

Microsemi Adaptec® Series 7 RAID Adapters

Take Center Stage in CacheIO Flash Arrays for Media and Entertainment Solutions

New Hampshire-based CacheIO develops all-flash storage systems, including all-flash cache and all-flash array. Combining patent-pending flash optimization software with commodity hardware, CacheIO has demonstrated unprecedented performance and cost per gigabyte for bandwidth-intensive applications.

CacheIO serves companies in the media and entertainment industries that push their storage networks to the limit during content generation, post-production, video and audio streaming, and content archiving. These companies need affordable, ultradense, and scalable storage solutions that enable users to store large amounts of media content with maximum bandwidth and minimal latency.

The CacheIO FA140 Flash Array delivers 140 Gbps bandwidth from a compact 2U platform. The platform is powered by the fastest and widest interconnect available between application and storage—18 8G Fibre Channel links and 48 6G SAS links. The FA140 also boasts the highest SSD density with 48 SSDs, and scales storage capacities from 3 TB to 48 TB.

Storage in the Spotlight

One of the biggest challenges facing storage providers who serve the media and entertainment industries is developing optimized solutions that support media workflows with no performance drop-off.



When producing a movie, for example, the footage undergoes many different processes in the production pipeline, from editing to adding special effects and color correction. Moving and manipulating these extremely large files, which can be 5 TB or larger in size, requires high-performance storage systems that allow everyone access to the data as they need it, without a long transfer process.

The need for affordable, high-capacity, high-bandwidth, low-latency storage solutions is becoming especially prevalent as media production moves to 4K and 8K frame rates, which are 4x and 8x higher resolution, respectively, than current high-definition standards.

Typical “best-in-class” storage systems can support two 4K streams but require hundreds of hard disk drives and can cost up to one million dollars. By contrast, the 2U CacheIO FA140 flash appliance with 48 1 TB or 1.6 TB SSDs can stream up to nine concurrent uncompressed 4K streams in real-time with no performance loss, making it the first viable storage solution for 4K and 8K media production.

The FA140 has nine PCIe slots, which are reserved for RAID adapters and quad 8GFC or dual 16GFC Fibre Channel cards.

Initially, the CacheIO FA140 used six low-profile 8-port RAID adapters from a competing vendor to connect 48 SSDs. This configuration, however, left only three PCIe slots available for Fibre Channel cards, and limited the appliance's performance to just 9 GB/s total bandwidth.

CacheIO recently switched to RAID 71605 adapters, a low-profile 16-port count solution that uses half as many PCIe slots than competing 8-port offerings.

With the RAID 71605, the FA140 needs only three adapters to connect 48 SSDs, thus freeing up an additional three PCIe slots to be used by Fibre Channel cards. Using six total Fibre Channel cards instead of three doubles the appliance's performance to 18 GB/s total bandwidth for media applications.

Executive Summary

Challenge

The low-profile RAID adapters used in the CacheIO FA140 Flash Array maxed out at 8 ports each and took up six of nine available PCIe slots to connect 48 SSDs, leaving only three slots to use with Fibre Channel cards.

Solution

Replace six competing 8-port adapters with three low-profile 16-port RAID 71605 adapters, freeing up three additional PCIe slots to be filled with Fibre Channel cards.

Result

By doubling the number of Fibre Channel cards from three to six, the FA140 Flash Array's bandwidth has also doubled, from 9 GB/s to 18 GB/s.

CACHEIO

Replacing competing 8-port adapters with 16-port RAID 71605 adapters allowed CacheIO to double the bandwidth of its FA140 Flash Array.



“The low-profile adapters from our last RAID vendor maxed out at 8 ports, which took up six of nine PCIe slots in our FA140 Flash Array. Low-profile 16-port RAID adapters have freed up three additional slots that we can use with Fibre Channel cards to double overall system performance.”

—Bang Chang, CEO of CacheIO

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RAID 71605 Adapter

The Series 7 SAS/SATA RAID adapter family features Microsemi's 24-port RAID-on-Chip (ROC), which combines an x8 PCIe Gen3 interface with 6 Gbps SAS ports to enable high performance high native port count RAID adapters that are unmatched by any other ROC in the industry.

The 71605 SAS/SATA 6 Gbps PCIe Gen3 RAID adapter offers 16 internal ports in a low-profile/MD2 form-factor, and is ideal for entry-level servers to high-end server platforms and high-performance workstations.

Series 7 adapters perform up to 83% better than competing RAID adapters in read and write throughput — 6.6 GB/s on sequential reads and up to 2.6 GB/s on sequential writes on parity RAID 5.

PCIe Gen3 RAID adapters with 8 native ports can only take advantage of a maximum throughput of 4.8 GB/s (8 × 6 Gbps SAS ports). Series 7 with 16 and 24 native ports takes advantage of the full PCIe Gen 3 bandwidth capability of 9.6 GB/s (16 × 6 Gbps SAS ports).

The auto configuration capability in Series 7 allows users to operate the adapters in HBA mode (expose drives to the host directly) or Simple Volume mode (use fast DRAM cache to reduce latency and improve performance) without the need for setup tools.

Conclusion

In compact storage platforms, PCIe slots are valuable and scarce. The low-profile 16-port 71605 RAID adapter allows system builders to do more with less by taking fewer PCIe slots than competing RAID adapters to connect the same number of storage devices.

Savvy builders like CacheIO take advantage of those open slots to improve system performance and gain an advantage over competing products on the market.

Related Information

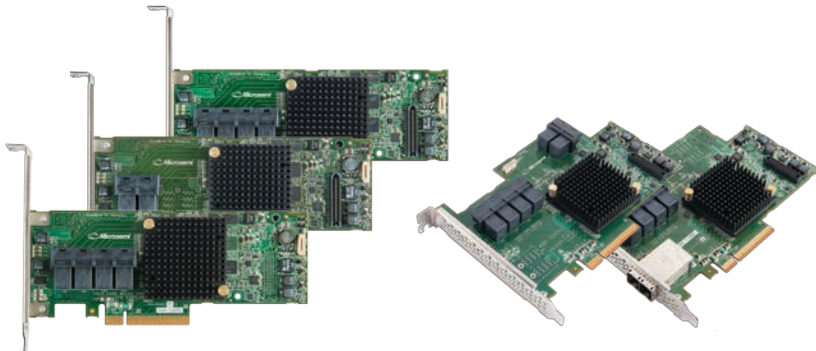
- Series 7 RAID Adapter product page: <http://www.microsemi.com/products/storage/raid-adapters/series7>
- Series 7 product brief: <http://www.microsemi.com/document-portal/docdownload/135900-series-7-product-brief>
- Series 7 compatibility report: <http://www.microsemi.com/products/storage/compatibility/>

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