STORAGE SOLUTIONS

French Institute for Brain and Spinal Cord Disorders gains petabyte storage

Promise Technology on choosing the right solution

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Keeping Storage in Mind

When needing to manage petabytes of data,
how do organisations decide which storage option is best?
We find out

High-Performance Computing has increased the realms of scientific discovery, but as the volume of data being generated through research continues to grow at an exponential rate, organisations are faced with the question of storage. Moving forward, this is the biggest challenge faced by research centres that don't want to be limited by the speed and capacity of their solution. Founded in Paris by Professors Gérard Saillant, Yves Agid and Olivier Lyon-Caen, the French Institute for Brain and Spinal Cord Disorders (Institut du Cerveau et de la Moelle épinière, ICM) needed an advanced storage system that would combine high performance, data security and manageability.

Common goals

The product of a new model in neuroscientific research, ICM is bringing together more than 800 researchers in the fields of molecular and cellular neurobiology, neurophysiology, cognitive sciences and related therapies. The main scientific objective of the institute is to understand the causes and mechanisms behind the major nervous system pathologies, and to offer new and specific treatments within a short-term perspective. Consolidating these activities in one place will allow researchers to take a multi-disciplinary approach to the discovery of new treatments for neurological disorders.

Thanks to progress in neuroscience research, the treatment of nervous system diseases, which are generally severe and often palliative, will become more effective. Potentially, such diseases could be prevented or cured. In order to achieve this objective, the information technology team under the direction of Dominique Bayle developed a vision of an architecture based on three pillars: High-Performance Computing, the network, and data storage. As the role of the ICM is to provide researchers with the technical infrastructure to perform their work in the best conditions possible, the primary guideline is that the infrastructure, and in particular the data storage, should not be a hindrance to research.

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The deciding factor

Following an invitation to tender, a high-performance computing solution proposed by NEC, Active Circle and Promise Technology was selected. Differentiating between vendors can often prove difficult, but Bruno Lecointe, sales manager Western Europe, from NEC Deutschland believes that while price will always be a necessary consideration, technical expertise should always be the most important factor. 'Within the storage market, companies are often focused on simply selling products, rather than being a true solutions provider,' he says.

'Because we don't operate through resellers, NEC is different and dealing directly with ICM meant that as the institute was doing its procurement we were able to point out the technical limitations and difficult requirements very quickly. Most importantly, we carefully examined ICM's individual needs, paying close attention to potential bottlenecks, and were clear on which of their requests were possible to fulfil, and which ones were not.'

NEC, Active Circle and Promise Technology provided an intelligent SAS/SATA based high-end storage solution which enables scientists to store their data with a high level of reliability and data protection, in a cost-effective solution. The enterprise-class, cable-less system design includes fully redundant, hot-swappable controllers, power and cooling units. All system components are constantly monitored using industry standard protocols to ensure continuous operation in case of failure or component malfunction. RAID storage by Promise Technology's Enterprise VTrak EClass systems equipped with Serial ATA (SATA) hard disk drives have been configured within RAID 6 disk arrays.

Petabytes of expected data meant that the capacity for handling an extremely high load of input/output operations (IOPs) was needed, and this was fulfilled by high-speed Serial Attached SCSI (SAS) host interfaces in a fully-redundant 'No Single Point of Failure' system architecture. The combination of enterprise-class RAID storage systems with cost effective,

but proven SATA hard disk drives provides the necessary performance and capacity ratio.

Virtualisation

Installed on all storage nodes as a clustered file system with integrated security and tiered-storage management, the software provided by Active Circle essentially virtualises the storage. This meant that ICM's information technology team had an open choice when it came to selecting the hardware. The solution is compatible with standard hardware and is particularly well-adapted to the management of large volumes of data, natively protecting against errors, corruption and disasters.

One of the benefits of implementing a software solution such as this is that a limitless amount of disk arrays can be converted into one large file system. Philippe Boyon, marketing and business development at Active Circle, explains: 'With facilities like the Institut du Cerveau et de la Moelle épinière that have multiple servers and disk arrays, the ability to virtualise and consolidate all the data into one, or even a few file systems, can make a big difference to the pace of research.' He adds that providing researchers with quick and easy access to information is a primary concern, but beyond that is the issue of protecting the data. By managing the replication between file systems within the storage environment, the Active Circle software guarantees data protection without the user needing to implement any additional software. A further benefit of this software is that the file systems can be managed independently of the storage itself.

Future growth

The storage solution delivered by NEC, Active Circle and Promise Technology has a capacity of almost three petabytes – necessary for storing the massive amounts of data generated from neuro and cellular imaging. While suitable now, that capacity will no longer fulfil requirements in the years to come. 'In this kind of research environment, each generation of experimental device increases the amount of data it produces – sometimes by a factor of 10. This means that IT departments are constantly trying to anticipate those exploding needs and requirements for capacity,' Boyon explains.

Currently under consideration at ICM is the introduction of tape storage in preparation for when a second tier of storage is required. The Active Circle software allows for the implementation of a multi-tiered storage architecture and so if a tape environment is required the institute will simply need to define a rule for migrating the data from disk to tape. The modular and scalable nature of the solution also means that the capacity can be increased on either disk or tape, while the hardware performance can be improved by adding servers.

NEC is currently performing some proactive maintenance on ICM's system in preparation for an increase in the number of petabytes. 'One of the key points is that we will be able to do this in a very short space of time, and without stopping the system,' says Bruno Lecointe. 'We delivered a solution that can easily be increased to six petabytes, and we will add in new disks and transparently grow the size of the file system in order to ensure that ICM has a storage system that meets its demands, now and in the future.'

For more information, please visit:

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