

Kaminario Speeds Healthcare Patient Information System

The Challenge

Healthcare providers need to access patient data from various sources, such as HMOs, hospitals and other doctors, to get a full view of a patient's history. A leading provider of a central service that enables healthcare organizations to integrate and leverage critical patient information was looking for a solution to accelerate access to critical patient records. In order to get more integrated patient data into doctors' hands faster, the company needed to resolve its data access bottleneck issues.

The company's patient data integration system provided a real-time analytical application for processing patient information from multiple patient records sources. The application accessed data from a Microsoft SQL Server database and analyzed it in response to multiple random patient record queries from healthcare professionals. The application was able to process a total of only 6.8 messages per second. This was not an acceptable response rate, given the number of outstanding patient record queries being made (as many as 20 messages per second). The delays were a result of the database read and write latencies, more than 30 milliseconds (ms) for each. The SQL Server database reported a WRITELOG average wait time (the dominant wait time) of more than 40 ms. Getting critical patient information into the hands of doctors quickly and reliably could be the difference between making a good or bad decision with regard to a patient's care. These delays in accessing this lifesaving information were not acceptable to the company's customers.

The Solution

The company deployed a Kaminario K2 in front of its SQL Server database and moved two databases, seven transaction logs and the tempdb files onto the Kaminario K2. The CPU utilization of the application servers immediately increased so that the system could process more load. The number of messages processed per second improved by more than a factor of six, jumping from 6.8 to 38. This result was limited by the application server's processing capacity (the CPUs were more than 90 percent utilized); with more CPUs, the servers could have processed even more messages per second. The I/O bottlenecks and long latencies were resolved; the write and read latencies went from more than 30 ms to 1 and 0 ms, respectively. The WRITELOG average wait time went from 40 ms to less than 0.7 ms. The improved responsiveness of the database represents a 10 percent average improvement in the total response time to the end user.

***“Speed and reliability of patient data are essential in the healthcare industry. The implementation of Kaminario’s K2 completely resolved the database bottleneck we were experiencing and provided predictable performance even at peak times.*”**

“The deployment of K2 was extremely easy, taking less than one day, and the impact was significant and immediate. The increased processing speed furthers our ability to drive improvements in the quality, safety and efficiency of patient care.”

— CIO, a Leading Provider of Integrated Healthcare Information Solutions



Extreme Performance

The Kaminario K2 family of all solid-state SAN storage solutions accelerate high I/O, latency-sensitive applications by consistently delivering higher throughput, ultra-low latency and improved system utilization at a significantly lower cost and smaller footprint than legacy SAN storage.

- IOPS: 100K – 1.5M IOPS
- Throughput: 1 GB to 16 GBs
- Consistent performance for any workload, with no degradation over time
- Latency: Read: 120 µsec to 260 µsec; Write: 150 µsec

Self-healing High Availability

K2 boasts full N+1 hardware redundancy and thus maintains operational status and data availability with no single point of failure. Fast and automatic recovery means a reduction in costs related to data loss and unavailability, including wasted IT services time in rebuilding data stores.

- Redundant system hardware and uninterrupted power supply (UPS)
- Internal data protection and resiliency with mirrored hard disk drives
- Automated hardware and data recovery while maintaining data integrity

Modular, Cost-effective Scalability

K2 enables cost-effective growth — so you can start small and grow as you need more capacity and/or performance. K2 also maximizes storage utilization and extends the life of your storage infrastructure, increasing ROI and reducing TCO.

- Modular, scale-out architecture
- Scale performance and capacity independently
- Consolidate high I/O and latency sensitive applications on the K2 that you had on multiple servers

Easy Installation and Management

K2's industry-standard components make it easy to install and maintain. Its storage system management makes it easier for IT staff to manage and control. K2 enables IT organizations to reduce operations, maintenance and service costs.

- Standard block device, fully transparent — no change to applications, database or data
- Single-system manageability
- Automatic data distribution quickly delivers extreme performance out of the box
- Fast deployment — less than one day to install



Kaminario K2

Kaminario is a leading supplier of high performance all solid-state SAN storage. Its Kaminario K2 family of SAN storage solutions eliminate I/O bottlenecks and dramatically reduce latency to accelerate critical business applications at a significantly lower cost and smaller footprint than legacy SAN storage. The K2 is the first self-healing, highly available all solid-state SAN storage to give users the freedom to choose the right SSD media for their unique application workload and budget. The K2 supports millions of IOPS, tens of GB/s of throughput, extremely low latency, and all without compromising on enterprise reliability or ease of use. Kaminario K2 solutions are application, database and file-system agnostic. Kaminario K2 solutions are seamless to integrate and easy to deploy and maintain; installation and configuration can be done in less than one day. Kaminario is simply faster.

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