



About ParTec

ParTec is a European leader in modular supercomputing based in Munich. With over 25 years of deep expertise, we are the architects behind some of the continent's most powerful and advanced high-performance computing (HPC) and artificial intelligence (AI) systems—including JUPITER, Europe's fastest and most energy-efficient AI supercomputer, currently ranked at position 4 in the global list of highest-performing supercomputers, and JEDI, the worldwide most energy-efficient system..

Our patented dynamic Modular System Architecture (dMSA) and the ParaStation Modular Software Suite are at the core of our innovation. Together, they enable scalable, flexible, AI-optimized, quantum-ready, and energy-efficient supercomputing environments designed for the challenges of tomorrow.

Driving Europe's Most Powerful AI-Ready Supercomputers

Our modular HPC architecture and/or technology is the foundation of many European flagship systems, including:

- **JUPITER**, Research Centre Jülich, Europe's first Exascale supercomputer, at #4 of the Top500 list (Jun25)
- **JEDI**, Research Centre Jülich, 3 times #1 on the Green500 energy efficiency list list (June,24 Nov24 & Jun25),
- **MeluXina**, Luxembourg's national AI-Optimized HPC system, at #36 of the Top500 list/ at #4 of the Green500 List/ #1 in the EU of the Green500 list (June 2021)
- **JUWELS Booster**, Research Centre Jülich, at #7 / #43 of the Top500 list (Nov20, Jun25); #3 of the Green500 (June 2020)
- **JURECA Data Centric Module**, Research Centre Jülich at #43 / #154 of the Top500 list (Nov21, Jun25)
- **Leonardo** at CINECA, Italy at #4 / #10 of the Top500 lists (Jun 23, Jun25)
- **MareNostrum 5** at Barcelona Supercomputing Center, Spain at #8 / #14 of the Top500 lists (Jun 23, Jun25)



These systems are purpose-built to achieve highest performance and energy efficiency for artificial intelligence workloads, simulations, and hybrid workloads—positioning them among the most capable AI-supercomputers in Europe.

Additional systems within our 20-Year long partnership with Research Centre Jülich:

- **JUROPA** ranked #10 in the Top500 list (June 2009; fastest cluster-computer in the Top500)
- **JURECA** ranked #50 in the Top500 list (November 2011; first modular HPL run worldwide)
- **JUWELS Cluster** ranked #23 in the Top500 list (June 2018); #29 in the Green500 list (June 2018)

HPC Consulting: from AI to Digital Twins

ParTec offers a full-spectrum consulting services in HPC, supporting local and global government agencies, enterprises and AI companies in designing and scaling infrastructure tailored to their needs. including solutions for initiatives like the GigaFactory.

A recent example of our engagement is our collaboration with the Destination Earth European flagship initiative (involving the European Space Agency, EUMERTSAT and the European Center for Medium-Range Weather Forecasts), where we provided consulting on how to best achieve seamless federation of geographically and organizationally distributed supercomputer resources and integrate streaming of data, in partnership with the European Technology Platform for High Performance computing (ETP4HPC).

Commitment to Research and Innovation — Our Constant Promise

ParTec is a proud partner in European research since over 15 years, contributing to numerous EU funded projects that have shaped the future of supercomputing and continue to do so. Among them¹:

- **EUPEX, DEEP** project family, **SEA** projects family – developing modular and energy-efficient HPC/AI solutions and infrastructures

¹ ParTec receives or received funding for these mention projects from the European Commission, the EuroHPC Joint Undertaking, and the Federal Ministry for Research, Technology and Space.

- **CoE RAISE** – advancing AI- and simulation-based engineering at Exascale
- **EPI SGA 2** – achieving digital HPC autonomy with the ARM-based European Processor Architecture
- **DARE SGA 1** – strengthening digital HPC sovereignty with RISC-V
- **EECLIPS** – enabling energy savings for climate simulations
- **SEANERGYs** – enabling energy-aware and efficient operation of supercomputing systems

Quantum Computing Integration — Bridge between QC, HPC, and AI

The dMSA enables hardware-agnostic integration of quantum resources into the HPC/AI landscape. In this context, ParTec plays a central role in the design and implementation of the next generation of hybrid systems, which allow for the efficient and simultaneous use of quantum and HPC/AI resources.

In doing so, we are building a bridge between classical high-performance computing and quantum computing on a unified platform. Key EU and national initiatives include²:

- **HPCQS** – integrating high-performance and quantum simulation
- **QSolid** – enabling solid-state quantum computing
- **EPIQ** – advancing trapped-ion quantum computing technologies

In each of these, ParTec's ParaStation Modulo Software serves as the integrator between quantum and classical HPC systems.

Shaping the Future of European HPC

ParTec is also a strategic thought leader in European HPC, Quantum, and AI policy. Within ETP4HPC we lead the preparation of the European Strategic Research Agenda, now in its sixth edition, helping to guide long-term infrastructure strategy and investments. In the EuroHPC JU Research & Innovation Advisory Group (RIAG), ParTec is represented by two members, and leads the Energy Efficiency working group.

² ParTec receives or received funding for these mentioned projects from the EuroHPC Joint Undertaking, the Federal Ministry for Research, Technology and Space, and the Ministry of Culture and Science of the State of North RhineWestphalia.



Sustainable, Scalable, Sovereign Supercomputing

Sustainability

We always design systems with achieving highest energy efficiency in mind. JUPITER is not just fast—it is the greenest of the global Top 5 systems, as shown by the leading position of JEDI in the global energy efficiency list – three times winner Green500 (June24/Nov24/July25).

With projects like EECLIPS and SEANERGYS, we continue to actively reduce supercomputing's environmental footprint.

Scalability, Building Speed, and Expansion without the Need of New Hardware Acquisitions

Our patented dMSA enables the implementation of modular systems that flexibly and adaptively evolve with technological advancements, ensuring future-proofing and continuous development.

This architectural paradigm allows for the seamless integration of diverse compute and noncompute resources—such as CPUs, GPUs, storage solutions, quantum processing units (QPUs), and neuromorphic components—without the need for complete hardware replacement.

As Prof. Thomas Lippert, Director of the Jülich Supercomputing Centre, stated during the JUPITER Top500 award ceremony at ISC 2025, the system's record-setting build speed and performance are direct results of the modular architecture.

Sovereignty

We enable sovereign, European-made compute infrastructure for critical national and industrial needs.

ParTec's Role in AI Factories

ParTec builds the infrastructures that enable AI. As a technology enabler and systems integrator, we bring deep technical experience from years of R&D and real-world deployments.

Our ParaStation Modulo Software Suite coupled with an unmatched system SW and system operation competency will be key assets for operating an AI-Factory in a highly efficient way and providing the best possible capabilities and services to its end-users.



Over 150 Global Patents

ParTec holds over 150 patents and patents applications related to the core of HPC/AI in key countries. The IP covers fundamental technologies related to:

- Invention of a HPC-Offspring: New species of AI-Supercomputers
- Processor architecture enabling AI-Model training and inference
- High-performance hardware optimized for neural networks and big data
- Heterogenous Computer Chips
- Cloud-based Applications (Cloud Computing)

They are in the early stage of their 20-year protection period.

What's Next?

ParTec is planning the construction of more AI factories in Europe.

- [VESUVIO](#), Italy, University Neapel Frederico II
- [Government of Hungary and Government of Romania](#), modular hyperscale AI data centers with up to 100 MW capacity

These projects rank among the largest AI factories in Europe. In partnership with leading quantum computing company Orca Computing, ParTec has [announced](#) a strategic collaboration aimed at delivering quantum-accelerated HPC and AI architectures to customers. As part of this partnership, ParTec will integrate Orca's technologies into its AI factory infrastructure – a significant step towards the practical use of quantum computing in both industry and research.

More projects are already in the planning.

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