

Queensland Brain Institute Cuts Backup Time from Seven Hours to Five Minutes



Queensland Brain Institute
Brisbane, Australia
www.qbi.uq.edu.au

Industry:

Education & Research

Employees:

380

Oracle Products & Services:

StorageTEK SL3000 modular library system
StorageTEK SL500 modular library system
Sun Flash Accelerator F20 PCIe Card
Sun QFS
Sun Storage Archive Manager
Oracle Premier Support for Systems

“An outage could have a serious impact on our research work; for example, a scientist could lose hundreds of thousands of dollars on a genetic sequencing run. Oracle Sun infrastructure and Oracle Premier Support ensures our critical research data and systems are secure, always available, and easy to access.”
– Jake Carroll, Information Technology Manager, Queensland Brain Institute

Established as a research institute within the University of Queensland in 2003, the Queensland Brain Institute (QBI) is one of the world’s largest neuroscience organizations. The institute’s 280 scientists are working to discover the cellular and molecular mechanisms that underlie the ability of the adult brain to generate new nerve cells and form functional connections. They aim to discover and develop new therapeutics to treat mental and neurological diseases such as dementia, depression, multiple sclerosis, and schizophrenia.

The institute must ensure its researchers and scientists can always access the data they generate. This data consists of magnetic resonance imaging files, high-resolution fluorescent microscopy files (sometimes as large as 40GB per image), and genetic sequence outputs from next-generation whole genome sequencers amounting to many terabytes per genome. In addition, administrative staff must be able to retrieve general operational and business information.

As the amount of data increased, the institute found it was taking increasingly longer to back up and retrieve files. This had a direct impact on the ability of scientists to conduct research and analyze results.

In July 2010, QBI upgraded its Oracle Sun server and storage infrastructure to improve performance, speed file backup and retrieval time, and future-proof its IT environment. The institute implemented Sun Fire X4270 servers, a StorageTek SL3000 modular library system, a StorageTEK SL500 modular library system, Sun Flash Accelerator F20 PCIe cards, and Sun QFS and Sun SAM-FS software.

Key Benefits:

- Ensured scientists can access the research data and image files they need much faster than before
- Eased the load on the IT team by eliminating the need for manual file retrievals
- Cut backup times from seven hours to between five and ten minutes, enabling more frequent backups that ensure data security
- Engaged Oracle Premier Support technicians to help prevent outages that may result in failed experiments and the loss of hundreds of thousands of research dollars
- Eliminated the need to self-diagnose issues, as Oracle Premier Support's Auto Service Request automatically checks for problems and at a much deeper level than the institute

In addition, QBI uses Oracle Premier Support for Systems to ensure fast resolution of any technical issues. A long-standing relationship with Oracle mean the vendor has a complete understanding of QBI's requirements and QBI can trust its technicians to fix issues with minimum instruction.

"Oracle Sun infrastructure, backed up with Oracle Premier Support, allows us to create, dream, and grow, and do more interesting research," said Jake Carroll, information technology manager at the Queensland Brain Institute.

More Powerful IT Infrastructure Needed to Support Research

QBI has been using Sun server and storage products since its inception in 2003. As the institute's research scope expanded over the years with new innovations in scientific instruments, the number and size of files that had to be processed, stored, and archived began to tax the IT infrastructure. Users complained that file retrievals were taking too long and preventing them from accessing research data in a timely manner. Backups were also slower, which further restricted users' ability to obtain the latest research data.

"The upgrade came about because we had reached the limits of what we had," said Toby O'Brien, systems programmer, Queensland Brain Institute. "The institute is growing, so we needed more powerful servers and bigger disk requirements—basically all the components that support an expanding organization. We are legally obliged to hold up to 15 years of data, so we were also looking for a large-scale storage and archiving solution."

At July 2010, QBI had 15 terabytes of live data, 600 terabytes of archival data, and was collecting up to five terabytes of data per day.

Faster Access to Research Data

Its previous positive experience meant QBI was happy to continue using Oracle Sun products. The institute implemented three Sun Fire X4270 servers that run Sun QFS software, which supports the sharing of large data volumes in collaborative environments. Another Sun X4270 server has four Sun Flash Accelerator F20 PCIe Cards installed and is set up as a disk array. The institute also purchased a StorageTek SL3000 modular library system and a StorageTEK SL500 modular library system.

“The Sun equipment is there for flash storage (high performance, small capacity data storage). This enables users to recall smaller files at rapid speed (comparable to host memory access) and reduces the impact of data recall latency to the end user,” said O’Brien.

System performance has improved significantly since the upgrade. In the past, whenever a user tried to access a file, metadata about the file had to be located before the retrieval process could even begin. Users complained that they were waiting too long for systems to look up and retrieve files from where they were stored, either on disk or tape. The IT team was sometimes forced to manually retrieve files for users, which involved time-consuming, back-and-forth discussions on what files were required.

“The Sun QFS software provides a much better method of file access and retrieval, and allows us to leverage different levels of storage depending on the characteristics of the file,” said O’Brien. “Larger files, data structures, and imaging data will be stored on the StorageTek systems, as tape offers good streaming throughput for reads that enable data to be returned at speeds that approach hard disk performance.

“Ultimately, this means researchers and scientists can get the data and image files they want much quicker than before,” he said. “In fact, a lot of our users are complimenting us on how good their access to data is, and that includes data they don’t use for years at a time. Now, they can go and pick out what they want with no interaction from us.”

Backup Times Reduced

The new infrastructure has also benefited the IT team. Carroll said data backup time has been cut from seven hours to between five to ten minutes.

“This means we have less chance of file changes happening during the backup,” he explained. “Previously, we would have to manually bring files back online so users could access them. That’s no longer an issue. We can also back up more frequently, which means our critical research data is more secure.”

Future-proof Infrastructure

QBI now has an infrastructure that will support the institute well into the future.

“The Sun servers are very comfortably exceeding the initial requirements we had,” said O’Brien. “We spent a lot of time during the changeover to tune the servers. They are currently under-subscribed so we’ve got a lot of headroom to grow into what we’ve bought. At this point in time, there’s nothing faster we can buy for the scenarios for which we’re using the servers.”

Around-the-Clock Support from Oracle

The availability of data is of paramount importance to QBI. Without quick, reliable access to core research data, scientists, researchers, PhD students, and even administrative staff would not be able to complete their research or do their jobs.

“At QBI, it’s all about the data and being able to bring back the data in a very short amount of time in the event of an outage,” said Carroll. “We can’t afford a lack of availability of our services, let alone our storage. If a researcher is doing an experiment in a lab, an outage might cause them to lose all their work and miss out on a potentially groundbreaking discovery.”

“Our IT environment is also dynamic and free-flowing,” added Carroll. “We have to be able to make changes all the time to cater for our scientists and their changing needs.”

This critical demand for availability prompted QBI to engage Oracle Premier Support to provide extra assurance that the institute’s infrastructure was always up and running. The support contract allows QBI to call Oracle at any time, giving the organization access to a local service desk. Working with Oracle also puts the institute in touch with the vendor’s backline engineering team, which enables O’Brien and Carroll to have an open discussion on any issues with the people who maintain the code.

“Our interaction and familiarity with Oracle Premier Support engineers is paramount to the relationship,” said Carroll. “Having worked with the local guys for several years, they know us and how different facets of our organization operate. Moreover, they know our footprint and have a very good understanding—a complete understanding—of what we have.”

Carroll singled out the Auto Service Request (ASR) as one of the best features of Oracle Premier Support for Systems. “It has simplified and streamlined how we work, in that we don’t have to self-diagnose. A lot of our issues are now diagnosed for us and at a much deeper level than we look at ourselves.

“With Oracle Premier Support, we don’t have to worry about the little things, like basic administrative tasks, anymore,” said Carroll. “Now, we just assume Oracle is looking after things for us and, because of our trust in them, that everything will be OK.”

Why Oracle?

According to O’Brien, as a long-time user of Sun products, QBI saw no reason to change providers.

“We went straight to Oracle for the servers because of the previous support we’d had and the software we’d run,” he said. “We wanted to run Oracle servers only so we could get support when we needed it.

“It was a similar situation when it came to support services,” added Carroll. “We changed over to Oracle once Oracle’s acquisition of Sun was complete. From our end it hasn’t been much of a change. We still work with the same people and have access to the support engineers we trust to understand our IT environment.”

Implementation Process

QBI elected to implement the Sun infrastructure itself as the IT team was familiar with the Sun QFS software. The implementation began in September 2009 and was completed by mid-October 2009.

The Queensland Brain Institute is one of the world’s largest neuroscience organizations. The institute’s 280 scientists are researching new therapeutics to treat mental and neurological diseases such as dementia, depression, multiple sclerosis, and schizophrenia.