Vendor Profile

Nexenta's Success Mirrors That of the Burgeoning Software-Defined Storage Platform Market

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IDC OPINION

The software-defined datacenter (SDDC) is a concept whose time has come. With most environments today built around what IDC refers to as 3rd Platform computing – IT infrastructure based around virtual computing, flash, and cloud technologies and targeting the demands of massively scalable mobile, social media, big data and analytics, and cloud applications – the SDDC delivers the agility, functionality, and lower cost these environments require. At the core of the SDDC is software-defined storage (SDS), a flexible enterprise storage infrastructure that leverages the agility of virtualized resource allocation, management, and reclamation to meet extremely dynamic business requirements. Further:

- To meet the requirements of 3rd Platform computing, new architectures that deliver flexibility and much lower cost than legacy storage solutions have become commonplace. Storage management functionality is increasingly becoming decoupled from proprietary high-margin hardware platforms and moving to commodity hardware, and more and more of the value in storage solutions is migrating to software. Decoupling enterprise storage management functionality from the underlying hardware meets a number of different 3rd Platform requirements: it enables the use of different storage (block, file, object, internal/external, and hyperconverged) to accommodate 3rd Platform data types, offers storage pooling across heterogeneous storage resources, and allows newer storage technologies like tiering, thin provisioning, space-efficient snapshots and clones, inline data reduction, encryption, replication, and other enterprise data services to be consistently applied across the heterogeneous storage hardware that most datacenters have today.
- Nexenta was one of the earliest entrants in the SDS space with its massively scalable NexentaStor offering in 2008. Since then, the company has amassed significant momentum, primarily replacing aging monolithic storage platforms with a much more flexible and lower-cost alternative, and built out its product portfolio to offer a comprehensive suite of block-, file-, and object-based storage solutions that clearly meet enterprise requirements. These types of solutions form the storage foundation for the SDDC that IDC believes will become the platform of choice in mainstream virtualized computing. 3rd Platform computing infrastructures demand agility. VMware proved out the value of resource virtualization on the compute side with vSphere, and vendors like Nexenta are enabling that same flexibility in storage with their SDS offerings.

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IN THIS VENDOR PROFILE

This IDC Vendor Profile examines Nexenta, an SDS solution providing unified block-, file-, and object-based storage as a storage foundation for the SDDC and a much lower-cost alternative to traditional network-based enterprise storage offerings. The document discusses the SDDC, reviews and analyzes key trends in this market today, and evaluates Nexenta's strategy and solution offerings in this space.

SITUATION OVERVIEW

When VMware introduced x86-based server virtualization, organizations discovered the value that software-defined virtual machines (VMs) could bring to the datacenter. Compute resources could be quickly allocated from a pool to create new VMs, and those resources could just as quickly be reclaimed and reallocated to other uses. The server consolidation and compute efficiencies that this enabled made for much better and more flexible use of computing resources, and it was not long before vendors began to look to provide the same provisioning model for other resources like storage and network. The idea of the SDDC was born and promised to deliver maximum agility and efficiency in resource allocation to meet the new era's much more dynamic business requirements.

With its better agility and efficiency, the new SDDC infrastructure stands in stark contrast to the older, much more rigid client/server architectures that dominated an earlier era. Today's 3rd Platform computing era, dominated by the needs of mobile computing, social media, big data and analytics, and cloud, is built on virtual infrastructure that heavily leverages flash and cloud technologies. Datacenters are coping with explosive data growth rates; data types that include structured, unstructured, and semistructured data; an increasing requirement for extremely high availability and fast recovery; and the need to respond rapidly and cost effectively to changing business conditions.

At the heart of the SDDC is SDS. The monolithic storage architectures of the past do not deliver the performance, flexibility, or cost profile demanded by 3rd Platform computing, and they have slowly given way to newer architectures that are much better at meeting those requirements. These new architectures are often built around scale-out designs and include not only shared storage solutions that leverage newer storage technologies like flash but also hyperconverged designs where compute, storage, and networking capabilities are colocated in each node. Customers are increasingly looking toward solutions built around cost-effective commodity hardware as opposed to proprietary hardware. At the same time, more and more of the value of enterprise storage solutions is migrating toward software. Both trends help meet the need for flexibility while at the same time keeping costs down.

Over the past several years, storage management responsibilities have been migrating more toward IT generalists. These resources have server and application management expertise but are less well versed in the intricacies of classic storage management. At the same time, these administrators are being asked to manage more storage capacity than ever before. Part of what is driving the increasing move to SDS is that, because it is decoupled from specific hardware, storage management processes can become more aligned with applications and business processes, not only enabling more intuitive management but also leveraging comprehensive automation that can help increase the administrative span of control.

IDC defines SDS as any storage software stack that can be installed on any commodity off-the-shelf hardware and used to offer a full suite of storage services, including federation between the underlying persistent data placement resources to enable mobility of its tenants between these resources. SDS requires no specialized hardware such as custom ASICs but must instead be based on commodity hardware. The industry's leading SDS offerings are proving effective replacements for legacy storage platforms for tier 2 and tier 3 workloads, and IDC expects to see the more innovative vendors begin to pursue selected tier 1 workloads as well. By consolidating multiple workloads onto a single platform that meets enterprise requirements for performance, scalability, reliability, security, and management, organizations can take advantage of economies of scale to make much more efficient use of not only existing hardware and software (capex) but also administrative resources (opex).

Given the increasing use of SDS solutions to replace older enterprise storage solutions, IDC has defined the SDS-P market. The SDS-P market is growing at double-digit rates, is composed of four main segments — block, file, object, and hyperconverged — and will be a $2.8 billion market in 2017. Multiple deployment models exist in this market — solutions can run on x86 servers with either internal or external disk where external disk can be JBODs or shared storage arrays of any kind. Most enterprises have storage hardware platforms from at least several vendors, and SDS helps put the management of all of those devices under a single, centralized interface. Different storage media types abound, with most enterprises today using flash and spinning disk. Many enterprises still have tape in the mix, and more and more enterprises are adding cloud storage to their infrastructure. In the SDS model, the software determines the storage functionality, allowing different types of storage to be amalgamated under a single management interface and given a consistent set of enterprise storage management functionality.

The SDDC, enabled by maturing SDS-P offerings, is slowly becoming a reality. Enterprises understand their need for flexibility and clearly see how SDS enables that, but they want to make sure that these platforms meet their enterprise storage requirements in the areas of performance, availability, reliability, scalability, security, and manageability before they start moving critical corporate application services onto them. Ultimately, however, the use of commodity hardware will become the rule for most general-purpose application environments, and software will be where most of the value resides. The economics of this model can be extremely compelling.

Meeting Enterprise Requirements

SDS solutions targeted at tier 2 and 3 environments needed to provide massive scalability, data reduction that would reduce the effective dollar per gigabyte of these environments, data protection to ensure that data could be reliably stored for long periods of time, encryption to provide security, and management features that were generally necessary for backup, disaster recovery, archive, content repository, and other secondary storage environments. But when they step up to directly challenge the enterprise storage workhorses of record in primary application environments, there were additional capabilities in the areas of performance, availability, reliability, and manageability that needed to be addressed.

The performance requirements of primary applications in 3rd Platform computing environments demand flash, and SDS solutions must not only accommodate the use of flash but make optimized use of it in conjunction with spinning disk. The ability to define storage tiers and associate them with particular applications is critical. Other performance-enhancing approaches like intelligent caching, the

use of intent logs, and snapshot and clone implementations that scale without performance degradation are important in these environments. Systems must be highly available, implementing features like dual controller architectures, efficient approaches to data redundancy at scale, automatic failover, rapid recovery in the event of device or node failures, online expansion and reconfiguration, and multisite replication to enable disaster recovery configurations.

Data reduction methods should make efficient use of RAM and flash media so that they can be in line without unduly impacting storage latencies. Algorithms to support the reliable storage and movement of data without errors are critical. And around all of this must be a management interface that enables intuitive administrative operations for tasks like provisioning, workflow definition and execution, monitoring, troubleshooting, and resource reclamation.

Ease of Deployment and Management

Most commercial enterprises prefer to buy off-the-shelf solutions when they can, as this simplifies deployment, support, and the evolution of products to add new features. In many organizations, virtual administrators are taking on more of the management responsibilities for other resources that can be defined in software and are running on virtual infrastructure like storage and networking. These administrators are very comfortable managing at the VM and application level when performing operational tasks. The use of provisioning templates can help make provisioning faster, easier, and more reliable in these environments. Automation can also improve reliability while at the same time increasing the administrative span of control of any operators, regardless of their level of expertise. The best SDS-P solutions include analytics and orchestration capabilities that make it easy for them to fit into preexisting datacenter workflows but also accommodate new ones.

Particularly in the areas of purchase, deployment, and support, an effective channel-based go-to-market strategy helps combine the economics of SDS platforms running on commodity hardware with the turnkey ease of deployment and support that were very attractive aspects of the integrated solutions sell. SDS building blocks can form the high-performance, scalable core of any number of vertically integrated solutions, making it very easy for channel partners to use them as a foundation for any number of different offerings. Channel partners with specific vertical market expertise can easily craft their own integrated solutions, maintaining the economics of a software-based solution while providing a simple, single point of contact for purchase, deployment, and ongoing support.

Company Overview

Nexenta was founded in 2005 by Alex Aizman and Dmitry Yusupov and based around a vision that the future of enterprise computing would be "software defined." The storage platform for that future would be a software-defined layer, complete with enterprise-class performance, availability, reliability, and scalability, running on commodity x86-based server hardware and exhibiting price points significantly lower than the monolithic hardware-based storage architectures of the past. The objective is to produce solutions that scale with today's datacenter workloads, can run on any x86-based server hardware, and provide a nondisruptive and evolutionary growth path to bridge the business transition from hardware-defined to software-defined datacenters.

Prior to Nexenta, Aizman and Yusupov had created the iSCSI stack that was accepted into the Linux kernel earlier in mid-2005. Nexenta has been through four rounds of funding, with a total of $54 million investment from various venture capitalists including Silicon Valley's Menlo Ventures and Sierra Capital. Nexenta, a privately held firm headquartered in Santa Clara, California, has offices in both EMEA and APAC and has roughly 250 employees. Nexenta has roughly 6,000 customers worldwide. Roughly 60% of them originally purchased Nexenta to provide more scalable and performant NFS services and 40% of them to provide FC/iSCSI-attached block storage, although a good percentage of customers now use the Nexenta platform as a unified data store. On this customer base, Nexenta has more than an exabyte of capacity deployed with its software. Throughout its history, Nexenta has often been purchased to replace aging NetApp infrastructure. NexentaEdge, the scale-out object storage platform, was announced in August 2014 and will GA early 2015.

The core product, NexentaStor, delivers unified block- and file-based storage using a pure software model, but since initial shipments in 2009, the portfolio has expanded to include NexentaEdge (object storage), NexentaConnect (a suite of vertically integrated enhancements for cloud, VDI, and virtualized infrastructure), and NexentaFusion (software-defined storage analytics and orchestration). These products are all integrated and managed under a single, unified interface that can be standalone or integrated into VMware vSphere. The scale this unified platform can achieve has been proven by commercial customers like Korea Telecom that use it to manage their entire cloud storage infrastructure, a data store that exceeds 100PB in size.

Company Strategy

During initial development, Nexenta chose open source ZFS to provide the core of the software platform. The choice of ZFS provided a mature, enterprise-ready platform that already included many of the performance, availability, and reliability features that datacenters required. Nexenta then selectively enhanced the open source platform over time to provide other desired features. The company has been very successful selling its platforms for use in tier 2 and tier 3 application environments such as backup, disaster recovery, and archive, but they are also used in tier 1 environments like VDI. Once flash became a media option in ZFS' Hybrid Storage Pools, more customers began to use Nexenta for tier 1 environments, and over time, usage is expected to expand more into these types of primary storage environments.

Nexenta developed into primarily a channel play, although a small direct sales force does work on particularly large accounts. Early on in the company's life, Nexenta worked with partners that had significant leeway to create any solution they liked based around Nexenta's portfolio products — these were called "certified solutions." More recently, the company began to work with Dell, HP, Supermicro, and others to define more repeatable reference architectures to help provide guidelines for Nexenta-based solutions sold in the channel. Within the past year or so, Nexenta has been working to provide integrated solutions, assembled by the channel partners and built around the Nexenta platform, that provide the same ease of purchase, deployment, and support that hardware-centric products offered but with the economic benefits that are central to the SDS value proposition. This strategy has clearly made Nexenta more competitive against hardware-centric offerings that have a much higher cost and often do not provide the breadth of functionality that Nexenta does.

Recently, Nexenta has also started to deliver software modules for its NexentaStor platform that are targeted for use with specific applications and/or environments. NexentaConnect is a suite of software solutions that utilize the core software technologies of NexentaStor to effectively create a larger vertical storage software stack that is specifically integrated into selected application environments to deliver more cost-effective and feature-rich storage options. The NexentaConnect products deliver higher performance, better storage efficiencies, and easier management for these environments. Options include NexentaConnect for VMware Horizon, NexentaConnect for Citrix XenDesktop, and NexentaConnect for VMware Virtual SAN.

The Nexenta Product Family

Although the Nexenta product family is essentially a very scalable, high-performance, and enterprise-ready SDS-P offering, the value proposition for organizations is that it is the storage enabler for the SDDC. Block, file, and object stores, hosted on either local or remote storage from various vendors, can be centrally managed with a full set of enterprise functionality that includes efficient data integrity protection; built-in data redundancy; automatic failover and recovery; storage tiering; thin provisioning; space-efficient, scalable, and high-performance snapshots and clones; inline data reduction including both compression and deduplication; 256-bit AES-compliant encryption; and replication. Support for critical APIs enables close integration with key hypervisor and application platforms, such as VMware vSphere, VMware Horizon View, and Citrix XenDesktop, and allows the easy deployment of efficient, pure SDS solutions that mesh easily with preexisting datacenter workflows.

NexentaStor, Nexenta's original and flagship SDS-P, provides foundational block (FC and iSCSI) and file (NFS and SMB) services for the SDDC. Scalable from tens of terabytes to petabyte-plus configurations, NexentaStor delivers all the performance, availability, and reliability of ZFS, including ZFS Hybrid Storage Pools that combine DRAM, SSDs, and HDDs into a pooled storage medium across x86 nodes. Adaptive replacement cache (ARC) lives in DRAM and uses a resilient write-back cache to deliver memory performance for writes and works intelligently with level 2 ARC and the ZFS Intent Log, both hosted on SSDs, to deliver extremely high performance for most read and write I/O. HDDs are managed in a lower tier to provide very cost-effective capacity in large-scale environments. Each of these is intelligently managed as a whole to provide high performance while keeping blended system-level dollar-per-gigabyte costs low. NexentaStor supports all-flash configurations if customers require them, but most installations use hybrid configurations.

Data protection in NexentaStor is provided by RAID-Z, a data redundancy scheme built and optimized for massively scalable environments. ZFS resilvering quickly rebuilds the data from failed drives with minimal data movement, and a similarly optimized scheme for new RAID set creation makes initialization almost instantaneous. ZFS ensures that data is always consistent on disk by never modifying data in place. A copy-on-write (COW) technology is used extensively within ZFS, and writes are always executed as atomic operations to help ensure extremely high data integrity. ZFS checksums are present in every data and metadata block, used to continuously validate data integrity, and provide transparent repair of any bad blocks that are discovered. COW is used in snapshot, clone, and replication operations as well as for improved efficiencies.

NexentaEdge is a scale-out block and object storage solution that offers real-time dynamic optimization of performance and capacity utilization and ZFS-grade end-to-end data integrity and scales to hundreds of petabytes. Object storage organizes data into containers with a unique identifier that allows retrieval without knowing the physical location of the data it contains. Object storage is better than NAS for handling large unstructured data sets used in medical images, movies/videos, photo libraries, scanned legal documents, CAD/graphic designs, media and entertainment assets, and cloud storage. NexentaEdge provides support for the iSCSI block protocol and Amazon S3 and OpenStack Swift object APIs. Supporting block and object on the same infrastructure makes NexentaEdge particularly well suited to serve as a hyperscalable OpenStack and CloudStack storage back end.

NexentaEdge also provides global inline compression and deduplication that can result in significant cost savings in the highly reducible workloads common in 3rd Platform computing. The ability to provide inline deduplication of all data enables NexentaEdge to provide extreme capacity savings when it is used to store thousands of virtual machine boot or virtual desktop images. Certain application environments benefit more from compression, while others benefit more from deduplication, but the combination of the two will generally always result in a lower effective dollar per gigabyte than either one by itself. For this reason, it is important that SDS-P solutions offer both compression *and* deduplication.

The *NexentaConnect* suite of software solutions includes three vertically integrated options today. *NexentaConnect for VMware Horizon* integrates with Horizon View APIs like VCAI to provide simple, efficient virtual desktop provisioning and leverages a combination of Nexenta's write logging, inline data reduction (compression and deduplication), and local SSDs to increase desktop density per host for stateless desktops based on VMware Horizon View. *NexentaConnect for Citrix XenDesktop* is designed to work with Citrix Machine Creation Services (MCS) to deliver the same efficiency, performance, and density benefits. For users of Citrix Provisioning Server (PVS), NexentaStor can be used as an ideal primary storage platform and allows PVS to take advantage of the advanced caching of NexentaStor. *NexentaConnect for VMware Virtual SAN* enables the simple addition of scalable, high-performance NFS and SMB file services to a Virtual SAN while continuing to manage everything through the VMware vSphere Web Client interface. NexentaConnect products can be deployed using shared network storage or on hyperconverged configurations. The vertical integration inherent in these offerings provides ease of deployment and ongoing management with significant cost savings over conventional alternatives.

NexentaFusion provides unified, policy-based management across the entire Nexenta portfolio, and in 2015, will also extend this to non-Nexenta products. It provides single-pane-of-glass management for all storage services; simple, policy-based storage provisioning that offloads data placement decisions from already overworked administrators; a flexible, dynamic rules engine for real-time event monitoring and alert generation; multilevel data aggregation; and predictive analytics to proactively handle risk areas, and it is multitenant ready.

Nexenta OEM and channel partners provide sales and deployment services for fully integrated "appliance"-based solutions that include hardware and software and offer level 1 and 2 support for the integrated platforms they sell based on Nexenta solutions. Nexenta handles level 3 support requirements for these environments.

FUTURE OUTLOOK

Virtualization has become the IT infrastructure platform of choice at this point, and this is driving enterprises to evaluate software-defined models for all resources. The SDDC offers compelling flexibility, functionality, and economics that the hardware-centric approaches of the past just can't, and the power and scalability of commodity x86-based hardware make delivering pure software-based enterprise-class solutions for all application tiers a very viable and attractive future.

Platforms like Nexenta's have already proven they can provide a solid enterprise storage alternative to legacy offerings, with savings that are generally in the 60–70% range. Most of these savings come right up front from not having to pay for premium-priced proprietary hardware platforms. While Nexenta has enjoyed considerable success being deployed with tier 2 and tier 3 application environments, customers are also using Nexenta in tier 1 application environments like VDI and high-performance databases. With the unified storage support, massive scalability, and the very complete set of enterprise data services that Nexenta offers, including thin provisioning, inline data reduction, intelligent storage tiering, snapshots, clones, encryption, and replication, the company will likely be pursuing more tier 1 application business.

IDC expects that, as a group, SDS-P vendors will attempt to pursue this approach. As legacy storage platforms need to be refreshed, many of them will be replaced by SDS-P offerings, and IDC expects this market to continue to outgrow the overall storage market over at least the next five years. Many of the major enterprise storage players have given up trying to generate concern about these newer designs and have entered the market with their own offerings, often through acquisition. These types of platforms have an advantage in supporting virtualization, flash, and cloud — the foundation technologies of the 3rd Platform — and clearly offer a better cost model. The most successful SDS-P players will be the ones that develop rock-solid reputations for massively scalable platforms that can be cost effectively configured to support both primary and secondary storage applications at the same time.

ESSENTIAL GUIDANCE

Nexenta is arguably one of the very first SDS vendors in the industry. Its delivery model has evolved, as the industry itself has changed, to today provide a well-integrated solution available from OEM and channel partners that rivals the ease of purchase, deployment, and support of higher-priced, hardware-centric offerings with a much lower price point. The big differentiator for Nexenta, as well as for other SDS-P vendors, is its ability to produce enterprise-class storage solutions based around commodity x86 servers and various storage architectures at much lower price points. Most of these vendors initially targeted tier 2 and 3 applications, as well as test and development environments, but vendors are hungrily eyeing business opportunities with tier 1 applications. Given their backgrounds, understanding the unique requirements of mission-critical applications may not be in the DNA of many of these vendors, but to be successful in this new market, they will have to not only understand the requirements but meet them with robust capabilities.

IDC market estimates indicate that the secondary storage markets are three to four times the size of primary storage markets. There are many SDS-P vendors pursuing secondary storage market opportunities, but not nearly as many have the capabilities to directly address primary storage requirements. SDS-P offerings pursuing primary storage markets with the required feature sets will have two very strong advantages to bring to bear against their legacy but proven enterprise storage platform competitors in that market: their ease of management and consistent data services feature set across heterogeneous environments and their much lower price point. Still, SDS-P vendors should understand their capabilities and their market opportunities in each of these areas — primary and secondary storage — as they plan out their future product and sales strategies. Clearly, a platform that is equally capable at simultaneously handling the requirements of primary and secondary applications will be more attractive than one that is just limited to one of those markets. As the industry continues to evolve away from and replace client/server computing designs and architectures, consolidation onto newer, more cost-effective architectures will be a strong trend in the industry.

Advice for Nexenta

The ease of purchase, deployment, and support of integrated solutions is a strong draw for IT shops tasked with responding quickly in today's dynamic business environment and in general doing more with less. Nexenta's move away from its "do it yourself" past to the integrated solutions that its channel and OEM partners now offer has proven to be a very smart strategic move. As Nexenta moves forward, it should create more of these solutions with OEM and channel partners and look for opportunities to provide even more complete SDS-P solutions that leverage the NexentaConnect products in select vertical markets.

A critical factor in Nexenta's success will be to continue to provide support for, and leverage with optimizations where possible, new commodity hardware capabilities with respect to device and connection type. For example, this might include providing quick support for features like 16Gb FC and 40GbE and tiering capabilities that can take advantage of memory channel storage solutions (based on flash) that are just starting to come to market now.

Nexenta is a relatively recent entrant into the object storage market with its NexentaEdge product. At this early stage of its life cycle, it is necessary to obtain key large, bellwether references that have worldwide brand recognition. Ultimately, most organizations will be faced with managing large data sets that include structured, unstructured, and semistructured elements, and not all vendors can offer a single, unified platform to do that. Common management capabilities across large, unified data stores can bring considerable efficiencies into the associated administrative operations, and this is an advantage that not all SDS-P vendors can bring to the table. Nexenta's largest customer, Korea Telecom, should clearly be a target of this platform if it is not already a user. Nexenta should also explore the object storage plans of its other extremely large customers.

Nexenta should keep a critical eye on how open source environments like OpenStack and CloudStack evolve. Nexenta already provides support for KVM (in addition to VMware vSphere, CitrixXenServer, and Microsoft Hyper-V), but continuing to enable its customers to make better, more efficient use of open source technologies will be a good strategic investment as more global organizations seek to leverage open source to replace aging and costly proprietary offerings over time. Nexenta should look to provide support for a wide range of popular block, file, and object APIs for these open source environments.

Finally, Nexenta may wish to consider targeting service providers more closely. Enabling a unified storage platform with good multitenant management capabilities can make it very attractive to service providers that are clearly already grappling with the issues of storage management at massive scale. SDS-P offerings can make great building blocks. This business development opportunity may put them more in the role of an original "device" manufacturer with respect to these types of customers, but if Nexenta's "off the shelf" option provides the functionality they require, it is a much more simple to deploy solution and much lower cost with much faster time to market than building such an environment yourself.

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Related Research

- *Software-Defined Storage with HyperDup Data Services from Atlantis Computing May Change the Industry* (IDC #253058, December 2014)
- *Scality Significantly Increases Market Opportunities by Adding A Commercial Market Focus* (IDC #252865, December 2014)
- *Worldwide File- and Object-Based Storage 2014-2018 Forecast* (IDC #251626, October 2014)
- *IDC's Worldwide File- and Object-Based Storage Taxonomy, 2014* (IDC #245940, January 2014)
- *IDC QuickPoll: Trends in File and Object-Based Storage Environments* (IDC #245090, December 2013)
- *IDC MarketScape: Worldwide Object-Based Storage 2013 Vendor Assessment* (IDC #244081, October 2013)

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