

The Atos Quantum Program

Paving the way to quantum-accelerated HPC

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Building a roadmap to quantum solutions

Ultimate goal:
Tackling currently intractable problems

Quantum
Chemistry

Quantum
Combinatorial
Optimization

Quantum Machine
Learning

Quantum Linear Algebra,
Solving ODEs, PDEs,
inverse problems...

NISQ Device (2-5 years)

Pre-QEC Device (5+ years)

Atos Quantum program

A global strategy

1 Quantum Programming Platform

Atos Quantum Learning Machine

2 Quantum Expert Consulting Services

Center of Excellence in Advanced Computing

3 New Generation Architectures

NISQ accelerator by 2023

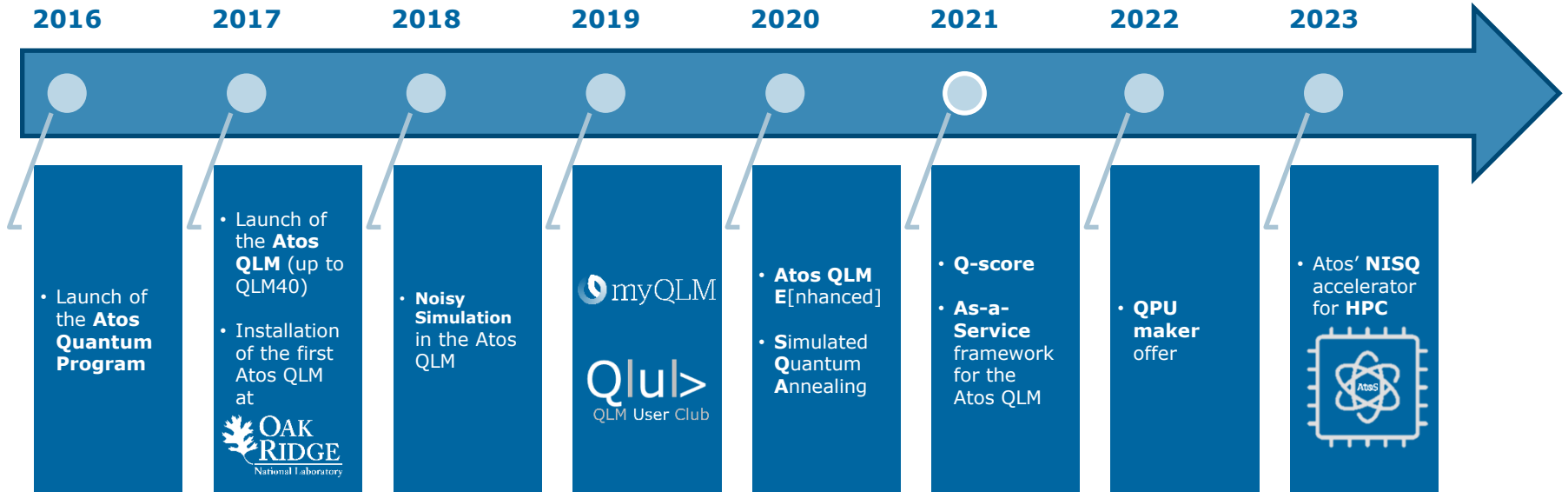
4 Quantum Algorithms

Variational Algorithms

5 Quantum Safe Cryptography

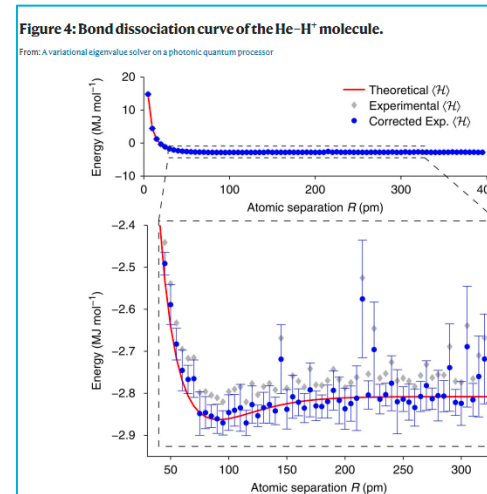
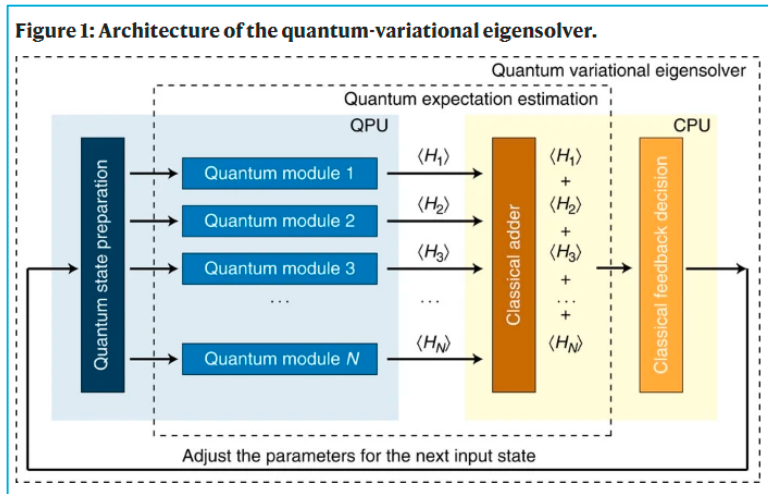
Post-Quantum Cryptography

The road to quantum-accelerated HPC



Integration of Quantum with HPC

- ▶ Practical solutions require tight coupling of HPC and Quantum Computing
- ▶ E.g. Variation Quantum Eigensolver

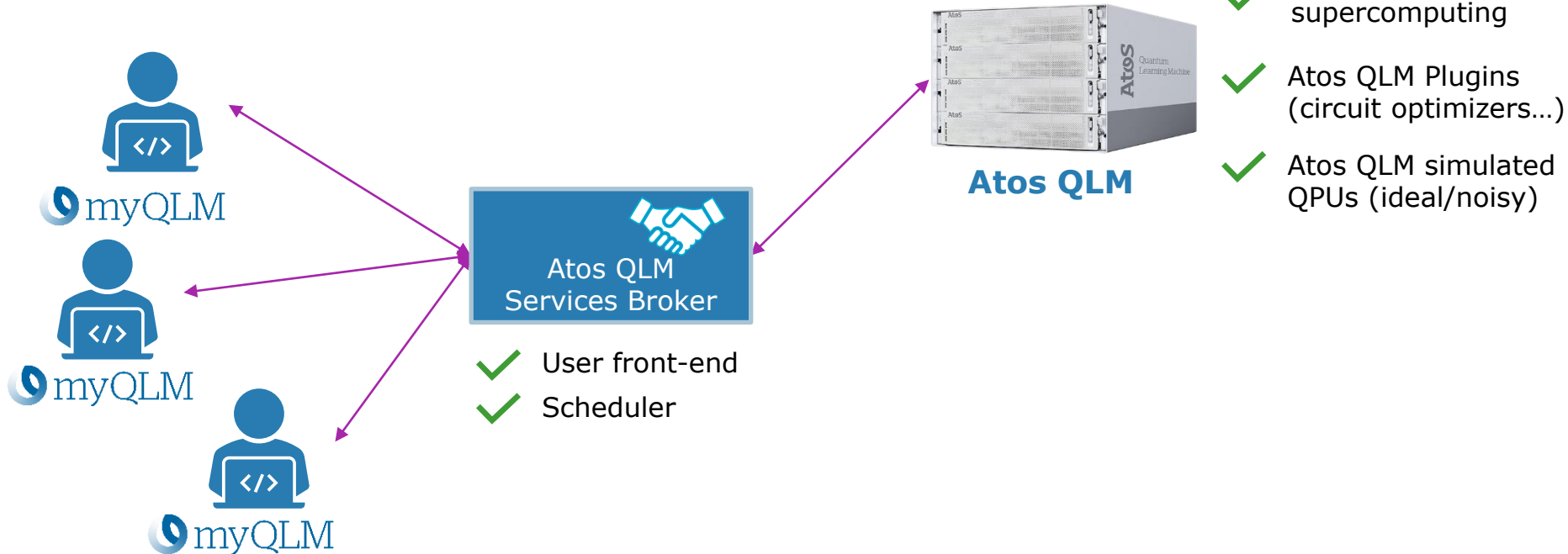


Peruzzo, A., McClean, J., Shadbolt, P. et al.
A variational eigenvalue solver on a photonic quantum processor.
Nat Commun 5, 4213 (2014). <https://doi.org/10.1038/ncomms5213>

Towards Quantum-accelerated HPC

Step 1 (2021)

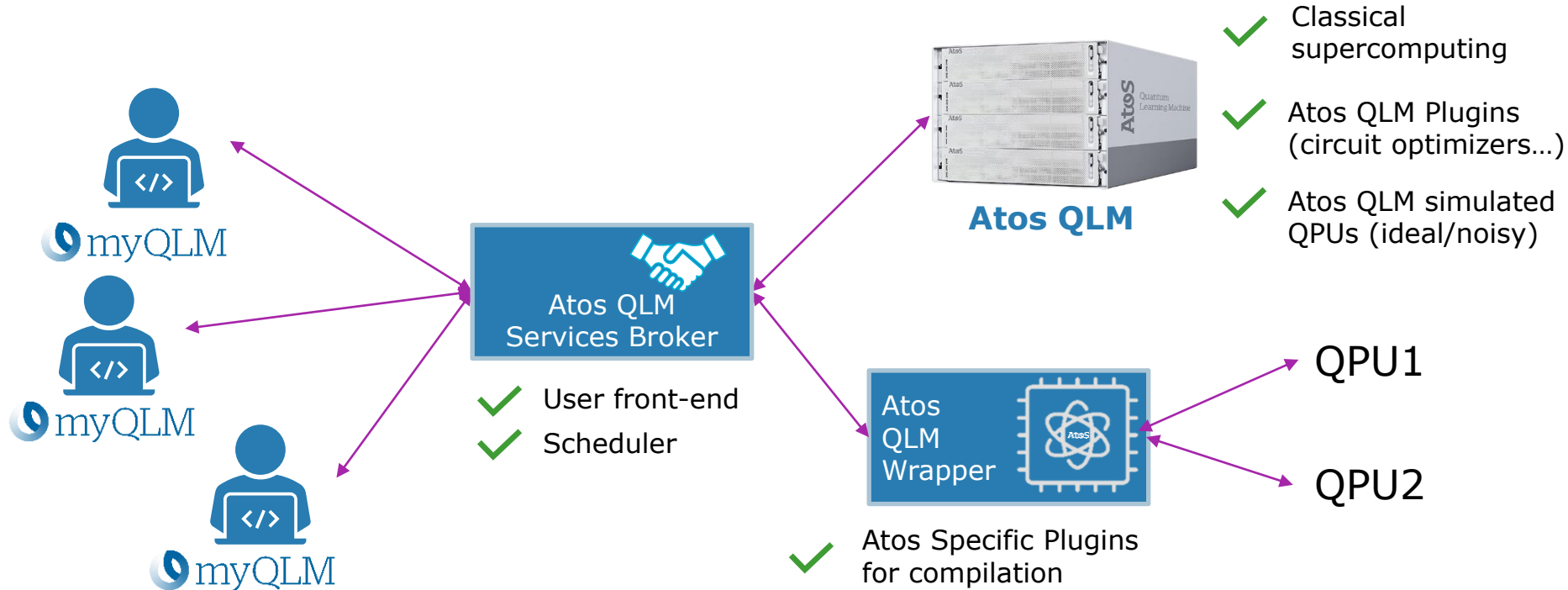
- ▶ myQLM as a client of a simulated QPU



Towards Quantum-accelerated HPC

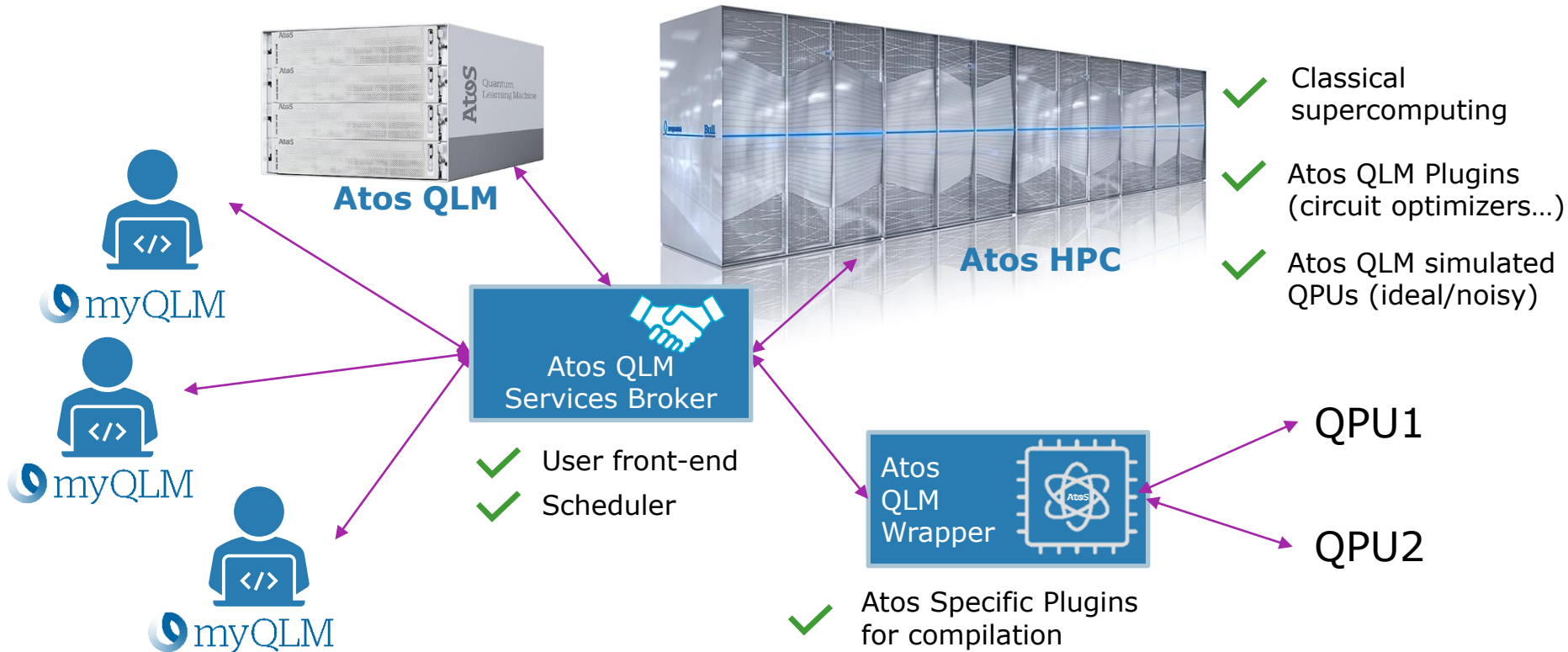
Step 2 (2023)

- ▶ myQLM as a client of actual or simulated QPU



Towards Quantum-accelerated HPC

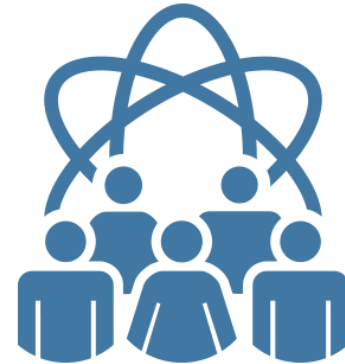
Step 3 (2025+)



Get ready for quantum-acceleration

- ▶ Quantum Accelerators based on NISQ will soon be available (2023)
- ▶ Integration of Quantum unit in HPC systems
- ▶ QLM
 - “Quantum Learning Machine” emulates today tomorrow’s Quantum solution
 - myQLM: quantum programming on your laptop <https://atos.net/en/lp/myqlm>
 - Wrapper to your future Quantum Hybrid system
- ▶ Quantum Algorithms Library
- ▶ Expert support and training

Delivering the full Quantum solution



Thank you

For more information please contact:



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