Case study
University of Bonn

»The private cloud environment from Fujitsu and NetApp gives us a high degree of flexibility. Whereas in the past new hardware constantly had to be acquired for a special project, now we can use the same hardware for a variety of research projects.«

Peter Middelhauve, Chief Information Officer of the Department of Economics, University of Bonn

The Customer

Globally recognized, top-level research and historical ambience shape the atmosphere of the University of Bonn. With approximately 31,000 students, it is one of the largest universities in Germany.

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The Challenge

The University of Bonn needed more flexibility for its server resources because of increasing computationally intense research projects. In addition, it was looking for an IT environment that allowed faculty and doctoral candidates to access their files on their own end-user devices or from home when necessary.

The Solution

Private cloud environment based on high-performance Fujitsu PRIMERGY servers, NetApp storage systems and virtualized PCs.

Modern by tradition – University of Bonn

The University of Bonn bears the name of Prussia's King Friedrich Wilhelm III., who founded this famous institution of higher learning in 1818. Today, it is one of Germany's great universities, one that produced two Nobel laureates: Wolfgang Paul and Reinhard Selten. The University's investments in research activities have not been in vain. "Since the introduction of the Bachelor's and Master's degree programs, the demands on our IT have risen dramatically," explains Peter Middelhauve, CIO of the University of Bonn's Department of Economics. "The tendency is that the increased work in advising students has to be covered by flexible, high-performing staff. In addition, more professors are working here now, many of whom are carrying out shorter, but more computationally intensive research projects."

Cloud computing for research

In terms of IT, the department that Middelhauve looks after has made a great leap in innovation. After all, the institutes that are combined in the department are very mathematically oriented. "They conduct intensive data analysis," says Middelhauve. "For that we need a computing instance in the background that can carry out constant data analyses over the course of many weeks." That could not be done with a classical infrastructure – at least not with the necessary speed and flexibility. "Once a year, we have to prepare our IT for completely new tasks," he adds. For that reason, the University relies on a private cloud environment, which includes not only server virtualization but also virtual desktops that enable bring-your-own-device. "That's important because our users are often on the go," says Aymen Bellalouna, a System Engineer in the department. "Furthermore," adds Middelhauve, "we have users, such as doctoral candidates, who only use their environment for a few months. For them, a flexible cloud is the optimal solution".

High-speed cache turbocharges the cloud

One particular feature demonstrates this cloud solution's high performance. Alongside high-performance Fujitsu PRIMERGY 4 way, 8 core servers, NetApp storage systems with extremely fast Flash Cache and Flash Pool technologies are in use.

The Benefit

- Greater investment protection thanks to the private cloud solution, because IT resources can always be readily adapted to new research projects
- Improved flexibility thanks to free choice of end-user devices
- Better utilization and scaling of hardware resources
- Higher degree of system stability

Products and Services

- Servers for academic data analysis: 5 PRIMERGY RX600 with a total of 160 CPU cores
- Servers for general services/virtual desktops: 3 PRIMERGY RX600 with a total of 96 CPU cores
- Servers for vCenter/Backup/Admin: 1 PRIMERGY RX200
- Storage systems: 1 NetApp FAS3240 with 12 TB (Flash pool), 1 NetApp FAS2050 with 11TB (Disk2disk backup)
- Backup system: 1 ETERNUS LT40
- Server virtualization: VMware vSphere ESXi 5.1 Enterprise
- Desktop virtualization: WMware View 5.1 Premier
- Services: Planning, conceptualization, assembly and installation by Fujitsu SELECT Partner CANCOM GmbH

The cloud as demand-oriented IT

MATLAB is the key to data analysis for complex scientific computations. Depending on the research project, this application regularly requires brief periods of very high CPU capacity usage in the servers of the Economics Department, which is a part of the Faculty of Law and Social Sciences. Because the research projects are very heterogeneous and often must run in parallel, it had been necessary to regularly acquire new hardware. That was not only cost-intensive, it also took considerable time because of the often protracted procurement process. Furthermore, hardware that was acquired for a particular project was often left unused after the completion of the project. Following a total cost of ownership (TCO) analysis, undertaken by Fujitsu partner CANCOM GmbH, it was readily apparent that virtualizing the MATLAB servers would be much more economical. "The IT environment now works completely according to services and demand," explains Jan Oettgen, a Presales Consultant with CANCOM, a systems integrator. "The University of Bonn profits from the dynamic division of resources in the framework of a private cloud. Instead of constantly having to arrange for a few, brief usage spikes, the computations for research projects can now be divided among many virtual servers." Now nobody has to wait for weeks or months for a new and specially constructed IT environment. Not even three hours elapse before a professor can put the necessary server resources to use. Peter Middelhauve is enthusiastic:

"I can simply reconfigure the previous research environment in the MATLAB cluster and re-use it for he next research project. That gives us a high degree of flexibility, because we can use the same hardware for a variety of research projects. That gives our University a leg up in recruiting new faculty, because the IT is already on hand, and a new professor does not have to apply for extra research funding to cover hardware."

More scalability and performance

The basis for the Economics Department's private cloud is a server farm comprised of high-performance servers from Fujitsu. A total of eight PRIMERGY RX600 systems, which together have 256 CPU cores, make up the resource pool for MATLAB computing, IT operations, databanks, and virtual desktops. With this approach, the Economics Department offers its users the opportunity to work on their own end-user devices or thin clients. To give these devices and clients greater speed, NetApp SAN storage systems with more than a terabyte of cache are used. Additional technologies in the setup include NetApp Flash Pool, Flash Cache and Virtual Storage Tiering. This leads to a noticeably more efficient capacity utilization and greater speed in all applications and use cases. Furthermore, the use of modern cache technology enables the adoption of high-capacity SATA hard drives. This leads to significant cost reductions, because the system can forego expensive fiber channel or SAS hard drives.

Highest level of security

VMware View was installed for desktop virtualization. Anyone who is not working on a University client can, via View, make any end device into a University computer and access his or her accustomed computing environment and personal files. That means that locally saved files can no longer be lost, because they are stored centrally and are secured by an automated backup that takes place every two hours. "Software roll-outs, updates, and maintenance run much more simply and quickly on View clients," says Bellalouna. "That saves us an enormous amount of administrative effort – and no staff person will lose an important document." The department has the highest levels of security and flexibility at its disposal. It is even theoretically possible, in case of absolute disaster, to run all files and applications through an external cloud provider.

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