DELL EMC

AMD EPYC

Helping us look deeper into the universe

The Dutch National Institute for Subatomic Physics (Nikhef) drives global research into the universe's building blocks with high-performance computing (HPC) from Dell EMC and AMD EPYC™

Nikhef | Fundamental Research | The Netherlands

Business needs

The Dutch National Institute for Subatomic Physics (Nikhef) is under constant pressure to increase the performance of its HPC capacity as the volume of raw data it needs to process continues to expand. To meet the task, Nikhef wanted to work with a technology provider whose products could maximise the efficiency and calculation power of the server processors per euro invested.

Solutions at a glance

- Dell EMC PowerEdge servers with AMD EPYC 7551P processors
- High Performance Computing

Business results

- Enables fast processing of tens of petabytes of raw data
- Supports doubling of raw data processing after 2020
- Maximises return on investment through stable performance

20%

greater processing efficiency

Faster

access to latest AMD EPYC processors through the Dell EMC account team

The Dutch National Institute for Subatomic Physics (Nikhef) studies the interaction and structure of all elementary particles and fields—at the smallest distance scale and the highest attainable energy. Its work—as part of a global research programme involving the Large Hadron Collider (LHC) in Geneva, Switzerland—helped confirm the existence of the Higgs boson particle, one of the universe's elementary building blocks. The same computing infrastructure used for the Higgs research was also involved in the Nobel-Prize winning confirmation of gravitational waves.

Data processing delivers breakthroughs

Computing power and data-analysis capacity are essential for Nikhef. "None of the interactions we study are visible to the naked eye," explains Tristan Suerink, IT architect at Nikhef. "We depend on particle accelerators and the data they generate to inform us. It's only through many calculations that we can understand the data. Every year we receive dozens of petabytes of raw data from various scientific research institutes. All of these must be processed and shared with thousands of researchers around the world."

Never-ending need for more power

The challenge for Nikhef was increasing HPC processing power for growing amounts of raw data. The issue, says Suerink, is likely to become even more acute from 2020 onwards. "We're going to see data from the LHC more than doubling," he says, "and increasing by a factor of five in 2025 when LHC enters its High Luminosity phase."

To meet the challenge, Nikhef goes to great lengths to improve the efficiency of the calculations, compared to every euro invested. "It is our policy to choose the most optimally designed CPUs, so that each core performs to the maximum, regardless of what other cores in the same CPU do," explains Suerink. "Moreover, we want CPUs and servers that guarantee four years of solid performance with full deployment."

Constantly meeting the HPC need

"Every time we want to expand our cluster, Nikhef compares the leading technology companies' server solutions," Suerink adds. "We are always looking for as much computing power as possible for our budget. Memory, network, calculation capacity and storage are the most important for us."

In its most recent HPC investment, Nikhef expanded the infrastructure with 93 Dell EMC PowerEdge R6415 servers, featuring AMD EPYC™ 7551P processors. The single-socket server contains 32 cores, 64 threads and 128 lanes of PCIe 3.0 an interface for high-speed connections between components. Suerink comments, "The design of the Dell EMC PowerEdge R6415 met both of our selection criteria: the CPU performance and the high I/O bandwidth available."

Staying ahead of the competition

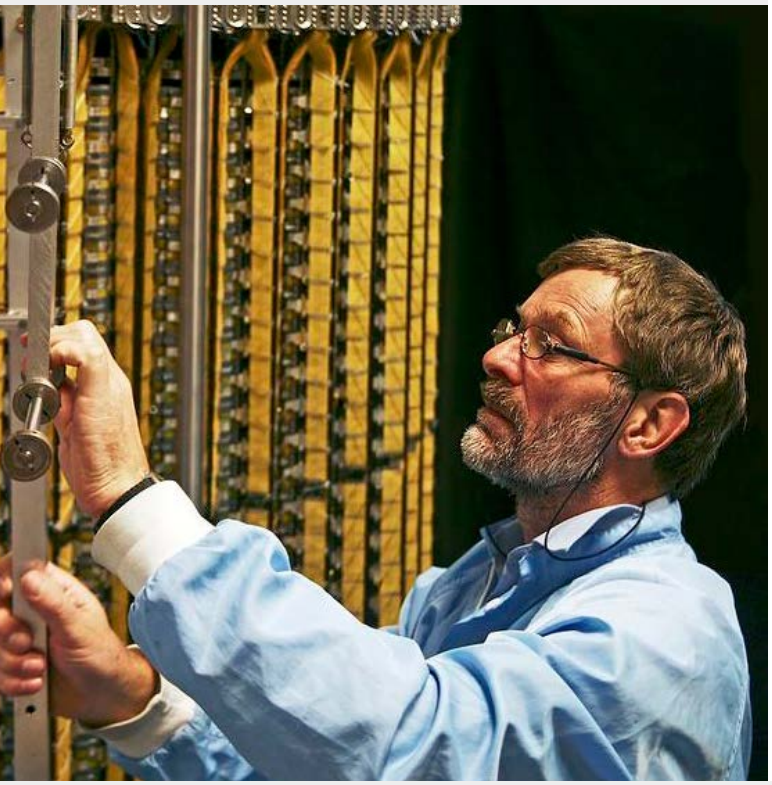
At the time of the engagement, the AMD EPYC processors were new on the market. Even those vendors with AMD offerings couldn't get servers with the EPYC processors into the hands of Suerink and his colleagues before Dell EMC. "We could test the latest AMD EPYC processors earlier because we worked with Dell EMC," says Suerink.

"Our Dell EMC servers are reliable, so users can work longer and do more calculations."

Tristan Suerink, IT Architect, Nikhef

"More effective computing power with Dell EMC means that scientists can analyse data more quickly and ultimately do more research."

Tristan Suerink, IT Architect, Nikhef



20% greater processing efficiency

Nikhef tested demo units of the servers extensively. A single-socket server, featuring the EPYC architecture and 32 cores offered the best price–performance ratio. By choosing a single socket, Nikhef ensured that all of the servers' processing capacity was available for data analysis. This makes the solution 20 percent more efficient than competing dual-socket systems. Suerink comments, "More effective computing power with Dell EMC means that scientists can analyse data more quickly and ultimately do more research."

Reliable performance increases returns

Nikhef is maximising the return on its investment thanks to the stability of the Dell EMC technology. "Our Dell EMC servers are reliable, so users can work longer and do more calculations," says Suerink. "It's the reliability, uptime and quality of delivery that are important to us."

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