OQTOPUS: Open Quantum Toolchain for Operators and Users

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Overview

OQTOPUS is an open-source system software stack for operating and managing cloud-based quantum computing.
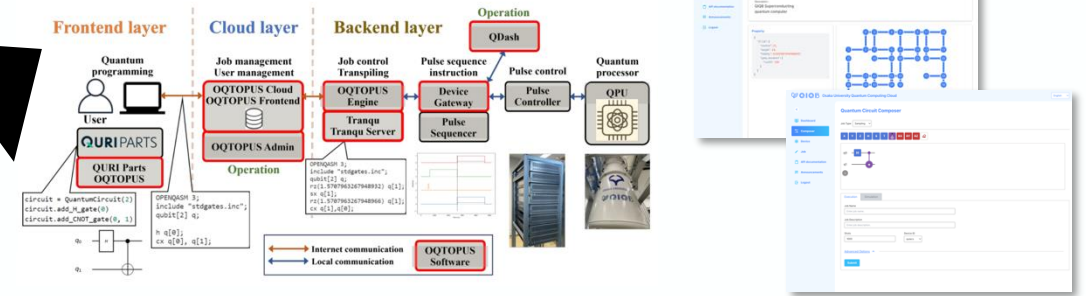
Why OQTOPUS?

Issue

⚠️ Most quantum systems are **closed and proprietary**.

⚠️ **Hard for newcomers** to build and operate services.

⚠️ No **standard full-stack platform** for integration or reuse.

OQTOPUS solves these issues

System Architecture

From user interfaces to hardware control
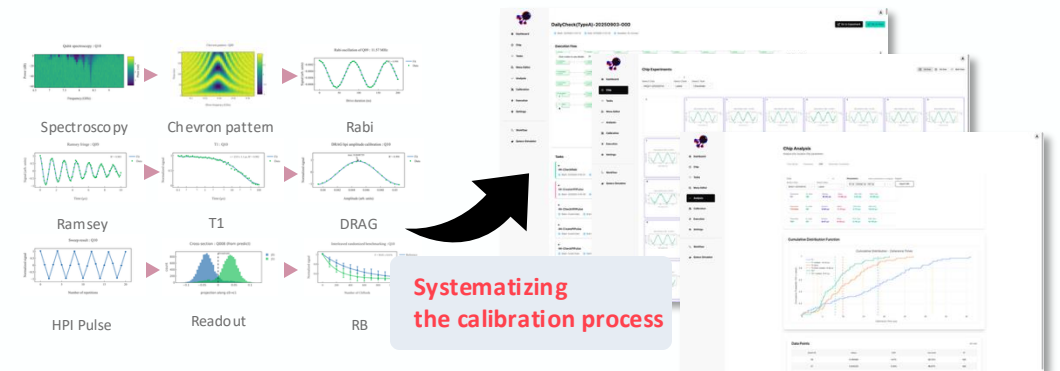

Comparison with Existing Systems

Key features \ Systems	IBM Quantum	Amazon Braket	Azure Quantum	Qibo	qBraid	**OQTOPUS**
Server-side transpiler	✓ (P)[a]	✓ (N)	✓ (N)	✓ (P)	✗	✓ (P)
Server-side execution[b]	✓ (N)	✓ (N)	✓ (N)	✗	✗	✓ (P)
Multi-programming[b]	✗	✗	✗	✗	✗	✓ (P)
Error Mitigation	✓ (P)	✓ (N)	✓ (N)	✓ (P)	✓ (N)	✓ (P)
Estimation	✓ (P)	✓ (N)	✗	✓ (P)	✗	✓ (P)
Composer[b]	✓ (N)	✗	✗	✗	✓ (N)	✓ (P)

a: (P) and (N) mean public and non-public, respectively.

b: Although these features already exist, they are not publicly available in these popular conventional systems.

Operator Tools

Automating and managing calibration workflows across the chip

Spectroscopy   Chevron pattern   Rabi

Ramsey   T1   DRAG

HPI Pulse   Readout   RB

Systematizing the calibration process

GitHub: https://github.com/oqtopus-team

Docs: https://oqtopus-team.github.io

Already deployed on a real quantum computer at the University of Osaka and RIKEN