

# Kaminario K2 All-Flash Array



## **COST EFFICIENCY**

Every element of the K2 design is optimized to balance costs with value and functionality. Customers can start small and grow with all benefits and capabilities included at every step. Added operational savings include reduced energy consumption and larger storage capacity in a smaller data center space.



## **SCALABILITY**

Kaminario's K2 delivers value at every stage of growth. Scale-up to add capacity. Scale-out to add performance. Add the latest drives and processors to an expanded Perpetual Array™ with a Capacity Guarantee.

The Kaminario K2 all-flash storage array delivers predictable performance, cost, scale, resiliency and simplicity so organizations can handle ever-changing and unforeseen business requirements as they arise.

## **Cost Efficiency**

The Kaminario K2 all-flash array elevates cost efficiency for enterprise storage to a new level. With a software architecture designed to take advantage of the most modern flash drives, K2 storage is designed for now and whatever comes next. The K2 protects investments by seamlessly combining existing systems with new capabilities and technologies.

- Data reduction with selective global inline deduplication, always-on inline compression, and thin provisioning
- RAID utilization of 87.5% with optimized dual-parity RAID
- High density of up to 60TB/U, increasing as higher drive capacities become available
- Low metadata footprint

## **Scale-up, Scale-out**

Kaminario's K2 delivers a powerful scale-up and scale-out architecture combined with a mesh active/active design. K2 enables organizations to start small at 7TB to 200TB in just 4U and grow seamlessly up to 1.44PB in 26U. Linear growth maintains consistently low latency while expanding both capacity and performance.

- Scale-out for linear performance and capacity growth with consistently low latency
- Scale-up enables scaling capacity with better density and lower \$/GB
- All controllers are fully active/active



## PERFORMANCE

A unique software-defined scale-out architecture combined with selective global deduplication and adaptive block size powers Kaminario's exceptional all-flash performance that smoothly handles simultaneous mixed workloads.

## Adaptive Block Size Optimized for Mixed Workloads

A unique global adaptive block algorithm capability automatically adapts to the best I/O size for any workload. One system simultaneously supports OLTP, OLAP, virtualized server and VDI environments without compromising IOPS or bandwidth.

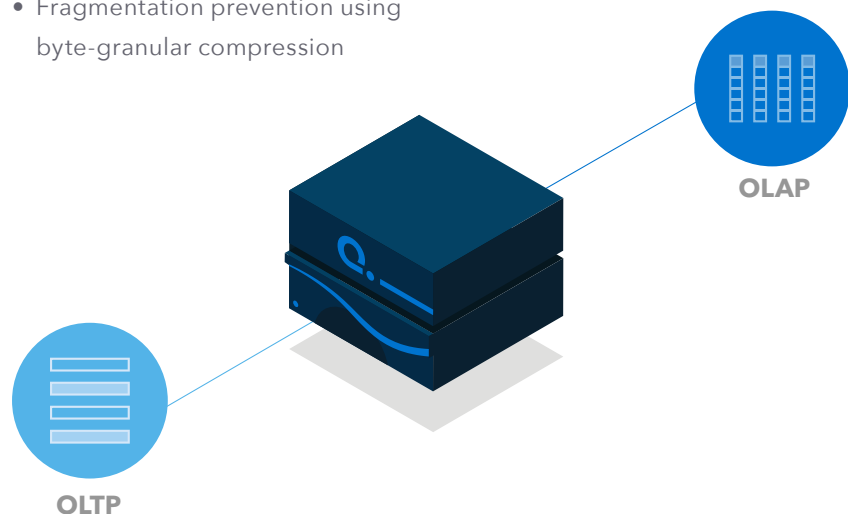
- Adaptive block size executes automatic and simultaneous use of the best I/O size for each workload
- Combine transaction processing and analytics workloads onto a single array

## Global Selective Inline Deduplication and Inline Compression

Kaminario deduplication eliminates redundant data, storing it only once. Deduplication is performed globally with processing distributed across all nodes. Uniquely among all-flash arrays, selective deduplication can be turned on for VDI and virtualized workloads, and turned off for OLTP or OLAP workloads where deduplication has little or no effect.

Highly efficient, byte-aligned inline compression reduces the physical data footprint on the flash media with no performance penalty.

- Selective deduplication adjustable by workload impact
- Data reduction through compression even with no deduplication
- Fragmentation prevention using byte-granular compression



## **K-ASSURED.**

by **kaminario.**

Worry-Free Today

Worry-Free Forever

### **Kaminario K-Assured™**

The storage industry's most comprehensive, most straightforward, most valuable business assurance program. K-Assured combines six simple promises to give customers certainty and predictability as their business scales.

#### **Assured Capacity**

Assured Capacity provides a minimum effective storage capacity over the life of the array. This assurance applies to any data set as long as it's not already compressed or encrypted. Kaminario will provide the assured capacity, at no additional cost, if the K2 does not deliver the stated effective capacity.

#### **Assured Performance**

The Kaminario K2 can scale-out to maintain performance and can maintain high performance in the face of mixed workloads. Kaminario K-Assured clarifies expected performance. Kaminario provides additional compute resources at zero cost to close the gap, if the K2 does not perform as promised.

#### **Assured Availability**

Assured Availability means that the K2 will deliver 99.999% uptime. Kaminario will provide additional support at zero cost, if the K2 doesn't meet the specified availability.

#### **Assured Scale**

Assured Scale means that existing K2 implementations can scale out with the newest, highest performance, most cost-effective hardware available. Older technologies can be non-disruptively decommissioned as they reach the end of their useful life.

#### **Assured Maintenance**

The Assured Maintenance program locks maintenance pricing as a fixed percentage of the actual hardware and software purchase price in perpetuity.

#### **Assured SSD Life**

Kaminario ensures that SSD wear does not pose a source of unpredictability. With Assured SSD Life, Kaminario covers all SSD failures, including wear out, for K2 systems under active support.



## RESILIENCY

The advanced failure handling of K-Raid delivers a new assurance level in data protection. Sophisticated engineering and non-disruptive expansion maintain continuous performance fused with a High Availability design and active system monitoring



## SIMPLICITY

The K2 All-Flash storage array simplifies the user experience. It requires no capacity management and no RAID tuning while K2 globally optimized the data and metadata layout as the system expands.

## Enterprise-Class Resiliency

The Kaminario K2 is designed to meet the most stringent requirements of sensitive enterprise applications. Substantial high availability (HA) and disaster recovery (DR) features support K2 resiliency and self-healing with advanced data protection algorithms, no single point of failure, non-disruptive upgrades and proactive serviceability.

- Self-healing HA with no single point of failure
- Self-contained battery backup for persistent data protection during power loss

## K-RAID Protection

Highly efficient and robust K-RAID can sustain two concurrent SSD failures without impacting performance, and up to three SSD failures within each SSD shelf without data loss.

- Dual parity protection
- Efficient metadata and real-time health monitoring aid in rapid SSD recovery
- K-RAID is fully automatic and requires no configuration or set-up

## Native Replication

Efficient replication ensures K2 enterprise data center resiliency using a snapshot architecture to perform asynchronous application-aware and crash-consistent replication. All essential disaster recovery capabilities support short recovery point objectives (RPO), as little as 60 seconds, and recovery time objectives (RTO) of less than one second. All are native capabilities, with no impact on production performance.

- Native replication requires no costly third-party software
- No performance impact on production
- Short RPO and RTO for disaster recovery
- Application integration ,e.g. Microsoft SQL, utilizing VSS
- Full support for VMware SRM

## Kaminario K2 Features

<p><b>SYSTEM MANAGEMENT</b></p>	<p>The central principles of K2 management are simple. Administered via an intuitive browser-based GUI, K2's built-in intelligence automatically executes RAID optimization, performance tuning, data distribution, monitoring, and capacity management. K2 supports a fully scriptable CLI, RESTful APIs, VMware vCenter plug-in and Microsoft VSS.</p>
<p><b>NON-DISRUPTIVE UPGRADE (NDU)</b></p>	<p>Hardware expansions and software enhancements can be deployed with no interference to production and no dependencies on maintenance windows. Upgrades can incorporate any preferred mix of controllers and SSDs, including newly released processors and drive types.</p>
<p><b>THIN PROVISIONING</b></p>	<p>Maximize storage utilization using thin provisioning to assist long-term capacity planning. All base volumes, snapshots and replicas are thin provisioned, reducing required initial capacity and allowing measured, as-needed growth.</p>
<p><b>SNAPSHOTS</b></p>	<p>K2's patented native writeable thin-provisioned and space-efficient snapshots deliver concurrent storage efficiency, performance, and scalability. With substantial capacity savings compared to full clones, snapshots are often used to create additional data sets for backup, archiving, development and testing.</p>
<p><b>SELF-ENCRYPTING DRIVES</b></p>	<p>Always-on K2 encryption provides protection against data theft, securing data-at-rest with no performance impact. 256-bit AES keys SSD encryption protects all data in the array with no impact on performance.</p>
<p><b>HEALTHSHIELD™</b></p>	<p>The Kaminario K2 is designed to meet the most demanding enterprise application requirements. HealthShield's continuous call-home monitoring protection and analysis are the foundations for Kaminario world-class technical support. Proactive monitoring actively discovers and tracks events in real time, with many issues resolved remotely.</p>

## System Specifications

	1 K-Block	2 K-Blocks	3 K-Blocks	4 K-Blocks
Footprint K-Blocks	4U	10U	14U	18U
Footprint +1 Exp.	6U	14U	20U	26U
Footprint +2 Exp.	8U	18U	26U	34U
Usable Capacity*	7TB-360+TB	14TB-720+TB	21TB-1.08+PB	28TB-1.44+PB
Media (encrypted)	480GB 3D MLC SSD / 960GB 3D MLC SSD / 1.92TB 3D TLC SSD			
Density TB/U	Up to 60TB			
IOPS	Up to 250K	Up to 500K	Up to 750K	Up to 1M
Bandwidth	Up to 3.2GB/s	Up to 6.4GB/s	Up to 9.6GB/s	Up to 12.8GB/s
Latency	0.35mSec			
Power (Max)	1.1KW-1.8KW	2.5KW-3.8KW	3.7KW-5.6KW	4.8KW-7.4KW
Power (Typical)	0.8KW-1.2KW	1.7KW-2.5KW	2.5KW-3.7KW	3.2KW-5KW
Cooling Max	3.9K-6.1K BTU/hr	8.6K-13K BTU/hr	12.4K-19.1K BTU/hr	16.4K-25.3K BTU/hr
Cooling Typical	2.6K-4K BTU/hr	5.7K-8.7K BTU/hr	8.3K-12.8K BTU/hr	10.9K-16.9K BTU/hr
Snapshots	Up to 8000 Snapshots			
Management	CLI (SSH), HTTP/HTTPS GUI, Scripting (SSH), RESTful API, VAAI, SNMP, Microsoft VSS, VMware vCenter Plug-in, VMware SRM			
Data Reduction	Global Selective Inline Deduplication, Inline Compression, Thin Provisioning			
Connectivity FC/iSCSI	FC: 4x 8Gbps iSCSI: 4x 10GbE	FC: 8x 8Gbps iSCSI: 8x 10GbE	FC: 12x 8Gbps iSCSI: 12x 10GbE	FC: 16x 8Gbps iSCSI: 16x 10GbE
Management Ports	2x 1GbE			

\*Capacity is subject to drive size and the application data reduction ratio. For some datasets such as VDI the range will be higher.



## Contact

Contact a business development representative to answer any questions you may have.



## Schedule a Demo

Schedule a demo with an engineer and learn if Kaminario's solution works for you.



## Request a Quote

Request a quote for your application from our business development team.

## About Kaminario

Kaminario, the leading all-flash storage company, is redefining the future of modern data centers. Its unique solution enables organizations to succeed in today's on-demand world and prepares them to seamlessly handle tomorrow's innovations. Only Kaminario K2 delivers the agility, scalability, performance and economics a data center requires to deal with today's cloud-first, dynamic world and provide real-time data access -- anywhere, anytime. Hundreds of customers rely on the Kaminario K2 all-flash array to power their mission critical applications and safeguard their digital ecosystem. Headquartered in Needham, MA, Kaminario works with an extensive network of resellers and distributors, globally.

For more information, visit [www.kaminario.com](http://www.kaminario.com)

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