Future IT challenges in scientific research

2014

CERN openlab, the public-private partnership between CERN, leading IT companies and research institutes, released today a whitepaper on future IT challenges in scientific research to shape its upcoming three-year phase starting in 2015.

96% of our universe is still unknown and the challenges ahead for the scientific community are striking. More than ever, computing plays a critical role in helping uncover our universe's mysteries. Scientific research has seen a dramatic rise in the amount and rate of production of data collected by instruments, detectors and sensors in the recent years. The LHC detectors at CERN produce a staggering one petabyte of data per second, a figure that will increase during the next LHC run starting in 2015. New international research infrastructures are being deployed and are expected to produce comparable—or even greater—amounts of data in various scientific domains, such as neurology, radio astronomy or genetics, and with instruments as diverse as Earth observation satellites, high-performance genomic sequencers, neutron diffractometers or X-ray antennas. More than ever, collaboration will play a vital role in enabling discoveries.

In this context, CERN openlab together with a number of European laboratories, such as EMBL-EBI, ESA, ESRF, ILL, and researchers from the Human Brain Project, as well as input from leading IT companies, have published a whitepaper defining the ambitious challenges covering the most crucial needs of IT infrastructures in domains such as data acquisition, computing platforms, data storage architectures, compute provisioning and management, networks and communication, and data analytics. A number of use cases in different scientific and technological fields are described for each of the six major areas of investigation.

Continuous collaboration between the research infrastructures and IT companies is more critical than ever to make sure scientific objectives and technological roadmaps are aligned. In the current CERN openlab phase, Huawei, Intel, Oracle, Siemens are openlab partners, while Rackspace is a contributor and Yandex an associate. This whitepaper, which results from six months of reflection

among IT experts and scientists, represents an exciting context for the CERN openlab public-private partnership in the years to come. It sets the goals, the technical expertise and identifies educational programs required, providing opportunities for future collaboration among CERN, other European laboratories, international scientific projects and leading IT companies to push the limits even further in support of many more years of outstanding scientific discoveries.

Explore further: CERN prepares its long-term future

More information: The white paper is available online: zenodo.org/record/8765

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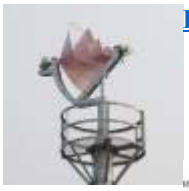

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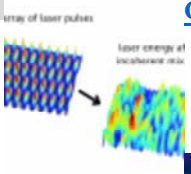

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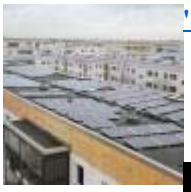

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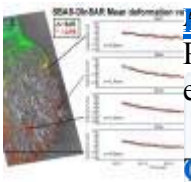

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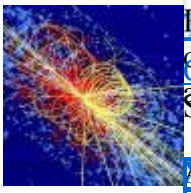

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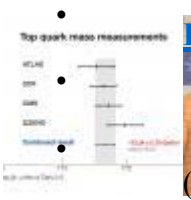

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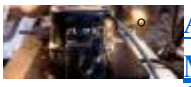

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