

Empowering Education and Advanced Research



University of Siegen lays foundations for connected learning with Cisco Unified Data Center

EXECUTIVE SUMMARY

Customer Name: University of Siegen

Industry: Higher Education

Location: Germany

Number of Employees: 1700

Challenge

- Optimize IT services to increase educational and operational efficiency
- Introduce latest technology to furnish systems fit for future
- Provide platform for private cloud services

Solution

- Pre-validated FlexPod-like solution with Cisco Unified Computing System (UCS), Nexus and MDS switching with Multihop Fibre Channel over Ethernet (FCoE), and NetApp storage
- Fully integrated with VMware vSphere

Results

- Consolidation from 120 standalone physical machines to 14 Cisco UCS servers, 12 of which will run up to 300 or more virtual servers
- Thirty percent power reduction offering associated environmental benefits and simplified management
- Ultrafast self-service server provisioning for university departments, as well as greatly enhanced availability

Challenge

The University of Siegen is a modern educational establishment with a strong international profile. Its 17,500 students and 1700 staff are based in eight locations around the town of Siegen in Germany, although more than 11 percent of students come from other countries. In addition to pure education, the university's four faculties undertake a broad range of basic and applied research activities. They also cooperate with major research centers and other universities both in Germany and abroad.

Increasingly sophisticated needs were putting the university's IT environment under pressure. Students, for example, wanted to use mobile phones and bring-your-own-device as everyday tools. Moreover, e-learning and the use of video were increasing, while research demanded high-performance computing. The university also needed to connect to outside bodies.

The university has an eight-strong networking team and a seven-strong server team, but their joint services were compromised by the IT environment. Limited to one computer room with insufficient power and cooling facilities, and little security, the infrastructure could not cope with existing demand and would certainly not support the organization's future plans.

"We had 120 physical servers from ten different vendors," says Klaus Groeger of the server team. "They were restrictive and difficult to manage, so we wanted to introduce server and storage virtualization to deliver faster and more efficient services to our students and professors."

Solution

The implementation of a new server cluster was already in planning, and the university wanted to scale out hosted services, but the existing architecture just could not support these ambitions. "Since the solution would have to last for many years, our main goal was to introduce the latest technology," says Groeger. Service optimization, server consolidation, and high availability were top priorities. The answer was to build a new data center on a greenfield site and equip it with a state-of-the-art infrastructure that would streamline service delivery.



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Member of the networking team
University of Siegen

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The University of Siegen installed a FlexPod-like architecture with pre-tested and pre-validated Cisco Unified Computing System™ (UCS®) B230 Blade Servers. Cisco Nexus® 2000 and 7000 Series Switches provided the underlying fabric, while Cisco® ASA 5585 security appliances offered the necessary protection. The solution also includes a NetApp FAS3270 unified storage system. To support virtualization, the university uses VMware vSphere.

The university benefits from Cisco Fabric Extender technology and Virtual Port Channel, which eliminates complex Spanning Tree Protocols and simplifies network management. Other technologies enabled by Cisco Nexus, such as Virtual Device Context, allow one physical switch to work as four virtualized switches, maintaining separate logical entities while delivering a 4:1 space-saving ratio in the racks.

A significant innovation is the introduction of Cisco Multihop Fibre Channel over Ethernet (FCoE) enabled by Cisco MDS 9513 Series Switches. Groeger says: “This advanced platform has been working securely for a long time and really does the job.” FCoE was adopted after thorough testing in Cisco Labs and was a key consideration for making the greenfield site, which has a lifespan of 10 to 20 years, compatible with future versions.

Results

Implementing Cisco UCS technology into the new data center has helped enable the University of Siegen to virtualize its server estate while improving speed of provisioning and scalability. FCoE was an important enabler for this move by allowing existing fiber channel and storage to be converged and run on the same 10Gbps Ethernet infrastructure. As a result, server footprint has reduced from 120 physical machines to 14 UCS blades. Just 12 of the UCS servers support 300 virtual servers, and the university forecasts that this will increase to 400.

“This consolidation has not only saved data center space, but has also brought corresponding reductions in power and cooling costs,” says Matthias Trute of the server team. “We have increased the reliability and the redundancy of our infrastructure and decreased power usage by about 30 percent. Thanks to the Cisco Nexus-enabled unified fabric you don’t see many cables in the server cabinets either.”

Individual university departments now have the power to provision and configure their own virtual machines within hours rather than weeks to meet their different educational and research needs. Cisco In-Service Software Upgrade (ISSU) has removed the need to negotiate service windows, which could interrupt research projects. Meanwhile, to reduce the management burden, a 50-desktop virtual desktop infrastructure (VDI) pilot has been launched using VMware View running on the Cisco UCS blades. “Management has been simplified, and data center vendors have been reduced from ten to two,” says Alexander Kiontke of the networking team.

Introducing a Cisco Nexus solution with top-of-rack switches has greatly simplified cabling. Kiontke says: “It’s quite impressive if you look at the server cabinets. You don’t see that many cables because of FCoE and virtualization. Our major legacy storage pool is accessed by Cisco Multihop FCoE, and our new NetApp storage and most of the UCS servers are connected that way as well.”



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Using the Cisco “wire-once, enable anywhere” design philosophy, the university has connected the old storage environment, which is based on Fibre Channel, with the new FCoE NetApp domain. This ability, to allow virtualized servers to be linked to both FCoE connected storage as well as the old Fibre Channel world, provided a smooth migration path for the university.

“This is a very good example for how old and new things can be brought together successfully,” says Groeger. As well as increasing reliability and lowering power usage, Multihop FCoE functionality also helps enable increased network flexibility and scalability by extending it beyond the first-hop access layer.

With Cisco Nexus technology, network bandwidth has increased from a single 1Gbps backbone to multiple 10Gbps links, which improves resilience and enables many more services to be provided concurrently. “This will also set the stage for private cloud computing,” says Hofmann, “which we have set our sights on for the coming 12 months.”

For More Information

To learn more about Cisco Unified Computing, please go to www.cisco.com/go/unifiedcomputing

Product List

Compute

- Cisco Unified Computing System (UCS)
 - Cisco UCS B230 M2 Blade Servers

Routing and Switching

- Cisco Nexus 2000 and 7000 Series Switches
- Cisco MDS 9513 Series Switches running Cisco Multihop Fiber Channel over Ethernet

Fabric Interconnects

- Cisco UCS 6120 Fabric Interconnects

Security and VPN

- Cisco ASA 5585 Adaptive Security Appliances

Applications

- VMware vSphere
- VMware View virtual desktop infrastructure software

Storage

- NetApp FAS3270 Storage



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