CUSTOMER CASE STUDY

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>
> **Professor DSci Ana Proykova**
> **Head of HPC Lab**
> **Sofia Tech Park**

Sofia Tech Park turned to Fujitsu to create an affordable, reliable, and scalable HPC cluster, enabling both commercial and academic projects to be completed quickly.

At a glance

Country: Bulgaria
Industry: Research and Education
Founded: 2012
Website: sofiatech.bg/en/about/tin/laboratory-complex/hpc/

Challenge

When the Sofia Tech Park was established, it wanted to incorporate HPC capability in order to attract researchers, SMEs, students, and funding. It needed to find the right technology partner at the right price to make HPC a reality.

Solution

Working with local partner, Kontrax, and Fujitsu, Sofia Tech Park configured and built a 24-node HPC cluster based on Fujitsu PRIMERGY servers. This now enables students, researchers, and commercial partners to operate a range of specialist applications, including WRF, Gromacs, ABINIT, Quantum ESPRESSO and CP2K.

Benefit

- Fujitsu HPC delivers measured performance of 19,001 gigaflops and parallel efficiency of 81.4%, making it the second fastest supercomputer in Bulgaria
- Leading performance ensures fast task completion
- Maximum uptime enables optimal availability
- Scalability and in-built capacity allow commercial partners to use the platform

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Customer

Sofia Tech Park was established to enable local research, innovation, and technological capabilities in Bulgaria. It partners with private and public institutions to create and manage a unique environment for educational programs and to provide support for the commercialization of new technologies, products, and services. The Park is also a prestigious destination for national, regional, and global researchers as well as innovative companies, demonstrating the importance of the knowledge-based economy to the Balkans region.

Products and Services

- FUJITSU HPC Cluster
- FUJITSU Server PRIMERGY RX2530

Building HPC capability

Sofia Tech Park is an ambitious, EU-funded attempt to create a technology innovation hub in the heart of Bulgaria. Planning began back in 2012 and, from the outset, incorporating High Performance Computing (HPC) was a top priority.

The mission of the HPC laboratory is to deliver reliable, sustainable computing resources and services, to facilitate the use of high-performance computing, and to meet the small scale and midrange computational demands of the scientific research community in the academic institutions and high-tech SMEs located all over the country and the region. Once the physical build was completed in 2015, the Park set about finding the right HPC partner.

"HPC helps us attract students, researchers and funding so it is a critical part of the Park, however, we wanted to make sure we were getting the best technology at the best price," explains Professor Ana Proykova, Head of HPC Lab, Sofia Tech Park. "As a public body, we were obliged to issue an RFP, which was won by local IT specialist, Kontrax, as it offered the most competitive price."

Sofia Tech Park was also impressed by the Fujitsu technology recommended by Kontrax, which it felt would offer the best performance and reliability, enabling it to tackle its core areas of focus: quantum information, weather forecasting, climate and ocean modelling, computational chemistry, computational physics, processes at the nano-level, and big data analytics.

"Fujitsu has a great reputation for build quality so when Kontrax proposed an affordable Fujitsu HPC solution, it was a natural fit," adds Proykova. "The challenge then was to design and build the cluster on time and on budget."

Enabling specialist research

The HPC cluster consists of FUJITSU Server PRIMERGY RX2530, equipped with two Intel Xeon E5-product family processors with 16 cores,128GB of RAM and 128GB of SSD. Internal communications are provided by InfiniBand links with 56 Gbps throughput. The storage NAS subsystem is based on FUJITSU Server PRIMERGY RX2530 running FreeBSD 10.3 OS with 3.94TB total storage RAIDZ2 pool. The file system is shared with NFSv4 via InfiniBand subnetwork.

This solution was configured in the Fujitsu Germany lab, then built onsite by Kontrax. The suite of high-powered applications (WRF, Gromacs, ABINIT, Quantum ESPRESSO, CP2K) installed by the HPC laboratory team enables more than 20 concurrent users to work on projects together.

"When we give each user an account, they immediately have access to up to 300GB of storage on the system and can install their own software as necessary," continues Proykova. "This flexibility ensures that everyone has the tools they need to succeed."

Support for the HPC platform is also provided by Kontrax, which guarantees a response within one day. However, in the 18 months since the cluster was activated, there have been very few problems to solve.

Optimal performance and availability

Benchmarks have shown that the Fujitsu HPC solution delivers measured performance of 19,001 gigaflops and parallel efficiency of 81.4%, making it the second fastest supercomputer in Bulgaria. This performance, combined with capacity and scalability, not only enables Sofia Tech Park to conduct its own research but also to offer HPC to private customers.

For example, the State Air Traffic Services Authority (BULATSA) uses it for weather forecasts, helping to increase flight safety. The Fujitsu cluster takes just 15 seconds to model a high-resolution one-hour meteorological forecast for the region, the cluster provides this information every hour, 365 days.

The Fujitsu HPC platform is also allowing Sofia Tech HPC Laboratory to participate in Europe-wide research projects, such as Big Data for Smart Society, which aims to develop advanced methods and tools for data collection, data consistency cleaning, data aggregation, data processing, modelling and analysis, by providing both accessibility and proper visualization.

"We couldn't take part in these projects or offer commercial HPC without Fujitsu. What's important, particularly when it comes to air traffic control, is that it is available 24/7 – we cannot afford downtime and Fujitsu doesn't disappoint," comments Proykova. "It delivers maximum availability, even when we experience peaks in demand. Moreover, the HPC solution's efficiency means that it consumes little energy and offers a dynamic low-consumption mode to enable further savings."

Most importantly, the Fujitsu HPC platform attracts the best and brightest academics from the region and, with them, the additional funding that helps Sofia Tech Park continue to evolve.

"We are very happy with our Fujitsu HPC cluster, which delivers reliable, affordable, and scalable high-performance computing," concludes Proykova. "When we come to upgrade the technology, we will undoubtedly look at the new technology Fujitsu has to offer."

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