

# Build a High-Performance Data Center with Quobyte Software-Defined Storage and Mellanox Networking



The Mellanox Ethernet solution provides the performance and flexibility to unleash Quobyte's full potential as the pervasive storage layer for all data center workloads

Faced with massive growth in demand for performance and reliability by today's business applications, traditional data centers are quickly reaching their budget limits. Scaling up such a system is not just a matter of the initial hardware investment, but also involves the high operational costs of managing and maintaining the system. So instead of relying on proprietary systems, the modern data center is built from standard server hardware and high-performance Ethernet equipment. Such a commodity hardware foundation allows companies to select and mix hardware and hardware service models from different vendors to tailor a solution that fits perfectly with their business needs.

Quobyte embraces this paradigm shift and develops high performance, scale-out storage software on standard server hardware. As the Quobyte software delivers a unified file, block, and object storage infrastructure for data centers, the Mellanox Ethernet solution works in conjunction to provide linearly-scalable networking performance to unleash the full power of the Quobyte software.

## Quobyte Data Center File System

Quobyte delivers modern software storage for enterprise clouds at any scale. The software turns commodity x86 hardware into a reliable and highly automated data center file system with all its benefits:

- It easily scales out to petabyte level and beyond.
- It is resilient in the face of misbehaving hardware or network failures.

- It is entirely software-defined, which allows for flexible adaptation to business needs.

Quobyte thus enables high-performance and lights-out operations at the same time. Built around a distributed parallel file system core, it handles all workloads, ranging from virtual machines over shared file storage and Big Data to high-performance computing. By adding more devices, Quobyte delivers linearly-scaling performance.

Apart from performance, automation is another important factor in today's data centers. While disparate data and devices (SSDs or HDDs) proved to be an issue within a traditional storage setting, this is no longer the case with Quobyte; the shared distributed storage devices are pooled into a single consolidated deployment that allows for centralized management and monitoring. Lastly, enterprises need to take special care of their data. In order to prevent data loss or corruption, Quobyte uses cutting-edge technologies such as end-to-end checksum, replication, and erasure coding, and makes storage accessible via local mount point for Linux and Windows, NFS, HDFS or S3.

*"Quobyte and Mellanox are a perfect match. Mellanox's Ethernet equipment delivers top-notch performance at very competitive prices, while Quobyte's software enables a practically limitless automated scale-out storage. Together, they make the software-defined data center available for everyone."*

*- Felix Hupfeld,  
CTO, Quobyte*

### Mellanox End-to-End Ethernet Solution

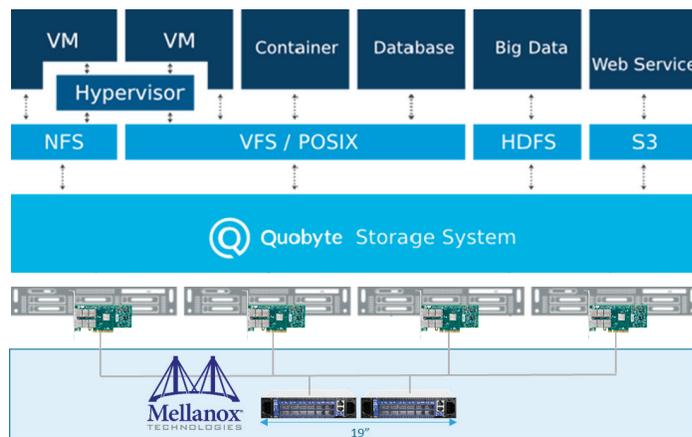
The Mellanox end-to-end Ethernet solution greatly simplifies the deployment and management of high-speed networking in the data center. Optimized for ultra-low latency lossless fabrics, the Mellanox Ethernet switches support the requirements of today's performance-demanding data centers and work as the ideal top-of-rack switches for various hyper-converged infrastructure deployments.

Equipped with intelligent ASICs, Mellanox Ethernet adapter cards provide offloading mechanisms such as Erasure Coding, T10/DIF, TCP and UDP offloads, and overlay offloads. By bypassing the CPU with RDMA over Converged Ethernet (RoCE), the CPU's resources are freed up, especially in a CPU-bound environment, for the necessary storage and compute tasks, allowing for higher scalability and efficiency with the data center.

### Solution Overview

Combining the Mellanox Ethernet solution with a Quobyte deployment on a cluster of standard x86 servers provides companies with a high-performance, efficient, and very flexible hyper-converged infrastructure. Quobyte allows compute and storage to run on the same servers, while the Mellanox Ethernet solution unleashes an efficient and fast network. Together, they significantly reduce complexity by automating processes and they achieve unprecedented levels of utilization and performance, thus keeping TCO in check.

To select the right networking devices for a customer's data center, Quobyte completed a trial with Mellanox's 10GbE and 40GbE solutions using ConnectX®-3 Pro network adapter cards and SX1012 Ethernet switches – to great success. What stood out was the easy and flexible setup and integration that brought out the advanced and compelling features of CPU offloading and RoCe.



The test results demonstrate that Mellanox Ethernet products exceeded expectations and fully met Quobyte's requirements for latency and throughput. Quobyte was able to fully saturate the network links, and thanks to the offloading features, the CPU utilization for upper-layer applications remained untouched. The flexibility provided by the SX1012 switches to mix 10 and 40GbE connections paved the way to perfectly matching application requirements with server utilization. Additionally, both solutions also provide capabilities for monitoring and automation, thus completing the last step in creating the software-defined data center.

### KEY BENEFITS

- High performance with standard hardware
- Ultra-low latency and high throughput for all application use cases
- Optimized server utilization with 10/40GbE networking and CPU offload
- APIs and automation enable software-defined data centers
- Application, storage and front-end network in one network fabric

### About Mellanox

Mellanox Technologies (NASDAQ: MLNX) is a leading supplier of end-to-end Ethernet and InfiniBand intelligent interconnect solutions and services for servers, storage, and hyper-converged infrastructure. Mellanox intelligent interconnect solutions increase data center efficiency by providing the highest throughput and lowest latency, delivering data faster to applications and unlocking system performance. More information is available at [www.mellanox.com](http://www.mellanox.com).

### About Quobyte

Founded in 2013, Quobyte Inc. is the first company to offer a fully automated, scalable, and high-performance software for implementing enterprise-class storage infrastructures for all workloads on standard server hardware. Leveraging its decade-long experience in distributed systems research and with large-scale storage systems at Google, Quobyte's founding software engineers and their growing team took the best parts of their former project – the open source distributed file system XtremFS – and rebuilt it from scratch. By incorporating their research results and cutting-edge technologies, Quobyte now provides reliable storage for all use cases while keeping data safe and available thanks to smart algorithms. Quobyte's capabilities are used in such diverse areas as supercomputing, public OpenStack cloud infrastructures, large-scale web services, and more. Find out more at [www.quobyte.com](http://www.quobyte.com) or get in touch directly via [info@quobyte.com](mailto:info@quobyte.com).



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