Kaminario K2 All-Flash Array

The Kaminario K2 all-flash storage array, now in Generation 6, delivers predictable performance, cost, scale, resiliency and simplicity so organizations can handle ever-changing business requirements as they arise.

K2 Overview

The K2 all-flash array is the most cost-efficient general purpose storage platform that was designed from the ground up to be optimized for solid-state drive (SSD) flash storage and to accommodate multiple applications and workloads such as databases, virtual servers & desktops and big data analytics.

The K2 all-flash array’s unique scale-up and scale-out architecture covers both dimensions of scale – capacity and performance. K2 can linearly grow the number of CPU cores by adding K-Blocks and independently grow only capacity by adding SSD shelves – thus breaking the limits of rigid architectures that are unable to scale-out or benefit from true shared metadata. K2 Gen6 can scale to multi-petabytes of shared flash storage with data services and data reduction that span globally across all the array’s components and management through a single pane of glass.
**K2 GEN6 HIGHLIGHTS:**

- 4X capacity
- 2X bandwidth
- 50% more IOPS
- 25% better data reduction

**VisionOS KEY FEATURES:**

- Shared metadata and data services across both scale-up and -out clusters
- Adaptive block size
- Selective Deduplication
- Flash-friendly

---

**Built-for-Flash, Software Defined Architecture**

Kaminario VisionOS, K2’s core software architecture and data services framework, enables modular components and services that demonstrate a superior value proposition across a real scale-out storage platform, in innovation, future-readiness and in ease of use.

**DataShrink**

**Deduplication.** Deduplication is performed globally with processing distributed across all nodes in a K2 cluster. Unique among all-flash arrays, deduplication can be turned on for VDI and virtualized workloads, and turned off for OLTP and OLAP workloads where deduplication has little or no effect.

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

**Thin Provisioning.** With the K2, thin provisioning combined with the K2’s scalable architecture facilitate limitless capacity growth within the array to facilitate predictable storage provisioning and planning.

**DataProtect**

**Native Snapshots and Replication.** Achieve point-in-time copies of data both locally and remotely using lightweight redirect-on-write snapshots.

**K-RAID™.** Dual parity RAID scheme that protects up to 3 SSD failures per SSD shelf with an industry-leading capacity utilization of 87.5%.

**Encryption.** Key-less AES256 data-at-rest encryption that makes sure data is protected from theft or misuse.

---

**DataManage**

Manage a true scale-out array from a single pane of glass. Use an intuitive and comprehensive GUI, fully scriptable CLI and a programmable RESTful API to achieve agile management.

**DataConnect**

K2 is integrated and connected to leading management and operations tools such as VMware vSphere, Microsoft VSS, Cisco UCS Director, OpenStack Cinder.
K2 Value Across Use Cases

RDBMS
K2’s sub-millisecond latency dramatically increases productivity for databases such as Oracle and SQL Server. OLTP and OLAP workloads can run concurrently without impacting one another to achieve real consolidation.

Virtual Environments
K2’s adaptive block size algorithm eliminates the I/O blender effect for virtual workloads. Consolidation of virtual servers and desktops is now possible on a single storage platform that is integrated with hypervisors such as VMware ESXi, Microsoft HyperV and Citrix XenServer.

NoSQL
Non-relational databases such as MongoDB and Cassandra benefit from the economics of shared storage and take advantage of K2’s inherent scalability.

Private Cloud
K2 matches the agile nature and the scalability of private cloud platforms such as OpenStack. K2’s RESTful API facilitates automating storage processes such as provisioning and capacity quota management.

Containerized Apps
Container platforms such as Docker can utilize the K2 for persistent storage via K2’s Flocker plug-in.

Kaminario DataAssurance
Kaminario DataAssurance is the storage industry’s most comprehensive, most straightforward, most valuable business guarantee program. It combines six simple guarantees to give customers certainty and predictability as their business scales:

- **ASSURED CAPACITY** - Guaranteed effective capacity - or capacity provided at zero-cost.
- **ASSURED PERFORMANCE** - Guaranteed performance across mixed workloads - or zero-cost compute provided.
- **ASSURED AVAILABILITY** - Guaranteed 99.999% availability - or zero-cost support extensions provided.
- **ASSURED SCALE** - No forklift upgrades or data migrations. Scale the array with new hardware seamlessly.
- **ASSURED MAINTENANCE** - Support and maintenance will always be the same proportional cost to the hardware purchase.
- **ASSURED SSD LIFE** - SSD wear-out will be covered in perpetuity with a valid support contract.
# K2 Gen6 All-Flash Array

<table>
<thead>
<tr>
<th>Scaled Configuration</th>
<th>1 K-Block</th>
<th>2 K-Blocks</th>
<th>3 K-Blocks</th>
<th>4 K-Blocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usable Capacity*</td>
<td>30TB - 1PB</td>
<td>60TB - 2PB</td>
<td>90TB - 3PB</td>
<td>120TB - 4PB</td>
</tr>
<tr>
<td>IOPS</td>
<td>Up to 370K</td>
<td>Up to 740K</td>
<td>Up to 1.1M</td>
<td>Up to 1.5M</td>
</tr>
<tr>
<td>Throughput</td>
<td>Up to 6.2GB/s</td>
<td>Up to 12.4GB/s</td>
<td>Up to 18.6GB/s</td>
<td>Up to 25GB/s</td>
</tr>
<tr>
<td>Latency</td>
<td>0.35ms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Media (encrypted)</td>
<td>480GB / 960GB / 1.92TB / 3.84TB 3D TLC NAND SSDs</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## VisionOS - Shared Services Across a True Scale-Out Storage Array

- **DataShrink**: Global selective inline deduplication, inline compression, thin provisioning, Zero detect.
- **DataProtect**: Native array-based snapshots and replication, key-less AES256 data-at-rest encryption, K-RAID that protects each SSD shelf independently up to 3 SSD failures.
- **DataManage**: CLI (SSH), HTTP/HTTPS GUI, Scripting (SSH), RESTful API, SNMP, Syslog.
- **DataConnect**: Microsoft VSS, VMware vCenter Plug-in, VMware SRM, VMware LogInsight, Flocker (containers), OpenStack Cinder, Cisco UCS driver.

## Connectivity, Power and Cooling

<table>
<thead>
<tr>
<th>Connectivity</th>
<th>FC: 4x 16Gbps iSCSI: 4x 25GbE</th>
<th>FC: 8x 16Gbps iSCSI: 8x 25GbE</th>
<th>FC: 12x 16Gbps iSCSI: 12x 25GbE</th>
<th>FC: 16x 16Gbps iSCSI: 16x 25GbE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management Ports</td>
<td>2x 1GbE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power (typical)</td>
<td>0.8KW - 1.4KW</td>
<td>1.8KW - 3KW</td>
<td>2.6KW - 4.4KW</td>
<td>3.4KW - 5.8KW</td>
</tr>
<tr>
<td>Cooling (typical)</td>
<td>2.8K - 4.8K BTU/hr</td>
<td>6.2K - 10.2K BTU/hr</td>
<td>9K - 15.1K BTU/hr</td>
<td>11.9K - 19.9K BTU/hr</td>
</tr>
</tbody>
</table>

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