Magic Quadrant for Distributed File Systems and Object Storage

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Distributed file systems and object storage deployments are growing faster than ever in both volume and size as the consolidated platform for unstructured data services in global data centers. This research helps I&O leaders to assess the vision and execution of vendors in this market.

Strategic Planning Assumptions

By 2026, large enterprises will triple their unstructured data capacity stored as file or object storage on-premises, at the edge or in the public cloud, compared to 2022.

By 2025, more than 40% of enterprise storage will be deployed at the edge, which is a significant increase from 15% in 2022.

By 2025, 60% of infrastructure and operations (I&O) leaders will implement at least one of the hybrid cloud architectures, which is a major increase from 15% in 2022.

Market Definition/Description

This document was revised on 31 October 2022. The document you are viewing is the corrected version. For more information, see the Corrections page on gartner.com.

The unstructured data storage market continues to evolve. New capabilities are being introduced to address the growing challenges of exponential data growth, rapid digitalization, cyber resilience, cloud integration and the globalization of data. Storage infrastructure deployments, based on distributed file systems and object storage, are growing faster than ever in both volume and deployment size as the consolidated platform for unstructured data services in global data centers.

Gartner end users report unstructured data growing more than 30% year over year. Thus, I&O leaders are looking for extensible on-premises storage products that can address an increasing number of digital business use cases with lower acquisition, operational and management costs. I&O leaders

are demanding scalability, flexibility, life cycle management, ease of management and analytics insights into data. In recent years, Gartner clients are also asking for cyber-resilient unstructured data solutions to prevent, detect and recover from ransomware attacks.

The steep growth of unstructured data for emerging and established workloads now requires new types of products and cost-efficiencies. Most products in this market are driven by software-defined storage (SDS), capable of delivering tens of petabytes of storage. SDS can also potentially leverage hybrid cloud workflows with public cloud infrastructure as a service (IaaS) integration to lower total cost of ownership (TCO) and improve data mobility. New and established storage vendors continue to develop unified scalable storage clustered file systems and object storage products to address cost, agility and scalability limitations in traditional, scale-up storage environments.

Gartner's view of the market is focused on transformational technologies or approaches delivering on the future needs of end users. It is not focused on the market as it is today.

Gartner defines the distributed file systems and object storage market as software and hardware appliance products that offer object and/or scale-out distributed file system technology to address requirements for unstructured data growth.

Core capabilities:

- Distributed file systems storage uses a single parallel file system to cluster multiple storage nodes together, presenting a single namespace and storage pool to provide high bandwidth for multiple hosts in parallel.
- Object storage refers to devices and software that house data in structures called "objects," and serve clients via RESTful HTTP APIs such as Amazon Simple Storage Service (S3).
- Data and metadata are distributed over multiple nodes in the cluster to handle availability, resilience and data protection in a self-healing manner and to provide high throughput and capacity linearly.

Optional capabilities:

- Cyber resilience or cyberstorage functionality enables active technologies to identify, protect, detect, respond to and recover from ransomware attacks on unstructured data storage solutions.
- Hybrid cloud integration that will leverage public cloud infrastructure and platform services can enable data mobility, resilience and operational efficiency for on-premises unstructured data platforms.
- Artificial intelligence (AI)-driven operations capabilities are leveraging machine learning to enable prescriptive health management, improved customer support and support of proactive capacity

management, nondisruptive workload simulation, placement and migration/tiering, and performance optimization.

- A unified platform for file and object storage provides common unstructured data services with multiprotocol access.

Magic Quadrant

Figure 1: Magic Quadrant for Distributed File Systems and Object Storage

Vendor Strengths and Cautions

Cloudian

Cloudian is a Challenger in this Magic Quadrant. It offers a scale-out object platform that is designed for high-throughput object storage workloads. Cloudian HyperStore runs on-premises and in public clouds. It offers an add-on scale-out file gateway to handle file workloads. Cloudian's operations are

mostly focused in North America and EMEA, and its clients tend to be enterprise customers across the public sector, service providers and large enterprises. Over the past 12 months, Cloudian added integration with Microsoft Azure Stack HCI and SQL Server 2022, certification with VMware Tanzu Kubernetes Grid and Tanzu Greenplum, support for Red Hat OpenShift, WekaFS integration, integration with Kasten by Veeam, improvements to its HyperIQ monitoring software and a new remote managed service offering called HyperCare. Cloudian is most popular for backup and archiving use cases.

Strengths

- **Resilience:** Cloudian attracts customers looking for S3-compatible storage with security certifications and object lock technology to protect against ransomware for backup and archive use cases.
- **Customer satisfaction:** Customers express a high degree of satisfaction with the HyperStore product for its S3 compatibility, simplicity of deployment and ease of management; and for quality of support and ease of working with the company.
- **Flexibility:** Cloudian delivers a broad set of deployment options such as software-based and hardware-agnostic offerings, Cloudian-branded appliances, cloud-based instances, and managed services options.

Cautions

- **File services:** Cloudian file services implementation integration remains a work in progress and currently depends on an external gateway solution with limited scale-out capabilities.
- **As a service:** Cloudian lacks a cloud-based or hosted SaaS offering for monitoring, reporting, alerting and analysis for HyperIQ.
- **Global coverage:** Cloudian has limited business and brand awareness in Asia/Pacific and Latin America, hindering its traction in those geographies.

Cohesity

Cohesity is a Visionary in this Magic Quadrant. Cohesity SmartFiles is a scale-out, unified file and object software product. The product is delivered as an integrated appliance or can be deployed on third-party certified hardware, in public cloud IaaS, or as a service-based solution through HPE GreenLake. Cohesity's operations are mostly focused on North America and EMEA, with a growing presence in APAC. Over the past 12 months, Cohesity added support for NFSv4; enabled the creation of custom-view templates; improved its dashboard for detailed consumption tracking; provided access to historical performance metrics and detailed SMB and NFS metrics; and introduced support for S3 object locking, SW WORM, IP whitelisting and multitenant management. Cohesity SmartFiles is best-suited for use cases such as management of backup and archiving datasets, and hybrid cloud storage.

Strengths

- **Expansion:** Cohesity SmartFiles can be a valuable opportunity for existing Cohesity DataProtect customers to modernize unstructured data management using hybrid cloud data services.
- **Product capabilities:** Gartner inquiries highlight Cohesity SmartFiles deployment and operations ease of use, policy-based operations, and layered security functions and capabilities.
- **Data services:** Cohesity differentiates itself by offering an integrated solution for both secondary storage services and data protection. It is powered by an immutable scale-out file system with in-line deduplication and reduction capabilities, and rich data management features such as live search and indexing, integrated network-attached storage (NAS) tiering and migration, data protection, cloud archiving, ransomware detection, and an integrated app store.

Cautions

- **Global deployments:** As a nascent product in this market, Cohesity's global installed base for customers with high-capacity file and object deployments is relatively limited.
- **Advanced capabilities:** Gartner inquiries indicate mixed experiences with Cohesity SmartFiles, as it is still missing some advanced capabilities in both file and object data services.
- **Performance:** Cohesity SmartFiles is not suitable for high-performance workloads; it is primarily designed for secondary workloads requiring significant scale-out capabilities.

DDN

DDN is a Niche Player in this Magic Quadrant. DDN EXAScaler is a distributed file system software solution that runs on-premises as an appliance and in the cloud as SDS. It is deployed primarily for large-scale, high-throughput file workloads, and also has S3 protocol support for archive use cases. EXAScaler is powered by the Lustre open-source parallel file system. DDN's operations are geographically diversified, and its clients tend to be large enterprises. Over the past 12 months, DDN improved performance with a new-generation all NVMe appliance; and vendor-enhanced management capabilities to simplify the installation, upgrade, configuration and monitoring of the EXAScaler product. In addition, DDN released a number of enhancements that improve diagnostics and error handling. DDN is best-suited for high-performance HPC and AI workloads.

Strengths

- **HPC heritage:** DDN has a strong presence in organizations with massive data processing challenges, especially in universities, government agencies and national labs.
- **Performance density:** DDN's storage appliances are field-proven and purpose-built for high-performance analytics workloads while providing high-density and resilience.
- **Cloud presence:** DDN's customers can extend their workloads from on-premises to public cloud as DDN's parallel file system SDS is present in all three major public cloud IaaS providers.

Cautions

- **Broad applicability:** DDN's offerings are limited in addressing requirements for use cases outside of the HPC market segment due to lack of supporting features for general-purpose storage.
- **Object storage:** DDN's S3 support on EXAScaler is suitable for limited object storage use cases, and not for large-scale, performance-sensitive object storage deployments.
- **High-touch service:** Customers continue to require significant support from DDN in the initial deployment as well as in day-to-day management due to lack of a common management tool and complexity in the user interface.

Dell Technologies

Dell Technologies is a Leader in this Magic Quadrant. Dell PowerScale is a distributed file system that runs on-premises, is available in Google Cloud and is also available through APEX cloud consumption models. Dell ECS is an object storage platform that runs on-premises and in the cloud. Dell Technologies' operations are geographically diversified, and its clients range from small to very large enterprises. Over the last year, Dell PowerScale added support to move file data into S3 buckets, NFS over RDMA, writable snapshots and cyber resiliency with air-gap and ransomware detection. Dell ECS added support for enhanced metadata search, S3 select support and the ability to mix nodes with different media types in the same cluster, and a new software-only offer that is based on containerized architecture. Dell PowerScale is best-suited for file shares and production high-performance workloads, and Dell ECS is best-suited for traditional object use cases.

Strengths

- **Broad reach:** Dell Technologies has the broadest portfolio of products and builds on insights gathered from the largest installed base in the market to address the challenges of unstructured data.
- **As a service:** Dell's APEX Data Storage Services (ADSS) is a fully functional storage service, with investments to create more tightly integrated and seamless data services, including public cloud connectivity.
- **Supply chain:** Dell Technologies' file and object storage appliances are vertically integrated with Dell's standard x86 servers, giving clients assurance on faster availability of parts around the globe.

Cautions

- **Hybrid cloud:** Dell Technologies lacks a file-based offering that can run on Amazon Web Services (AWS) or Microsoft Azure, providing limited options for PowerScale and Isilon customers who want to move their on-premises applications to the public cloud.

- **Customer satisfaction:** Customers running the new PowerScale appliances based on commodity servers, versus purpose-built storage appliances, are experiencing more customer satisfaction issues coming from early integration complexity.

- **Parallel file system:** Dell Technologies lacks a pNFS or other parallel file system access client to address workloads that require parallel access from a compute farm; it is addressing this today via partners.

Hitachi Vantara

Hitachi Vantara is a Challenger in this Magic Quadrant. The Hitachi Content Platform (HCP) is an object storage product that can be deployed in many forms: an appliance, software only, cloud and on-premises. HCP scales performance and capacity independently to support a wide range of workloads. Hitachi Vantara's operations are in the Americas, EMEA and Asia/Pacific. Clients tend to be midsize to large enterprises. Over the past 12 months, Hitachi Vantara has added the following capabilities: automated real-time classification for data management; action support capability; and new OEM backup and ISV partners. HCP is best-suited for analytics, cloud storage, backup and archive, and hybrid cloud.

Strengths

- **Broad reach:** Hitachi Vantara HCP is known for its resilient, flexible and large multinode cluster solutions. The vendor has a global and diverse customer base across many object use cases.

- **Consumption model:** Hitachi Vantara HCP EverFlex expanded its consumption-based managed solutions to include financial and deployment options across its entire suite of products and services.

- **Continuous improvements:** Hitachi Vantara continues to expand its HCP features and invest in HCP innovation. It filed more patents this year than in previous years.

Cautions

- **Sales support:** According to Gartner clients, Hitachi Vantara sales is inconsistent in proactive follow-up with clients on matters of strategic roadmap interest.

- **File services:** Hitachi Vantara's OEM relationship with WekaFS file system software requires a coordinated partnership approach to effectively support performance-intensive, file-heavy workloads.

- **Hybrid cloud:** HCP for Cloud Scale lacks a full-stack public cloud marketplace offering for use in major public clouds.

Huawei

Huawei is a Challenger in this Magic Quadrant. Huawei offers OceanStor Pacific as a unified distributed file system, block and object storage appliance product. While the older offering, OceanStor 9000, is still supported for file-only workloads, OceanStor Pacific is now Huawei's lead product for all unstructured data needs as file services adoption is fast increasing. It has large operations in the Asia/Pacific region, and its clients tend to be service providers, and government and financial institutions. Over the past year, OceanStor Pacific added advanced compression, cross-site disaster recovery and tiering to AWS. It has improved small files performance and added some cybersecurity features. OceanStor Pacific is best-suited for private clouds, analytics, cloud-native applications and archiving.

Strengths

- **Investments:** Huawei's steady investments in OceanStor Pacific R&D, support, sales and marketing has resulted in significant customer adoption and capacity growth in large enterprises.
- **Unified platform:** OceanStor Pacific is well-positioned to accommodate a variety of large-scale, unstructured data workloads on a single product.
- **Customer experience:** OceanStor Pacific has one of the highest grades for customer satisfaction among vendors in this Magic Quadrant.

Cautions

- **Global coverage:** Huawei's adoption outside of Asia/Pacific remains lower than market leaders and may have less appeal for multinational customers concerned with geopolitical impact.
- **Cloud and edge capabilities:** OceanStor Pacific services are still nascent in terms of public cloud integration, cyber resilience and edge storage services delivery.
- **File services adoption:** The majority of OceanStor Pacific's customers are using object storage capabilities, as most file services are still running on the older OceanStor 9000 product and are yet to be migrated.

IBM

IBM is a Leader in this Magic Quadrant. IBM Spectrum Scale is a parallel file system product. It runs on-premises on purpose-built appliances or as software-defined storage on standard x-86 servers, as part of IBM Spectrum Fusion HCI stack, and in select public clouds. IBM Cloud Object Storage (COS) is an object storage that runs on-premises and in the IBM Cloud. IBM's operations are geographically diversified, and its clients range from midsize to very large enterprises. Over the past year, IBM has containerized file and object services, enhanced performance of S3 interface on IBM Spectrum Scale, and improved performance of its NVMe appliances, including NVIDIA GPUDirect support. IBM COS added support for S3-compatible object versioning for container mode, CPU upgrades to COS appliances and other minor enhancements. IBM Spectrum Scale is best-suited for high-performance file and analytics. IBM COS is best-suited for cloud storage.

Strengths

- **High performance:** Sustained enhancements in performance-related capabilities of IBM Spectrum Scale translate well for large-scale, demanding environments for high-performance analytics workloads.
- **Global file and object services:** IBM Spectrum Scale's active file and object management provides local read/write performance at edge locations, irrespective of the location of data, in core, cloud or other edge locations.
- **Data services:** IBM Spectrum Discover enables customers to categorize and analyze data stored anywhere in IBM and/or non-IBM file and object storage platforms.

Cautions

- **Managed file services:** IBM depends on partners to offer managed file services in Azure, AWS or Google Cloud Platform (GCP). It offers IBM Spectrum Scale virtual machines only in the AWS marketplace for customers to deploy and manage.
- **As a service:** IBM trails other providers in this market by not offering its own branded storage-as-a-service offering, which significantly limits customers' buying options. It depends on Kyndryl and other managed service providers to address customers requiring storage as a service.
- **Customer experience:** Some Gartner client feedback shows below average scores for both IBM Spectrum Scale and Cloud Object Storage when asked to rate overall experience with the vendor.

Inspur

Inspur is a Niche Player in this Magic Quadrant. The Inspur AS13000G6 series provides a unified software solution for both file and object storage. Inspur offers four AS13000G6 appliance models for petabyte-scale applications for high-performance, high-definition video; high reliability; and cloud-based deployments. Its operations are mostly focused in Asia/Pacific and EMEA, and its clients tend to be telecom, government, internet and education institutions. Over the past 12 months, Inspur refreshed its product line to the AS13000G6, improving NFS performance, efficiency and manageability, along with support for containers. Inspur storage is best-suited for backup and archiving, commercial HPC, hybrid cloud, and analytics.

Strengths

- **Deployments:** Inspur has experienced rapid growth in customers and managed petabytes in the China, Japan and APAC regions, with a majority of its customers over one petabyte.
- **Integration:** Inspur leverages its broad product IT infrastructure portfolio, robust supply chain and global server market position to integrate with dominant cloud service providers to provide full-stack IT solutions.

- **Performance:** Inspur invested heavily in its next-generation AS13000G6 with intelligent software and dozens of performance optimization algorithm enhancements to provide very high levels of input/output operations per second (IOPS).

Cautions

- **Global coverage:** Inspur's storage product brand is little known outside of its dominant APAC region with limited support staff to address market and customer expansion initiatives.
- **Supply chain:** Inspur's upgrade to AS13000G6 includes an Inspur proprietary SSD that provides unique capabilities that may not be available from alternative SSD manufacturers in the event of a supply chain disruption.
- **Advanced capabilities:** Inspur lacks tagging and expense management capabilities to optimize pricing based on usage level or resource allocation as an effective means of managing license costs.

NetApp

NetApp is a Visionary in this Magic Quadrant. NetApp StorageGRID is an object storage solution available as software and hardware appliances that can run on-premises and in the public cloud. NetApp offers as-a-Service cloud like consumption models for StorageGRID software and appliances on the customer's premises. NetApp supports tiering and replication of data from on-premises StorageGRID to public cloud services, including Google Cloud, AWS and Azure. NetApp operations are global, and its clients tend to be large enterprises, media and entertainment (M&E), government, and service providers. Over the past 12 months, NetApp added support for tiering and replication to Google Cloud, Amazon S3 Select, S3 object lock API, AWS secret region replication, Azure AD and usability enhancements. NetApp StorageGRID is best-suited for private cloud storage and cloud-native applications.

Strengths

- **Integration:** NetApp StorageGRID offers rich integration between on-premises deployments and public cloud services through tiering, replication, elastic search and bucket-level change notifications.
- **Object storage capabilities:** NetApp StorageGRID addresses a broad set of use cases including those related to production storage, such as analytics, cloud-native applications and hybrid cloud storage.
- **Hardware:** NetApp offers a broad portfolio of purpose-built appliances ranging from cost-optimized dense platforms to performance-focused appliances for transactional object workloads.

Cautions

- **File services:** StorageGRID lacks a native file interface, and customers have to use an external file gateway for applications supporting only file protocols.
- **Customer experience:** Gartner client feedback shows that customer experience with initial deployment and user interface can be more complex relative to leaders in the market.
- **Cloud services:** StorageGRID integration with NetApp's cloud services offerings such as Cloud Secure, is a work in progress.

Nutanix

Nutanix is a Visionary in this Magic Quadrant. Nutanix Files and Nutanix Objects are integrated with the Nutanix Cloud Platform to provide a unified storage offering. Nutanix Unified Storage is deployed across server nodes, leveraging an existing hyperconverged infrastructure (HCI) for smaller deployments or on dedicated-storage-only cluster nodes. Nutanix's operations are global and rely on server OEM and channel partners for solution delivery. Nutanix has customers across all verticals and geographies. Over the last year, Nutanix expanded the Nutanix Data Lens SaaS offering focusing on cyber resilience, added life cycle management, file migrations, immutability and object multitenancy. Nutanix introduced single unified storage licensing and now has public cloud tiering and analytics tools integration. Nutanix is best-suited for hybrid cloud and cloud IT operations.

Strengths

- **Investments:** Nutanix's investment in unified data R&D, sales, marketing and differentiating product improvements resulted in major year-over-year growth in deployed capacity and customer awareness.
- **Integration:** Nutanix Files and Nutanix Objects service have broad integration with the third-party ISV ecosystem in file management, analytics, data protection, healthcare and antivirus areas.
- **Customer satisfaction:** Gartner clients highlight Nutanix's ease of use and high-quality customer support experience.

Cautions

- **Cost:** As a premium product, Nutanix might not be the most cost-effective solution for deployments outside of the existing Nutanix HCI customer base.
- **High-touch services:** Customers might require vendor engagement for careful cluster rightsizing and proof of concept (POC) activities to adhere to the requirements of the large-scale performance-sensitive applications.
- **Advanced capabilities:** Nutanix Files and Nutanix Objects do not support advanced data deduplication features, and the vendor's public cloud presence is currently limited to AWS.

Pure Storage

Pure Storage is a Leader in this Magic Quadrant. Pure FlashBlade is a purpose-built unified file and object storage appliance. Pure offers a distributed system that is designed to handle massive file and object throughput and parallelism by easily adding blades to scale capacity and/or performance. FlashBlade's primary market adoption has been in North America. Over the past 12 months, the vendor launched a new FlashBlade//S appliance that leverages QLC flash; a partnership with hosted Equinix Metal; native SMB enhancements; and support for multidomain trust for Active Directory domains. Pure is best-suited for commercial HPC, analytics and backup where recovery time objective (RTO) performance is critical.

Strengths

- **Consumption model:** Pure FlashBlade appliance includes all hardware and software licenses, along with a flexible consumption model to deliver simplified deployment and administration.
- **Expansion:** Pure FlashArray business along with investment in Pure1 AIOps capabilities provide FlashBlade with a referential client base and credibility within IT and procurement.
- **Customer satisfaction:** Pure customer feedback is highlighting its broad business programs, ease of procurement and deployment, and operational simplicity of its product.

Cautions

- **Cost:** Pure's support fees are generally more expensive than competitive offerings as a percentage of the initial array costs over a three-year period.
- **Deployments:** The number of Pure FlashBlade customers over 1PB of noncompressed data is relatively small compared to leading competitive offerings.
- **Hybrid cloud:** Pure lacks a fully integrated public cloud marketplace as part of a broader hybrid cloud platform strategy.

Quantum

Quantum is a Visionary in this Magic Quadrant. Quantum's ActiveScale is an object storage solution that can be delivered either as an appliance or as a software-based solution. Quantum operates globally with a focus on North America, EMEA and APAC. Over the past 12 months, Quantum simplified the architecture of ActiveScale, improved performance, scalability and efficiency, and completed the integration of ActiveScale disk with tape technology to deliver a cold storage tier. Quantum extended the partnership with Supermicro into a reseller agreement that supports its software-based solution. Quantum also announced Quantum Object Storage Services, a fully managed service to deliver on-premises storage as a service. Quantum ActiveScale is well-suited for analytics, backup and recovery, and archiving use cases.

Strengths

- **Integration:** Quantum's ActiveScale native integration of disk with tape technology is a differentiating offering for storing very large amounts of data for long terms on green storage technology.

- **Media and entertainment:** Quantum is a prominent vendor in the media and entertainment industry for high-end postproduction, content distribution, content archiving and video surveillance solutions where customers leverage a mix of Quantum's broad portfolio technology for collaborative workflows and long-term content archiving.

- **Expansion:** Quantum's acquisition of Pivot3 makes it one of the few vendors that can provide end-to-end solutions within the video surveillance market that can scale to very large deployments.

Cautions

- **Product growth:** Quantum ActiveScale has shown limited product improvement since the acquisition and has a smaller installed base with slower growth compared to the market leaders.

- **Use cases:** Quantum's ActiveScale strategy is mainly around large unstructured repositories and backup. Thus, Gartner clients are rarely considering it for other use cases.

- **Enterprise features:** ActiveScale continues to lag in key features such as data deduplication and compression, QoS, support for all flash, NFSv4 and distributed SMB, hybrid cloud integration, and dual protocol access.

Qumulo

Qumulo is a Leader in this Magic Quadrant. Qumulo offers a portable software-defined multiprotocol file storage platform with data services such as analytics that operates on-premises and natively in public clouds. The solution is designed for large-scale, high-throughput file workloads with built-in performance analytics and capacity management. Its primary market adoption has been in North America where clients tend to be in the M&E, healthcare and public sectors. Over the past 12 months, Qumulo released NVMe support for HPE, NFSv4.1 and S3 protocol support for object; introduced Recover Q; expanded its partner portfolio with Supermicro; and expanded its Azure offering to all North America regions. Qumulo is best-suited for commercial HPC, archiving and hybrid cloud storage.

Strengths

- **Hybrid cloud:** Qumulo's cloud-native architecture is integrated and available on three major public cloud service providers' infrastructure, offering clients a natural upgrade path to cloud-native file services solutions.

- **Customer experience:** Qumulo is known for its high level of customer satisfaction, and ease of setup, administration, monitoring and analytics with responsive access to technical support.

- **Deployments:** Over half of Qumulo's customers store over one petabyte of managed capacity, making it a reliable choice for multipetabyte deployments under a single namespace.

Cautions

- **Global coverage:** Qumulo's ability to compete globally, as a major consumption-based platform vendor, is limited by its size and breadth of hybrid offerings.
- **Integration:** Qumulo's lack of full integration with HPE InfoSight to provide metric-based service-level agreement (SLA) requirements will limit HPE GreenLake's ability to deliver SLA commitments for file services.
- **Cloud services:** Qumulo's Azure offering is not available in Azure EMEA regions, limiting its ability to service cloud-native, non-OEM partner requirements in Azure European regions.

Red Hat

Red Hat is a Visionary in this Magic Quadrant. Red Hat Ceph Storage supports block, object and file workloads. Red Hat also sells OpenShift Data Foundation, which is container native storage based on Red Hat Ceph Storage. Vendor operations are focused in North America and Europe, and its clients tend to be large enterprises, telecom and financial services organizations. Over the past year, Ceph Storage has added WORM functionality, an object lock API and enhanced encryption capabilities. Recent Ceph Storage releases include performance and multisite replication enhancements. Red Hat Ceph Storage is best-suited for cloud storage and container-native applications.

Strengths

- **Open-source community:** Red Hat's Ceph Storage is attracting end users looking for an open-source software-defined platform and broad ecosystem support powered by community-driven innovation.
- **Use cases:** Red Hat Ceph Storage provides a versatile unified storage platform suitable for a variety of cloud-native application use cases.
- **Red Hat integration:** The Ceph-Storage-based OpenShift Data Foundation product is uniquely positioned to deliver integrated container-native data services for end users deploying the Red Hat OpenShift platform.

Cautions

- **Storage focus:** Gartner clients rarely shortlist Red Hat Ceph Storage as a stand-alone storage product since the majority of Red Hat Ceph Storage is being deployed as a component of Red Hat OpenShift or OpenStack.
- **Customer experience:** Gartner clients cite complexity and manageability problems as potential inhibitors to speedy Ceph Storage deployments.

- **File services:** Red Hat Ceph File System (CephFS) has low adoption for large production deployments, limiting product applicability as a provider of enterprise file services.

Scality

Scality is a Leader in this Magic Quadrant. The Scality RING solution runs on-premises and integrates with the public cloud. Scality offers an object storage platform, with native file protocol support, for high-capacity unstructured data workloads and runs as software on commodity hardware. Its operations are focused in North America, EMEA and Asia/Pacific, across all verticals. Over the past 12 months, Scality added active/active S3 replication, multisite asynchronous replication, storage accelerator by supporting multiple storage tiers, tape system management integration and small object performance acceleration. In addition, it increased its support capabilities with a premium support offering. Scality is well-suited for analytics, backup, cloud-native apps, hybrid cloud storage and archiving use cases.

Strengths

- **Integration:** Scality's software-defined deployment capabilities, its cloud integration, and integrated file and object storage services as a single solution are attractive differentiators.
- **Scale:** Scality has a proven track record for multipetabyte geographical distributed objects and file deployments across almost every vertical.
- **Customer experience:** Gartner clients' feedback is positive about the quality of sales, presales and technical support for Scality RING.

Cautions

- **Global coverage:** Scality's global installed base is relatively small compared to other Leaders in this Magic Quadrant. In addition, most of its customers are based in North America and EMEA, with limited presence in APAC and Latin America.
- **File services:** Scality does not address file workloads that require low latency, such as analytics.
- **Learning curve:** Gartner clients describe Scality as a high-complexity system that requires a higher level of expertise to deploy, maintain and manage.

VAST Data

VAST Data is a Challenger in this Magic Quadrant. VAST Data is a unified distributed file system and object storage appliance that is designed for large-scale multiprotocol data center deployments. VAST's front-end stateless protocol nodes and JBOF persistent storage nodes are connected via NVMe over fabric (NVMe-oF) protocols to enable higher-scale, lower-latency and global-efficiency algorithms. A shared-everything architecture platform is leveraging storage-class memory to improve latency, resilience and throughput, and quad-level cell (QLC) flash media. Its operations have been

mostly focused in North America. Over the past 12 months, VAST Data added replication, NFS4.1, SMB3, user quotas, immutable snapshots, multiprotocol and S3 versioning. VAST Data is best-suited for AI/machine learning (ML), financial analytics, life sciences and other large-scale performance-sensitive workloads.

Strengths

- **Architecture:** VAST's shared-everything platform architecture is attracting end users looking to modernize and consolidate their multipetabyte scale file and object deployments.
- **Efficiency at scale:** VAST's architecture is designed to deliver high-performance, low-latency storage at high scale while leveraging cost-effective QLC flash to lower overall cost of its all-flash platform.
- **Customer experience:** VAST end users highlight good presales and postsales support and customer service, and fast vendor response to the product improvement feature requests and bug fixes.

Cautions

- **Global coverage:** VAST has limited brand awareness and global reach, and lower customer count compared to the market leaders.
- **Edge:** VAST is not ideally suited for customers with smaller deployment sizes and small-scale capacity increments for ultra-low-cost general-purpose file systems.
- **Enterprise features:** The VAST product lacks certain enterprise features such as geodistributed erasure coding, ransomware detection, synchronous replication and public cloud integration.

WEKA

WEKA is a Visionary in this Magic Quadrant. WekaFS is a software-defined distributed file system that can be deployed on-premises through OEM server partners and in the public cloud, and includes a client tool for parallel access. The WEKA Data Platform was designed as an NVMe-based, I/O-intensive, low-latency distributed file system that can also extend to object storage in a single namespace on-premises, in the public or in the hybrid cloud. Its operations are mostly focused in North America and Europe. Over the past year, WEKA added cloud integration with Oracle and Google Cloud platforms, and autoscaling and snap to object capabilities to improve cloud DR. WEKA now supports QLC drives, added front-end object storage interface, and improved SMB stack performance and multitenant capabilities. WEKA is well-suited for AI/ML, financial analytics, life sciences and HPC deployments.

Strengths

- **Hybrid cloud:** WEKA attracts customers looking for flexibility to deploy hybrid cloud file services on commodity servers on-premises and as software-defined storage in the cloud.

- **Cost at scale:** WEKA's platform combines high-performance file services and lower-cost object storage to deliver on both price and performance customer requirements.
- **Performance:** Gartner clients are giving high grades to WEKA's file system performance as well as its ability to extend low-latency file services to the public cloud.

Cautions

- **Global coverage:** WEKA is one of the smaller vendors in this research, which results in limited brand awareness, traction and global reach, compared to the market leaders.
- **Use cases:** Gartner clients generally shortlist WekaFS for high-performance file use cases and not as a general-purpose file system or object storage.
- **Enterprise features:** WEKA is lacking some enterprise features (such as synchronous replication, nondisruptive upgrades, data reduction and NFS v4 production support). Also WEKA did not have production deployments in Azure cloud at the time of evaluation.

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

- VAST Data
- Cohesity

Dropped

No vendors were dropped.

Inclusion and Exclusion Criteria

To qualify for inclusion, vendors must meet all of the following requirements:

- Revenue: above $15 million of recognized product revenue over the last four quarters (as of May 2022) for the distributed file systems and/or object storage solutions between 1 May 2021 and 30 April 2022 **and** should have at least 100 production customers each consuming more than 500TB raw capacity through either distributed file or object storage protocols only. Vendors must provide reference materials to support this criterion.
- The product must be in production use in at least three (out of four) major geographies. Vendor will provide evidence of a minimum of 25 production customers brought to revenue in each of the

three geographies (North America, EMEA, Asia/Pacific and South America). This requires proof in the form of a confidential list of representative customers from diverse geographies (25 customers of at least 500TB each in each of three geographies). If vendors could not share customer names, they could be anonymized as “large manufacturing company” or “small service provider.”

- The product should be deployed across at least five out of the seven use cases that are outlined in **Critical Capabilities for Distributed File Systems and Object Storage**. Vendors must provide reference materials to support this criterion.
- The product must be designed for primarily on-premises workloads and not as a passthrough solution where data will be permanently stored elsewhere.
- Product should not be offered exclusively as-a-service offering.
- The vendor should own the storage software intellectual property and be a product developer. If a product is built on top of open-source software, the vendor must be one of the top 10 active contributors to the community (in terms of code contribution over the last 12 months).
- The vendor should not rely on another third-party company’s product to be commercially usable in a production environment.
- The vendor must have a product including features and capabilities generally available before 5 April 2022 that meet the following criteria.

Packaging:

- Product must be sold as either an appliance or software-based storage solution.
- Product must be available for purchase and consumed as a stand-alone file and/or object storage only product and not as part of an integrated, converged or hyperconverged system with compute and hypervisor bundle.

Product capabilities:

- Product must have file and/or object access to the common name space/file system.
- Product must have a fully distributed architecture where data and metadata are distributed, replicated or erasure coded over the network across multiple nodes in the cluster.
- Product must have the ability to handle disk, enclosure or node failures in a graceful manner without impacting availability.
- Product must have a single file system capable of expanding beyond 500TB.

- Product must have a global namespace capable of 2PB expansion.
- Product must have a cluster that spans more than four nodes.
- Product must have support for horizontal scaling of capacity and throughput in a cluster mode or in independent node additions with a global namespace/file system.

Note: A fully distributed architecture is a distributed computing architecture in which each node is independent and self-sufficient, and there is no single point of contention across the system. More specifically, none of the nodes share memory or disk storage. People typically contrast distributed design systems with systems that keep a large amount of centrally stored state information, whether in a database, an application or metadata server, or any other similar single point of contention.

Evaluation Criteria

Ability to Execute

We analyze the vendor's capabilities across broad business functions. Ability to Execute reflects the market conditions and, to a large degree, it is our analysis and interpretation of what we hear from the market. Gartner analysts evaluate vendors on the quality and efficacy of the processes, systems, methods and procedures that enable IT provider performance to be competitive, efficient and effective, and to positively impact revenue, retention and reputation within Gartner's view of the market.

Table 1: Ability to Execute Evaluation Criteria

Evaluation Criteria ↓	***Weighting*** ↓
Product or Service	High
Overall Viability	High
Sales Execution/Pricing	Medium
Market Responsiveness/Record	High
Marketing Execution	Low

Evaluation Criteria ↓	Weighting ↓
Customer Experience	High
Operations	Low

Source: Gartner (October 2022)

Completeness of Vision

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

Table 2: Completeness of Vision Criteria

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

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

Source: Gartner (October 2022)

Quadrant Descriptions

Leaders

Vendors in the Leaders quadrant have the highest scores for their Ability to Execute and Completeness of Vision. A vendor in the Leaders quadrant has the market share, credibility, and marketing and sales capabilities needed to drive the acceptance of new technologies. Market leaders will typically be able to execute strongly across multiple geographies with products that cover both distributed file systems and object storage offerings. They will also have consistent financial performance, broad platform support and flexible deployment models. Leaders are strategic vendors that are well-positioned for the future, having established multiyear success in meeting the needs of unstructured hybrid cloud IT data services.

Challengers

Challengers are typically vendors with proven global presence and market achievement that only target a narrower subset of the market, or have not yet established themselves across the broader market for both the distributed file system and object storage areas. They have strong products as well as sufficient credible market position and resources to sustain continued growth in the future; however, they currently fall behind on influence and thought leadership for this market segment.

Visionaries

Visionaries are typically vendors that are focusing on strong innovation and product differentiation, but are smaller vendors with limited reach or achievement to date, or larger vendors with innovation programs that are still unproven. A vendor in the Visionaries quadrant delivers innovative products that address operationally or financially important end-user problems on a broad scale, but has not demonstrated the ability to capture market share or sustainable profitability.

Niche Players

Niche Players may be vendors that address the distributed file system or object storage market more narrowly than other vendors. Or they may be vendors with market programs that have not yet established their differentiation and/or execution ability. However, Niche Player vendors may address their specific market category and excel by focusing on specific market or vertical segments.

Context

This Magic Quadrant assesses vendors that sell products for unstructured data growth for enterprise data centers. The distributed file system and object storage market emerged as a response to the tremendous increase in unstructured data generation that is fueled by new business requirements. To address it, the storage platform has to be based on a scale-out software approach to enable seamless data growth with a strong emphasis on long-term data efficiency for cost optimization. I&O leaders seek distributed scale-out storage products to build new platforms based on software-defined approaches. This is where performance comes from hardware innovation of a commodity hardware layer, and data durability and availability come from a scale-out software layer where data is distributed across multiple nodes.

Across many products in this market, vendors are providing appliances, software-only products and preintegrated storage systems to fit the needs of the different deployment strategies of enterprise end users. In addition, some of those products are enabling hybrid cloud workflows and being deployed in public cloud IaaS.

As the distributed file system and object storage market matures, storage software and hardware vendors are expanding their product portfolios to provide more differentiated and agile offerings. New consumption models and procurement offerings are emerging to provide end users with different ways to purchase storage. Advances in software technology and commoditization of the hardware will make it possible for I&O leaders to enjoy web-scale economics and scalability of the storage platform for unstructured data growth.

Market Overview

The markets for distributed file systems and object storage have merged. For that reason, Gartner publishes a single Magic Quadrant on the combined technology segments. The distinctions between the two segments are blurring, and buyers are already treating it as one market and requiring both file and object access for unstructured datasets. To address it, the most innovative vendors now offer file and object services on a common data store, typically a key-value store. This is in contrast to using an access-protocol-based gateway on top of a file system or object storage.

I&O leaders often decide between public cloud and on-premises infrastructure for given workloads. Organizational culture and sensitivity to security and governance mandates are typically the leading factors that enterprises consider when deciding whether to move applications and data to the public cloud or to keep them on-premises.

When customers choose to keep applications and data on-premises, they are increasingly choosing between object storage and file system products to accommodate the large sets of unstructured data. In many cases, customers seeking solutions in this market would be better-suited with a single product that has file and object services, so workloads can seamlessly interact with data using the most appropriate protocol for the specific task and environment:

- **Startups and innovation:** Formerly risk-averse enterprises have become receptive to buying from storage startups that are using clean-sheet designs and a wealth of knowledge to build more efficient systems. This is illustrated by the popularity of products such as solid-state arrays, hyperconverged infrastructure, distributed file systems and object storage. Many large incumbent vendors are repositioning their distributed file systems for emerging AI workloads, while we are also seeing several emerging vendors tackling the performance, scale and deployment flexibility improvements required for large-scale training and inference AI/ML workloads. Hyperconverged solutions are moving forward and replacing traditional network-attached storage deployments, while also offering a single platform for multiple data service needs.

- **Choice in deployment:** The vendors in the market for distributed file systems and object storage are offering mixed deployment options to give customers choices in how they deploy infrastructure. Common deployment options include turnkey high-density appliances or software-only options that can be deployed either on bare-metal industry-standard hardware as virtual machines or on Docker containers. Increasingly, vendors in this market are offering their products as SDS precertified to run on x86 industry-standard hardware.

- **Choice in business model:** I&O leaders are now looking for flexible acquisition and management scenarios and starting to consider vendor-managed cloud-based storage as a service (STaaS) and its benefits as a replacement for owned, on-premises storage infrastructure. Some vendors are starting to promote file and object STaaS products to provide a viable option for cloud-native benefits, along with hardware life cycle management from which IT can centrally manage. In STaaS models, vendors take responsibility for administration, maintenance and support, further addressing risk for lack of IT storage experts

- **Amazon S3 API standardization:** The current object storage segment can be thought of as a two-sided market: There are providers of object storage protocols and consumers of these protocols consisting of applications. There were more providers than consumers until the Amazon S3 API became the de facto standard for object storage. Vendors deploying object storage platforms in enterprise data centers adopted Amazon S3, a protocol mainly used in the public cloud, because of the developer community that formed around it. Now many consumers and providers are using Amazon S3. The object storage market is finally in equilibrium. Interest in using public cloud services such as AWS has brought customer awareness to the object storage market. Software developers building Mode 2 web and mobile applications are sometimes asked to repatriate these applications back to enterprise data centers. Enterprise IT seeks control of applications and data,

while software developers seek novel and efficient ways of programmatically interacting with infrastructure. The market for on-premises object storage products solves both of these.

- **Hybrid cloud storage:** The current unstructured storage market is evolving to embrace hybrid cloud workflows and capabilities as IT leaders are looking to take advantage of public cloud agility, efficiency and cloud computing capabilities. In 2022, Gartner saw more evidence of vendors not just adding tiering to the public cloud, but also enabling new use cases to leverage public cloud for rendering and analytics, and enabling application data bidirectional sharing between on-premises and public cloud locations. In addition, many vendors are working to deploy their software in the public cloud to enable business continuity and standardization of data services on-premises or in the public cloud.

- **Cyber resilience:** Most ransomware attacks target unstructured datasets making centralized storage solutions an attractive target for encryption and/or data exfiltration of large amounts of data. Traditional storage systems are not equipped to prevent data exfiltration or manipulation, as they rely on solutions outside of the storage domain. New cyber storage capabilities embedded with distributed file systems and object storage platforms are now required to identify, protect, detect, respond to and recover from ransomware attacks on unstructured data storage solutions.

Evidence

Placement on the Magic Quadrant for Distributed File Systems and Object Storage is based on Gartner's view of a vendor's performance against the criteria noted in this research. Gartner's view on vendor placement on the Magic Quadrant is heavily influenced by more than 1,000 inquiries and one-on-one meetings with Gartner clients regarding object storage and distributed file system solutions, conducted since the publication of the last iteration of this Magic Quadrant. Gartner also utilizes worldwide end-user surveys, Gartner conference session polling data, Gartner Research Circle polls and Gartner Peer Insights. The included vendors submitted comprehensive responses to Gartner's Magic Quadrant survey on this topic. Vendors' responses were used as the basis for subsequent vendor briefings and follow-up meetings, product demonstrations, and correspondence.

Additionally, this research drew input from other Gartner analysts, industry contacts and public sources, such as U.S. Securities and Exchange Commission filings, articles, speeches, published papers and public domain videos.

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.