

Microsemi Adaptec® Series 7 RAID Adapters

Lower Data Center Costs and Deliver the Performance Customers Demand

Liquid Web Inc. is a privately-held managed web hosting company founded in 1997. The company owns and operates three data center facilities located in Lansing, Michigan in addition to a software development office and data center in metropolitan Phoenix, Arizona. In 2014, the company also launched development space in Ann Arbor, Michigan, and extended hosting operations to Europe by attaining space in Amsterdam, NL.

It has established itself as a leader in the professional web hosting market with an unwavering dedication to providing the best hosting products customer service available. With a client base that spans over 120 countries, the company has assembled a world-class Heroic Support staff and a proactive Sonar Server Monitoring team, professionally educated and easily accessible 24 hours a day, 7 days a week. The rapidly expanding web host has been recognized amongst INC Magazine's 5000 fastest growing companies for eight consecutive years, beginning in 2007.

"Liquid Web has helped set the industry standard for creative and flexible hosting on a robust network," said Matthew Hill, Liquid Web founder and CEO. "To do this, our servers need to achieve the best performance with the highest possible reliability."

Liquid Web's performance and reliability stem from its central focus on redundancy, which is multi-tiered with N+1 internal device elements, as well as entirely redundant chassis. The setup allows its network to rapidly self-heal failures without interruptions to client data connectivity.

Data Centers Rely on Storage Optimized for the Most Demanding Workloads

Liquid Web's dedication to providing the best hosting environment available has been a catalyst for its growing customer base and the corresponding explosion in the amount of data that is transmitted, cached, stored, analyzed, and archived on its network. Its users are accessing data more frequently and from more devices than ever before, and properly managing the complexities of this increased demand while providing the highest quality of service contributes to Liquid Web's success.

To maintain performance and reliability for its customers, Liquid Web relies on storage solutions that are optimized to meet current needs but also flexible enough to help future-proof its data centers in anticipation of ever-increasing customer demands.

Data centers, like those engineered by Liquid Web, must satisfy that demand in the most cost-efficient manner possible, with an emphasis on reducing the performance-to-cost ratio which includes hardware-related Capital Expenses (CapEx) and Operating Expenses (OpEx). The days of simply adding more servers to accommodate more traffic are over. Adding complexity to the situation is the desire to keep the infrastructure footprint to a minimum, thus minimizing the associated costs that come from powering and cooling larger spaces.

Server vendors are enabling data centers to do more with less with the proliferation of smaller and denser server chassis sizes that allow data centers to add more storage I/O capability while maintaining the same or smaller footprint. Similarly, storage vendors have developed small form-factor solutions—such as 2.5-inch drives and low-profile storage adapters—that fit into the smaller chassis while providing the high performance that data centers require.

Liquid Web's three data centers are comprised of more than 32,000 servers—a number that continues to grow. By deploying a standardized server platform, the company can use off-the-shelf components, resulting in cost savings without compromising performance or reliability.

Executive Summary

Challenge

Liquid Web's build-out of data center capacity quickly outgrew the capabilities of its previous storage solution to provide the connectivity and performance-to-cost ratio that are at the core of its operational requirements.

Solution

71605E entry-level SAS/SATA 6 Gbps PCIe Gen3 RAID adapter, featuring 16 internal ports in a low-profile MD2 form-factor, and delivering performance of hardware RAID at the right performance-to-cost ratio.

Result

Liquid Web has lowered its performance-to-cost ratio by supporting more customers on each server with no dropoff in performance.



Utilizing Microsemi's Series 7 RAID adapters allowed Liquid Web to increase the capacity of its build out of data center and satisfy customer demands.

"Our servers need to achieve the best performance with the highest possible reliability. Adaptec by PMC products have helped us do this while maintaining value that we can, in turn, give back to our customers."

—Mike Jung, Liquid Web Product Manager

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Upgrading Network Performance with the 71605E RAID Adapter

With a growing customer base and increased traffic, Liquid Web's build out of data center capacity quickly outgrew the capabilities of its previous storage solution, hampering connectivity and increasing the company's performance-to-cost ratio.

It became clear to Liquid Web that the RAID adapters installed throughout its data centers were throttling storage performance. In exploring upgrade options, the company found that most adapters max out at 8 ports. These options would force Liquid Web to add extra servers in order to maintain the performance levels that its customers expect. Instead, Liquid Web chose the 71605E entry-level SAS/SATA 6 Gbps PCIe Gen3 RAID adapter.

The 71605E features 16 internal ports in a low-profile MD2 form-factor, and delivers affordable hardware RAID that outperforms software-based HBAs and SATA controllers. Series 7 RAID adapters are available with 8, 16, or 24 native SAS/SATA ports.

Like all devices in the Series 7 RAID adapter family, the 71605E includes Microsemi's 24 port RAID-on-Chip (ROC), which combines a x8 PCIe Gen3 interface with 6 Gbps SAS ports to enable a new generation of high-performance RAID adapters that are unmatched by any other ROC in the industry.

The PCIe Gen3 interface doubles bandwidth to the host compared to PCIe Gen2, but requires at least 16 6 Gbps SAS/SATA ports to double the bandwidth to the storage devices. Competing 6 Gbps solutions that have only 8 ports cannot leverage that advantage.

Series 7 adapters perform at up to 6.6 GB/s on sequential reads and up to 5.7 GB/s on sequential writes, more than doubling the performance of competing host-based RAID adapters. With 16 direct-connected solid-state drives (SSDs), Series 7 adapters can deliver over 530,000 IOPS—nearly 10x the performance of previous-generation RAID adapters.

The 71605E offers seamless compatibility with existing storage architectures, application software, and operating systems, which allowed Liquid Web to install the adapter into its existing infrastructure without disrupting operations.

By implementing the 71605E into its three data centers, Liquid Web has been able to lower its performance-to-cost ratio by supporting more customers per server with no dropoff in performance.

"We were looking for a higher performance solution at a lower cost," said Mr. Jung. "The 71605E has delivered just that for us, which is value that we can, in turn, give back to our customers."

Related Information

- Series 7 RAID Adapter product page: <http://www.microsemi.com/products/storage/raid-adapters/series7>
- Series 7 product brief: <http://www.microsemi.com/document-portal/docdownload/135900-series-7-product-brief>
- Series 7 compatibility report: <http://www.microsemi.com/products/storage/compatibility/>

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