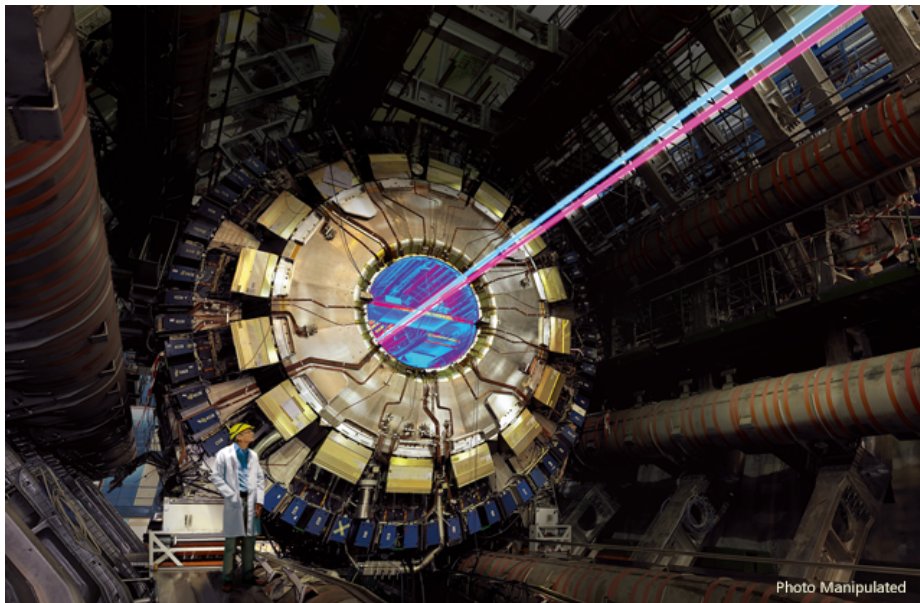




How Cloud-based Universal Distributed Storage helps CERN



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CERN is the world’s largest particle physics research organization, boasting over half of the scientists in the international particle physics community as its users.

It is the cradle of numerous scientific breakthroughs since it was officially founded in 1954, such as the world’s first proton-proton collider in 1971, discoveries of weak neutral currents in 1973, and the W and Z particles in 1983, to name just a few. On July 4th, 2012, the laboratory declared that two Large Hadron Collider (LHC) general-purpose experiments, ATLAS and CMS, had evidenced the presence of a new subatomic particle with a mass of roughly 125-126 gigaelectronvolts (GeV) and the expected profile of the long-sought Higgs boson, which is thought to give mass to all matter. A

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discovery that led Stephen Hawking, the preeminent physicist being out a hundred dollars, as the iconic author of A Brief History of Time had previously doubted the existence of the Higgs Boson.



CERN openlab was created to develop innovative and advanced IT systems to be used by the LHC community through bringing together the efforts of science and industry. CERN openlab's fourth phase which started in January 2012 heralded the launch of more in-depth cooperative activities in projects involving automation & controls, databases, networking, and platforms, for all of which the storage system is indispensable. Huawei became a CERN openlab contributor in 2012 and is now a CERN openlab partner since 2013.

As a storage expert, Huawei is committed to developing innovative next-generation cloud solutions and decided to join CERN openlab as a contributor in 2012. Given the promising results of the first year of collaboration, Huawei became a full CERN openlab partner in 2013. Huawei has developed and tested a cloud-based Universal Distributed Storage (UDS) system to meet the challenges of exascale data storage (one exabyte = 1,048,576 terabytes).

In addition to this scalability, Huawei UDS cloud storage features reliability and broad compatibility. It also employs dense nodular distribution and is based on the energy-efficient Advanced RISC Machine (ARM) architecture. UDS enables storage and sharing of big data on its mass object-based storage infrastructure, which integrates object-based storage, a P2P distributed storage engine, and clustering applications. The system also intelligently adjusts the workload at each node to break through previous performance

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bottlenecks, so system performance grows evenly with each capacity expansion.

Huawei UDS cloud storage system features reliability to the tune of 99.999%, while facilitating redundancy across data centers. It also ensures data security throughout the system's lifecycle through multilayer protection at the node, storage, and data center level through multiple copies, erasure codes, and multi-layer encryption verification involving the interface, storage, and transmission processes.

"CERN is hitting the technology limits for resource-intensive simulations and analysis. Our collaboration with Huawei shows an exciting new approach, where their novel architecture extends the capabilities in preparation for the exascale data rates and volumes we expect in the future."

This technology is also cost-effective. Maintenance costs are curtailed through the use of desktop hard drives, intelligent &

Bob Jones, Head of CERN
openlab

automatic fault recovery, energy-efficient ARM chips, efficacious cooling technology, and various other self-maintenance measures (which effectively enhance storage availability & reliability), while compatibility with S3 interfaces, NFS/CIFS protocols, and mainstream backup software ensure an E2E public cloud solution that is easy to use, while meeting the storage access requirements of different applications.

UDS is ready for greater challenges

In early 2012, Huawei delivered its UDS cloud storage system to CERN, with installation and benchmark performance evaluations completed three months later. The read/write performance proved excellent in large-scale data environments, while scalability proved not too shabby either. On the whole, these scores were deemed worthy of the very organization that gave birth to the World Wide Web.

"Establishing the link with CERN openlab gave us a fantastic opportunity to further develop our cloud storage products, and proved their worth in the extreme scientific research and mass data environment." James Hughes, Huawei's Chief Architect of Cloud




Storage.

CERN pushes further into the strange boundaries that define the quantum realm. CERN is now undertaking more in-depth studies to define more precisely the new particle so as to explore other enigmas of the universe. In this exciting context and based on the successful outcome of the benchmark performance evaluation, Huawei and CERN decided to upgrade their engagement from contributor to full partnership in 2013 for the three upcoming years. Hence Huawei's UDS cloud storage system should have further opportunities to distinguish itself, on a scale that you'd have to be a particle physicist to really grasp.

Source : [Huawei cloud storage shines at CERN](#)

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