CUSTOMER CASE STUDY

> “We needed modern, resilient, high-performing servers to form the foundation of the new Center of Excellence and Fujitsu has delivered beyond our expectations.”

Prof. Emanouil Atanassov
Head of Department of High Performance Computer Systems, Networks and Algorithms
IICT

Building next-gen HPC with NVIDIA

At a glance

Country: Bulgaria
Industry: Research
Founded: July 2010
Website: iict.bas.bg

Challenge

In preparation for the creation of an HPC Center of Excellence, the Institute of Information and Communication Technologies (IICT) at the Bulgarian Academy of Sciences wanted to build a robust, high-performing, distributed server platform with in-built GPU acceleration.

Solution

It collaborated with local certified partner Kontrax and Fujitsu to deploy 40 Fujitsu PRIMERGY RX2540 servers with NVIDIA® Tesla® V100 32GB GPUs. The new system supports a range of processor-intensive projects such as neural network planning, advanced natural language processing and molecular dynamics in drug research.

Benefit

- Processing speed has increased tenfold, making research more productive
- Advanced NVIDIA Tesla V100 accelerates AI, HPC, data science and graphics
- Fujitsu servers provide a 24/7 continuous operation with no unplanned downtimes
- Best-in-class energy efficiency, redundant and hot-plug system design

shaping tomorrow with you

Customer

The Bulgarian Academy of Sciences (BAS) conducts research, training and solves problems related to the development of Bulgarian society and state. It has a consistent policy to encourage science and innovation as a condition for economic progress in the country, and is an active participant in the European Research Area. The Institute of Information and Communication Technologies (IICT) at BAS was founded in July 2010 as a successor of Institute for Parallel Processing (IPP), Institute of Information Technologies (IIT) and Institute of Computer and Communication Systems (ICCS).

Products and Services

- 40 x FUJITSU Server PRIMERGY RX2540, with 2 x Intel® Xeon® Gold 5118 processors and NVIDIA® Tesla® V100 32GB GPU with GRID EDU Perpetual License

Laying the foundation for a Center of Excellence

Within the Institute of Information and Communication Technologies (IICT) at the Bulgarian Academy of Sciences sits the department of High Performance Computer (HPC) Systems, Networks and Algorithms. It is focused on activities in the development and deployment of grid middleware and software components, methods, algorithms, applications suitable for grid, cloud and HPC computing systems.

As part of its ongoing evolution, the IICT wanted to build a 'Center of Excellence' research complex, which could conduct scientific research in accordance with the best global standards and practices, while also providing a critical mass of high-level scientists, a well-defined organizational structure and ambitious research agenda. Following a €15m grant from the EU, 75% of which needed to be spent on infrastructure, the organization decided to begin phase one with establishing a high-performing server platform across multiple project partners.

"The broader vision is to create labs for visualization, and the processing, analysis and storage of data with state-of-the-art workstations, however, first we needed to build the underlying distributed server architecture," explains Prof. Emanouil Atanassov, Head of Department of High Performance Computer Systems, Networks and Algorithms, IICT. "By distributing 40 servers across the partnership – institutes of BAS and universities in Bulgaria, we can ensure every partner in the project has a slice of processing power."

Processing power is a key consideration – as part of the RFP issued, IICT stipulated that it needed cost-effective GPU-powered parallel processing to run advanced applications efficiently, reliably, and quickly. Following the evaluation process, in which four vendors competed, the institute selected Fujitsu and local systems integrator specialist Kontrax, based on its low-cost and high performance.

"We had worked with Kontrax in the past and were confident in its ability to deliver a Fujitsu solution that would meet our technical specifications and budget," adds Atanassov. "Just as importantly, the team could provide the GPU acceleration we need for computational throughput."

Industry-leading GPU power

Kontrax configured and installed 40 FUJITSU Server PRIMERGY RX2540, with two Intel® Xeon® Gold 5118 processors and NVIDIA® Tesla® V100 32GB GPUs with GRID EDU Perpetual Licenses. The NVIDIA® Tesla® V100 Tensor Core is the most advanced data center GPU ever built to accelerate AI, HPC, data science and graphics. It is powered by NVIDIA® Volta® architecture and offers the performance of up to 100 CPUs in a single GPU.

Kontrax and Fujitsu delivered 12 servers to IICT, eight to the Institute of Mathematics and Informatics and four each to five other partners, where at any one time ten projects run concurrently. These range from neural network planning, advanced natural language processing, molecular dynamics in drug research and quasi-Monte Carlo numerical analysis.

"We have ten ongoing projects which involve very different types of research, all underpinned by the Fujitsu server technology," continues Atanassov. "This gives our professors and academics the processing power they need to publish ground-breaking papers and push innovation."

Blistering performance, rock solid reliability

In its six months of operation, the Fujitsu servers and NVIDIA GPUs have made an enormous impact, with a tenfold increase in processing power compared to previous servers, speeding complex calculations and analysis. Certain tasks which once took 758 seconds to perform can now be completed in just 17 seconds, bringing projects to fruition much sooner.

Moreover, during that time there has been no downtime – a particularly important consideration: "We made it clear from the outset that these machines would be running at 100% around the clock so availability was a key concern," comments Atanassov. "Thankfully, the Fujitsu PRIMERGY servers have not let us down and have coped with the intensive demands we have placed on them."

The Fujitsu servers are also simple to manage and boast best-in-class energy efficiency courtesy of two hot-plug power supplies with up to 96% efficiency. The system is easily scalable so the IICT can expand the compute power as the Center of Excellence evolves. The Center of Excellence will strengthen Bulgaria's leadership position in Southeast Europe in the field of HPC, and will ensure the full participation of Bulgaria in the European cloud and grid infrastructure.

"We needed modern, resilient, high-performing servers to form the foundation of the new center and Fujitsu has delivered beyond our expectations," concludes Atanassov. "It provides the bedrock on which we can now build a three-petabyte data storage and processing platform together with a 3D Digitization and Microstructural Analysis Laboratory, which is the next phase of the project."

FUJITSU

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IN COLLABORATION WITH KONTRAX

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