



RE-CREATING THE BIG BANG

Powerful Dell™ PowerEdge™ blade servers deployed in just nine days provide high levels of performance and efficiency to help put a German research center on track for a major scientific breakthrough.

CHALLENGE

Scientists at the Deutsches Elektronen-Synchrotron (DESY) research center rely on IT to support major research into the structure of matter. With the arrival of new data from the world's largest particle accelerator—the Large Hadron Collider—DESY needed to expand its server infrastructure and ensure high performance in limited space.

SOLUTION

Dell PowerEdge blade servers provide DESY scientists with a powerful environment that helps maximize uptime for critical calculations. Dedicated Dell services including Premier Pages and Custom Factory Integration help ensure a smooth implementation and ongoing simplified management.

BENEFITS

- Blade server solution was up and running in just nine days.
- Thousands of physicists worldwide can analyze petabytes of data.
- Efficient blade servers help minimize power, cooling, and space requirements.
- Dell Premier Pages and Custom Factory Integration services help significantly speed installation and simplify asset management.

Related Categories:

Blade servers, case study, data consolidation and management, Dell PowerEdge blade servers, Deutsches Elektronen-Synchrotron (DESY), green IT

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The Deutsches Elektronen-Synchrotron (DESY) research center, located in Hamburg and Zeuthen in Germany, hosts more than 3,000 scientists working to identify the structure of matter. For almost 50 years, DESY has developed and created particle accelerators used in photon science and particle physics. The center plays an important role in the latest experiments conducted at the European Organization for Nuclear Research (CERN) Large Hadron Collider (LHC)—the world's highest-energy particle accelerator. From the information gathered at the LHC, physicists hope to examine how matter behaved a fraction of a second after the Big Bang, at the moment the universe began, and find explanations for dark matter and the origins of mass.

At approximately 10 PB every year, the volume of data produced by the LHC is vast. And, given the size of the project, the LHC is unable to process all the data in Geneva. Instead, it sends raw data to regional distributors. Grid computing centers worldwide—including DESY—then receive and process this data, performing complex calculations and analysis.

To support its scientists' work, DESY has two data centers that house more than 2,000 servers and currently store more than 5 PB of data produced by the center's own particle accelerators. But in preparation for rapidly increasing data volumes—from the LHC project in particular—DESY was keen to enhance its infrastructure. "We constantly review our IT infrastructure to ensure that it supports our critical work," says Dr. Knut Woller, deputy head of IT at DESY. "We undertake fundamental research projects that can go on for more than a decade, with results that have a worldwide impact in the scientific community and beyond."

The location and design of the data centers presented the DESY IT group with a further challenge. Following expansion, DESY created a second data center in the computer center in 2005. It provides room for 1,500 rack units and an air-conditioning capacity of 500 kW. It was essential that the new infrastructure make optimum use of this space. "The less space and energy each new server consumes, the more computing power we can host without expanding into a second site," Woller explains.

OPTIMIZED CONNECTIVITY AND ENERGY EFFICIENCY IN REDUCED SPACE

DESY conducted a European tender in search of a solution to meet its specific requirements. For the past three years the center has worked closely with Dell. "We've found Dell servers more reliable than those of our previous providers. What's more, we have a great partnership," says Woller. The measurements, tests, and vendor discussions during the tender convinced the DESY team that Dell PowerEdge M600 blade servers, together with PowerEdge M1000e modular blade enclosures, would offer the best price/performance and result in a favorable total cost of ownership compared with competing products.

Crucially, the blade servers are designed for energy efficiency. "Based on our own measurements, we found Dell blades 10 to 15 percent more energy efficient than competitor products," Woller says. And by providing 60 percent greater density than traditional 1U servers, the blade servers offer the required computing power in the data center's restricted space.

In total, DESY has more than 300 blade servers in modular enclosures, and an additional 80 have been ordered. Approximately 90 percent of the capacity is used for scientific calculations on particle physics. The remaining 10 percent runs daily IT tasks such as databases and e-mail.

"Connectivity is also very important," adds Woller. "The multiple I/O interfaces in the Dell blades mean we can access our data through different technologies, including iSCSI and Fibre Channel. The blades also support InfiniBand, which offers a higher bandwidth and lower latency so that we can rapidly exchange data within a set of servers." Woller adds, "Dell provides the most cost-effective solution as our project needs continue to grow. The blade servers meet our needs with regard to space as well as being highly energy efficient."

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—Dr. Knut Woller
Deputy head of IT at DESY
October 2008

RAPID IMPLEMENTATION THROUGH DEDICATED DELL SERVICES

The Dell Premier Pages and Custom Factory Integration (CFI) services helped DESY dramatically cut the implementation time with its latest blade server deployment. The Premier Pages service enables the DESY team to order and configure systems online, while CFI services play a vital role in speedy deployment. "Dell support, and in particular Dell CFI, has halved the time taken to deploy and install servers compared with any previous provider's solution," says Woller. "The first delivery was of 32 servers. These were fully operational in less than seven days, which set a new record at the center for server setup."


A week before a server delivery, CFI sends an e-mail message informing DESY exactly which IT assets are scheduled to arrive. "With Dell CFI, we can configure the network and management ports before the products arrive," says Woller. "The servers arrive with individually assigned addresses, and we can immediately place them in the racks. The whole process is simple and the system is up and running fast, saving us valuable time."

POWERFUL, RELIABLE SYSTEMS

The staff at the computer center continues to be impressed by the support and products provided by Dell. "With previous solutions, we've encountered a number of failures over a three-month period, but

with Dell blades we haven't had a single issue," says Woller.

For additional reassurance, DESY has Dell ProSupport for IT with the Mission Critical option, which includes a four-hour on-the-spot response time for enclosure issues and next-business-day support for individual blade servers. "We have excellent relationships with Dell technical experts and are very satisfied with the comprehensive levels of support," says Woller.

Crucially, the powerful system supports the center's pivotal role in the LHC investigations into the origins of the universe. "With our current Dell infrastructure, thousands of LHC scientists worldwide can run analysis on petabytes of data stored here at DESY," says Woller. As the LHC project continues, and while preparing future accelerators for photon science research, DESY knows it can rely on Dell systems to support scientists working toward the next breakthrough. 

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