Case Study:
Data Center

CERN - the European Organization for Nuclear Research

Solution Summary

Challenges

- Managing incredible amount of data generated by world's largest particle physics laboratory
- Require storage solution providing high compute or storage capacity per watt of electrical power
- Require storage solution that minimizes the complexity of hardware deployment and operation

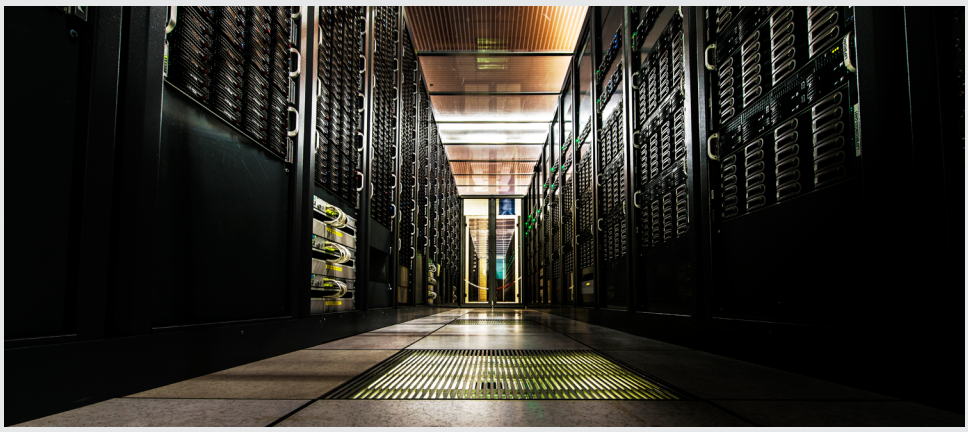
The PROMISE Solution

- Approximately 200 PROMISE VTrak storage systems from PROMISE Technology in 2012

The Benefits

- Optimal quality - price - performance ratio
- A solution meeting the specific requirements at CERN
- After service support & in case of emergency a PROMISE Technology expert engineer on location
- Highly efficient solution meets power and cooling requirements
- Flexibility and reliability of solution meet CERN's demands for critical services

PROMISE Technology's VTrak Tailor Made to Tackle Data Challenge at CERN



The Data Center at CERN, Photographer Maximilien Brice © 2012 CERN

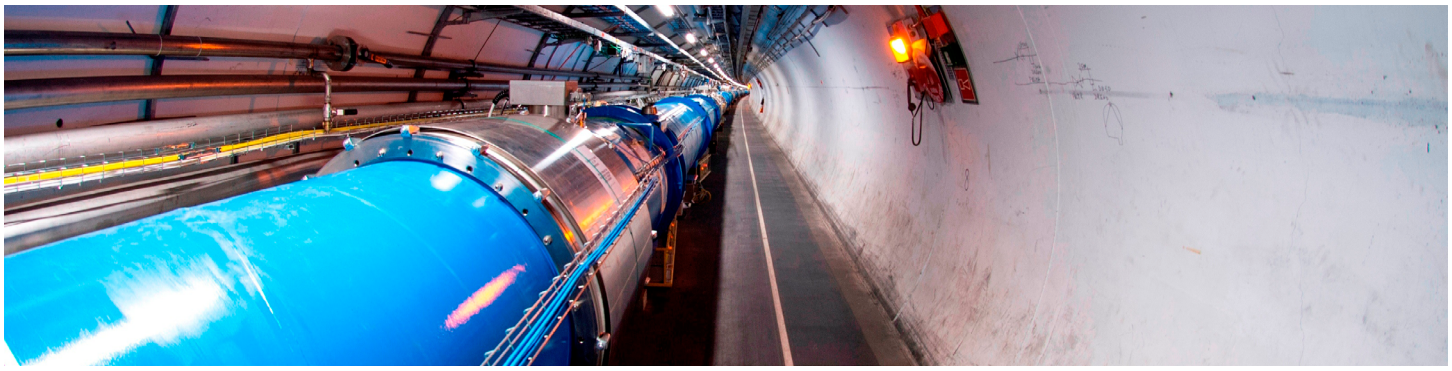
About CERN

Founded in 1954, CERN, the European Organization for Nuclear Research, is the world's largest particle physics laboratory and home to the some of the most advanced scientific research equipment in the world, including the Large Hadron Collider (LHC), a machine weighing an incredible 38,000 tons and stretching 27km in a circular tunnel 100 meters below the Franco-Swiss border at Geneva. The LHC is the world's largest and highest energy particle accelerator that enables the amazingly gifted team at CERN, comprised of scientists and engineers from around the globe, to study fundamental forms of energy and matter to further increase human knowledge of the universe.

The incredibly advanced research conducted at CERN places a tremendous need on equipment to store the huge amount of data generated by these experiments. The IT center at CERN is an impressive facility that currently hosts 8, 700 servers with 65, 000 processing cores, and 67,000 hard disk drives that add up to a total raw disk capacity of roughly a massive 97 Petabytes (one petabyte is one million Gigabytes!), and it's growing rapidly as the 2.9MW facility will be extended to 3.5MW by the beginning of 2013.

The Challenge

With the incredible amount of data generated by the fascinating research at CERN, including 25 Petabytes of data generated annually by the LHC, the IT team at CERN has a massive job which includes providing computing and storage capacity for processing high energy physics data. CERN is notably the Tier-0 facility in the Worldwide LHC Computing Grid, the world's largest computing grid that is made up of over 140 computing centers in 36 countries. The scientific data collected at the four LHC experiments, ALICE, ATLAS, CMS and LHCb, is ingested by the CERN Advanced STORage manager (CASTOR), an in-house hierarchical storage management system developed for processing physics data. CASTOR



The LHC Tunnel at Point 4, Photographer - Jacques Fichet © 2012 CERN

The Globe of Science and Innovation, a landmark of CERN, Photographer - Maximilien Brice © 2005 CERN

Learn More About:

CERN, the European Organization for Nuclear Research

- One of Europe's first joint ventures and now has 20 Member States
- The first proposal for the World Wide Web (WWW) was made at CERN by Tim Berners-Lee in 1989
- Scientists at CERN have won the Nobel Prize in Physics multiple times
- The Large Hadron Collider started up in 2008 and is used by physicists to recreate the conditions just after the Big Bang
- Roughly 10,000 visiting scientists come to CERN for their research, representing 608 universities and 113 nationalities.

Source: www.cern.ch

CERN IT has deployed storage solutions from PROMISE Technology, including approximately 200 PROMISE VTrak J830s storage systems which are used to help tackle the big data challenge at CERN.

manages a large disk buffer and a tape archive, with the disk buffer consisting of independent clusters of front-end servers directly-attached to SAS JBOD expansion units.

One of the key challenges CERN IT faces is matching the growing demand from their users' community for more disk capacity with the electric power and cooling available for the equipment. Therefore, power efficiency is a critical component to their procurements as solutions providing high compute or storage capacity per watt of electrical power are favored.

Additionally, CERN IT faces the challenge of minimizing the complexity of hardware deployment and operation. By going for a model with storage units providing minimal controller functionality and SAS host bus adapters without any RAID logic, CERN can rely on established standards like SES over in-band SAS and avoid having to deal with proprietary interfaces, firmware and monitoring. Resilience and data protection is provided either by software RAID or built-in data redundancy features in CERN's mass storage systems.

The PROMISE Solution

PROMISE Technology creates dynamic tailor made storage solutions to meet the specific requirements in a vertical market. CERN provides a list of technical requirements for their storage equipment and ask their suppliers to select the best storage manufacturer with the best quality - price - performance ratio. PROMISE Technology storage equipment is able to meet the requirements from both CERN and their suppliers. PROMISE Technology is proud of its large network of value add partners who help to understand the specific needs and requirements from CERN and enable PROMISE to develop innovative storage solutions.

CERN IT has deployed storage solutions from PROMISE Technology, including approximately 200 PROMISE VTrak J830s storage systems which are used to help tackle the big data challenge at CERN. The largest deployment is 165 VTrak units fully populated with 24x 3TB drives per storage unit. In the bulk storage deployment each storage unit is directly attached to a SAS HBA.

The VTrak J830s is a robust storage expansion platform that serves as a building block to provide high-availability, flexibility and energy efficiency in a cost effective package

VTrak x30 Series

Tomorrow's performance. Today.

PROMISE VTrak x30 Series

Features & Highlights

- Industry leading performance and reliability for mission critical environments at an affordable price
- Active-Active dual controller support with ALUA support
- Up to 90% power efficiency
- Quad 8Gbps FC ports per controller provides maximum system throughput
- Supports 6Gbps and 3Gbps SAS & SATA drives simultaneously
- Reliable, flexible and easy to manage RAID storage system

For more information about the VTrak x30 Series , please contact PROMISE Technology or your authorized reseller today.

www.promise.com

"After about two years of production use, which in this last year has become a quite significant deployment, the flexibility and reliability provided by the PROMISE VTrak J830s units met our expectation."

that meets the demands of CERN. With power efficiency a critical component to CERN's requirements, VTrak is the ideal solution as its efficient power supplies provide up to 90% power efficiency that improves total cost of ownership by conserving power, reducing heat output and improving cooling costs.

THE BENEFITS

By deploying the VTrak J830s, CERN enjoys all of the benefits PROMISE Technology provides with each installation, including delivering an optimal quality - price - performance ratio.

The solution from PROMISE Technology meets all the requirements at CERN, including on hot-swappable parts and also provides CERN with full management and monitoring support in SES over in-band SAS. An important point for CERN is that the PROMISE Technology solution does not need to be in cascade with a RAID array but is qualified for use directly attached to a server with SAS HBA without any hardware RAID functionality. The fact that it supports two management modules also allows CERN to use it in redundant configurations when required.

The CERN team is in direct contact with PROMISE engineers. In case of an emergency PROMISE Technology will send an expert engineer on location to CERN to fix the problem, an asset to the data center that keeps it running at peak performance.

Additionally, power efficiency is a key component to procurements at CERN and the VTrak J830s meet the critical power and cooling requirements for their data center.

"During a significant two-year deployment ramp-up, the flexibility and reliability provided by the PROMISE VTrak J830s units met our expectations," said Olof Bärring, Technical Responsible for Procurement of Servers and Storage, IT Department, at CERN. "We are able to use them both for our bulk storage as well as in high availability configurations for critical services."

To learn more about the exciting research at CERN, please visit www.cern.ch.