UCLA LONI

Transforming Grey Matter into Medical Breakthroughs

Applications

UCLA's Laboratory of Neuro Imaging (LONI) houses and maintains the world's largest repository of brain images.

Challenge

With a rapidly growing catalogue of brain scans—now exceeding 16,000 subjects—the IT decision makers at LONI recognized they were running into critical limitations when it came to their image file storage requirements. Moreover, the relative size of scans is dramatically increasing as image resolution improves, with some individual files generating as much as 200GB of data. The volume and sheer bulk of these image files creates significant performance and management issues, hindering the important work of its globally dispersed research staff who rely on LONI's vast library of neuro images to conduct their work.

Isilon IQ Benefits

LONI selected Isilon IQ to help manage and retrieve hundreds of terabytes of neuro imaging data due to Isilon IQ's:

- Fast, concurrent access to high resolution neuro image data

- Three-fold performance increase in network bandwidth and a doubling of data throughput

- Flexible, plug-and-play storage add-on capabilities that minimize system downtime

- Simplified management by unifying LONI's distributed image archive into a single file system and single volume

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UCLA LONI Embraces Isilon IQ Clustered Storage to Power Critical Work for Hundreds of Researchers in Advancing the Scientific Understanding of the Brain

The Laboratory of Neuro Imaging (LONI) at UCLA represents one of the world's most advanced research centers dedicated to understanding the inner workings of the human body's most complex organ: the brain. Since its inception in the early 1980's, LONI has scanned more than 16,000 subjects including human, primate and rodent neuro images. These scans represent a critical foundation for the laboratory's researchers who collaborate from around the world to deliver scientific breakthroughs that are shedding new light on complex diseases such as Alzheimer's, autism and schizophrenia.

Rendering a single three-dimensional subject scan is a complex, data-intensive process that requires a high-performance computing environment. To create these scans, LONI generates hundreds of two-dimensional MRI scans and then employs a variety of custom applications to virtually stack the images together to build a complete three-dimensional composite. To process these files, LONI leverages the largest computing cluster at UCLA, comprised of 320 dual processor servers, representing a total of 720 CPUs.

In addition to the computational challenges, the ability to store, access and retrieve these images in real-time is a functional necessity for the several hundred researchers that are working onsite, as well as around the world. However, due to the inherent limitations of traditional storage arrays, LONI's research efforts were often stymied due to slow retrevial times or unavailability of critical image data. To overcome this challenge, LONI evaluated a wide range of technologies to help them meet the ever-growing storage demands of their researchers.

"Data storage represents a mission critical resource for LONI and we knew that whatever system we selected, it had to meet a broad set of criteria that included system and network performance, simplified management and perhaps most important of all, the ability to quickly scale. Deploying Isilon IQ was incredibly easy—an Isilon engineer came to our data center at 8AM and by noon our clustered storage system was up and running. To add storage capabilities to our existing SAN is typically a four-day process. Now if we want to add another Isilon storage node, it takes all of 10 minutes."

—Rico Magsipoc, Chief Technology Officer, LONI

Clustered Storage Delivers Immediate Results: High Availability Plus Low Latency Equals Productive Researchers

LONI selected the Isilon IQ 3000 with InfiniBand® to facilitate intracluster communication and to support its high-throughput operating requirements. Before deploying Isilon, LONI's average data throughput topped out at 450MB per second. With Isilon in place, LONI has more than doubled throughput to a rate of 1GB per second, providing the laboratory with the capability to concurrently serve up large image files to its research staff—regardless of whether they are on campus in Los Angeles or at a research facility on the other side of the globe.

From a management perspective, LONI required a full-time administrator to manage their existing SAN. Armed with the fifth generation of Isilon's powerful OneFS® operating system to facilitate the provisioning and management of their storage nodes, LONI no longer requires a dedicated storage manager and can now reassign this valuable resource to other technology priorities. In addition to using Isilon IQ for their own storage requirements, LONI also functions as a service provider to other neurological research centers around the nation that use these images for comparative analysis purposes. This service puts additional strain on their storage infrastructure, further demonstrating the unique value of Isilon's clustered storage environment.

With Isilon IQ, LONI is now reaping the benefits of a fully redundant clustered storage system that can quickly scale to meet their ever-growing storage demands and help deliver the next wave of breakthroughs in neuro research.

"The research we are conducting at LONI promises to help demystify the inner workings of the brain and bring new medical breakthroughs to market. We understood our current storage systems wouldn't be able to meet the heavy usage demands of our research teams and that a new approach to storage was necessary to fulfill our mission. We evaluated several storage solutions and Isilon came out far ahead of the pack due to its inherent scalability, ease-of-use and system redundancy. Isilon has delivered as advertised."

—*Rico Magsipoc, Chief Technology Officer, LONI*

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