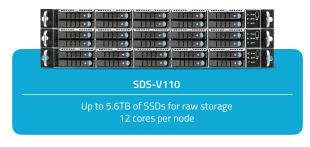# AIC

AIC VMware Virtual SAN Ready Node Solution Brief
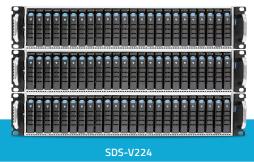
[Overview]

Lowering cost of data storage has become a common business practice. Simplifying storage management is now a shared goal among IT professionals. Having quick access to data is what every user wants and needs. Meeting all these objectives can be a daunting challenge.

That is why AIC joins hands with Micron and ATTO to introduce a new line of all-flash VMware Virtual SAN™ (VSAN) ready nodes. AIC's all-flash array hardware are pre-configured with processors, Micron memory, Micron SSDs and ATTO SAS HBAs to serve as hyper-converged building blocks. 40GbE NICs (network interface cards) from ATTO are offered as options to maximize some specific workloads performance.

The solution can be integrated on an existing VMware cluster or used as a brand new cluster (three nodes minimum) with an outstanding cost to performance ratio. All nodes are fully populated with Micron's SSDs which are optimized for VSAN. Performance is tremendously boosted. Cost-wise, SSDs have become affordable on most budgets and the increase in capacity has reached the point where it now makes business sense to use flash as mainstream storage than just caching. The adoption of this technology is quick and easy. It helps reduce the total cost of ownership (TCO) and still keeps the simplicity of traditional hard drives based nodes.

SDS-V110
Up to 5.6TB of SSDs for raw storage
12 cores per node

SDS-V224
Up to 21.12TB of SSDs for raw storage
12 cores per node

A minimum of 3 nodes is required per cluster.
To scale, an increment of 1 node can be added.

For whom the solution is created

- SMBs who desire for simple storage optimized for a virtualized environment
- Current vSphere users who need to lower cost of storage or need servers refresh
- VARs, SIs and distributors who look to sell solutions branded with their own name

Key benefits

- ✔ Accelerated performance of VSAN thanks to all-flash
- ✔ Hassle-free adoption as the configurations have been tested for interoperability
- ✔ Quick path to revenue by branding these white-box, ready-to-go solutions
- ✔ Lower total cost of ownership

[AIC VSAN Ready Nodes Specifications]

Per node	SDS-V110	SDS-V224
Processor Cores	12	12
Processors	2 Intel® Xeon® Processor E5-2620 v3 2.4 GHz	2 Intel® Xeon® Processor E5-2620 v3 2.4 GHz
RAM options	64 GB (8 x 8 GB) 128 GB (16 x 8 GB)	64 GB (8 x 8 GB) 128 GB (16 x 8 GB) 256 GB (16 x 16 GB)
Hot-swap drive bays	10	24
Raw Storage	Up to 5.76 TB (Micron M510DC)	Up to 21.12 TB (Micron M510DC)
Cache	1.2 TB (2 x 600 GB)	1.2 TB (2 x 600 GB)
HBA(s)	ATTO ExpressSAS H1208	ATTO ExpressSAS H1208 & ATTO ExpressSAS H120F
NIC (Optional)	1 single-port 40GbE PCIe 3.0 network adapter	1 single-port 40GbE PCIe 3.0 network adapter

[Why Micron's SSDs?]

The solution keys off 2 related, but distinct, SSD SKUs, the M510DC 600GB and the M510DC 960GB.
Below are more details on each:

1 **No waste capacity :** Micron's M510DC 600GB user capacity cache SSD is optimally sized to exactly match VMware's recommendation – the M510DC Virtual SAN cache drive is exactly 600GB user capacity. While larger user capacity drives are often used, they are not optimally sized to match VMware's guidelines and can leave portions of the drive for which one paid inaccessible. For example, one could deploy an 800GB SSD as the cache tier drive, but about 200GB of the user space for which one paid would not be accessible.

2 **Tiered capacity with performance :** Micron's M510DC 960GB SSD is an excellent fit for a capacity tier drive. It offers very high performance, a design well suited to capacity tier requirements, and an approachable price point.

3 **Certified VMware compatibility :** The M510DC 600GB and 960GB SSDs are on VMware's HCL for cache and capacity tier SSDs respectively making integration worry free.

Micron's M510DC 600GB cache tier and 960GB capacity tier SSDs both employ the XPERT feature set. XPERT is a suite of Micron-designed storage architecture enhancements that greatly improve SSD performance and reliability:

- **ARM/OR (Adaptive Read Management / Optimized Read) :**
  The optimal methods of reading data on an SSD are not static. Specific characteristics of the READ command can—and should—be dynamically tuned. Such tuning has a direct impact on data reliability. Proper tuning improves READ command performance in terms of immediate data access and long-term data reliability—which are key requirements of enterprise applications.

- **RAIN (Redundant Array of Independent NAND) :**
  RAIN is a parity protection mechanism that operates in real time. Using well-proven parity techniques, RAIN embeds protected data with the user data. The details of each RAIN implementation are design-specific.

- **DataSAFE :**
  DataSAFE provides data path protection by storing additional information (metadata) along with user data to help ensure that XPERT-enabled SSDs return the exact data requested.

- **ReCAL :**
  ReCAL (Reduced Command Access Latency) uses well-managed background operations to enable faster response times. ReCAL does not interfere with the host I/O, which enables a substantial reduction in maximum WRITE latency.

- **Media Customization :**
  Like most XPERT features, the level of media customization depends on the SSD design, the intended workload, and the required lifespan. Media optimizations can be simple (e.g., additional factory testing) or complex (e.g., custom designs for specific SSDs).

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Micron products – from high performance, reliable DRAM to Enterprise-grade SSDs – help form the foundation on which the solution is built. The M510DC 600GB SSD is engineered and tuned for the rigors of a Virtual SAN 6.2 cache tier SSD while the M510DC 960GB SSD provides exceptional space, performance, and value for the capacity tier.

Eric Endebrock, Vice President Marketing Storage Business Unit, Micron
"

Micron M510DC SATA SSD

The M510DC's robust features, extended endurance, and competitive price point are ideal for sequential workloads with large block transfer sizes. The M510DC's optional TCG Enterprise-level data encryption also provides superior data security without sacrificing performance.

For more information, download the *"XPERT Enhancements for SSDs Technical Marketing Brief"* at
https://www.micron.com/~/media/documents/products/technical-marketing-brief/brief_xpert_feature_set.pdf.

[Why ATTO's HBAs?]

1 Proprietary Advanced Data Streaming (ADS™) technology reduces latency by managing data acceleration, maximizing the number of transactions the host CPU can process. Customer ROI increases dramatically as server resources are fully utilized.

2 Opportunity for massive scalability – connect up to 2048 unique devices on each ExpressSAS™ adapter. Cost-effective support for entry-level VSANs, as well as larger implementations as the business grows.

3 Performance of VSANs can be limited by the number of simultaneous operations permitted. With support for queue depths of greater than 256, ExpressSAS adapters ensure high performance as operations are handled smoothly without having to wait for resources to free up.

4 ATTO's vConfigTool™ for VMware vCenter Server is a software plug-in that integrates centralized management and monitoring of ExpressSAS SAS/SATA HBAs into VMware virtual environments. This utility helps administrators optimize storage connectivity performance, accelerate adapter deployments, optimize configurations, and improve system availability.

5 ExpressSAS adapters are NUMA-enabled, providing up to 22% more efficient transfers than standard drivers. Non-uniform Memory Access ensures that CPUs have the data they need by allowing multiple processors to access memory simultaneously and moving data closer to the processor where it's needed. NUMA support is a must-have for VSAN servers to operate efficiently.

> "The speed, availability and predictable performance provided by Fibre Channel Storage Area Networks have made them a go-to solution for enterprises that require resilient data storage. But Fibre Channel SANs aren't always a good fit for small-to-medium businesses that need lower TCO, reduced complexity and an ability to easily scale resources in response to evolving business needs. VMware® Virtual SAN™ can provide an alternative for businesses like these. Virtual SAN is VMware's native version of Software Defined Storage (SDS), a hypervisor-based distributed platform that enables the convergence of compute and storage resources. Virtual SAN significantly reduces storage TCO. In addition, Virtual SAN simplifies and speeds up storage provisioning through policy based management with virtual machine-level granularity."

Peter Donnelly, *Product Manager, ATTO*

8 Internal Port 12Gb/s SAS/SATA to PCIe 3.0 Host Bus Adapter

ATTO ExpressSAS H1208

The ExpressSAS H1208 leverages next-generation storage technologies - PCIe 3.0 host interconnect and 12Gb/s SAS/SATA interface to storage.

16 Internal Port 12Gb/s SAS/SATA to PCIe 3.0 Host Bus Adapter

ATTO ExpressSAS H120F

The ExpressSAS H120F leverages next-generation storage technologies - PCIe 3.0 host interconnect and 12Gb/s SAS/SATA interface to storage.

Single Port 40GbE PCIe 3.0 Network Adapter

ATTO FastFrame™ NQ41 Direct Attach Interface

The ATTO FastFrame single-port NQ41 Direct Attached Ethernet Adapter draws less power than competing solutions while providing faster throughput, meaning users can transfer more data at a lesser cost than the competition.

[Why ATTO's NICs?]

ATTO FastFrame™ 40GbE NICs combine 40GbE throughput and best-in-class latency to enable high-performance streaming and data intensive applications while enhancing throughput in data center aggregation levels. RoCE support enables full utilization of 40GbE bandwidth, ensuring faster connection speeds than competitors without interrupted data transfers. With low power requirements and features to reduce CPU utilization, FastFrame 40GbE NICs provide best-in-class performance with an enhanced ROI and reduced OPEX for users.

- **40GbE Bandwidth and Low-latency Services**

  Function : Satisfies demanding performance requirements due to data proliferation and shortens the overall time to data
  Benefit : Outperforms the competition, offering up to 75% faster data transfers compared to standard Ethernet adapters

- **Enhanced Offloads and Energy Efficient Ethernet**

  Function : Broad feature set reduces CPU utilization including RoCE support, TCP/UDP stateless offloads, NVGRE and VXLAN offloads; Energy efficient Ethernet support reduces power draw
  Benefit : Reduces expenditures in data center with regards to power requirements and transfer times; More data transferred per power-related dollar than competition

- **Versatile Driver Support**

  Function : Server and workstation operating system support including Windows, Linux, OS X and FreeBSD
  Benefit : Single vendor for competitive performance across all major workstation & server operating systems for easier system design and support

ATTO

To purchase the solution, please contact AIC

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About AIC

AIC is a leading provider of both OEM/ODM and COTS (commercial off-the-shelf) and server and storage solutions. With expert in-house design, manufacturing and validation capabilities, AIC's products are highly flexible and configurable to any form factor, standard or custom. AIC leads the industry since 1996 with experience in mechanical, electronic, system-level engineering as well as a dedication to innovation and customer satisfaction. Headquartered in Taiwan, AIC has offices and operations throughout the United States, Asia and Europe.

www.aicipc.com

About Micron

Designing and building some of the world's most advanced memory and semiconductor technologies, we develop the technologies that transform what's possible. As one of the most prolific patent holders in the world we continually rethink, recast, and advance new ideas to bring innovation to broader markets and find ways our technology can inspire new applications or make fundamental improvements to existing designs.

www.micron.com

About ATTO

For nearly 30 years, ATTO Technology, Inc., has been a global leader across the IT and media and entertainment markets, specializing in storage and network connectivity and infrastructure solutions for the most data-intensive computing environments. ATTO works collaboratively with partners to deliver a wide range of end-to-end, customized solutions to better store, manage and deliver big data. With a focus toward markets that require higher performance and with a dedication to working as an extension of customer's design teams, ATTO manufacturers host and RAID adapters, network adapters, storage controllers, Thunderbolt-enabled devices, switches and software. ATTO solutions provide a high level of connectivity to all storage interfaces, including Fibre Channel, SAS, SATA, iSCSI, 40/10GbE, FCoE and Thunderbolt. Distributing its cutting-edge products worldwide through Original Equipment Manufacturers (OEMs), systems integrators, value added resellers (VARs) and authorized resellers, ATTO is the Power Behind the Storage.

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