NVMesh Accelerates the Data Center

Micron's software-defined storage (SDS) solution, based on Excelero's NVMesh®, is a validated and tested reference architecture built upon technology from Micron, Excelero, Supermicro® and Mellanox®. Micron has combined its storage engineering expertise along with Excelero's world-class SDS solution to build a bulletproof, scalable storage solution for your data center needs. This solution uses Micron's highest-performing NVM Express® (NVMe™) SSD and DRAM technology on Supermicro's 2028U-TN24R4T+ server platform interconnected with Mellanox ConnectX® and Spectrum 100Gb Ethernet infrastructure.

Supermicro provides fulfillment for all components of the reference architecture (RA) including Mellanox adapters, switches, Excelero NVMesh software and support.

Innovation Requires High-Performance Infrastructure to Emerge

Your business is driven by data — lots of data. So how do you obtain maximum value from that data in the most efficient way? Today's storage infrastructures cannot keep up with your demands, but what about future technologies? Which future advancements will you take advantage of to continue your innovatation? And what if that future technology was already here today?

The fastest storage solution available today consists of server-local NVMe SSDs. The challenge is that these server-local SSDs are hard to manage, with the NVMe benefits locked into individual servers that typically don't fully utilize the device's potential capacity, IOPS or throughput. To remove these limitations, Micron has introduced a reference architecture that truly unlocks the full potential of NVMe at scale. This solutions allows you to build more responsive, scalable and low-cost solutions to innovate far into the future.

Key Benefits

Performance
- Get near-local NVMe performance in a centralized, networked storage solution.
- Get predictable application performance.

Flexibility
- Deploy nodes to fit your application and data center requirements.
- Choose volume layout for performance and/or protection.
- Meet business requirements and budgets with "right-sized" volumes for hundreds of servers.

Manageability
- Provide consistent deployment and performance across the data center with a simple, lightweight storage protocol stack.
- Gain complete control of the storage infrastructure with RESTful APIs and web-based management.

Scalability
- Grow to petabytes or exabytes of ultra-fast NVMe storage.
- Scale to over 1000 nodes thanks to the NVMesh lightweight storage stack.

Release the Power of NVMe™ for Your Next-Generation Data Center

The Micron® SDS With Excelero NVMesh RA is a validated reference architecture that implements the next-generation of intelligent infrastructure platforms designed to provide applications with all of the raw performance you can expect from local storage — and all of the flexibility, manageability and scalability typically experienced with traditional storage area network-based solutions. Leveraging the latest Micron NVMe and PCIe standards, this RA uses a low-latency, high-bandwidth Mellanox RDMA over Converged Ethernet (RoCE) fabric infrastructure to connect compute and storage together in a flexible way that will fit almost any application's architecture requirements. Deploy this RA in storage-centric, compute-centric or mixed storage and compute configurations, and integrate it with existing data center application servers as desired (see Figure 1).

With the Micron NVMesh RA, you can unlock unused capacity and performance, so you can run the same workload with potentially fewer storage devices because capacity can be shared across applications and servers. This reference architectcure has the horsepower to host even the most demanding, real-time analytics applications, SQL and NoSQL databases, and virtual infrastructure solutions.
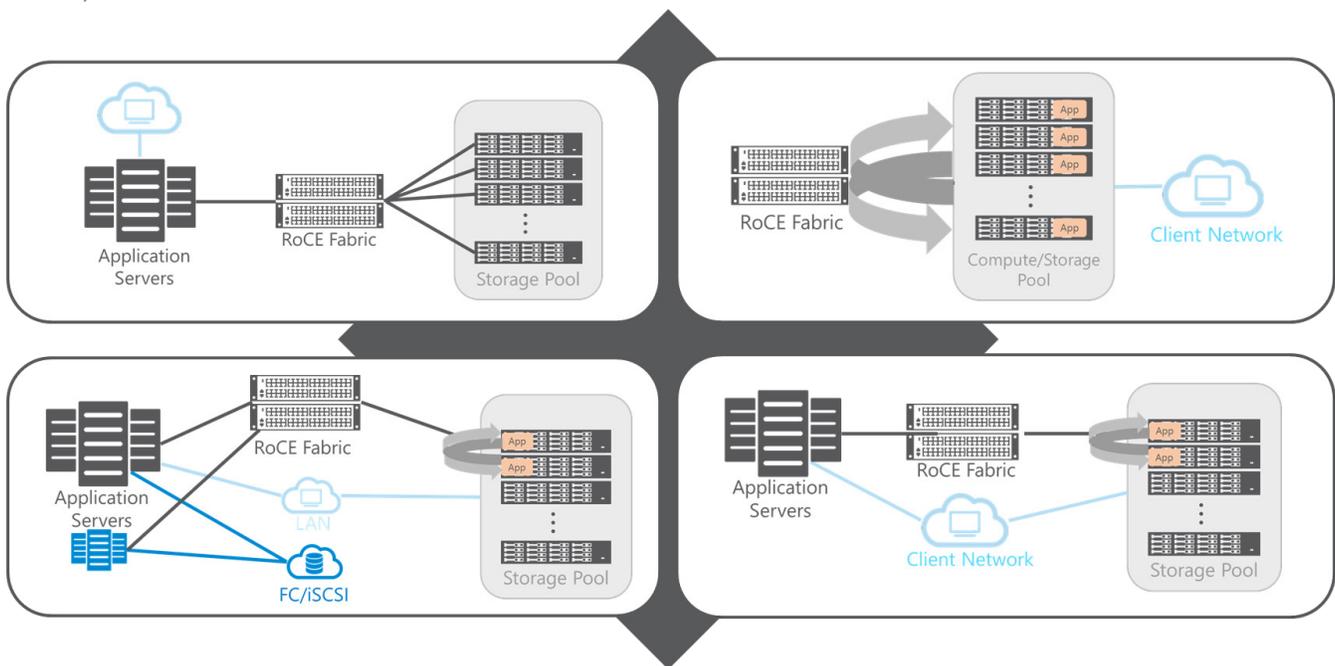

Figure 1: The Micron NVMesh RA provides a flexible, high-performance application infrastructure. The initial RA testing is focused on the top-left dedicated storage model. NVMesh provides seamless growth to future deployment options.

Ultimate Flexibility

Regardless of the deployment model, the NVMesh RA provides the flexibility to create and manage a single, centralized pool of storage, create "right-sized" logical volumes, and even share storage resources with existing compute resources. This lets you support existing applications currently deployed in your data center without making changes to the applications because they see the storage as local. Mix and match nodes to provide the flexibility and performance you need to support your legacy and next-generation cloud-centric application needs with the extremely low latency and high throughput required by these applications without worrying about noisy neighbor problems.

Any data center infrastructure is only as useful as its ability to be easily configured and managed, especially at scale. Excelero NVMesh provides a complete management interface using a robust RESTful API to allow the solution to be easily managed using existing management tools. Excelero NVMesh also provides a graphical, web-based user interface for an easy and interactive configuration experience.

Performance Is the Name of the Game[2]

One goal of the NVMesh RA is to provide near server-local performance in a linear scale-out remote NVMe solution. In early platform testing, a series of five test runs showed impressive performance:

- We achieved average IOPS levels within 4% of an equivalent server-local deployment (see Figure 2).
- We achieved an average of 10μs latency to the overall I/O in 100% random reads in 4K blocks (see Figure 3).
- In early scalability testing using three 2U Supermicro® server nodes[1], we achieved over 10.9 million IOPS[3] over a single 100Gb link.
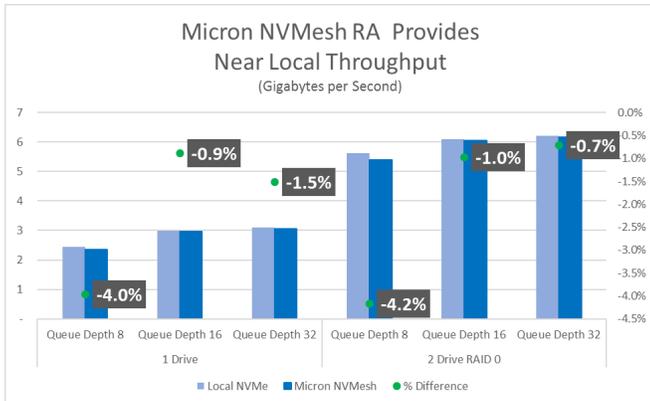
Figure 2: Micron NVMesh RA provides linear scale throughput close to those of local NVMe
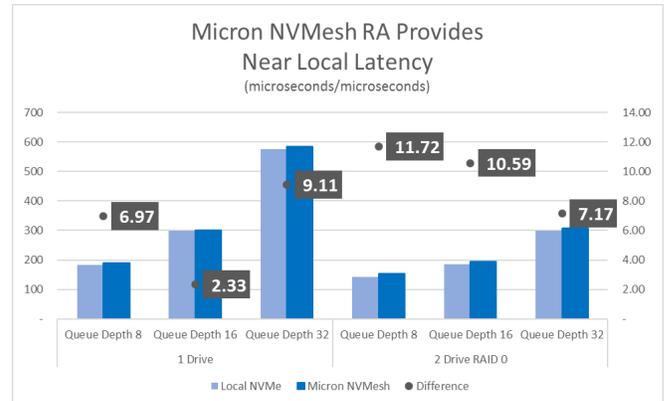
Figure 3: Micron NVMesh RA provides latency levels close to those of local NVMe

Want to Learn More or Try It Out?

To learn more about the Micron SDS With Excelero NVMesh RA, visit micron.com/accelerated-solutions.

To download the reference architecture, go to https://www.micron.com/%7E/media/documents/products/other-documents/micron_nvmesh_reference_architecture.pdf.

To purchase the solution, contact your Micron sales representative who will help you get in touch with Supermicro. Supermicro is offering Excelero NVMesh nodes fully configured with Micron storage and memory, plus Supermicro support to ensure you experience the astounding performance we have seen in our labs and customer sites around the world.

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