Preserving a digital record of life on Earth

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Rob Zschernitz, Chief Technology Officer, The Field Museum

The Field Museum

Established in 1893 as part of Chicago's World Fair, The Field Museum of Natural History has earned a global reputation as both an active scientific research institution and the safekeeper of some 30 million specimens and artifacts. Its educational exhibits attract about 2 million visitors a year. Its wide range of collections, many ranked among the world's best, cover fields such as archaeology, biology, botany, and paleontology. To make these resources available to researchers worldwide 24/7 via the web, the museum started digitizing its collections in recent years—creating no less than a digital record of life on Earth. This initiative has spawned a data set that grows daily with the addition of high-resolution images, staff files, and data from the museum's own researchers. When its traditional storage area network (SAN) and data protection failed to keep pace with growth, the IT staff turned to a cloud-based solution, deploying Nasuni Enterprise File Services™ with Microsoft Azure.

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Providing scalable cloud storage on demand

According to Chief Technology Officer Rob Zschernitz, the museum's digital archiving of all its collections—plus its extensive, ongoing research activities such as genomic sequencing of endangered species—had triggered a data explosion. But it wasn't just the data volume that exploded, it was also the types of data and the storage volume. "Over the past few years we noticed a change in the type of data we were storing," he says. "It went from structured database and VM-type data to file-based data, including high-resolution images, DNA-sequencing data, and standard business files. And those hi-res images need lots of storage. We have hundreds of thousands of them."

The problem was that, like many businesses, the museum had relied for years on a traditional storage area network (SAN) that was optimized for storing structured data. Another issue with its fast-growing data was unpredictable fluctuations in its volumes. "Because our research projects are grant-funded, IT has no way of telling when or if grants will be approved," Zschernitz explains.

"Also, sometimes local philanthropists can totally surprise us with a big donation to support a particular research project that's a favorite of theirs. Either way, when a project does proceed, we have to immediately provision the necessary data capacity, so we'd often find ourselves in situations where we had to scale storage very quickly, like in days or weeks."

Clearly, the museum needed more storage scalability and agility so it could better match capacity with demand. Unfortunately, it could not afford to add capacity just in case projects got funded, then let it sit unused until grants were awarded. "In our situation, using a traditional SAN environment gave us only a couple of options," he says. "We'd either need to have storage that we're paying for sit idle, all ready to go, or we had to try to find a solution that would let us scale quickly and almost on demand to accommodate the needs of grant funding."

Providing hassle-free, worry-free data protection

Zschernitz cites another big issue with the museum's file data growth: protection. IT was backing up to tape drives and a tape library, which took ever-more effort, cost, and time. Although Zschernitz's team migrated to a disk-based system, that approach was also becoming too costly. "We were concerned about how fast we could recover from data loss," he says. "Our data needs to be available 24/7 to both our own researchers and others around the world."

For all these reasons, Zschernitz knew that adding more capacity to the current SAN would waste the nonprofit's money and IT's time, especially because cloud-based alternatives existed. In particular, he decided a hybrid approach, with cloud-based storage tied into on-premises infrastructure, could best address the museum's requirements. For advice, he contacted SHI International, an IT consultant and a Microsoft channel partner.

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Together they evaluated several options, including one offering from Amazon Web Services, but they ultimately chose Nasuni, backed by the Microsoft Azure cloud platform. Nasuni assists enterprises worldwide with a file-focused, hybrid cloud storage solution that delivers highly scalable, unlimited capacity, automatic backups, instant disaster recovery, fast remote access, and simple, unified management through a single console.

"We played with AWS, but I personally think Azure is more cutting-edge on the technology side, and having the Filers backed by Azure brings that to the forefront," he says. "With Nasuni and the Azure cloud, we can take advantage of the vast resources in Microsoft's huge datacenters, which is especially vital for a small IT team like ours, as we must support not just storage but also a wide range of stakeholders, applications, and operations."

Enabling a hybrid approach to avoid disruptions

Zschernitz sought to avoid disrupting the ongoing digitization project and the work of the museum's own scientists and that of others from around the world who work on-premises or access the museum's data via the web. "Researchers are here in the building or remotely tapping into our data at all hours, so we don't have traditional maintenance windows to conduct a forklift upgrade," he says. "That's why the hybrid approach with Nasuni and Azure appealed to us, because it let us scale up our storage quickly and protect it all, yet still get

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The key to the Azure-backed Nasuni solution is the Nasuni UniFS® file system. Designed to be native to the cloud, Nasuni's one-of-a-kind file system links the museum's local Nasuni Edge appliance to Azure's virtually unlimited cloud storage resources, providing true scalability without impacting local performance. This gives The Field Museum high-performance access to stored files, on-demand scalability, and built-in data protection through continuous versioning.

As Zschernitz sees it, his Azure-backed Nasuni solution has become such a normal part of his storage infrastructure that he doesn't think of the cloud as a separate entity. "With our single-pane-of-glass Nasuni console, managing our storage whether it's on-prem or in the Azure cloud is completely transparent," he says. "I don't even think about the cloud as something separate anymore."

Another benefit is fast performance, Zschernitz gladly reports. "We expected that we'd see some latency when files were coming back from the cloud," he says. "But what we've experienced is just the opposite. When we moved all our data to Nasuni and Azure, our clientele inside the museum, our colleagues, and staff, all noted that their access to that data was actually much faster."

In addition, the museum complemented its Nasuni storage management capabilities

hosted on Azure by tapping into Azure's Blob (Binary Large OBject) storage. This Azure feature offers massive scalability with exabytes of capacity. The museum can use this capacity to store any type of unstructured data—images, videos, audio, documents, and more. And it can do so in hot or cool tiers, depending on how often its researchers need access to that data.

Today, The Field Museum no longer needs to overprovision its storage capacity by buying excess hardware. This has helped to shrink its datacenter footprint, freeing significant space for other uses, especially exhibitions. Yet the IT team can still spin up storage as fast as needed. "Because we often have no lead time to spin up storage, having something on-premises that we could just immediately start sending data to has been really key for our business," Zschernitz says.

Saving up to 60 percent in costs and time

Powerful but easy-to-use management tools and increased visibility have been big benefits, too. "Managing Nasuni and Azure is a dream compared to a traditional SAN," Zschernitz says. "In an executive team meeting, I can be asked, 'How much data are we storing and what does this it look like?' With instant access to that information via the Nasuni console, I can answer those kinds of questions immediately."

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The museum and IT staff are also enjoying big money and time savings. "The Azure-backed Nasuni solution has saved us a ton of money—about 60 percent of what we were paying for storage on our traditional SAN," Zschernitz notes. "It also saves up to 50 percent of our time in managing our storage compared to before."

A big part of those time-savings come from not having to deal with data protection anymore, as the Azure-backed Nasuni solution performs that function better, faster, and cheaper. Copies of frequently accessed files reside in the local cache, for fast access. Then, to back up those files and for cold storage of archival files, Nasuni maintains a "gold copy" of every file in the Azure cloud, along with multiple geo-redundant copies in Microsoft's many Azure datacenters around the world. The gold copies are updated as often as every minute. This offers the museum recovery time objectives and recovery point objectives that simply were not possible previously.

"With Nasuni and Azure safeguarding our data, we have the peace of mind knowing we can recover that data at any point, at any time, in a way that we couldn't before," Zschernitz says.

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