UNIVERSITY OF GRONINGEN ESTABLISHES PLATFORM TO DRIVE GLOBAL RESEARCH AMBITIONS

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INDUSTRY
EDUCATION

LOCATION
GRONINGEN, THE NETHERLANDS

KEY CHALLENGES

- Maximize the utilization of IT resource
- Simplify management of three data center clusters
- Provide consistent, automated infrastructure provisioning for researchers

SOLUTION

VMware ESXi is a purpose-built bare-metal hypervisor that installs directly onto a physical server. VMware vSphere 6.7 provides exceptional management simplicity, outstanding operational efficiency, and faster time to market, all at scale.

IMPACT

- The mission critical cluster hosts a range of HPC workloads, providing a scalable, portable and compliant environment for researchers
- Supports culture of IT and institutional innovation

The University of Groningen (UG) in the Netherlands has ambitions for global excellence. To support innovation, collaboration and globally-recognized research, it has transformed how it delivers IT services by building platforms such as 'Research as a Service', underpinned by VMware ESXi™ and vSphere® 6.7. This has delivered efficiency, agility, security, and compliance.

The University of Groningen is an international research university with strong roots in the north of the Netherlands. The University creates and shares knowledge through its outstanding research, scholarship, and education. With an academic tradition dating back to 1614 and a rich heritage, the University is a unique academic community with a strong sense of belonging and a culture of innovation in teaching and research.

Challenge

The University of Groningen bills itself as an international academic community. It is a place where disciplinary and cross-disciplinary research leads to scientific breakthroughs and societal innovation. Talented students learn to become innovators who will contribute to a sustainable society. Its research and education, says the University, is "driven by intrinsic curiosity and interaction with global society."

Technology plays a key role in facilitating this collaborative, inquisitive, entrepreneurial mindset.

"Open Access, Open Research and Open Data are important strategies for realizing these goals," says Wietze Albers, IT Architect, University of Groningen. "They help us achieve excellence in research, education and societal impact."

Specifically, Albers and his colleague Gemma van der Voorst, a Virtualization Specialist at the University, wanted to create an efficient bank of IT resource. Having identified that as much as 30% of the capacity across the University's three data centers was unused, the pair wanted to make this available for research teams to run new, high-performance workloads, including machine learning and AI.

"We saw an opportunity to combine resources to accommodate a variety of workloads," says van der Voorst. "With the right segmentation we can view resource in totality, and run IT applications and HPC workloads on the same shared infrastructure."

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"IT efficiency is extremely important to us. vSphere 6.7 helps us to use resources to the fullest."

GEMMA VAN DER VOORST
VIRTUALIZATION SPECIALIST
UNIVERSITY OF GRONINGEN

VMWARE FOOTPRINT

- VMware ESXi™
- VMware vSphere®
- VMware vSAN™
- VMware Power CLI

The project would increase resource utilization across the institution. By automating access to complex environments across all IT infrastructure using a self-service model for researchers, it would turn time to value from months to hours. In addition, clearer segmentation would help protect private data and research projects, ensuring a secure research environment with compliant infrastructure.

"IT efficiency is extremely important to us. We need to use resources to the fullest," says Albers.

Action

By unifying the three data centers, with a minimum 80GB bandwidth, the University ensures resources are managed and automated effectively. There is a total of 3.5 THz 1296 CPU cores, with 27TB of memory.

Central to this is VMware ESXi and vSphere 6.7. VMware ESXi is a purpose-built bare-metal hypervisor that installs directly onto a physical server. With direct access and control of underlying resources, ESXi is currently more efficient than hosted architectures and can effectively partition hardware to increase consolidation ratios and cut costs for users. vSphere 6.7 provides exceptional management simplicity, outstanding operational efficiency, and faster time to market—all at scale.

Van der Voorst says, "Only VMware was able to deliver this functionality at the time. All our ESXi nodes have 11 VMK-adapters so, they have 11 IP-addresses, 150 networks divided over three vSwitches, and 60 datastores. During the installation and configuration we set storage policies, installation of VIBs, port group settings, log servers, NTP servers, SSH keys, and access to the ESXi shell. Thanks to the scripted installation/configuration, this was no problem."

She lists a range of compelling new features offered by vSphere 6.7: "NVIDIA GPU support, improved overall performance using the latest hypervisor version, and improved vCenter APIs to help automation."

Impact

The result allows UG to maximize the use of IT resource, lowering costs and drastically improving the user experience. Resource computing enables UG to smoothly handle workloads from separate user communities, be they academia, research or the University's business users.

"We do more with the VMware infrastructure. We provide the ability for data scientists to use the reserved overcapacity to run HPC workloads on the same mission critical infrastructure," says van der Voorst. "Researchers now have more time to dig into even more innovative solutions."

The platform supports a range of application frameworks central to the research work being done at UG. These include Gromacs (Groningen Machine for Chemical Simulation, originally developed at UG); TensorFlow (an open machine learning framework, originally developed by Google); Caffe (a deep learning framework, from UC Berkeley); Relion (an application for refinement of images in electron cryo-microscopy); and AmberTools (a biomolecular simulation application).

"We think it's a unique platform, and one that provides a point of difference for the University. The biggest challenge is not the technology, but making sure that users understand the cool new functionality."

GEMMA VAN DER VOORST
VIRTUALIZATION SPECIALIST
UNIVERSITY OF GRONINGEN

The transformation simplifies the maintenance of physical servers and strengthens business continuity. Critically for research projects, it simplifies the task of setting unique security layers. It helps create secure, compliant and portable IT environments for conducting research. It means UG is able to guarantee capacity for its mission-critical and high-performance computing workloads.

"vSphere creates a general purpose platform, able to handle generic and HPC workloads. We've created a self-service environment for users, where it is easy to get your own virtual piece of the computing cluster," says van der Voorst. "Automation makes it easier to manage, and it helps create a culture of innovation at the University, and among the IT team."

Beyond the cost benefit of shared resources, the solution means hardware replacement can be conducted in phases rather than in one go.

"We can now manage rolling upgrades," says van der Voorst. "We think it's a unique platform, and one that provides a point of difference for the University. The biggest challenge is not the technology, but making sure users understand the cool new functionality."

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