Ghent University powers advanced research with HPE energy-efficient supercomputers

HPE Apollo 6000 System speeds research for high-performance computing

“The power of the HPE Apollo 6000 System strengthens scientific research for Ghent University and allows our researchers to quickly test new hypotheses and explore areas like bioinformatics, weather prediction, fluid dynamics, nanotechnology, physics, computational chemistry, and linguistics. The ability to swiftly process massive amounts of data enables innovative analysis that opens up new worlds of research and exploration.”

– Ewald Pauwels, Scientific Coordinator for High-Performance Computing, Ghent University
Since the beginning of the century, both the Flemish government and the Flemish universities in Belgium have taken bold initiatives to build up a supercomputer infrastructure to support high-performance research. A consortium of universities from the Flemish region of Belgium banded together to share the cost of deploying a Tier 1 supercomputer to support their research efforts. They selected Hewlett Packard Enterprise (HPE) servers, and a Tier 1 system was installed at Ghent University in Belgium in 2012.

The Flemish Tier 1 supercomputer opened at Ghent University in October 2012, and is operated by Ghent University and shared by all Flemish universities and by industry and public research institutions. The Tier 1 supercomputer facility consists of a 528-node cluster of HPE ProLiant SL230s Gen8 Servers, and it also includes HPE ProLiant DL380e Gen8 Servers.

With over 41,000 students and 9,000 employees, Ghent University is one of the largest universities in Belgium, and it sought additional high-performance computing power to support its own researchers and therefore extended its Tier 2 supercomputing cluster to strengthen the university’s research capabilities. After a careful evaluation, Ghent University selected the HPE Apollo 6000 System and is now able to conduct even more sophisticated computational research than previously possible.

“Universities can improve themselves by implementing high-performance computing,” explains Pauwels. “Supercomputing allows researchers to go to new levels of experimentation. Whether a chemist is analyzing the stability of chemical interactions or a mathematician is trying to prove a theory, powerful computing infrastructure accelerates and improves the quality of research. And high-performance computing is not just for hard sciences like technology, engineering, life sciences, and math; it is also being used effectively by sociology and literary researchers to expand our collective knowledge base and improve the quality of research published by major universities.”

Implementing high-performance computing

Supercomputers play an important role in academic research and are used for a wide range of computationally intensive tasks in various disciplines, including bioinformatics, weather forecasting, climate research, molecular modeling, mechanical engineering, statistics, linguistics, and physical simulations. High-performance computing allows researchers to combine advanced computing power, scalable network infrastructure, an adaptive software environment, and production reliability to push the boundaries of academic research.

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The Apollo 6000 System delivers industry-leading performance in less space with the flexibility to tailor the system to precisely meet workload requirements. This rack-level solution allows Ghent University to address the growing demand for high-performance computing while controlling costs and optimizing operational efficiency. It allows Ghent University to optimize performance at the rack level, and the HPE Apollo family is designed to deliver efficient rack-scale compute, storage, networking, power, and cooling solutions for high-performance computing workloads.

The Apollo 6000 System was deployed with ProLiant XL230a Gen9 Servers and runs Red Hat Enterprise Linux 7. Twenty Apollo 6000 System chassis were deployed with 10 nodes per chassis in a scaled-out chassis configuration. In addition, 16 ProLiant DL380e Gen9 Servers were each fitted with half a TB of memory and a tiered HD/SSD storage solution in order to boost Big Data research. The installation was smooth, and the new computing cluster went online in April 2015. The academic community immediately began reaping the rewards of the expanded high-performance computing environment.

“The increased computing power is allowing researchers to run more complex calculations and obtain results much faster,” states Pauwels. “For example, our supercomputer is being used to build better climate models that calculate weather patterns for increasingly larger regions, and to develop new materials with exciting properties. Biochemists also use it to examine the properties of enzymes or study the evolution of biological systems. It’s also being used to develop linguistic models to determine whether chat room feeds can be interpreted to detect suicidal thoughts, and by legal scholars to analyze the behavior of burglars on a geographic basis.”

He continues, “Our own supercomputer infrastructure onsite is enabling big science in which members of the academic community move beyond their own safety zones and conduct innovative research that challenges existing views and potentially leads to new levels of understanding that improve society. It also dramatically improves research productivity. For example, one of Ghent University’s medical researchers was previously analyzing magnetic resonance imaging (MRI) scans periodically using legacy infrastructure, but this was very time-consuming. With the aid of our supercomputer, this researcher was able to perform the analyses overnight, and pushed beyond previous boundaries by processing much larger sample sizes on the more powerful computing capabilities now available.”

**Ensuring server reliability**

Ghent University relies on HPE Proactive Care Service to support this supercomputer deployment. Flexible and cost-effective, Proactive Care Service combines support with smart technology to help prevent problems, keep IT reliable and stable, and boost operational performance. HPE experts take a hands-on, personalized approach with proactive reports that include analysis, consultation and recommendations, and reporting to prevent issues and quickly resolve problems. This results in an enhanced call experience that includes start-to-finish case management.
According to Ghent University technical team member Wouter Depypere, “Having a dedicated hardware engineer in country who knows the environment and the university helps us proactively support our supercomputer infrastructure.”

The servers are connected to HPE and leverage 24x7 monitoring, pre-failure alerts, rapid diagnosis, automatic call logging, and parts dispatch to help avoid outages. Ghent University receives proactive scans and a periodic healthcheck on the connected devices with tailored maintenance recommendations from HPE as part of Proactive Care Service.

HPE Insight Online, available as part of the HPE warranty agreement, enables the university and technical team to monitor the servers from anywhere, at any time, from any device. “Proactive Care Service and the Insight Online dashboard help us maintain and operate our systems,” states Depypere.

**Increasing advanced research**

Supercomputers enable the world’s leading scientists to find answers to some of the most difficult challenges of our time. But while the human imagination is limitless, the massive space and energy requirements of traditional supercomputers, combined with the fall off in semiconductor scaling, are slowing the pace of innovation. HPE is breaking through traditional supercomputing barriers by rethinking cooling to enable high-density, energy-efficient supercomputing solutions.

Ghent University is providing its research community with access to high-performance computing capabilities that are increasing the university’s ability to attract leading researchers and publish world-class, multidisciplinary academic research. “Faster and more powerful and reliable computing means an improved research environment,” says Pauwels. “The Apollo 6000 System is allowing Ghent University to efficiently deliver the computing resources that researchers need to investigate their fields and publish breakthrough research that advances our knowledge.”

Learn more at [hpe.com/apollo](http://hpe.com/apollo)