

CERN Selects Infotrend Storage Arrays to Organize the Historic Data from the Large Hadron Collider

Business:

CERN, the European Organization for Nuclear Research, is the world's largest laboratory for particle physics research

Challenge:

To deliver 400TB of storage optimised for retaining valuable metadata which organises the research data

Solution:

EonStor® RAID subsystems met the challenge with:

- high reliability
- excellent price / performance
- comprehensive technical support
- a broad range of array sizes and technologies
- ease of use - LCD displays aided use prior to management system commissioning

THE EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH (CERN)

CERN in Switzerland is the world's largest particle physics laboratory. Founded in 1954, as one of the first European joint scientific ventures and the first European organization founded after World War II, CERN now has twenty member states and over 10,000 scientists working on unlocking the secrets of how the universe is put together. As esoteric as this sounds, CERN research touches many aspects of every day life, from cancer therapy and medical imaging, to the development of the World-Wide Web.

A MASSIVE NEW STORAGE CHALLENGE

Designed to help answer fundamental questions about the universe, such as what is the origin of Mass, the Large Hadron Collider (LHC) is the most complex scientific instrument in the world.

The LHC is a particle accelerator installed in a tunnel 26,659m in circumference. The proton particles circulate in tubes held at a vacuum ten times lower than on the moon, making 11,000,245 circuits round through the tunnels per second before being made to collide. These collisions generate temperatures which, for an instant, are more than 100,000 billion times hotter than the temperature in the heart of the Sun. The six experiments installed on the LHC detect the fragments resulting from these collisions. These experiments will produce in the region of 15 Petabytes (15,000 Terabytes) of priceless scientific data per year, a very significant storage challenge. In order to organise and administer this data, dedicated and sophisticated infrastructure is necessary that in itself requires several hundred Terabytes of highly reliable storage space.

A MATTER OF INFRASTRUCTURE CHOICE

In designing and commissioning the storage infrastructure for the LHC, the IT Department at CERN aimed to ensure the research team had the best possible systems to work with, whilst working within a strict budget and to tight deadlines. After a detailed evaluation, for the metadata storage CERN selected Infotrend EonStor RAID subsystems which provided an optimal balance between cost, reliability and technical features. Across the LHC, a mixture of different EonStor arrays was utilised, including 8-, 12-, 16- and 24- bay Fibre to SATA products, as well as Fibre to SAS products.

Seemingly small design features in the EonStor range were recognised as significantly increasing ease of use. The team at CERN found, for example, that having a front panel LCD display was particularly important before the introduction of the central management facility. The comprehensive technical support provided by Infotrend's technical team was also noted as a key factor in selecting Infotrend during the deployment of the numerous LHC projects.

"As a leading research centre in the world, CERN must provide its scientists with best-in-class IT facilities around the clock, seven days a week, and, although the volume of data generated at the laboratory grows incessantly, we cannot compromise on performance and reliability when we add capacity," said Dr. Helge Meinhard, Technical Co-ordinator for Server Procurement, IT Department at CERN. "For metadata storage, Infotrend's EonStor ticked all the boxes. A key attribute was that EonStor provided us with the ability to access the RAID storage from a number of different servers. This is a very important requirement for CERN."

CERN's data storage infrastructure is predominantly a NAS-like set up: many applications rely on Linux PC servers, each with 5 to 14TB of SATA discs in a RAID configuration, providing more than 7,000TB of usable capacity. However, for more demanding applications, in particular for the metadata describing the contents of the bulk storage systems, CERN uses databases implemented as Oracle Real Application Clusters. Five instances each consist of 30 PC servers with no local storage and 30 RAID subsystems connected by a redundant Fibre Channel network. In addition, tapes and external RAID systems are used for backup, archiving and long term data retention. As you would expect for such a

scientifically important and high profile project, the CERN IT team demanded that their chosen storage vendor met a very strict list of criteria.

"Infotrend's products were comprehensively evaluated against other leading RAID manufacturers and proven to deliver the quality and performance required. We are very pleased to have been selected to help further the course of science, and are looking forward to the results of this next phase of CERN's research," said Rick Dudson, Director of Sales at Infotrend Europe.



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- Dr. Helge Meinhard Technical Co-ordinator for Server Procurement

About CERN

CERN, the European Organization for Nuclear Research, is one of the world's largest and most respected centres for scientific research. Its business is fundamental physics, finding out what the Universe is made of and how it works. At CERN, the world's largest and most complex scientific instruments are used to study the basic constituents of matter — the fundamental particles. By studying what happens when these particles collide, physicists learn about the laws of Nature. The instruments used at CERN are particle accelerators and detectors. Accelerators boost beams of particles to high energies before they are made to collide with each other or with stationary targets. Detectors observe and record the results of these collisions. Founded in 1954, the CERN Laboratory sits astride the Franco-Swiss border near Geneva. It was one of Europe's first joint ventures and now has 20 Member States.