

Magic Quadrant for Primary Storage

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Next-generation primary storage strategies are shaped by hybrid cloud IT operation models, artificial intelligence for IT operations, software-defined storage and consumption models. I&O leaders need to assist in the selection of primary storage vendors to maximize the benefits of these trends.

Strategic Planning Assumptions

By 2025, more than 40% of all on-premises IT storage administration and support activities will be replaced by managed storage as a service, which is an increase from fewer than 5% in 2021.

By 2025, more than 70% of corporate, enterprise-grade storage capacity will be deployed as consumption-based offerings, which is an increase from less than 40% in 2021.

By 2025, 30% of external enterprise storage arrays deployed to support primary storage workloads will adopt nonvolatile memory express over fabrics, compared with fewer than 5% in 2021.

Market Definition/Description

Primary storage covers vendors that offer dedicated products or product lines for solid-state arrays (SSAs) or hybrid storage arrays (or both), and software-defined storage (SDS) software. Hybrid storage arrays include 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 a dedicated product name and an associated model number. SDS products are designed to operate on industry-standard, commodity hardware on-premises or in the public cloud.

A primary storage product's foremost purpose is to support response time and input/output per second (IOPS)-sensitive structured data workloads. Typical use cases include mission-critical workloads, such as IBM Db2, Microsoft SQL, Microsoft Exchange and SharePoint, Oracle Databases and applications, SAP HANA, and in-house-developed transactional applications. Other use cases include application consolidation, support for virtual environments, providing persistent storage for container environments and cloud IT operations.

The core capabilities of the products in primary storage market include support for:

- Native data services that conserve capacity utilization, protect against data loss, and enhance recovery via local and remote replication.
- SSDs or HDDs or a combination of the two. The architecture can be scale-up or scale-out.
- Host interface protocols that are block-based, such as Fibre Channel (FC) and Internet Small Computer System Interface Serial Attached (SCSI), or file-based, such as Network File System (NFS) and Server Message Block (SMB), or a combination of block-and-file protocols.

Additional primary storage capabilities include:

- An SDS product for on-premises storage or cloud platforms that is integrated with industry-standard server hardware or specialized proprietary hardware as a scale-out, disaggregated compute and storage architecture.
- Artificial intelligence for IT operations (AIOps) features for operational needs, such as cost optimization and capacity management, proactive support, workload simulation and placement, forecast growth rates, and/or asset management strategies.
- Managed storage as a service (STaaS), subscription to a product catalog and API-only provisioning to deliver a flexible storage platform managed via a globally accessible, centralized data services and operations panel that supports public/private cloud IT operations.
- SSAs with nonvolatile memory express over fabrics (NVMe-oF) as a host interface.

Magic Quadrant

Figure 1: Magic Quadrant for Primary Storage

Source: Gartner (October 2021)



Vendor Strengths and Cautions

DDN

DDN is a Challenger in this Magic Quadrant. DDN has continued to leverage and integrate its at-scale high-performance computing (HPC) technologies with previously acquired companies and products into a cogent enterprise product portfolio strategy. DDN refreshed VMstore with an all-nonvolatile memory express (NVMe) drive platform and its IntelliFlash Operating Environment data services. Tintri NexentaStor by DDN is the Tintri SDS solution.

DDN is privately held, with geographically diversified operations in the mid-to-large-enterprise and HPC segments. DDN has reorganized its VMstore, IntelliFlash appliances and Nexenta SDS solution under its Tintri enterprise brand, enabling technology cross-pollination and leveraging engineering resources to address enterprise storage.

Strengths

- DDN has made good progress in leveraging and streamlining core features and capabilities from its acquisitions into its Tintri business, which addresses a broad spectrum of use cases and workloads.
- DDN VMstore leverages intelligent storage infrastructure insights, AIOps and analytics to simplify and deliver optimal workload performance across the virtual machine (VM) layer.
- DDN's VMstore platform provides an always-on auto-quality of service (QoS) feature that models VM input-output (I/O) behavior and allocates resources to ensure consistent sub-1 ms workload performance.

Cautions

- DDN's efforts to unify its Tintri products into a common storage management and data services roadmap are largely a work in process, so clients should map IT requirements to Tintri development roadmap initiatives before evaluating.
- VMstore does not provide all-in-one pricing, so software options are likely to carry an additional license fee that also requires a software maintenance contract per each option.
- As a policy, DDN does not provide contractual guarantees for performance or effective capacity, so customers should avoid or negotiate if these are critical service-level agreement (SLA) requirements.

Dell Technologies

Dell Technologies is a Leader in this Magic Quadrant. PowerMax, PowerStore and PowerFlex are Dell's first-line storage platforms for the primary storage market. PowerMax, featuring high-availability and robust remote replication attributes, solidifies Dell's position in the high-end primary storage market. PowerStore unifies Dell's SSA offerings for the midrange storage market. PowerFlex, a multihypervisor-supported SDS offering, targets database and other transactional workload opportunities that benefit from its symmetrical scale-out architecture and linear scaling of performance. Dell's operations are geographically diversified. Its clientele ranges from small to very large global enterprises, with a presence in all vertical markets.

Strengths

- Dell has a portfolio of fit-for-purpose storage arrays to address a wide range of price points, as well as differing capacity and performance requirements to support primary storage workloads.
- Dell offers a broad spectrum of acquisition options including stand-alone capital expenditure (capex) contracts, Transformation License Agreement (TLA), Transformational Program Amendment (TPA), APEX Data Storage Services STaaS, and APEX Custom Solutions (Flex On-Demand, Data Center Utility and Pay-As-You-Go).
- PowerStore performance and capacity attributes make it an appropriate platform to consolidate multiple, midrange, hybrid storage arrays and older SSAs, simplifying the storage infrastructure.

Cautions

- Quotations that bundle Power-branded hardware, software, support and services into a single net price, without accompanying line-item list prices, are challenging users to determine the true quality of the quotation, relative to fair market value.

- Dell EMC Power-branded storage offerings for the primary storage market do not support a software-defined, unified cloud storage infrastructure.
- Gartner client inquiries indicate support for legacy primary storage products — SC Series, Unity, UnityXT and XtremIO — deployed to support primary storage workloads can be inconsistent.

Fujitsu

Fujitsu is a Niche Player in this Magic Quadrant. Its product portfolio consists of the Storage ETERNUS AF SSAs and Storage ETERNUS DX hybrid array systems. Fujitsu's operations are mainly focused in Japan, APAC, South America and Europe; its clients tend to be in the entry, midmarket and large-enterprise market segment. In June 2020, Fujitsu announced an OEM agreement with NetApp. This relationship will enable Fujitsu to sell NetApp FAS, AFF and E-Series via its ETERNUS product line in Japan and its E-Series in Europe.

Fujitsu will continue to resell NetApp AFF and FAS in Europe via a reseller's agreement. In March 2021, Fujitsu announced the withdrawal of its storage product business from North America.

Strengths

- The ETERNUS DX and AF midrange products offer dedicated Storage Acceleration Engines and NVMe-based read cache, providing higher efficiency and performance at lower price points.
- The ETERNUS midrange systems for the DX and AF product lines are priced lower than most of the vendor's competitors evaluated in this research.
- The ETERNUS platform offers high levels of reliability and overall customer satisfaction.

Cautions

- Fujitsu ETERNUS customers may need to consider NetApp or other alternatives, as Fujitsu will increasingly focus on the OEM relationship with NetApp.
- ETERNUS AF and DX arrays do not adequately address hybrid IT requirements, because they provide limited integration with leading public cloud platforms, such as Amazon Web Services (AWS), Google Cloud Platform (GCP) and Microsoft Azure.
- ETERNUS AF arrays do not provide AIOps support for their storage systems for enhanced postsales support.

Hitachi Vantara

Hitachi Vantara is a Leader in this Magic Quadrant. Hitachi's storage portfolio covers a broad spectrum of industry-critical workloads with a common NVMe-optimized, storage virtualization OS. Hitachi's operations are geographically diversified, and its clients tend to be in the large and midsize enterprise segments. Hitachi has made improvements in its Hitachi Ops Center, an artificial intelligence (AI)-driven management system to provide automation, analytics and protection to improve IT operational efficiency.

Hitachi offers a 100% data availability guarantee. Under the EverFlex as a Service, Hitachi offers a pay-per-use STaaS consumption model that includes utility pricing for both capacity and data protection.

Strengths

- Hitachi Vantara's continued investments in a broad spectrum of mainframe and open-system storage solutions provide enterprise and midsize enterprise customers with a common OS environment that simplifies management.
- Hitachi's Storage Virtualization Operating System (SVOS)-based architecture simplifies management and the benefits gained from the use of AIOps across a common family of systems that span midrange to enterprise systems.
- Clients often cite Hitachi's performance obtained through the use of its advanced cache and global DMA architecture, as well as the Hitachi Accelerated Flash system.

Cautions

- The VSP E Series midrange products lack support for offloading accelerated data-processing functions and intrafabric node I/O processing, due to the limits of its controller node architecture.
- Hitachi's software-defined block storage product lags leading storage vendors that can run on public cloud infrastructure.
- Hitachi Vantara lags industry leaders in the use of real-time data collation in support of back-end customer care capabilities.

HPE

Hewlett Packard Enterprise (HPE) is a Leader in this Magic Quadrant. Its operations are geographically diversified, and its clients tend to be in enterprise business-to-business (B2B) and business-to-consumer (B2C) markets. HPE has extended its storage systems portfolio in a rebranding effort to include the new HPE Alletra 6000 and 9000 models, alongside its HPE Primera and HPE Nimble Storage products. NVMe and storage-class memory (SCM) media support were added to HPE Alletra 6000 and NVMe and NVMe-FC to the HPE Alletra 9000 series. HPE Alletra provides cloudlike, data services capabilities, with HPE GreenLake cloud services.

HPE's subscription-based Data Services Cloud Console (DSCC) management platform provides intent-based provisioning, upgrades and data services. A storage program, called Timeless, offers nondisruptive technology refresh every three years, at no additional cost.

Strengths

- HPE's CloudPhysics' data-driven insights simplify the planning and procurement processes, which lessen the need for client storage domain-specific skills.
- HPE GreenLake cloud services provide partner-integrated and bundled solutions, such as EPIC, for key vertical industry applications, thereby accelerating time to production value.
- HPE InfoSight's AI-powered, autonomous operation provides the capability to resolve complex, cross-stack infrastructure problems through use of a machine learning (ML)-enabled recommendation engine.

Cautions

- HPE is shifting to a cloud-native services business model that requires a wholesale restructuring of back-end operations, such as billing, IT, logistics and support, which may cause an inconsistent customer experience and support issues.

- HPE lags some industry competitors with a cloud-native, fully managed, software-defined, block storage software product, limiting its use with the public cloud or for non-HPE server infrastructures.
- The Data Services Cloud Console is a cloud-native, software as a service (SaaS)-based management platform that is operationally limited in use with dark sites that have restrictions on internet access. It should be thoroughly vetted for cloud-native hybrid IT operations.

Huawei

Huawei is a Leader in this Magic Quadrant. Its product portfolio consists of the OceanStor Dorado V6 series and OceanStor F V5 series SSAs, and the OceanStor V5 hybrid storage systems, which collectively address midrange and high-end storage array requirements.

Huawei mainly operates in China, Latin America, and Europe, the Middle East and Africa (EMEA). Its clients tend to be in the large-enterprise, public clouds in China, and communications service provider (CSP) verticals. Huawei has invested heavily in AI/ML capabilities integrated as part of its product offerings.

Strengths

- Huawei's three-layer, AI-powered data management system provides cross-stack management, visualization, workload simulation and analysis to simplify infrastructure operations.
- Huawei has made enhancements to its product capabilities that have resulted in accelerated growth and market adoption outside its base Asia/Pacific (APAC) region.
- Clients' decisions to select Huawei over competitive products tend to favor its focus on pricing, high performance and investments in roadmap initiatives.

Cautions

- U.S. sanctions and geopolitical issues may challenge Huawei's market expansion efforts and partner initiatives outside China and parts of the APAC region, Latin America and Eastern Europe.
- Huawei lags major players with a global, centrally managed, cloud-native STaaS offering for automated provisioning storage and data services across hybrid, multicloud workloads.
- Huawei lags industry competitors with a cloud-native, fully managed, software-defined block storage product for use with major public clouds or non-Huawei infrastructures, limiting client optionality and flexibility.

IBM

IBM is a Leader in this Magic Quadrant. Augmented by Spectrum Virtualize for Public Cloud software, the FlashSystem and DS8900F platforms are IBM's key storage offerings for the primary storage market. The DS8900F is positioned to sustain IBM's position in the IBM mainframe infrastructure market, while the FlashSystem SSA and hybrid array portfolio is positioned for growth opportunities. IBM has delivered a steady cadence of performance, management, security, and high-availability enhancements to the FlashSystem and DS8900F offerings. The technology investments continue with the announcements of Safeguarded Copy and expanded volume size and mobility support for the FlashSystem platform and performance enhancements for the DS8900F.

Strengths

- IBM provides a single codebase that supports FlashSystem SSA, as well as hybrid array models that span the entry to the high-end primary storage price range.
- Spectrum Virtualize and its derivative, Spectrum Virtualize for Public Cloud, support a unified hybrid-cloud storage infrastructure with common provisioning, data services and management software, regardless of data location — on-premises, or public cloud infrastructure as a service (IaaS) platform.
- The FlashSystem Solid-State Array portfolio provides compelling price/performance per rack unit.

Cautions

- Depending on geographic locality and/or the installed model IBM storage array platform, some clients report that client response and resolution support are inconsistent.
- Native compression and data deduplication, as well as support for NVMe SSDs and NVMe-oF, remain missing capabilities on the IBM DS8900F offering.
- On products that do not yet have Expert Care, IBM's pricing policies for extended support and maintenance after the prepaid maintenance and support agreements expire can result in a steep increase in support and maintenance costs.

Infinidat

Infinidat is a Leader in this Magic Quadrant. Its primary storage portfolio consists of InfiniBox, which is characterized by its high-capacity and performance capabilities, as well as its resilient storage architecture. In June 2021, Infinidat announced its first SSA — InfiniBox F4304S for ultra-low-latency applications. During the evaluation period, it also announced support for VMware vVols, released a new CSI driver for Kubernetes environments, and achieved AWS Outpost Partner Ready Designation. Infinidat's operations are focused in North America, Europe, South Africa and Japan. Its clients tend to be very large enterprises and service providers.

Strengths

- Infinidat offers multiple purchasing models — capex-only; Elastic Pricing, which is a combination of operating expenditure (opex) and capex pricing; and FLX, an OpEx-only consumption model — enabling enterprises to consume STaaS.
- Infinidat offers comprehensive AIOps capabilities through a combination of a Neural Cache, an ML engine embedded in the system, and InfiniVerse, a SaaS-based platform that provides predictive analytics and support capabilities.
- Infinidat customers express a high level of satisfaction with its technical support and overall user experience.

Cautions

- Infinidat's multi-PB architecture is not ideally suited for enterprises that require less than 250TB of storage.
- InfiniBox does not support direct integration with public cloud platforms, such as AWS and Microsoft Azure, to enable use cases such as tiering, backup and disaster recovery.
- Infinidat has a limited direct presence in emerging markets. Customers in these regions must work with credible Tier 1 Infinidat partners to ensure adequate postsales support.

Inspur

Inspur is a Challenger in this Magic Quadrant. Its product portfolio consists of the HF and AS series, which address a broad range of midrange and high-end storage array requirements. During the evaluation period, it announced new versions of the HF and AS product lines, released a new CSI plug-in for Kubernetes environments, three-site replication support, and backup to Alibaba Cloud and AWS. Inspur's sales operations are largely concentrated in China. Clients are mainly in the midmarket and large-enterprise market segment.

Strengths

- Inspur storage products are offered at one of the lowest dollar/TB among vendors evaluated in this research.
- Inspur supports all major hypervisors, container management platforms and backup software.
- Presales experience is enhanced through virtual labs that provide clients with the opportunity to explore the platform and carry out performance validation.

Cautions

- Customers outside the APAC region must work with a credible Tier 1 partner to ensure adequate postsales support, because Inspur has limited direct presence in these locations.
- Inspur arrays have limited integration with leading public cloud providers, such as Microsoft Azure and GCP.
- Inspur trails the competition in its ability to provide a comprehensive STaaS offering.

Lenovo

Lenovo is a Challenger in this Magic Quadrant. The Lenovo ThinkSystem DE/DM Series are proven external storage arrays based on technology sourced from NetApp under a strategic partnership agreement. Under this agreement, Lenovo has leveraged its world class supply chain to manufacture and deliver the DE/DM Series solutions. In addition to a steady launch of new DE/DM Series platforms, and associated announcements based on NetApp technology, Lenovo has enhanced organically developed management tools for the DE/DM Series offerings.

Capitalizing on Lenovo's global sales and support infrastructure network, the new "One Lenovo" go-to-market initiative leverages the entire Lenovo portfolio to be an end-to-end solution provider for its customers.

Strengths

- Lenovo provides an end-to-end IT infrastructure solution that includes servers, networking, and storage for primary storage workloads; this enhances performance, simplifying problem resolution responsibilities and vendor management.
- Lenovo is a large, global IT infrastructure company with the financing, engineering and manufacturing assets, as well as the global logistics, required to support its expanding initiatives in the external enterprise storage market.
- Lenovo's XClarity Administrator centralized management system enables users to manage ThinkSystem servers and DE and DM Series storage arrays from a common console.

Cautions

- Lenovo ISG depends on NetApp to make the R&D investments essential to maintaining a competitive posture in the fast-changing enterprise primary storage market.
- Lenovo's AIOps software, ThinkSystem Intelligent Monitoring (TIM), does not support some important features, such as automatic issue resolution and ticket closure functionality, and a capacity and performance recommendation engine.
- Lenovo's presales and postsales support responsiveness in complex storage area network (SAN) infrastructures that support a hybrid cloud architecture is inconsistent and varies by region.

NetApp

NetApp is a Leader in this Magic Quadrant. NetApp addresses a wide range of primary storage workloads across its storage arrays: AFF, FAS, SolidFire, E-Series, EF-Series and its Cloud Volumes ONTAP SDS offering. This vendor supports a global customer base with on-premises or cloud-native storage. NetApp is a leader in providing integration with the public cloud providers and in support of hybrid cloud IT infrastructures.

New capabilities in the last year showcased its continued focus on cloud management and services with Cloud Manager, SnapMirror Cloud and Cloud Backup, and enhanced governance and compliance with Cloud Data Sense. The vendor also enhanced its container support and management via Astra, which is available across its product portfolio.

Strengths

- NetApp's Data Fabric strategy and common ONTAP software offers a unified management platform across hybrid cloud storage environments.
- NetApp offers a leading, broad product portfolio with extensive NVMe support and offerings that are attractive for entry-level, as well as able to scale to serve the largest global customers.
- NetApp Keystone Flex subscription offers comprehensive and flexible consumption models that extend from on-premises to the edge to the cloud.

Cautions

- NetApp's pricing policy for extended support can result in varying cost increases after the prepaid maintenance and support agreements have expired.
- ActiveIQ, its AIOps data management platform, lacks full cross-stack visibility of the hardware infrastructure to proactively address issues beyond storage.
- Some customers report challenges with support response times and the depth of technical postsales support.

Pure Storage

Pure Storage is a Leader in this Magic Quadrant. The vendor competes with its FlashArray//X; the lower-cost, lower-performance FlashArray//C; and its SDS offering, Cloud Block Store. Pure Storage is completely channel-driven and operates mostly in North America; the APAC region; and Europe, the Middle East and Africa (EMEA); and Japan, representing more than 80% of its revenue. The vendor performs well in the enterprise market and expanded its presence across large, global enterprises spanning all industry verticals.

During the past 12 months, Pure Storage introduced NVMe over FC and ActiveCluster support, as well as Cloud Block Store on Microsoft Azure. In September 2020, it acquired Portworx for container

orchestration. The company has also broadened its FlashArray//C appeal by expanding its high-capacity offering and lowering its introductory capacity.

Strengths

- Pure Storage has defined simplicity in its ease of use and consumption models with high levels of customer satisfaction supported by references.
- The company offers deep integration at the application and container level. Its AIOps platform, Pure1, offers proactive support, predictive analytics and real-time simulation modeling.
- Pure as a Service offers a unified data storage subscription under a single contract with common management across on-premises and public cloud deployments.

Cautions

- Some customers report concerns about the vendor's lack of sustained profitability.
- Cloud Block Store is not supported on GCP, and it can be cumbersome to deploy on Amazon AWS and Microsoft Azure public clouds.
- Pure Storage Flash Array products may command a premium in terms of cost and support, compared with hybrid-based storage arrays.

Zadara

Zadara is a Niche Player in this Magic Quadrant. The zStorage offering for primary storage consists of Zadara Virtual Private Storage Array (VPSA) for Block/File. Zadara products are completely software-defined and are available via an OpEx consumption program. The company's primary target audience is managed hosting service providers. Thus, it offers a fully managed solution for partners and enterprise customers.

The company is most established in North America and Europe, with about 20% of its business coming from outside those regions. The zStorage 20.12 release's most notable updates during the past 12 months have included flash storage performance enhancements, automatic storage tiering, 100 Gbps Ethernet support and CSI support for Kubernetes.

Strengths

- Zadara is focused exclusively on hosting providers and more than 300 managed service providers (MSPs) that can deliver strong multitenancy and low-latency performance, compared with public cloud providers.
- zStorage cloud and a single VPSA can be elastically and dynamically expanded or shrunk, commensurate with workload and SLA utilization demands, with no interruption to service or impact on performance.
- Zadara offers a fully managed service and is available via a 100% OpEx consumption pricing with no additional cost for support.

Cautions

- Zadara is a private company, and lacks public financial transparency. This can make it difficult for prospects to evaluate services and support capabilities.
- Zadara has a limited presence in emerging markets, which may be a concern for large, multinational customers.

- Detailed reporting and analytics at the volume level is not available from Zadara solutions.

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

Zadara

Dropped

Oracle didn't meet the inclusion criteria.

Inclusion and Exclusion Criteria

Vendor Inclusion Criteria:

- Be a significant player in the market, as determined by Gartner, due to market presence, competitive visibility and/or technology innovation.
- Have generated more than \$50 million in recognized primary storage revenue (GAAP) during the past four quarters (as of March 2021) and/or have an installed base of at least 500 customers in the upper-midsize and large enterprise market. (Gartner defines the upper-end midmarket as being 500 to 999 employees, and the large enterprise as being 1,000 employees or greater.)
- Produce and release primary storage products for general availability as of 31 July 2021. All components must be publicly available, shipping and included on the vendors' published price list as of this date. Products shipping after this date will only have an influence on the Completeness of Vision axis.
- Have more than 100 full-time equivalent (FTE) employees as of 1 June 2021.
- Sell storage arrays through a combination of direct, indirect or OEM channels (but not exclusively), and must have an average selling price of \$49,999 per array for the entire family of products.
- Have products available in at least two of the following three geographic locations — APAC region, EMEA and/or North America — by either direct, service provider or channel sales. Have a minimum of 20 customers per each of the geographies. With the exception of the SDS product, a minimum number of customers shall be waived.
- Sell its products under its brand as a stand-alone array platform, without the requirement to bundle it with other vendors' storage products in order that the product be implemented in a commercial production environment.
- Sell its SDS product through a combination of direct, indirect or OEM channels (but not exclusively), or third-party marketplaces.

- Provide an enterprise-class support and maintenance service, offering 24/7 customer support (including phone support). This can be provided via third-party service organizations, MSPs or channel partners.

Product Inclusion Criteria:

- Produce and release primary storage products for general availability as of 31 July 2021. All components must be publicly available, shipping and included on the vendors' published price list as of 31 July 2021.
- The primary storage array products must be available as a single configuration of the required hardware or a software of SDS software needed to reliably store and retrieve data using industry-standard, host connection protocols.
- The primary storage array products should have no single points of failure.
- In the case of SSAs, the system must be a self-contained, solid-state-media-only system with a dedicated model name and model number.
- In the case of hybrid storage arrays, the systems can be configured with a combination of HDDs and SSDs in a single array.
- In the case of an SDS solution, the system must be self-contained and available to operate on one or more public or hybrid cloud platforms. It should provide API support to integrate with the providers' IaaS platform, its marketplace and offered as a subscription license. Furthermore, it must support NVMe-oF.

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, planned new application deployments, forecast growth rates and/or asset management strategies.

Exclusion Criteria:

- Storage arrays and SDS products designed to support only unstructured data workloads managed by dedicated scale-out distributed file systems and object storage protocols are not included for evaluation as a part of this Magic Quadrant.
- Storage arrays and SDS products that are designed and marketed as solutions to support specific use cases only (e.g., video surveillance or video rendering and content production) are not included in this research.
- Storage products that are purposely designed to solely support both the applications and the storage volumes associated with the applications in an integrated form factor (rack or appliance) under a common product brand are not included in this Magic Quadrant.

Written Confirmation of Financial Achievement

Gartner may require that you provide a written confirmation of achievement of one of the following requirements. The confirmation must be from an appropriate senior finance executive in your organization.

- More than 500 current primary storage customers (with active support contracts) in the upper-end midmarket or large enterprise segment. Gartner defines the upper-end midmarket as being 500 to 999 employees, and the large enterprise as being 1,000 employees or more.
- More than \$50 million of recognized product revenue (GAAP) in the primary storage array market during the past four quarters (as of March 2021).
- More than \$12 million in primary storage array, or recurring software subscription revenue during the past four quarters (as of March 2021). It also requires a minimum of 2x the number of active product-based revenue customers from April 2020 to March 2021 during the previous 12-month period. Finally, 2x product revenue growth year over year compared with the previous 12-month period, and more than 35 FTE employees as of 1 June 2021.

Evaluation Criteria

Ability to Execute

Table 1: Ability to Execute Evaluation Criteria

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Product or Service	High
Overall Viability	High
Sales Execution/Pricing	High
Market Responsiveness/Record	Medium
Marketing Execution	Medium
Customer Experience	High
Operations	NotRated

Source: Gartner (October 2021)

Completeness of Vision

Table 2: Completeness of Vision Evaluation Criteria

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Market Understanding	Medium
Marketing Strategy	High
Sales Strategy	High
Offering (Product) Strategy	High
Business Model	Medium
Vertical/Industry Strategy	Medium
Innovation	High
Geographic Strategy	Medium

Source: Gartner (October 2021)

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 the five major geographical regions, consistent financial performance and broad platform support.

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 size and 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.

Niche Players

Vendors in the Niche Players quadrant are often narrowly focused on specific markets 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 that are having difficulty developing and executing on their vision.

Context

This Magic Quadrant represents vendors offering hybrid storage arrays, SSAs or both, and/or SDS solutions, developed internally or acquired through an OEM agreement. Integration with public and hybrid clouds; ease of management using AIOps; a comprehensive set of data services to increase availability; and efficiency are technical attributes infrastructure and operations (I&O) leaders must consider when choosing a primary storage system.

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 opex — for the organization. Preference should be given to vendors that provide availability, efficiency

and performance guarantees, and those that have a competent partner network that ensures solution design and installation is flawless and hardware replacements are carried out in a timely manner. Internally, I&O leaders must work with application owners to understand application performance and availability requirements, as well as roadmaps. They must choose among, or choose a combination of SSAs or hybrid arrays or SDS offerings, based on these application requirements.

Market Overview

External controller-based (ECB) storage vendor revenue fell by 2.3% in 2020 as a result of the COVID-19 pandemic, followed by a modest growth of 3.7% in 2021. The adoption of SSAs continues to increase and, in the long term, will continue to buoy the declining ECB market. In 2024, 55.5% of ECB revenue will come from the SSA subsegment, up from 44.4% in 2019. The primary storage market faces other headwinds, as customers have accelerated adoption of alternatives, such as hyperconverged systems and public cloud. Public cloud computing grew 22% in 2020, and is expected to grow 26.2% in 2021, expediting the shift from on-premises enterprise storage footprint to public-cloud-native storage.

In 2021, SSA vendors continued to make incremental investments to their product portfolio and announced products that supported capabilities, such as support for quad-level cell (QLC), SCM and NVMe-oF technologies. These technologies are available at a premium, when compared with traditional SSAs, and are not yet viewed as compelling and mature enough for enterprises to broadly deploy as storage tiers. Also, unlike the transition from hybrid arrays to SSAs, which enterprises viewed as a significant technology shift with tangible performance benefits, enterprises have yet to understand the value that these new technologies bring to their application landscapes. Hence, enterprises will look to extend the life of current SSA systems, as they already address the high-performance and availability requirements of most workloads in the enterprise.

Primary storage vendors also continued to make investments in software capabilities that provide tighter integration with public cloud providers, primarily AWS, GCP and Microsoft Azure. Storage systems are being designed to handle data mobility to and from the public cloud, and to address use cases such as backup to cloud, storage tiering, disaster recovery to public cloud and hybrid cloud. Vendors are exploring the possibility of using AI to perform predictive hardware maintenance and automatic storage performance tuning, based on application behavior. Such capabilities are already proved to reduce first- and second-level technical support and offer a degree of agility into the storage system.

Evidence

Gartner analyst inquiries

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.