Accelerating the path to sustainable energy

Eni launches one of the world's most powerful and sustainable computing systems to fuel research into new sources of energy.

Energy | Italy

Business needs

Eni requires lightning-fast high performance computing systems to accelerate the company's ongoing digital transformation and the development of new energy sources.

Solutions at a glance

- Dell EMC PowerEdge servers
- Intel® Xeon® Scalable processors
- NVIDIA® V100 Tensor Core GPUs
- Mellanox® InfiniBand® HDR networking

Business results

- Accelerating the development of new energy sources
- Creating a path to a sustainable low-carbon future
- Enabling new AI-based approaches to energy discovery
- Furthering the company's ongoing digital transformation

The new HPC5 supercomputer at Eni has a peak performance of

52 petaflops

The combined compute power of Eni's HPC5 and HPC4 systems yields total peak performance of

70 petaflops

A focus on sustainability

Eni is an integrated energy company that is focused on playing a decisive role in the energy transition to a low-carbon future. The Italy-based company is engaged in the exploration, production, refining and sale of oil, gas, electricity and chemicals, acting at all times with the well-being of the planet in mind. Sustainability is an integral part of Eni's business, as the company does its part to work toward the United Nations' 17 Sustainable Development Goals for 2030.

To carry out its diverse mission, Eni uses high performance computing systems for a wide range of applications that support the company's highly complex processes. Eni's leadership recognizes that high performance computing (HPC) is one of the keys to accelerating the company's ongoing digital transformation and the development of new energy sources, such as the generation of energy from the sea, magnetic confinement fusion, and other climate and environmental technologies.

Initiatives like these require not just HPC, but also the computational power of leading-edge HPC systems — like Eni's new HPC5 supercomputer from Dell Technologies.

Petaflops of performance

The HPC5 system, which came online in early 2020, debuted as one of the world's most powerful and sustainable computing systems and the most powerful supercomputer in the industrial sector.[1] The system is rated for total peak performance of 52 petaflops, which means it can perform 52 million billion mathematical operations per second. In addition, the new supercomputer builds on the capabilities of Eni's existing 18-petaflop HPC4 system to yield a total of 70 petaflops of processing power to fuel the advanced research conducted at Eni.

The HPC5 system is based on 1,820 Dell EMC PowerEdge C4140 servers, each with two 2nd Generation Intel Xeon Scalable processors — with built-in acceleration for artificial intelligence and 24 cores — plus four NVIDIA V100 Tensor Core GPUs. The servers are connected by a 200-Gbit/s Mellanox InfiniBand HDR network and use full non-blocking topology to help ensure the most efficient server and data storage connections. HPC5 also incorporates a high performance 15-petabyte storage system with 200 GB/s aggregate read/write speeds.

---

1   Eni, "Eni unveils its new supercomputing system HPC5, the world's most powerful for industrial use," February 6, 2020.

D&LL Technologies

To further rev up performance, the HPC5 system uses an advanced parallel architecture and supports a hybrid programming model, which enables Eni to process seismic images faster and use highly sophisticated algorithms. Even better, by taking advantage of the NVIDIA GPUs, Eni is able to accelerate seismic workloads, as well as develop new AI-based approaches to energy discovery and processing.

With the performance of the HPC5 supercomputer, Eni's scientists and engineers can use extremely sophisticated in-house algorithms to process subsoil data. The geophysical and seismic information the company collects from all over the world is sent to the HPC5 system for processing. Using this data, the system develops extremely in-depth subsoil models, and on the basis of these, Eni can determine what is hidden many kilometers below the surface — in fact, this is how Eni found Zohr, the largest gas field ever discovered in the Mediterranean Sea.

Sustainable supercomputing

In line with Eni's unwavering commitment to sustainability, the HPC5 system has been designed to be as energy-efficient as possible. In fact, the company says it is one of the "greenest" supercomputers on the planet, measured in terms of its extremely low electricity consumption per petaflop.[2]

To further reduce emissions and operating costs, the HPC5 system uses energy produced by a vast solar plant at Eni's Green Data Center in Ferrera Erbognone. This data center, which houses all of the company's supercomputing systems and data, was developed to be a cutting-edge technology hub and to achieve world-leading energy efficiency results.

Viewed at a broader level, the HPC5 system will help Eni accelerate the company's research and development programs for new sustainable energy sources that will be critical components of tomorrow's energy mix.

"This system is able to boost and even further refine the highly complex processes that support Eni's people in their activities and therefore accelerate our digital transformation," Eni CEO Claudio Descalzi notes in a new release announcing the system rollout. "This is an important time in the path toward the energy transition. It's another step forward to the global goal that we share with our research and technology partners: making tomorrow's energy an even closer reality."[3]

2   Eni, "HPC5: Technology," accessed April 6, 2020.

3   Eni, "Eni unveils its new supercomputing system HPC5, the world's most powerful for industrial use," February 6, 2020.
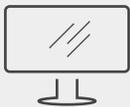
Learn more about Dell EMC advanced computing

Unlock the value of data with artificial intelligence

Share this story

DELLTechnologies