QUANTUM MACHINES

HPC QUANTUM

Quantum Acceleration – The Next Level of HPC Performance

Opportunities and Challenges

As HPC centers across the globe start to integrate quantum computing technologies, they realize the importance of selecting the optimal quantum strategy. There are several key considerations.

First, quantum computers must be tightly integrated into the HPC environment to facilitate the co-scheduling of resources and user environment.

Second, users must have low-level access to quantum accelerators, enabling them to explore the hardware, optimize it, and gain true knowledge of emerging quantum technologies.

Finally, support for several quantum bit (qubit) types and Quantum Processing Unit (QPU) technologies allows for diversification of risk, as well as building a better educated and balanced expert workforce.

Quantum Machines Benefits

- **Complete quantum control stack**, from high-level programming to analog pulses and quantum electronics
- **Interoperable and unified control** for any qubit technology, open-source software tools, and integration with OpenQASM standards
- **Cost-effective scalability control roadmap**, from tens to thousands of qubits with minimum effort and zero hardware and software redesign
- **Best quantum performance**, with low-latency quantum-classical hybrid workflow and high uptime. Runs complex quantum algorithms out-of-the-box – orders of magnitude faster than other control solutions, if they can run them at all
- **Field-proven**, with over 200 instantiations worldwide
- **Committed to your success**, close support from the largest quantum control-focused team in the industry, over 150 experienced physicists and engineers

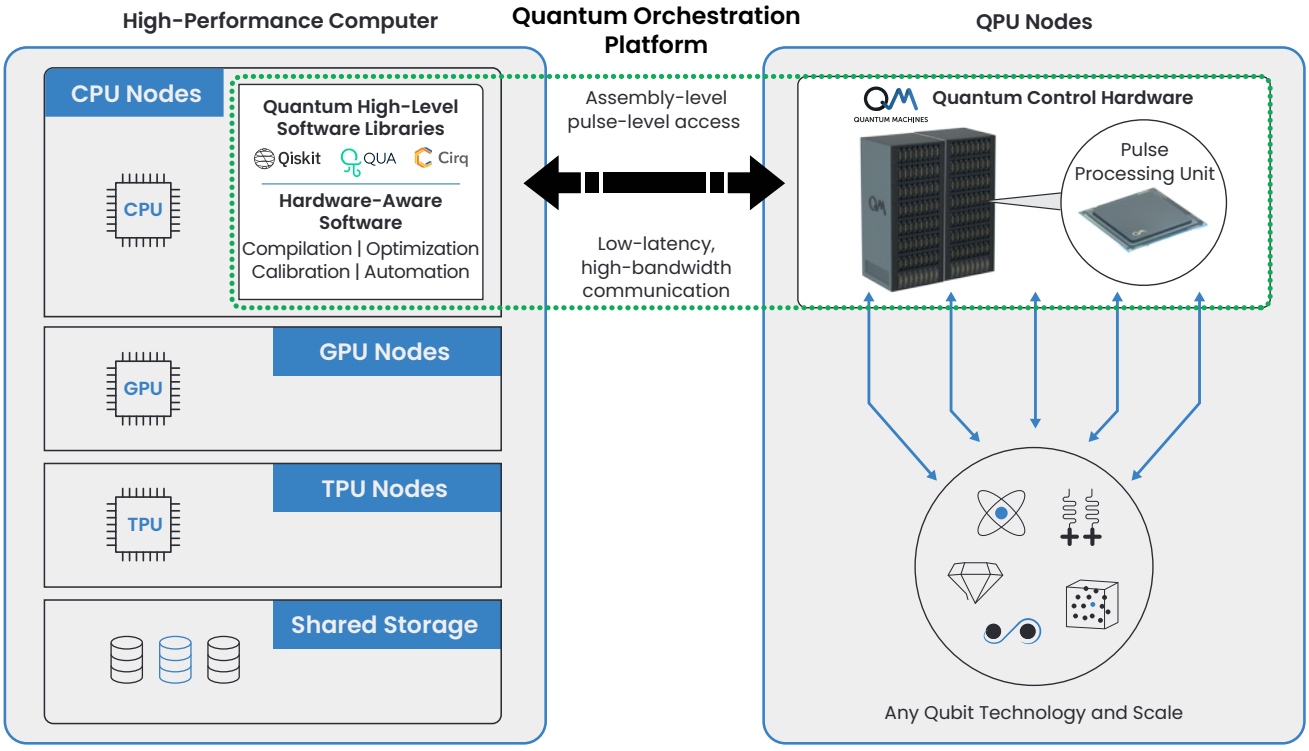
HPC-Quantum Integration Begins with Quantum Control

A quantum control system is a prerequisite for smoothly integrating quantum capabilities in HPCs. The ideal solution needs to offer:

- **Multi-qubit technology support**
  Facilitating the usage of parallel QPU technologies and assimilation of novel qubit technologies as they are developed
- **Out-of-the-box interoperability**
  with high-performance computers, following regulations and standardization, as these evolve to define a classical-quantum interface that fosters ecosystem growth and reduces interoperability and integration costs
- **Best performance**
  Delivering an efficient and cost-effective way to exploit advanced quantum algorithms like novel quantum error correction, ultra-fast qubit reset, and quantum-based neural networks
- **Economic scalability**
  Enabling cost-effective quantum system growth while reducing hardware and operating costs per qubit as quantum processors scale to millions of qubits

Inside the Quantum Orchestration Platform

Quantum Machines' Quantum Orchestration Platform (QOP) allows maximum performance while providing a unified interface to HPCs. The QOP supports all qubit types and includes deep access to quantum accelerator hardware for low-level programming flexibility and optimization. Reliable and field-proven, QOP has had over 200 deployments since 2018 in major academic institutions, national labs, and enterprises worldwide.



About Quantum Machines

Quantum Machines accelerates the realization of useful quantum computers that will disrupt all industries. Supporting multiple Quantum Processing Unit (QPU) technologies, the company's Quantum Orchestration Platform (QOP) fundamentally redefines the control and operations architecture of quantum processors with unprecedented levels of scalability, performance, and productivity. Our rich product portfolio, including full stack (hardware and software) quantum control and state-of-the-art quantum electronics empowers academia and national labs, HPC centers, enterprises, and cloud service providers building quantum computers all over the world. To learn more, please visit quantum-machines.co.