# Case Study
# King Abdulaziz University

»Our investment in Fujitsu's HPC technology helped KAU deliver upon its responsibilities by providing a reliable solution for students, academics and researchers, who can leverage our new Center of Excellence and the technical support it will provide.«

**Prof. Abdulfattah Mashat, VP of Development, King Abdulaziz University**

## The customer

Country: Saudi Arabia
Industry: Education
Founded: 1967
Employees: 40,000
Website: www.kau.edu.sa

## The challenge

King Abdulaziz University wanted to introduce a high performance computing capability to enable the rapid processing of vast volumes of data, boosting its ability to research while also offering HPC cloud services to other educational, government, and commercial entities in the region.

## The solution

Fujitsu has installed FUJITSU Integrated System PRIMEFLEX for HPC, and delivered an integrated and certified cluster-type supercomputer with a theoretical peak performance of 230 teraflops. The cluster consists of Fujitsu PRIMERGY servers and ETERNUS storage systems with the necessary reliability to deliver excellent performance for scientific and engineering applications.

## The customer

King Abdulaziz (KAU) is the largest university in Saudi Arabia with more than 140,000 students and 6,000 faculty staff. It is a technology role model for more than 15 universities in the Kingdom and offers consultancy services for other segments in the region. KAU aims to become a leader in developing standards of assessment for student performance as well as high-quality research and development programs.

## The challenge

KAU plays a leading role in research and was keen to extend its technology platform in order to further boost its capabilities. It wanted to deploy a high performance computing (HPC) cluster that would advance its research while also offering HPC cloud services to other educational, government, and commercial entities in the region. This would form a new Center of Excellence to support the many researchers and scientists affiliated with KAU and enable them to process large volumes of data.

The new system was intended to significantly enhance research capabilities in meteorology and climate modelling, engineering, nanotechnology, aeronautics, genomic research, real-time vision, bioinformatics, water desalination, and industry-specific numerical simulations in the Kingdom. Through the Center of Excellence, KAU will study possible impacts on the society in the Kingdom such as climate change and also work in collaboration with worldwide scientific communities, regional universities, government departments and commercial organizations on research projects that can benefit from the computer's capacity.

"To win this prestigious project, Fujitsu satisfied the varied and challenging HPC requirements of King Abdulaziz University's faculties of Environmental Designs, Meteorology, Environment and Arid Land Agriculture, Computing and Information Technology, and Genome Research," explains Prof. Abdulfattah Mashat, VP Development, KAU. "Fujitsu provides integrated and certified ready-to-go HPC cluster solutions optimized for the University's specific needs. What's more, its consultancy services and collaboration with government agencies in planning and problem-solving by delivering results of highly complicated experiments – particularly regarding environmental changes and meteorology accuracy – ensured that the solution will deliver the desired results."

## The benefit

- High-end computational modelling and simulation capabilities beyond academia and for the commercial and manufacturing industries in the Kingdom
- Improved execution time of different applications such as Genomic Analysis Toolkit, WRF, COSMO, OpenFOAM
- Delivers capacity required to perform the most sophisticated, computer-intensive simulations for the country

## Products and services

FUJITSU Integrated System PRIMEFLEX for HPC Cluster Solutions:

- 496 x FUJITSU Server PRIMERGY CX250 S2
- 4 x FUJITSU Server PRIMERGY CX270 S2
- 43 x FUJITSU Server PRIMERGY RX300 S8
- 55 x FUJITSU Storage ETERNUS DX200 S3, 2 PB
- 1 x FUJITSU Storage ETERNUS CS8400 V6, 1 PB
- 1 x Quantum i6000 5 PB Tape Library
- 2 x NetApp FAS 2240 24 TB each
- 64 TB Memory

## The solution

The large-scale PRIMEFLEX for HPC cluster consists of 496 Fujitsu PRIMERGY CX250 S2 and four PRIMERGY CX270 S2 servers, with a theoretical peak performance of 230 teraflops. For the peripheral systems, 43 PRIMERGY RX300 S8 servers have been installed. Furthermore, the 2-petabyte temporary disk storage capacity composed of 55 FUJITSU Storage ETERNUS DX200 S3 units is connected with a scalable parallel file system. In addition, the ETERNUS CS8400 V6 along with a tape storage system offers 6 PB of separate backup and archive storage.

Fujitsu is providing not only hardware, but also maintenance and training services, as well as services meant to increase institutional collaboration worldwide by linking the resources of remote organizations to an HPC cloud service that will be hosted on KAU's new system.

The new system is fully operated and maintained by Fujitsu on site professionals. The on-site team has HPC engineers and code optimizers, in addition to PhD holders in the field of HPC, and has an ambitious plan to build capacities and disseminate HPC knowledge to KAU researchers. Fujitsu also provides scientific assistance and collaboration that was recognized by the first scientific publication of results about solving spectrum assignment problems in elastic optical networks.

## The benefit

In its first efforts to put this system to practical use, KAU is initiating research to create meteorological models of particular interest to Saudi Arabia, such as for sand storms, and to develop technology for the desalination of seawater. KAU can also now offer high-end computational modelling and simulation capabilities beyond academia and for the commercial and manufacturing industries in the Kingdom.

"As the largest university in Saudi Arabia, we deliver a global standard in research resources that supports the public and private sector in the Kingdom. We also focus on developing our ICT solutions that allows over 160,000 students to flourish at KAU," says Mashat. "As a consequence, our investment in Fujitsu's HPC technology helped KAU deliver upon its responsibilities by providing a reliable solution for students, academics and researches, who can leverage our new Center of Excellence and the technical support it will provide."

"The demand for HPC technology is increasing and the Kingdom of Saudi Arabia and KAU understand the value it will add for industries such as aerospace, meteorology, healthcare, energy, environment and education and for the development of smart cities," adds Akira Kabemoto, Head of Service Platform Business, Fujitsu. "As a consequence, we worked in close collaboration with KAU to develop a solution that can deliver the necessary capacity to perform the most sophisticated, computer-intensive simulations for the country."

## Conclusion

The system has been called Aziz and was officially switched on by His Royal Highness Prince Mishaal bin Majed bin Abdul Aziz, alongside Kabemoto, at a ceremony attended by over 250 researchers, academics, and students. KAU now enjoys a system that has the necessary reliability to deliver excellent performance for scientific and engineering applications.

"Through our co-operation with Fujitsu, one of the leading companies in HPC, KAU has been able to increase the technologies available for our scientific research. I believe this project will have a beneficial and long lasting effect on Saudi Arabia and the Arab countries as a whole."

Prof. Abdulfattah Mashat, VP Development, King Abdulaziz University

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