

PROJECT BRIEF



PREPARED

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cli-anything-quantum — Quantum Computing CLI Harness

An agent-native command-line harness that exposes a quantum-computing framework (local simulators and real cloud QPUs) as a scriptable, JSON-emitting CLI.

SIGNATURE CAPABILITY

Validated on real quantum hardware — jobs submitted to a 72-qubit cloud QPU, measuring Bell-pair fidelity 0.63 and 3-qubit GHZ fidelity 0.45.

OVERVIEW

The tool wraps the pyQPanda3 SDK behind a single quantum command so agents and humans can build, run, and visualize quantum circuits without touching the underlying Python API. It runs canonical circuits (Bell pairs, GHZ states, Quantum Fourier Transform), simulates arbitrary user-defined gate lists, encodes classical data into quantum states, and generates quantum random numbers. Every command supports a `--json` flag for machine consumption, and an interactive REPL is available for exploration. Beyond simulation it submits jobs to live cloud hardware, including a 72-qubit QPU, and applies these primitives to quant-finance use cases.

TECHNOLOGY

Python 3.9+, pyQPanda3 (Origin Quantum SDK), Click 8, prompt-toolkit, NumPy; local state-vector and density-matrix simulators plus a cloud QPU service.

HIGHLIGHTS

- ◆ **13 subcommands** (bell, ghz, qft, simulate, encode, montecarlo, random, vqc, draw, wordhunt, backends, cloud, repl), all with **`--json agent output`**.

- ◆ Custom circuits via JSON gate lists over **25+ gates** (H, X/Y/Z, S, T, rotations, CNOT, CZ, SWAP, TOFFOLI, controlled-phase, ISWAP, and more).
- ◆ Five data-encoding schemes and variational quantum circuits with parameterized ansatze.
- ◆ **Verified against real hardware**: submitted to a **72-qubit cloud QPU** (Bell-pair fidelity 0.63, 3-qubit GHZ fidelity 0.45).
- ◆ Capability suite of **25 integration tests (23 passing)** plus a 34-test unit/E2E suite running in ~2s.
- ◆ ASCII circuit visualization and a cloud-backend discovery command listing online QPUs and simulators.

STATUS

Functional and hardware-validated v1.0.0 harness; local simulation and 72-qubit cloud execution work end to end.



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