

# GREAT LESSON IN SUPERCOMPUTING

Dell adds computing muscle to 'Hulk' high-performance cluster at German university in five working days



University researchers working in areas such as numerical mathematics and computational science increasingly rely on high-performance computer clusters. In short, it takes a supercomputer to cope with the number of calculations backing up their work. Despite their power, however, these computers don't have limitless capacity, so universities and academic institutions need flexible technology - which they can scale over time - at the heart of their clusters.

## SOLUTIONS:

- GREEN IT
- HIGH-PERFORMANCE COMPUTING
- MANAGEMENT



JACOBS  
UNIVERSITY

## CUSTOMER PROFILE

**COMPANY:** Jacobs University Bremen

**INDUSTRY:** Education

**COUNTRY:** Germany

**FOUNDED:** 1999

**EMPLOYEES:** 384

**WEBSITE:** [www.jacobs-university.de](http://www.jacobs-university.de)

## CHALLENGE

A high-performance computer cluster at Jacobs University was reaching its limitations due to the increasing number of personnel using the facility to help with their research programmes.

## SOLUTION

The university scaled the cluster with support from Dell consultants, using Dell blade servers powered by Intel® Xeon® Processors and modular blade enclosures.

## BENEFITS

### Get IT Faster

- New 104-node computer cluster is up and running in five days

### Run IT Better

- Dell blades help reduce energy and cooling costs by up to 20 per cent
- Cluster is nearly three times as powerful as the previous environment
- Researchers can complete more and larger processing-intensive computations

### Grow IT Smarter

- The university retains scalable solution for continued low-cost growth

DELL

The Computational Laboratory for Analysis, Modelling and Visualization (CLAMV) at Jacobs University in Bremen operates on a shared infrastructure with workspaces for researchers and students. The laboratory is open to all Jacobs University students and staff scientists. A few years ago, the university built a high-performance computer cluster, consisting of 40 Dell™ PowerEdge™ 1950 and 1955 servers running Intel® Xeon® Processor 5300. The cluster supported Suse® Linux Enterprise Server 10, and helped research work in many areas such as material science, life science and earth-space science.

Due to its strong computing power and 320 processor cores, the solution was nicknamed the Hulk. Dr. Achim Gelessus, head of CLAMV, says: “We called it the Hulk for a very good reason – it could process at an impressive rate of 2.9 teraflops. Alone, it could achieve more computing power than all the other clusters in the university put together.”

But even supercomputers such as the Hulk have processing limitations, as CLAMV discovered. Only 15 to 20 people used the cluster at any one time – a number that may seem relatively small compared with the Hulk’s number of computers. However, each person could be running up to 20 processing-intensive calculations, which exhausted the solution’s computing capacity.

As soon as funding became available to increase the computing power of the cluster, Gelessus contacted Dell. “Because we were so happy with the initial configuration and performance of the existing cluster, we approached Dell to help expand the solution,” he says. “Dell technology has always proven to be very reliable and inexpensive to manage.”

## EXPANDED CLUSTER RUNNING IN FIVE WORKING DAYS

Dell helped CLAMV scale the existing cluster, producing a design that consisted of 64 Dell PowerEdge M600 blade servers featuring Intel Xeon Processor 5420.



## “THE DELL M600 BLADES WITH INTEL XEON PROCESSORS HELP TO REDUCE ENERGY AND COOLING COSTS BY AS MUCH AS 20 PER CENT.”

Dr. Achim Gelessus, head, CLAMV

### HOW IT WORKS

#### HARDWARE

- Dell™ PowerEdge™ M600 blades with Intel Xeon Processor 5420
- Dell PowerEdge M1000e modular blade enclosures

#### SOFTWARE

- Suse® Linux Enterprise Server 10
- Dell OpenManage™ Systems Management

#### SERVICES

- Dell ProSupport for IT
  - Next Business Day On-site Service

In spite of the relatively large number of servers delivering 512 additional processing cores, the whole solution fitted into four Dell PowerEdge M1000e modular blade enclosures – which in turn slotted into a single standard 42U server rack.

The cluster was up and running in five days. The blades were installed with the ParaStation software technology, which is designed to manage parallel computing solutions. “Work began on Monday – and by Friday we had a fully functioning supercomputer,” says Gelessus. “Everything was working correctly, so we didn’t even need to make any adjustments – we could start work straightway. It was incredibly impressive.”

He adds: “Dell helped us finish the whole project, including initial planning in three months. This is fast, when you consider that a similar project would take at least a year.”

### SUPERCOMPUTER DOUBLES COMPUTER POWER WITH DELL BLADES

With the Dell M600s, the new-look Hulk has 104 computer nodes instead of 40. Thanks to this, the cluster can process at a higher rate of almost 8.1 teraflops – making it nearly three times as powerful as the previous cluster.

# **“TODAY, OUR RESEARCHERS CAN SIMULATE MORE AND LARGER SYSTEMS CONCURRENTLY, SIGNIFICANTLY REDUCING THE TIME FOR SIMULATION PROJECTS AND ALLOWING US TO TACKLE MORE COMPLEX SCIENTIFIC PROBLEMS.”**

Dr. Achim Gelessus, head, CLAMV

Gelessus says: “For simulations of proteins or DNA or for the accurate modelling of geological processes you need fast computers like Hulk. Today, our researchers can simulate more and larger systems concurrently, significantly reducing the time for simulation projects and allowing us to tackle more complex scientific problems.”

## **BLADES HELP REDUCE ENERGY AND COOLING COSTS BY UP TO 20 PER CENT**

By deploying M600 blades, the university gained one of the most energy efficient, flexible and manageable blade servers on the market. Even though the performance was the main criterion for choosing the blades, the new infrastructure saves power. “The Dell M600 blades with Intel Xeon Processors help to reduce energy and cooling costs by as much as 20 per cent,” says Gelessus. “The servers have been 100 per cent reliable and the performance of the Intel Xeon Processor 5420 has been excellent.”

## **EASY TO MANAGE, SIMPLE TO SCALE**

Administering the new cluster is made easy by the chassis management controller and Dell OpenManage™ Systems Management, a comprehensive set of standards-based tools for proactively controlling servers. By using the software, the IT team at CLAMV can optimise hardware deployments and proactively monitor the health of the cluster

through a single web-based interface.

Says Gelessus: “The chassis software and Dell OpenManage makes managing the cluster easy. It’s a good system for monitoring the performance of servers proactively, so we can tackle any issues before they affect the availability of the cluster.”

## **EXCELLENT SUPPORT HELPS MAINTAIN HULK’S RELIABILITY**

CLAMV has Dell ProSupport for IT with Next Business Day On-site Service to help maintain the availability of the cluster. According to Gelessus, the support services from Dell have always been responsive to enquiries by the IT team. He adds that the university could choose the Next Business Day service instead of a service with a more rapid response time, thanks to the reliability of the cluster.

Gelessus says: “The cluster performs incredibly well and is reliable, so the Next Business Day service is perfect for us. What’s more, if we have to take a couple of servers out of action for maintenance work, the cluster can still operate well on the remaining 100-plus nodes available.”

**For more information on this case study or to read additional case studies, go to [www.dell.com/casestudies](http://www.dell.com/casestudies) and [www.dell.de](http://www.dell.de)**

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