



Higher Education

University of Utah Marriott Library Turns the Page on Unreliable Storage by Deploying Qumulo File Fabric (QF2)

The Marriott Library's storage infrastructure was pushed beyond the breaking point by digitization and archival initiatives, yet as a public institution it had significant budget constraints for an upgrade. QF2, a modern, highly scalable file storage system offered the reliability, performance, and scalability required, while promising significantly enhanced functionality thanks to its unique real-time analytics design. All without breaking the bank.

The Perils of Cheap Storage

The University of Utah's J. Willard Marriott Library is at the forefront of digitizing and archiving media, from newspapers, thesis, research data, and books to analog or uncompressed film, photography and video. It houses the Utah Digital Newspapers Project, which, at over 23 million items, is second only to the Library of Congress in open access newspaper collections. Yet that large digital newspaper repository still only represents a fraction of the overall volume confronting the Marriott Library, with its two Kirtas automated book scanners and teams of technicians generating millions of digital files annually.

The Marriott Library's storage system was born out of two conflicting goals: significant capacity requirements and a shoestring budget. The answer at the time was a "home brew" Supermicro server and cluster of inexpensive high-density disks. The system served as a primary archival repository and the target for metadata tagging — making it central to the entire digitization initiative. Ultimately, though, the combination of large digital scans and vast quantities of individual files brought the system to its knees.

Unfortunately, over the next few years that system began to experience disk failures at a rate of about once per week, and its RAID 5 architecture inevitably resulted in lost data and a restore from backup. Even after the Marriott Library's IT team switched to RAID 6, one particularly bad failure wiped out the whole system.

It was while visiting the data center to replace a failed drive that the Marriott Library's Assistant Head for Systems Development, Joel Hsia, identified the problem. Apparently, in order to acquire enough disk capacity while staying within budget, someone made an unfortunate choice: consumer grade disk drives.

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Assistant Head for
Systems Development,
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Hsia and his team quickly redesigned the system using enterprise grade drives, RAID 6, hot spares and more. While that solution ran fine for a while, it was still fundamentally a home-brew system and didn't offer the enterprise grade reliability, uptime and scalability the Marriott Library ultimately required. So, Hsia's team set out to identify a new solution that would do all of that, while also fitting within its limited budget.



Solution Overview

- 4 Qumulo QC208 hybrid storage appliances
- SMB, NFS and REST protocols
- Qumulo Care enterprise support

Key Benefits for Marriott Library

- Prevents data loss and downtime through rock-solid reliability
- Scales to gracefully meet growing storage and performance requirements over time
- Saves time through fast, streamlined deployment
- Ensures flexibility by delivering enterprise-class storage at a budget-friendly price
- Maintains uninterrupted operation through proactive Qumulo Care support

Massively Scalable, Impressively Reliable, Surprisingly Affordable

The IT team first eliminated cloud storage as too expensive for the volume required, and quickly settled on three options: a better roll-your-own system, renting part of a cluster from another department in the University, or a new scale-out NAS solution. Both internal systems were eliminated — the roll-your-own because it wouldn't really meet the goal, and the other department's offering because it ended up being prohibitively expensive. That left scale-out NAS, or so they thought. The Library considered solutions from HP and Isilon, but ultimately focused on a different, more innovative, solution — a highly scalable file system called QF2 from a then little-known company called Qumulo.

"I first heard about Qumulo at a discovery event held in Salt Lake City, and the functionality and pricing they offered was just incredible. I was hooked," says Hsia.

QF2 is a modern, highly scalable file storage system that is fast, flexible and delivers the real-time analytics necessary for visibility into data usage and performance at petabyte scale. Hsia recognized that QF2 offered the reliability, uptime, scalability, and world-class support required, and all within budget. It also offered advanced data analytics and performance that Hsia's team could leverage as needed over time. As importantly, Qumulo promised to rapidly get the new cluster installed, configured and deployed, something Hsia knew was important for the Marriott Library to keep its digitization initiative on track.

Hsia and his team ultimately selected Qumulo's QC208 4U hybrid storage appliances, deploying a four-node cluster capable of storing over 400TB of data. Before even opening the cluster for direct access by technicians, the team is already using over 75% of the capacity with more than 110 million files on the system. Fortunately, Qumulo's 'pay as you grow' design allows new nodes to be easily and non-disruptively added to expand the cluster.

The J. Willard Marriott Library is the flagship academic library for the Utah State System of Higher Education and the largest state-funded academic library in the six-state region of Idaho, Montana, Nevada, New Mexico, Utah and Wyoming. As the primary service hub and destination for students, the Marriott Library is integral to the teaching, research and public life missions of the University of Utah. The library's mission is to inspire the creation, discovery and use of knowledge for Utah and the world. Library holdings include 3 million volumes and nearly 200 unique digital collections containing countless photographs, maps, books, audio recordings, newspaper articles and other items. Important collections span Utah, the Mormons, and the West to extensive science, engineering, medical and legal archives. The library also holds more than 1 million historical photographs and extensive film collections.

Consolidating Storage on a Modern Platform

The new QF2 storage cluster delivers the scalability and reliability Hsia and his team wanted for the J. Willard Marriott Library. It has also begun to pay additional unexpected dividends: thanks to the extremely fast performance, the Marriott Library has been able to offload virtual machine datastores onto the QF2 appliances.

"The fact that the QF2 appliances are fast enough to mount and host VMDK's as repositories is a real help with our overall infrastructure," Hsia says. "In fact, the cluster is so fast we're now using it as the primary storage for all of the digital collections accessed by the public."

Other departments within the Marriott Library are also eyeing the QF2 cluster. One group was managing a media streaming server attached to a Drobo storage unit that was failing — migrating that system to QF2 started a trend.

Hsia and his team have begun consolidating many different workflows and files onto the QF2 cluster, meaning disparate, spread out systems now share one common and easily manageable infrastructure. "As we shift additional applications to point at the QF2 cluster, I'm confident that backups are happening and the reliability and availability is there. It really helps not having to worry about that," notes Hsia.

That reliability is helped by Qumulo's proactive Customer Success team. In one instance, Hsia called in a permissions issue, and within 30 minutes of filing that trouble ticket the dedicated support team was screen sharing on a web conference call to solve the issue.

"The Qumulo Customer Success team makes us very happy — they routinely see problems before we do, and in most instances are already working to resolve the issue before we're even aware it exists," says Hsia.

Qumulo builds on that responsiveness with an agile development and release model that delivers software updates through rapid, two-week sprints. "A big initial selling point for us was the coming Active Directory support; Qumulo delivered it as promised, and it's been very easy to use," he says.

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Hsia envisions QF2's role in the Marriott Library's infrastructure becoming larger and more important over time. He ultimately expects it to become their primary storage solution and looks forward to tapping the system's real-time analytic capabilities to better manage and control access, along with its REST-based API to integrate with other applications.

This is a night-and-day difference from where the Marriott Library was with its original disk farm.

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