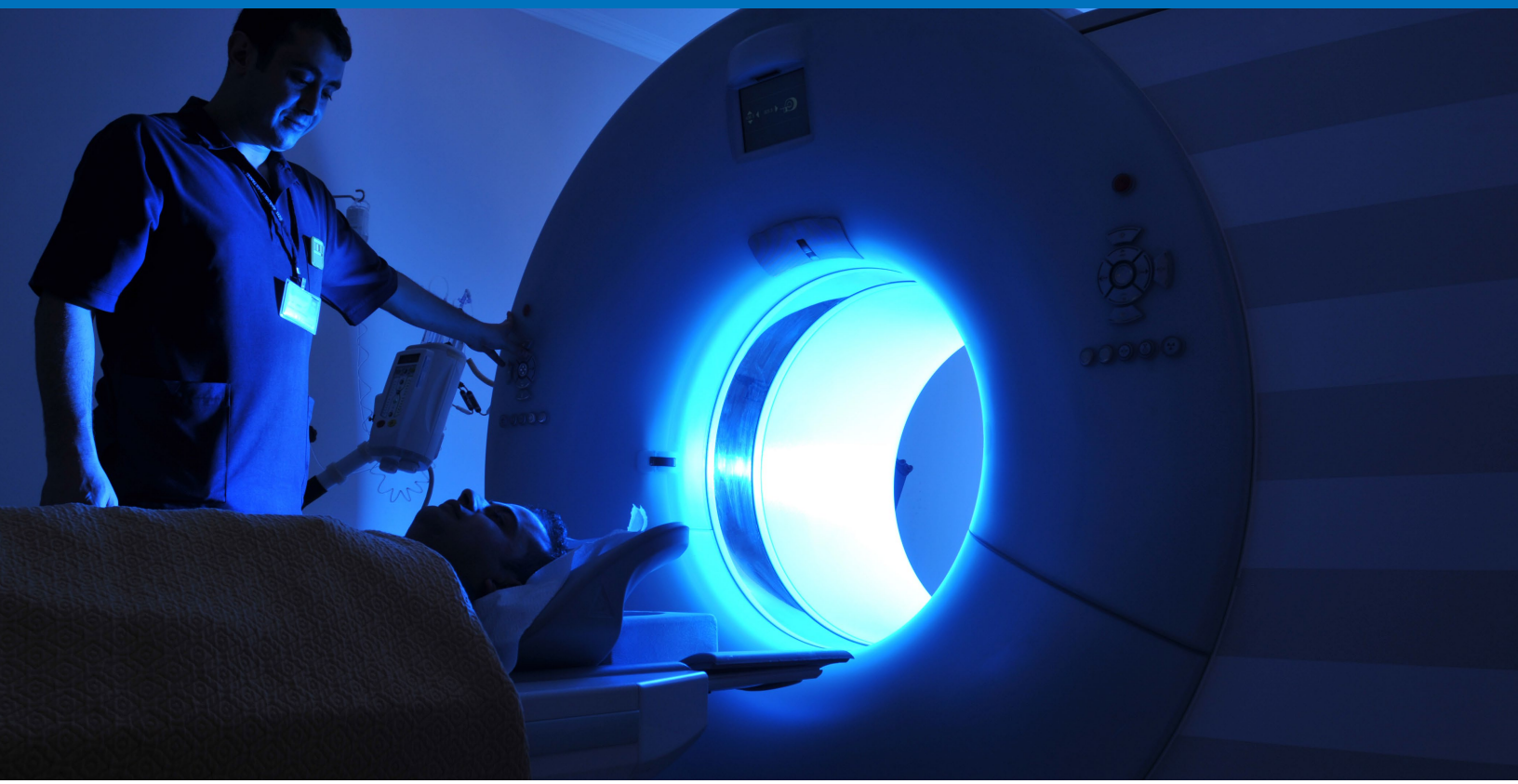
Quantum



CASE STUDY

NIH Keeps Medical Imaging Healthy with StorNext Scale-out Storage

When the National Institutes of Health Department of Radiology and Imaging Sciences needed a solution for storing, accessing, and protecting one of the most important libraries of medical images in the world, they turned to Quantum StorNext. The result is high-speed shared storage that enables the NIH to easily manage their growing MRI image archive—freeing NIH scientists to do what they do best.

FEATURED PRODUCTS

StorNext 5

> Advances in medical imaging are helping patients around the world get better care. Quantum helps imaging sciences teams stay focused on driving research forward—rather than on managing the storage infrastructure.

Jeff Plum
Vice President, MedData

> The images help researchers analyze everything from cancer to the common cold, with a single study generating as many as 82,000 images. And with most of the data, it must be stored and protected indefinitely—effectively forever.

Jeff Plum - Vice President, MedData Research, Inc.

SOLUTION OVERVIEW

- Quantum StorNext® Scale-out Storage
- Quantum StorNext AEL500 Tape Archive

KEY BENEFITS

- **Keeps up with the growth of imaging data,** with support for petabytes of data and hundreds of millions of files
- **Provides high-speed shared access** that enables hundreds of imaging scientists to share data and do complex analysis over both SAN and LAN—increasing productivity
- **Integrates seamlessly with applications** such as PACS and enhanced DICOM apps, regardless of whether running on Windows, Mac, Linux, or Unix
- **Provides an economic petascale archive** to enable long-term preservation of critical research data with best-in-class data integrity
- **Compatible with next-gen object storage** and cloud storage tiers from Quantum, making it easy to scale
- **Includes proactive support from experts** at Quantum, to keep research and imaging data available and protected

As medical imaging technology advances, its role in medical research continues to expand. Today this even extends to behavioral sciences as breakthrough levels of detail in functional magnetic resonance imaging (MRI) give researchers the ability to directly observe brain functions. But more detail means larger file sizes, which created data management challenges at the National Institutes of Health.

MANAGING DATA GROWTH AT THE NATIONAL INSTITUTES OF HEALTH

The department of Radiology and Imaging Sciences (RIS), part of the Clinical Center at NIH, oversees 750TB of imaging data today, with growth measuring roughly 10% every month.

RIS provides services to all of NIH's 27 separate institutes and centers, supplying MRI, computed tomography (CT scans), and ultrasound, among other imaging technologies. Its nearly 250 scientists conduct and publish results from their own research. In addition, RIS stores, protects, and manages images for thousands of other NIH researchers. The underlying infrastructure supporting RIS imaging sciences is managed by contractor MedData Research Inc., a specialist in integrating and supporting research and clinical protocols.

FINDING A CURE FOR A GROWING MEDICAL IMAGE LIBRARY

"The images help researchers analyze everything from cancer to the common cold, with a single study generating as many as 82,000 images," explains Jeff Plum, MedData vice president. "And with most of the data, it must be stored and protected indefinitely—effectively forever."

Plum adds that RIS has some of the most challenging requirements for any large library of images.

"The system needs scalability to keep up with growth. It needs very high performance to allow multiple researchers to access the data at

the same time. It has to support many different platforms running different applications. And it needs to be able to preserve and protect data for the long term, so it can be analyzed and studied again in the future."

In past decades, the RIS team was an early user of UNIX-based hierarchical storage management (HSM). Later, they added Macs and the Xsan file system for Fibre Channel connectivity. As data outgrew that system, the team at RIS adopted an Active Storage solution. Today, the entire storage system and workflow is supported by StorNext scale-out storage from Quantum, a 100% Xsan-compatible solution.

CONTROLLING COSTS OF A PETASCALE ARCHIVE WITH TIERED STORAGE

StorNext scale-out storage provides the RIS team with high-speed shared access to their large MRI image repository—as well as a cost-effective approach to managing the growth of the imaging data. With the tiered storage options offered by StorNext, it's easy for the RIS team to store images on a combination of high-speed disk and green, economic LTO tape libraries. When RIS needs to grow the archive in the future, StorNext also offers tiering options to object storage and cloud, giving the RIS team the flexibility to balance performance, access, scale, and cost by transparently accessing data across locations from a single interface.

"The workflow brings data onto the high-speed disk where it resides for as long as active research is being conducted—anywhere from weeks to decades," Plum says. "Copies are created on tape every day, and when the images are no longer active, files are removed from disk and exist only in the archive—until the scientists tell us to delete the images."

ACCELERATING WORKFLOWS WITH STORAGE BUILT FOR SPEED AND SCALE

Plum explains, "StorNext supports very large amounts of data—the smallest file system has 47TB and over 110 million files—and it allows for resources to be added quickly and transparently. Capacity can be increased whenever needed just by adding more arrays. Overnight, they become part of the storage pool and show up for the research team. The tape archive also scales dynamically; MedData can move to new drive technology easily, or add more units. Researchers keep accessing data from all locations through a single interface that looks like a C: drive."

Importantly, the technology stays out of the way of researchers and their work.

"The performance of StorNext is extremely high," adds Plum. "The scientists with SAN-attached workstations see direct Fibre Channel speeds—and the system keeps the performance high even when many of them are working on the same data sets."

The new solution helps MedData keep RIS ready for whatever applications its researchers might need and however those researchers might need to work.

"StorNext works seamlessly with all of the applications, even the roll-your-own applications that the research teams develop, as well as many different platforms like Windows, Mac OS, Linux, and UNIX—including their access and security features," says Plum. "It is also compatible with the standard PACS [Picture Archiving and Communication System] tools, and the enhanced DICOM [Digital Imaging and Communications in Medicine] format. StorNext has also let MedData establish LAN clients. That means that scientists can analyze data in the lab over high-speed Fibre Channel, then go back to their offices and download the same files to their laptops to use in presentations."

ARCHIVING RESEARCH ASSETS INDEFINITELY

With research studies often lasting 10 years or more, protecting data over the long term to keep it available for future use is a high priority.

"With lifetime studies, images can be taken of a patient over a long period of time, and the latest images are always compared back to the original," explains Plum. "With StorNext, MedData is able to create two copies of new

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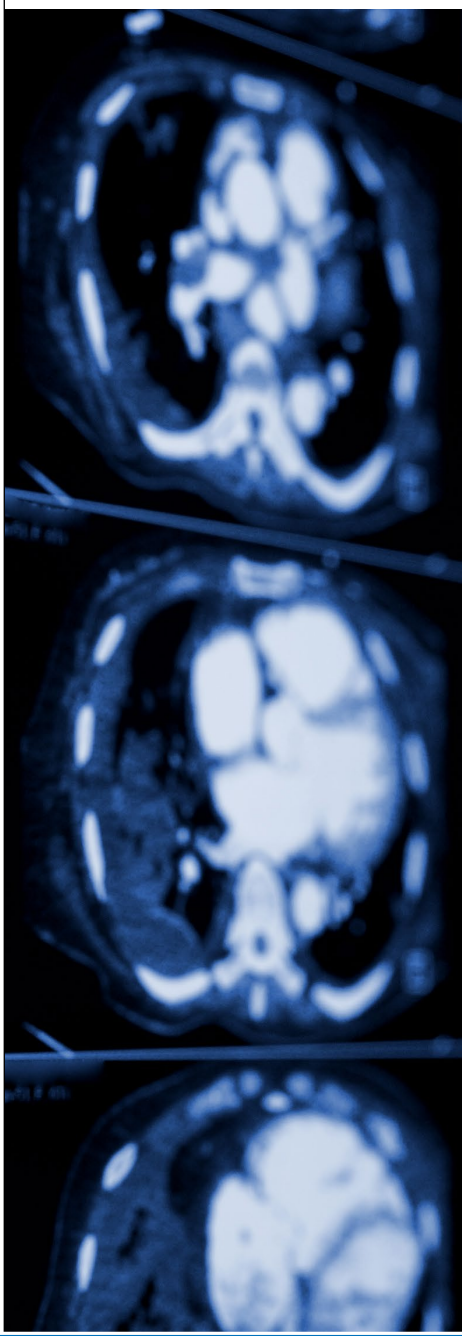

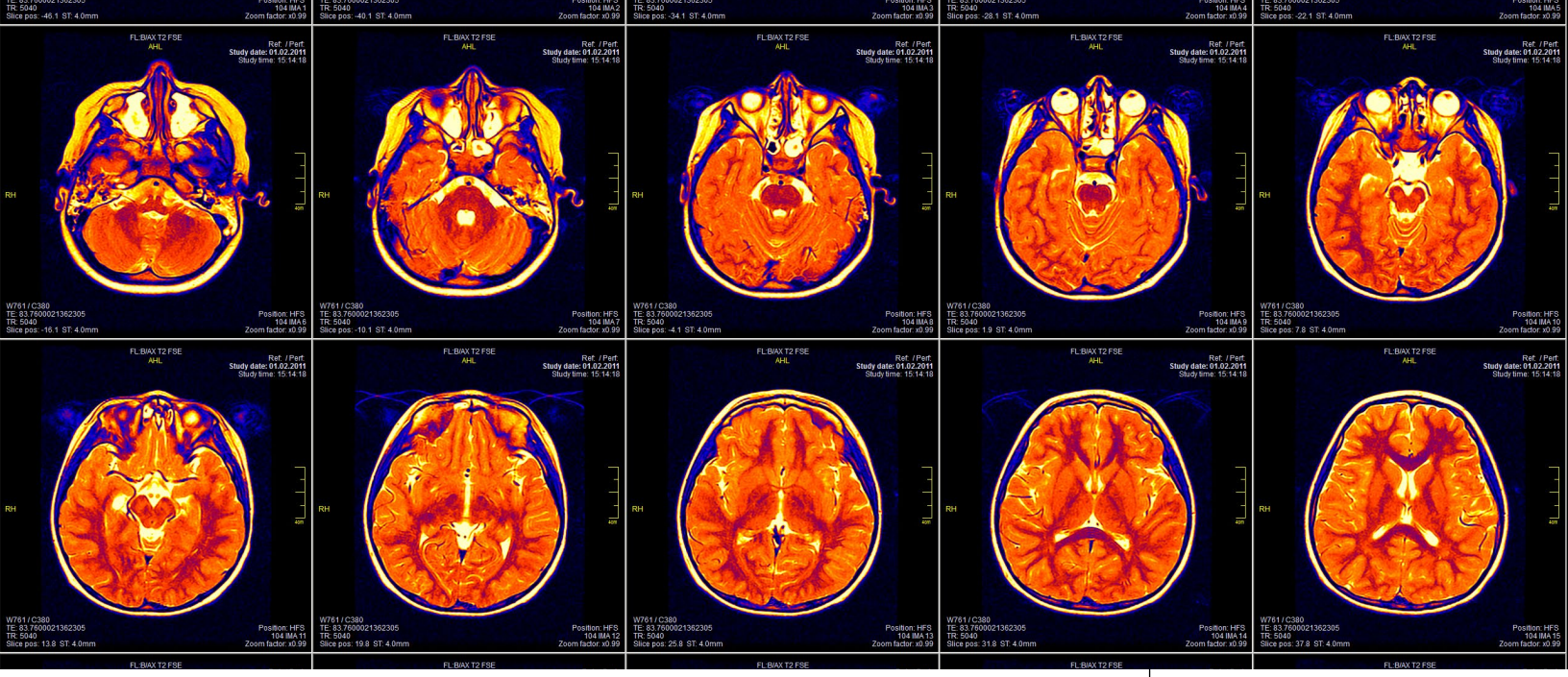

data on tape, including one copy in the LTFS Linear Tape File System open standard. Going forward, that second copy can be read without having to rely on any specific hardware or application, so the data remains accessible for the lifespan of the study."

To protect the data integrity of its tape archives, RIS uses the Extended Data Life Management (EDLM) feature from Quantum. EDLM detects suspect media and automatically migrates data to new tapes if needed. With policies set to control the frequency and behavior of EDLM, RIS can ensure that archived data is available when researchers need it.

SIMPLIFYING ADMINISTRATION WITH SUPERIOR SERVICE AND SUPPORT

The RIS team at NIH was initially concerned about transitioning from their previous Xsan and Active Storage solutions to StorNext, but Quantum made it easy.

"Quantum really stepped up and made the move to StorNext easy," Plum notes. "It was up and running without impacting research, doctors, or patients."

RIS and MedData have also been impressed with the quality of Quantum support.

"Twice, once with disk drives and once with tape drives, the Quantum service team looked at data sent from the drives, told MedData that they were headed for problems before we saw any symptoms, and overnighted us replacements," says Plum. "In each case we had new parts ready to plug right in, which meant we avoided downtime."

DEPLOYING STORAGE BUILT FOR THE FUTURE OF MEDICAL IMAGING DATA

The StorNext platform gives RIS the scalability it needs to support imaging technologies as they evolve.

"Quantum also gives us a path to a next-generation object storage technology tier when MedData is ready for it," says Plum. "Because it offers massive scale and easy access, object storage is a great fit for the long-term preservation of medical imaging data."

ABOUT THE NATIONAL INSTITUTES OF HEALTH AND THE DEPARTMENT OF RADIOLOGY AND IMAGING SCIENCES

The National Institutes of Health, a part of the U.S. Department of Health and Human Services, is the nation's medical research agency—making important discoveries that improve health and save lives. The Clinical Center's Department of Radiology and Imaging Sciences provides clinical care and research support in the areas of Body Imaging, Interventional Radiology, Neuroradiology, Nuclear Medicine, and Clinical Image Processing Services.

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