FRENCH NATIONAL
OCEANOGRAPHIC
LABORATORY

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THE FRENCH NATIONAL OCEANOGRAPHIC LABORATORY MANAGES SATELLITE AND NUMERICAL MODELLING DATA USING STATE-OF-THE-ART SAN STORAGE SYSTEMS

At the Midi-Pyrénées Observatory, which employs 1,000 people, the Laboratory for Studies in Geophysics and Spatial Oceanography processes satellite data alongside data gathered from field campaigns in order to define the environments being studied. A simple-to-manage, flexible, high-density secure IT architecture is required to manage the hundreds of terabytes worth of disk space needed for applications and backup. Nexsan E-Series storage systems provide a perfectly adapted and highly scalable solution.

GLOBAL CUSTOMER OVERVIEW

The Midi-Pyrénées Observatory (OMP) is an observatory of the Sciences of the Universe (OSU), a scientific research centre which responds to the French National Scientific Research Centre (CNRS), the University of Toulouse 3, the Institute of Research for Development (IRD) and the French National Centre for Space Studies (CNES). The observatory is organised into thematic laboratories which focus on different fields of study: astrophysics, ecology, aerology, geology, seismology, oceanography, hydrology, etc. It has facilities in multiple locations: Toulouse, Tarbes, Lannemezan and the Pic du Midi de Bigorre. Approximately 1,000 people work for the organisation, from researchers to teachers, technical and administrative staff to Ph.D. students.

Mr. Bruno Buisson is Head of IT of the OMP's Laboratory for Studies in Geophysics and Spatial Oceanography (LEGOS), located on the Toulouse 3 university campus next to the National Centre for Space Studies (CNES) to which it is strongly linked. LEGOS uses satellite data and data gathered from field campaigns to define the environments it is studying: oceans, lakes, rivers, glaciers, etc. In addition, numerical models are developed in order to reproduce the evolutions of these environments, on different scales of space and time. Much of the research conducted here centres on the issue of global warming (see the LEGOS website: http://www.legos.obs-mip.fr). LEGOS has been evolving the architecture of its information system and has chosen Nexsan to cater for the laboratory's expansion requirements.

As Mr. Buisson explains; "From an IT point of view, the data generated by the satellites and numerical models is extremely heavy (~200 terabytes) and strong computing power is required in order to process it." In addition to the computing tools supplied by the national centres, the laboratory gives its scientists the IT environment they need to perform the processing: work stations, computing servers, storage means, an efficient network, software, etc. along with a conventional office environment.

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CHALLENGES ENCOUNTERED

Scientific research is highly unpredictable by nature; often, leads which at the beginning appear to be promising are abandoned and others which had not initially been considered are pursued. This means that collaborations amongst researchers can change rapidly depending on the leads followed. In an ever shifting context, the IT system adopted must be sufficiently agile to adapt at any time. However, the storage volumes at play impose major constraints. The data gathered from both sea campaigns and satellites is very expensive and is unique as natural environments change constantly. As a consequence, this data must be secured and solid backup is required. The backup windows must be flexible in order to guarantee the global efficiency of the system. Indeed, backup cannot in any circumstances congest networks or slow down applications. Nevertheless, due to specific constraints, a continuous backup system is also being contemplated by LEGOS. Therefore, LEGOS needs both an efficient and scalable primary system for scientific projects (Nexsan systems for servers and work stations) and an appropriately-sized secondary storage system on dedicated hardware (older backup bays). Mr. Buisson's concern is to "size the storage system correctly and provide the simplest and safest means of access to the data, so each and every scientific project can be carried out comfortably without affecting the others".

SOLUTION

Mr. Buisson's vision is very clear: "Our choice of architecture has been very stable for about 10 years. In terms of storage, we made the choice to place all permanent scientific data on bays connected to a SAN Fibre channel." More volatile spaces (such as the non-backup of intermediate computing information which is not relevant to the research) are linked to computing stations and servers to ensure network efficiency and prevent network congestion. The SAN front-end hosts file servers such as NFS, CIFS, FTP or HTTP that manage access to the different volumes. SAN's flexibility makes it very easy to access a LUN logical unit on any server, which in turn makes it much easier to develop or resume activities in the event of system malfunctions. Mr. Buisson praises this feature which he elegantly describes as the "rejuvenation of hardware" which makes it possible to reallocate LUNs on operational servers whilst, for example, updating other front-end servers. Storage systems should not be a point of weakness, therefore they all include a redundant internal hardware architecture (power supplies, ventilation, controllers, access to data, hot-swappable components, etc.). This architecture consolidates both scientific data and each office environment.

LEGOS's storage architecture is constantly evolving (technological migration and increase in storage volume) and since 2013 Nexsan systems have been integrated into it. "We launched two tenders," states Mr. Buisson, "one for scientific storage, the other for office storage. For the former, we chose a Nexsan E48 bay (48 4TB SATA disks); for the latter, a Nexsan E18 bay (18 600GB SAS disks)." In October 2014, thanks to Nexsan's assistance, a new bay (a Nexsan E48V with 16 NL-SAS 4TB disks) was put into service. This bay, which is intended for a specific team as part of the investments lined up for 2015, provides a larger volume and ensures the scalability of the installation.

According to Mr. Buisson: "The hardware architecture of Nexsan's systems is very well conceived (high density, optimal disk cooling, anti-vibration system, turning off unused discs, etc.). All components met our redundancy criteria and the firmware of the bays makes it possible to perform updates flexibly." Identical firmware was installed on bays E18 and E48 to spare users from having to interact with a different interface and coming across features which aren't available on all bays. The administration console is very light, does not require

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- **High quality client service and support** Nexsan commits to providing the finest service and support to its clients - this is why the LEGOS laboratory benefits from a the expertise and responsiveness which ensure that its storage infrastructure is always available and secure.

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installation on behalf of the individual client and integrates perfectly into the environment (in this specific case, the administration console runs under Linux). Nexsan offers a very stable and efficient firmware which does not automatically integrate the latest features available on the market which may compromise the system. Mr. Buisson says: "This approach works for me, because it integrates perfectly into a context which adopts heterogeneous hardware (different brands of bays or servers), so functioning needs to be harmonised." The Nexsan system secures access to the LUNs using RAID 6. Once made operational, there was no loss of connectivity on the Nexsan systems; furthermore, operations are timely and workload management is excellent. Lastly, in terms of the global security of the data and the threat posed by external elements capable of destroying it (the city of Toulouse experienced this first hand not long ago), the implementation of a secondary storage site in a Data Centre in Tarbes is also being considered. With regard to the integration of systems, LEGOS has long collaborated with the IT service company Capella Média. This company's professional knowledge of the laboratory environment has made it possible for LEGOS to clearly explain the need for Nexsan system integration into LEGOS infrastructure. The advice this company provided prior to the purchase and the local Nexsan support service available also constitute an advantage.

Mr. Buisson concludes: "What's more, Nexsan were financially competitive, because although the price is not the first thing we look to when choosing who to work with, this factor can rule a company out altogether."

ABOUT THE MIDI-PYRÉNÉES OBSERVATORY

Historically, the Toulouse Observatory is a French astronomical observatory founded by the French Science Academy in 1733 in the city of Toulouse. It was moved to Jolimont in 1841, and again in 1981 to the scientific campus of Toulouse- Rangueil. It then merged with the Pic du Midi Observatory and later became the Midi-Pyrenees Observatory (OMP). The OMP is an observatory of the Sciences of the Universe (OSU) and a school within the University Toulouse 3 which groups the universities' laboratories of science of the universe, the planet and the environment. The research fields at the OMP are astrophysics and planetology, the interior structure of the Earth, its exterior layers (the ocean, the atmosphere, the ice fields), climate, surfaces, continental interfaces and functional ecology.

ABOUT MR. BRUNO BUISSON

Born in 1963, Bruno Buisson obtained his Diploma of Extensive Studies (DEA) in Information Technology in 1987 specialising in language theory, compilation methods and parallel computations. He began his professional career in New Caledonia where he took the post of Software Acquisition and Oceanography Data Processing Developer at the Institute of Research and Development (IRD) in Nouméa until 1996. He subsequently joined the Institute of Research for Development (IRD) in Île de France taking on the organisation's role of System and Network Administrator, before finally becoming System and Network Administrator of the LEGOS laboratory at the OMP in 2001, a post he holds to this day.

ABOUT NEXSAN

Nexsan™ is a global leader in unified storage solutions that are focused on seamlessly and securely enabling a connected workforce. Its broad solution portfolio empowers enterprises to securely manage, protect and utilize valuable business data – while allowing users to sync, share and access files from any device, anywhere, anytime. www.nexsan.com.