IEIT SYSTEMS' operations are largely concentrated in China. Clients are mainly in the midmarket and large enterprise market segment. In the past 12 months, IEIT SYSTEMS has introduced support for an anti-ransomware detection and recovery solution, and for its AS13000 ICFS SDS product, synchronous and asynchronous remote replication, and volume encryption.

Strengths

- IEIT SYSTEMS is leveraging its captive NVMe SSD drive cost advantages by proactively offering to replace its clients with a mixed hard-disk and flash-installed base with the NVMe SSD drive.

- IEIT SYSTEMS combines the AS13000 ICFS SDS product with the strength of its server business to create a price/performance cost advantage over competitive SDS offerings.

- IEIT SYSTEMS clients cite cost-effective pricing and highly resilient storage as reasons to select its products over competing options.

Cautions
- IEIT SYSTEMS' view of the market and its roadmap are not aligned to customer needs outside of the primary China region in which they market and sell their products.

- IEIT SYSTEMS lacks a competitive SDS offering for hybrid cloud storage solution for use in the three major public clouds (AWS, Azure and Google), making it tougher for end users to evaluate and assess their hybrid cloud platform strategy.

- IEIT SYSTEMS' workload placement AIOps capabilities lag industry leaders for effective optimization and resource allocation across infrastructure, making it difficult for customers to achieve optimal resource utilization and cost efficiencies.

Infinidat

Infinidat is a Leader in this Magic Quadrant. The InfiniBox and InfiniBox SSA II are based on its common InfuzeOS, also now available as an SDS product. Infinidat is a private company focused on North America, EMEA and Japan that focuses on large enterprises and service providers. In the last 12 months, recent updates are: InfuzeOS Cloud edition for AWS, enhancements for its SSA portfolio, InfiniSafe technology offers cyberdetection, providing dataset scanning and extending its file capabilities. Infinidat's Neural Cache architecture optimizes HDD with SSD technology, providing strong performance in a hybrid system. The products perform well in large-scale virtualization environments, databases and especially for application consolidation.

Strengths
- Infinidat customers express a high level of satisfaction with its ease of use, technical support and professional services that are supported by a suite of service-level guarantees.

- Infinidat excels at application consolidation, with petabyte (PB)-scale offerings in both hybrid and all-flash configurations, achieving favorable dollar per input/output (I/O) and dollar-per-watt returns that underpin compelling total cost of ownership (TCO) benefits.

- Infinidat offers a variety of purchasing models, including capital expenditure (capex)-only, elastic pricing (a combination of operating expenditure [opex] and capex pricing) and FLX, a consumption-based STaaS offering.

Cautions
- Infinidat has limited geographic support for emerging markets, making it difficult for some multinational companies to evaluate services and support capabilities for long-term investments.

- Infinidat's portfolio lacks a low-capacity (sub-250TB) offering and deduplication capabilities, limiting its appeal to some smaller customers and select workloads that benefit from

deduplication.

- Infinidat's new SDS InfuzeOS Cloud Edition is based on a single-node architecture, limiting its cloud-native scalability and resiliency attributes, and it is only currently available on AWS.

NetApp

NetApp is a Leader in this Magic Quadrant. The vendor addresses a wide range of primary storage workloads across its storage arrays: AFF A-Series, AFF C-Series, ASA, FAS, E-Series, EF-Series and its SDS offering, Cloud Volumes ONTAP. NetApp supports a global customer base with on-premises or cloud-native storage. During the last 12 months, NetApp introduced a ransomware recovery guarantee, as well as the AFF C-series, which leverages cost-effective QLC flash, packing more capacity per flash drive and thereby lowering energy and carbon emissions. NetApp also introduced its dedicated block-only ASA A-series, with multiple models. ONTAP One is a new offering that bundles all data services into a single license and is available across NetApp's AFF, ASA and FAS storage models.

Strengths

- NetApp's storage operating system is designed to run on-premises, and in AWS, Azure and GCP, with the ability to tier and replicate between locations and manage them from a common SaaS-based control plane.

- NetApp has mature and rich enterprise file services capabilities, making it a reliable unified storage offering.

- NetApp's BlueXP is a centralized, AIOps-powered, SaaS-based management portal for NetApp's products across on-premises and cloud locations, with built-in capabilities for cloud migration, data classification, governance, protection and storage optimization.

Cautions

- Some NetApp customers have expressed concerns about ease of use and the quality of initial technical support.

- Compared to its peer group, NetApp has had a limited rollout of financing and storage capitalization for STaaS channel initiatives, limiting on-premises capex to consumption customer deployment options

- NetApp's portfolio can be complex and requires careful understanding of the trade-offs between the different products to select the right product for application and business requirements.

Pure Storage

Pure Storage is a Leader in this Magic Quadrant. Its portfolio consists of FlashArray//XL, FlashArray//X, FlashArray//C and FlashArray//E, spanning high-to-low performance and capacity

workloads. Its SDS offering, Cloud Block Store, is available on AWS and Microsoft Azure. Pure Storage sells across small to very large customers and plays mostly in North America, Europe and select countries in APAC. In the last 12 months, the vendor introduced FlashArray//E, which challenges hybrid array price points over 1PB. Additionally, Pure Storage rolled out performance improvements with its //X and //C products, enhanced file capabilities and improvements to its Pure1 AIOps.

Strengths

- Vertically integrated direct flash modules are tightly integrated with the Purity OS, enabling compelling economics at PB system capacities without compromising performance and reliability.

- The company's Evergreen portfolio provides flexible consumption model options ranging from all-capex to all-opex, and a hybrid model in the middle, where hardware is capex and software is opex.

- Customer experience is rated highly, as its ease of use and high service levels help reduce administration complexity and save costs.

Cautions

- Pure Storage's acquisition pricing on its high-end products and overall support fees are generally more expensive than competitive offerings, as a percentage of the initial array costs over a three-year period.

- The company does not offer any cost-effective alternatives to hybrid storage below 250TB, where price is paramount and performance secondary.

- Pure Storage lacks international presence in emerging countries, which could be problematic for customers demanding specific support and service needs.

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

No vendors were added to this Magic Quadrant.

Dropped

Fujitsu was unable to meet inclusion criteria, due to its dependency on a third-party storage controller operating system.

Lenovo was unable to meet inclusion criteria, due to its dependency on a third-party storage controller operating system.

Zadara was unable to meet the minimum revenue inclusion criteria.

Inclusion and Exclusion Criteria

To be included in this Magic Quadrant, vendors were required to:

- Develop and have released its own storage controller operating system product (sometimes referred to as data management software), and a software-defined storage (SDS) product that decouples controller software from its hardware, for general availability for the period July 2022 through May 2023 to support all use cases.

- Have products that do not depend on a third-party or OEM license.

- Be serviceable in three of the major primary storage market geographies that include Asia/Pacific, Japan, EMEA and North America by either direct, service provider or channel sales.

- Have generated a minimum $100 million in recognized primary storage billings and or bookings revenue (using GAAP) over the last four quarters as of 31 March 2023, excluding support revenue; or have generated over $100m in total ARR contract value as of 31 March 2023; or have an installed base of at least 500 active customers within the midsize and large enterprise markets. Gartner defines the midmarket as being 500 to 999 employees, and the large enterprise as being 1,000 employees or greater. Products must be sold under its brand as a stand-alone product, without the requirement to bundle it with other vendors' storage products for the product to be commercially usable in mission or business-critical production use cases.

- Produce and have released a managed hybrid platform block storage as a service and at least one data services infrastructure offering in at least two of the major primary storage market geographies. This offering must be able to be used with on-premises and public cloud infrastructure along with integrated AIOps capabilities for use in the vendor's central control and data plane.

A one-time exception, due to the research for the year's Magic Quadrant being initiated one month earlier than usual, may allow products or enhancements made generally available during the period 31 May 2022 through 31 May 2023 to be considered, subject to Gartner acceptance. These products only have an influence on the Completeness of Vision axis.

The primary storage arrays and SDS product offerings evaluated in this research include hybrid storage arrays, SSAs and/or SDS products that scale up, scale out and may have unified storage architectures. Because these products have different availability characteristics, performance profiles, scalability, ecosystem support, pricing and warranties, they enable users to tailor solutions

for operational needs, plan new application deployments, forecast growth rates and/or implement storage asset management strategies.

Vendors were excluded from this Magic Quadrant if they had:

- Storage array and/or SDS products that are designed to support only unstructured data workloads managed by dedicated scale-out distributed file systems and object storage protocols.

- SDS options excluded from this market:

  - Software that eliminates shared storage by simply mirroring internal flash or HDD disks between hypervisors;

  - Open-source licensed software that is not directly owned vendor IP;

  - Products where SDS is part of HCI;

  - Products whereby storage services are created and delivered per policy-controlled virtualization software;

  - Storage software not available on-premises or as the majority share of vendor's primary storage revenue;

  - Hyperconverged infrastructure software.

- Storage arrays and/or SDS products that are designed and marketed as solutions to support specific or limited use cases only, for example video surveillance or video rendering and content production, high performance computing.

- Public cloud storage services offered by IaaS or PaaS providers, including cloud service providers.

Evaluation Criteria

Ability to Execute

Table 1: Ability to Execute Evaluation Criteria

Evaluation Criteria ↓	Weighting ↓
Product or Service	High
Overall Viability	Medium

Evaluation Criteria ↓	Weighting ↓
Sales Execution/Pricing	High
Market Responsiveness/Record	Medium
Marketing Execution	Medium
Customer Experience	High
Operations	Medium

Source: Gartner (September 2023)

Completeness of Vision

Table 2: Completeness of Vision Evaluation Criteria

Evaluation Criteria ↓	Weighting ↓
Market Understanding	High
Marketing Strategy	High
Sales Strategy	High
Offering (Product) Strategy	High
Business Model	Medium

Evaluation Criteria ↓	Weighting ↓
Vertical/Industry Strategy	Medium
Innovation	High
Geographic Strategy	Medium

Source: Gartner (September 2023)

Quadrant Descriptions

Leaders

Vendors in the Leaders quadrant have the highest composite scores for their Ability to Execute and Completeness of Vision. A Leader 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, with well-articulated plans that customers and prospects can use when designing their storage infrastructures and strategies. In addition, Leaders have a presence in three major geographical regions, consistent financial performance and support for platform initiatives.

Challengers

Vendors in the Challengers quadrant participate in the broad primary storage market and execute well enough to be a serious threat to vendors in the Leaders quadrant. Challengers have strong products, as well as a sufficiently credible market position and resources to sustain continued growth. Financial viability is not an issue for Challengers; however, they lack the influence of vendors in the Leaders quadrant.

Visionaries

Vendors in the Visionaries quadrant deliver innovative products that address operationally or financially important end-user problems on a broad scale, but have not yet demonstrated the ability to capture market share or sustainable profitability. Visionaries are frequently privately held companies and acquisition targets for larger, established companies. The likelihood of acquisition often reduces the real versus perceived risks associated with installing their systems. Visionaries in this market have a limited portfolio of limited focus on certain geographies or vertical industries.

Niche Players

Vendors in the Niche Players quadrant are often narrowly focused on specific markets or vertical segments, such as data warehousing; high-performance computing; low-cost, disk-based data retention; and other areas that are generally underpenetrated by the larger array vendors. This quadrant may also include vendors that are ramping up their array and as a service consumption offerings, or larger vendors that are having difficulty developing and executing on their vision against market demands.

Context

This Magic Quadrant represents vendors offering hybrid storage arrays, SSAs and/or SDS solutions, developed internally. When choosing a primary storage system, infrastructure and operations (I&O) leaders must consider:

- Integration with public and hybrid clouds for hybrid platform capabilities that stretch beyond on-premises.

- Ease of management and continuous improvement in productivity and efficiencies, using AIOps to enhance IT operations.

- A comprehensive set of data services to enhance availability and resilience.

I&O leaders must also ensure that primary storage systems and SDS solutions are acquired at the right price points using industry benchmarks, while choosing the appropriate acquisition model — capex or as-a-service consumption (opex) for the organization. Preference should be given to vendors that provide written guarantees as to IT operating model outcomes, such as productivity and storage asset management, data availability, storage efficiency, I/O performance and cyberliability resilience. Further, those that have a competent partner network should also be given preference; this ensures that solution design, installation and managed services are flawless and that support is integrated with use of AIOps tools.

Internally, I&O leaders must work with application owners to align IT priorities and outcomes to business demands. The primary storage market is shifting from traditional IT budgeting processes and capex sourcing to cloud-like, platform-based consumption, as well as metric-based SLA sourcing models. I&O leaders must reexamine their long-term platform requirements through this lens and choose a vendor- and partner-based approach that effectively aligns storage solutions with desired IT operating model outcomes. The industry will undergo a sea change unlike anything before this time, so it's critically important that I&O leaders develop a hybrid platform strategy that will guide this period of transformation. (For further detail, see Infographic: Hybrid Infrastructure Platform Services Will Modernize IT Cloud Operations.)

Market Overview

Total external-controller-based (ECB) primary storage revenue grew 5.3% from 2021 to 2022 to $16.8 billion, as a result of solid-state array (SSA) revenue of $1.1 billion in growth, to $10.6 billion total for the period. Primary storage revenue shifted from hard-disk drive (HDD)/hybrid to SSA, driving up SSA's share in the primary storage market to 63% in 2022. Total ECB primary storage revenue was offset by a decline in hybrid array revenue by $211 million, as the market continued to accelerate to SSA flash. The overall ECB storage global revenue, of which primary storage is a major segment, increased 6.9% to reach $22.7 billion in 2022, fueled by continued storage infrastructure modernization.

External storage systems revenue worldwide was $5.0 billion in 1Q23, an increase of 0.5% compared to 1Q22. Revenue for SSAs and backup and recovery appliances grew by 3.6% and 9.4% year over year (YoY), respectively, while HDD/hybrid arrays saw a revenue decline of 1.4%. In the last calendar quarter ending 31 March 2023, the primary storage ECB market was $3.64 billion, down 1.4% from $3.7 billion in 1Q22.

Primary storage vendors continued to make incremental investments to their product portfolios to include support for capabilities such as quad-level cell (QLC), cyber resiliency and NVMe-oF TCP technologies. Some vendors have added data services to their STaaS solutions, such as backup, disaster recovery and ransomware recovery. Also, every primary storage vendor now offers an STaaS for block service, with total STaaS annual recurring revenue exceeding $1.0 billion as of the end of 2022.

Primary storage vendors also continued to invest in SDS capabilities that provide tighter integration with public cloud providers, extending their on-premises solution to enable hybrid platform solutions. Vendors also have invested heavily in AIOps capabilities to automate telemetry-metric-based SLA offerings in support of application requirements. They have also improved storage asset management costs and optimized utilization with elastic scaling to real-time workload demands. In addition, they have made a conscious effort to reduce support and maintenance costs, included in their as-a-service consumption licensing and pricing.

Evidence

This research is based on hundreds of IT inquiries and proposal reviews.

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.