

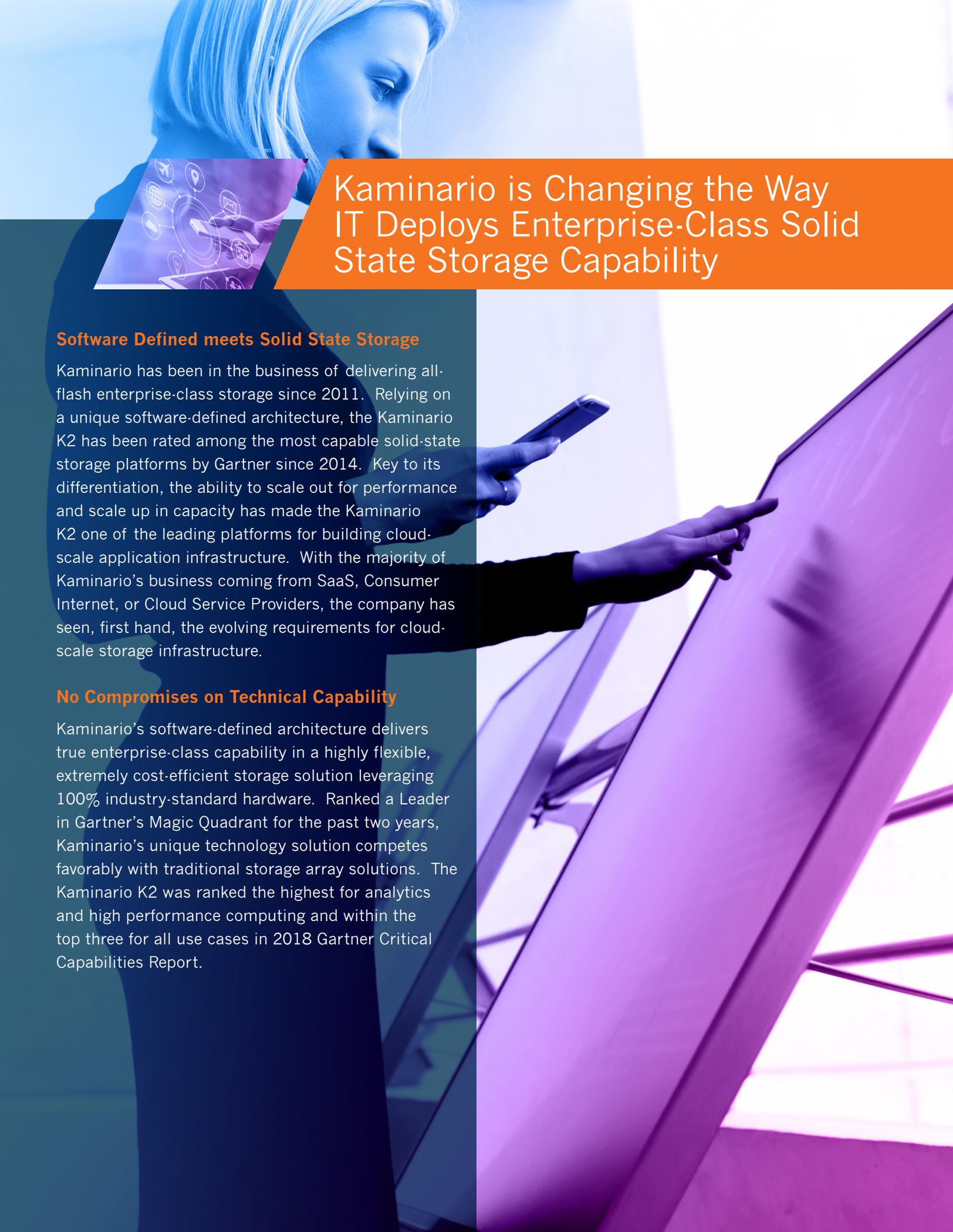
September 2018

Welcome to the Age of Composable Infrastructure

Kaminario unveils software-defined, composable storage solutions for the modern datacenter.

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Kaminario is Changing the Way IT Deploys Enterprise-Class Solid State Storage Capability

Software Defined meets Solid State Storage

Kaminario has been in the business of delivering all-flash enterprise-class storage since 2011. Relying on a unique software-defined architecture, the Kaminario K2 has been rated among the most capable solid-state storage platforms by Gartner since 2014. Key to its differentiation, the ability to scale out for performance and scale up in capacity has made the Kaminario K2 one of the leading platforms for building cloud-scale application infrastructure. With the majority of Kaminario's business coming from SaaS, Consumer Internet, or Cloud Service Providers, the company has seen, first hand, the evolving requirements for cloud-scale storage infrastructure.

No Compromises on Technical Capability

Kaminario's software-defined architecture delivers true enterprise-class capability in a highly flexible, extremely cost-efficient storage solution leveraging 100% industry-standard hardware. Ranked a Leader in Gartner's Magic Quadrant for the past two years, Kaminario's unique technology solution competes favorably with traditional storage array solutions. The Kaminario K2 was ranked the highest for analytics and high performance computing and within the top three for all use cases in 2018 Gartner Critical Capabilities Report.

Figure 1. Magic Quadrant for Solid-State Arrays¹



Source: Gartner (July 2018)

The Composable Storage Paradigm

Kaminario is committed to the vision of delivering composable storage solutions that deliver a new level of flexibility and control to SAN storage infrastructure. Unlike traditional scale-up or scale-out storage arrays, Kaminario can scale in any direction. This lets IT organizations optimize their storage infrastructure for the specific performance, capacity, and cost-efficiency needs of their application. This highly flexible software

architecture leverages standard hardware building blocks that can be easily scaled-up, scaled-out, scaled-down, or scaled-in as business needs dictate.

Enterprise-class Data Services

While highly differentiated in its delivery model, Kaminario delivers true enterprise-class data services demanded by world-class IT organizations. Highly efficient data reduction, native replication utilities,

¹ Gartner's Magic Quadrant for Solid-State Arrays G00338339, Analyst(s): Valdis Filks | John Monroe | Joseph Unsworth | Santhosh Rao, 23 July 2018

robust integration support, and true enterprise-class availability put Kaminario in the same class of solutions as traditional storage arrays.

In addition to the rich data services, Kaminario also delivers the unique ability to support mixed workloads and deliver consistent low latency for a wide array of applications such as, real time analytics, transactional processing and high performance computing.

Advanced Analytics, Management, Automation, and Orchestration

Kaminario's storage platform is complemented with a world-class analytics, management, and automation platform called Clarity. Clarity provides Kaminario customers with a rich toolset for monitoring, planning, and automating common storage management tasks. Kaminario Flex is an orchestration platform that can dynamically control storage resources delivering true autonomous datacenter management capabilities.

The Economics and Agility of Software Defined Storage

Kaminario delivers its software-defined solution as either a pre-integrated appliance or as a usage-based software model. In either case, fully integrated solutions are available, on-demand, through a strategic alliance with Tech Data (NYSE: TECO), a Fortune 100, global IT distributor. The combination of world-class software-defined storage with best of breed hardware infrastructure distribution delivers the economics and flexibility that only hyperscale datacenters achieve.

As cloud-scale operators strive to emulate the software-defined datacenter efficiencies of the public cloud, Kaminario is the ideal partner for building highly flexible, highly cost efficient software-defined storage infrastructure.

Source: Kaminario



Research from Gartner:

Critical Capabilities for Solid-State Arrays

Solid-state arrays have become faster, smaller and more reliable, and they're a safe business decision, due to guarantees that can't be obtained in other areas of infrastructure. Here, Gartner analyzes 18 SSA product families across high-impact use cases for infrastructure and operations leaders.

Key Findings

- Solid-state arrays are highly secure and are insulated from Spectre and Meltdown security exposures, because arrays do not allow application code or user code access to the storage software.
- High-performance, nonvolatile memory express, Peripheral Component Interconnect Express solid-state drive use in solid-state arrays is increasing; however external NVMe over Fabric host connections are rarely used, and often only with proprietary NVMe-oF implementations.
- To improve density and performance and create integrated software stack advantages, vendors are designing and offering their own flash modules, rather than using only standard SSDs.
- Many vendors are quoting prices for SSAs by effective or expected capacity, rather than raw capacity.

Recommendations

Infrastructure and operations leaders focused on building and sustaining dependable infrastructure should:

- Use SSAs to reduce the fault domain of an outage or security exposure and improve the level of security in their data centers.
- Request that the offer contain the raw capacity and use the raw capacity to compare offers at a price per raw terabyte, when purchasing or comparing the price of SSAs
- Request guarantees that keep financial comparisons valid with no cost remedies for any claims of effective storage array capacity, performance or any other promise. This is because effective capacity and performance is workload- and data-dependent and can be variable.
- Select SSAs when a project, service, application or infrastructure requires low latency, consistent performance, high availability and a small environmental footprint. SSAs offer transparency and guarantees that can't be obtained from other storage, hyperconverged, integrated or server solutions.

Strategic Planning Assumptions

In 2022, artificial intelligence (AI)/machine learning will represent more than 25% of solid-state array (SSA) workloads, which is an increase from fewer than 5% in 2018.

By 2020, 30% of SSAs will be based on nonvolatile memory express (NVMe) technology, which is an increase from fewer than 5% in 2017.

What You Need to Know

Customer satisfaction with SSAs is high. Nevertheless, SSAs are still improving in performance, automation and predictive/preemptive support. Performance improvements are due to the increased adoption of the NVMe protocols used by internal SSDs and backplanes. This is slowly expanding to front-end NVMe-oF, which uses Fibre Channel NVMe (FC-NVMe) or high-speed Ethernet host/storage network connections. This, in turn, is causing transformation changes in the storage market, because the performance differences between internal or external storage have narrowed enough to allow external storage to be used as slow memory.

The sophistication of array software that integrates with applications, public cloud services and hypervisors causes high levels of storage automation as long as APIs are developed, published and supported by all parties. This simplifies array administration storage provisioning via APIs

and patching. Service outages and preemptive maintenance and support tasks are reduced, due to end-to-end application to array AI and machine learning analytics used to monitor, predict problems and suggest configuration changes or patches before a problem occurs. The overall advantages of storage disaggregation do not tie into upgrades or expansions to servers and the obvious security benefits of storage arrays. Customers can select SSAs to create an agile and flexible IT infrastructure. This can be isolated from server issues, reliably used, and nondisruptively upgraded and expanded for several years.

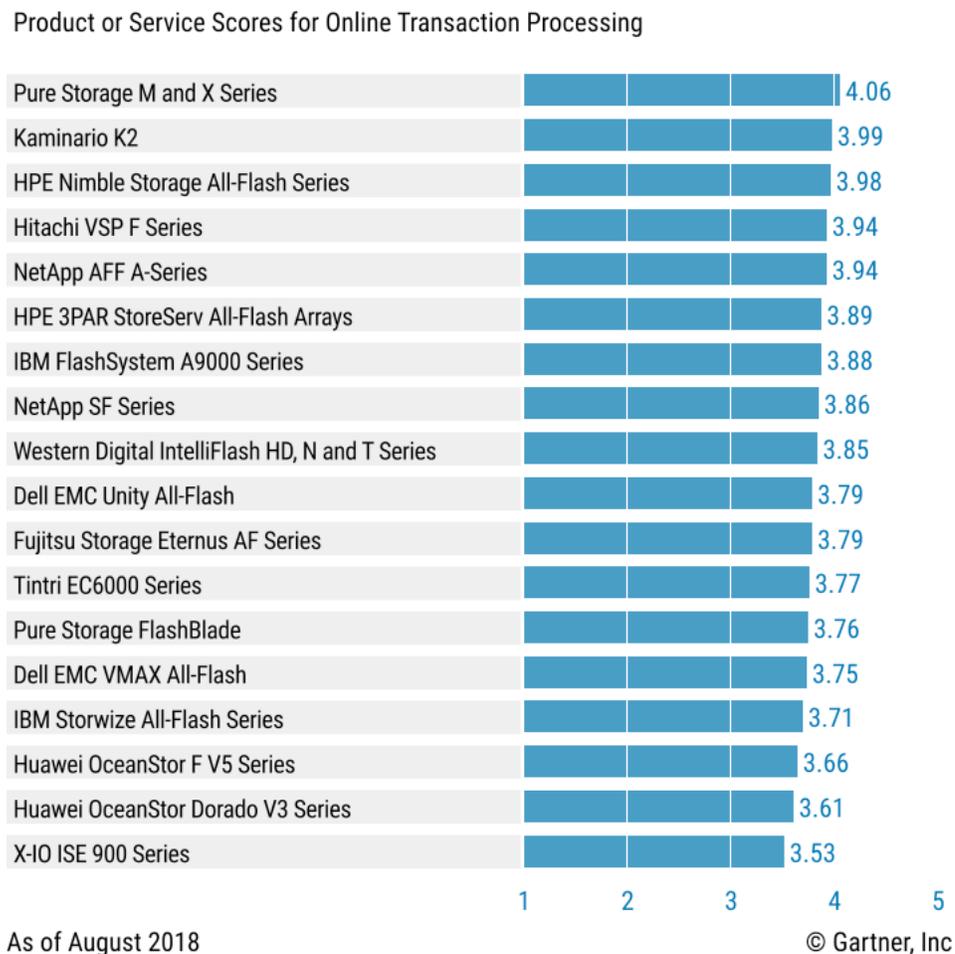
This research analyzes which products are poised for scalable performance and capacity, coupled with a smooth transition to NVMe technology, to achieve sustained, predictable performance. Manageability and interoperability from the core to the cloud to the edge, with predictive/prescriptive performance, cost and issue resolution define the characteristics of leading solid-state drive (SSD) products.

I&O leaders who need to have a secure, fast, reliable and flexible storage infrastructure can use this research to select an SSA that best meets their needs. The SSAs analyzed in this research are diverse — scale-up, scale-out, scale-in. Some are purpose-built, and some are evolutions from previous disk array designs. Nevertheless, the market offers many more products from SSA vendors that have not been included in this research. All of the SSAs in this research have received overall scores above 3.0, which signifies that they meet or exceed all of the requirements required of an SSA.

Analysis

Critical Capabilities Use-Case Graphics

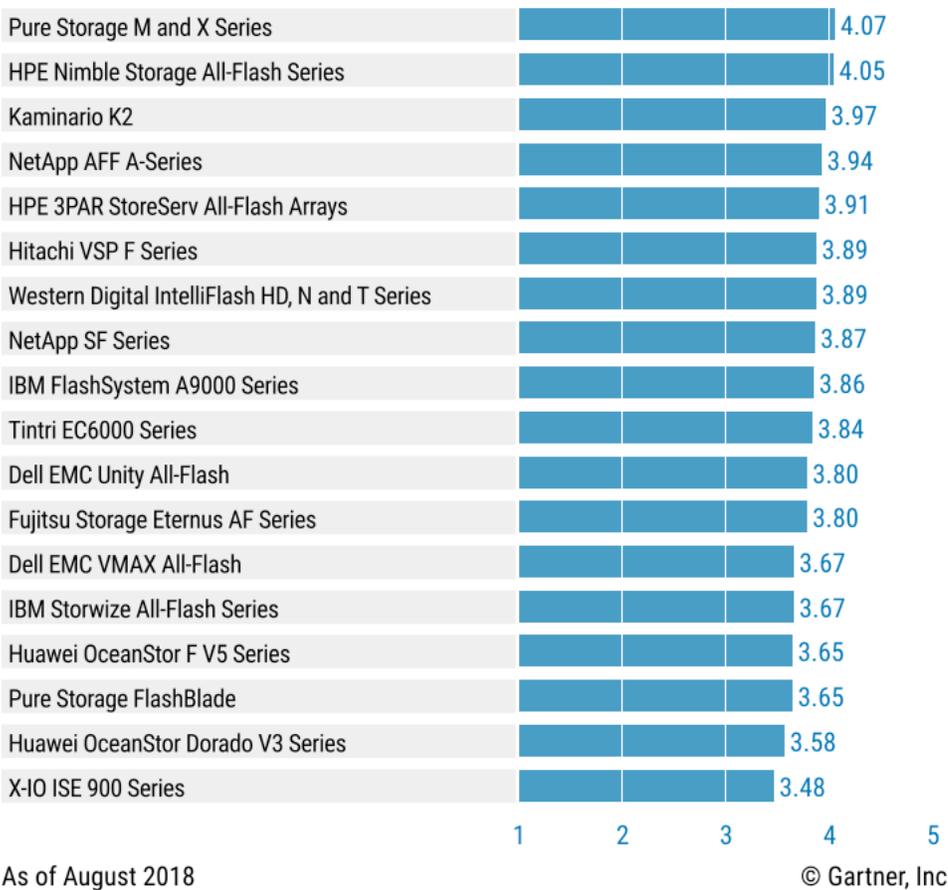
Figure 1. Vendors' Product Scores for the Online Transaction-Processing Use Case



Source: Gartner (August 2018)

Figure 2. Vendors' Product Scores for the Server Virtualization Use Case

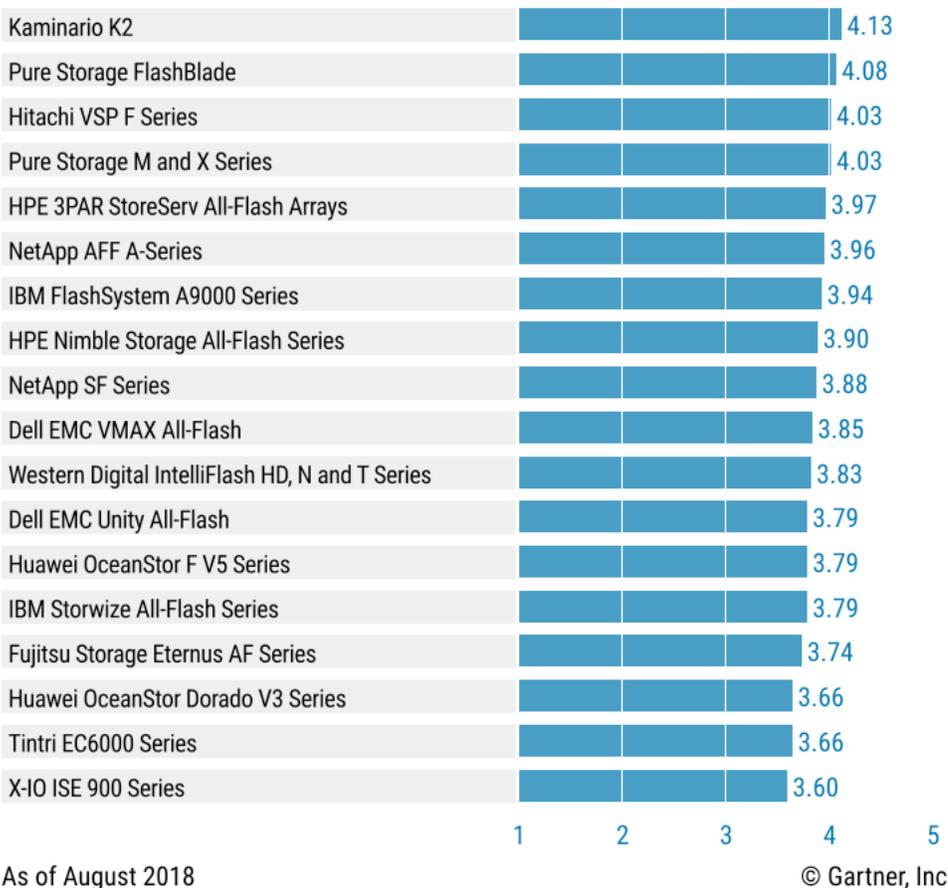
Product or Service Scores for Server Virtualization



Source: Gartner (August 2018)

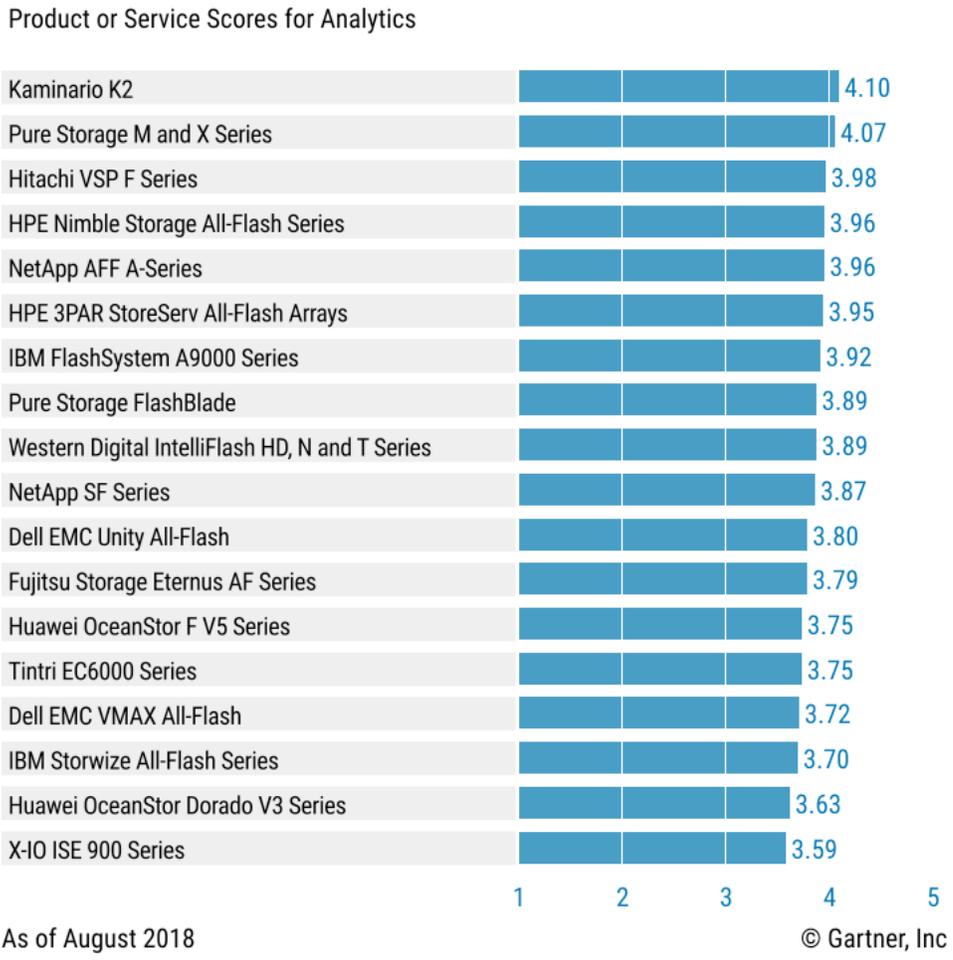
Figure 3. Vendors' Product Scores for the High-Performance Computing Use Case

Product or Service Scores for High-Performance Computing



Source: Gartner (August 2018)

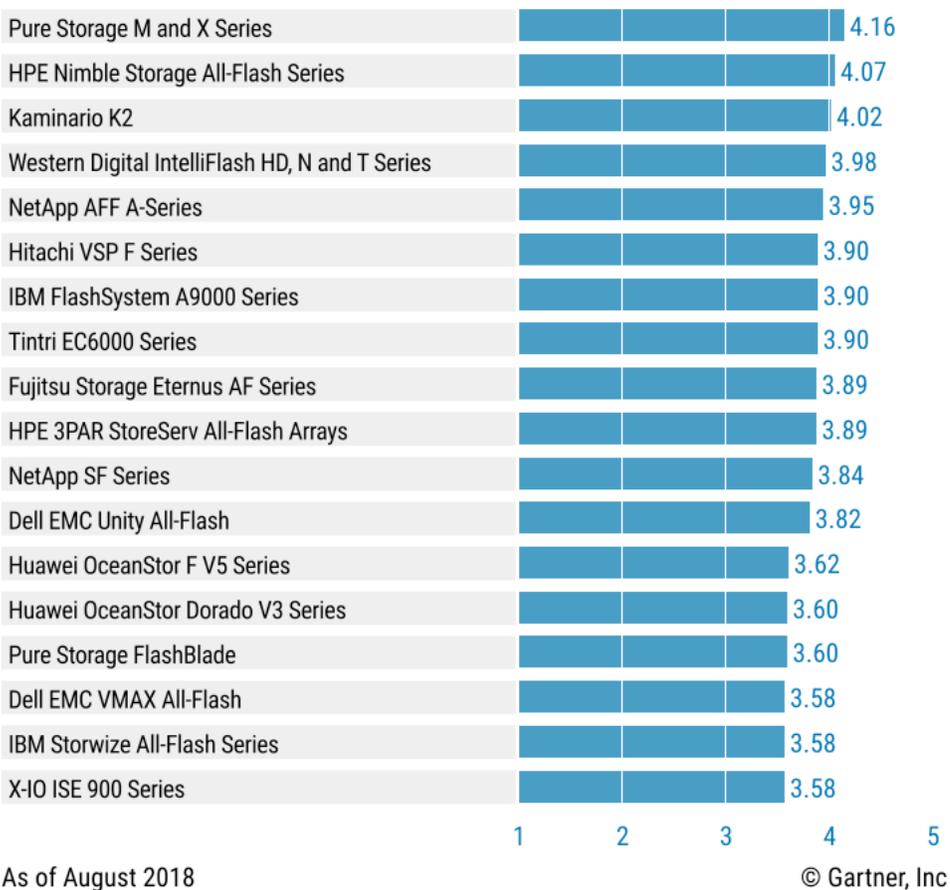
Figure 4. Vendors' Product Scores for the Analytics Use Case



Source: Gartner (August 2018)

Figure 5. Vendors' Product Scores for the Virtual Desktop Infrastructure Use Case

Product or Service Scores for Virtual Desktop Infrastructure



Source: Gartner (August 2018)

Kaminario

The sixth-generation Kaminario K2 family, announced and available in February 2017, was augmented with the new K2.N NVMe-based series. This was announced during the fourth quarter of 2017, but became available in May 2018. Both product families feature FC, iSCSI and NVMe-oF host connectivity and reinforce an excellent track record of flexible product innovation. Customers who own prior-generation K2 arrays can mix and match these with new sixth-generation K2 nodes, enabling simple product migration and investment protection. Kaminario has enhanced its software offerings, with its VisionOS storage management suite which is now complemented with Flex (automation and orchestration) and Clarity (analytics and machine learning). The company continues to offer “Assured Capacity, Availability, Performance, Scale, Maintenance and SSD Life” programs (Kaminario ForeSight).

Combined, the new products provide a base for diversely “composable” storage, with proven scale up and scale out capabilities from 7.4TB to 4PB, managed by a simple GUI that is intuitive and easy to use, even by nonstorage administrators. The sixth-generation K2 and K2.N also have the latest high-speed external interconnects: 32 Gbps FC and 25/50/100GbE. Deduplication is selectable, but compression cannot be disabled. The K2 supports asynchronous replication; however, synchronous replication is not available. System security is good, with Advanced Encryption Standard (AES) encryption at the SSD level and key management.

Contact us

For more information contact us at:



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