



<>deltaflow

Deltaflow is the quantum error correction (QEC) stack that unlocks useful quantum computing.

Deltaflow 2 enables up to 10,000 error-free quantum operations (QuOps) on up to 250 physical qubits. It includes Riverlane's proprietary HW-accelerated decoder.

By providing QEC in real-time, it allows quantum computers to stream high-fidelity memory for the first time. This means information stored in the qubits can be kept alive forever. Critically, this enables quantum memory and stability experiments to be performed.

Deltaflow 2 features 'leakage aware' decoding. This improves decoding accuracy, particularly in superconducting systems where qubits can leak into higher energy states other than 0 or 1.

Communication with the qubit control system is handled via the Quantum Error Correction interface (QECi), which is being developed as a universal standard capable of connecting any control system to any QEC stack.

Quantum Algorithms and Applications

High-level languages and algorithm libraries

Programming Framework

Run times, parallelisation and workflows on logical qubits

Orchestration

Hardware-aware compilation and processing, decoders coordination

Decoding

Error decoding, feedforward

Data Processing & Routing

Management and routing of syndrome data

Control System

Interfaces with physical qubits, operation of the quantum device from gates to MW pulses

Physical qubit hardware

Qubits and interconnects

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Decoding Capabilities



- Riverlane's proprietary Local Clustering Decoder (LCD)
- Supports the rotated surface code in a square and rectangular lattice and the repetition code
- Decodes surface code patches in real time up to distance 11
- Fast response time
- Supports wiggling circuits and mid-circuit unconditional reset

Quantum Error Correction Capabilities



- Decodes the following experiments in real time:
 - Streaming quantum memory
 - Quantum stability
- Can adapt based on detected leakage events



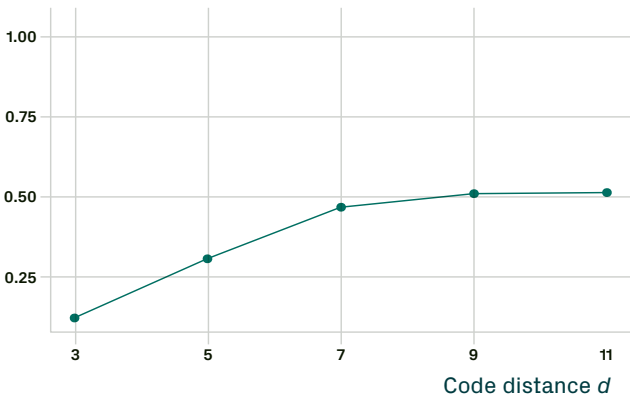
Hardware

Form factor:	1U, 19" rackmount chassis	Weight:	13.5 kg (30 lbs)
Connectivity:	Quad Small Form-Factor Pluggable (QSFP) connector using the Quantum Error Correction interface (QECi) to communicate with the qubit control system.	Power supply:	1 + 1 redundant power supply to ensure uninterrupted operation. Up to 1300 W (operating), 110/220V single phase AC power.

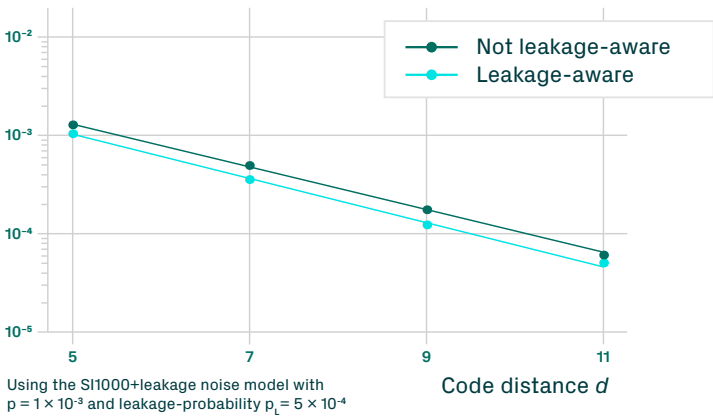
Decoder Performance

FPGA implementation of our Local Clustering Decoder (LCD) inside Deltaflow 2, showing its logical error rate per round and decoding time per round consistently less than 1 μ s.

Decoding time per round (μ s) vs code distance

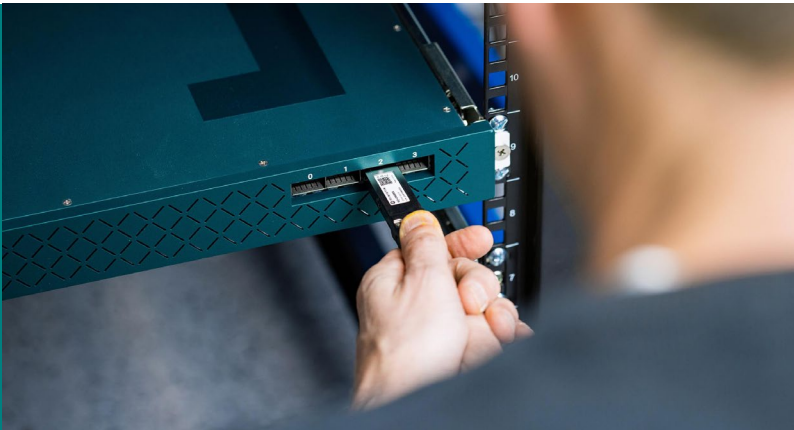


Logical error rate vs code distance



Support

Our enablement team will fully support the installation of Deltaflow 2 alongside its integration with your control system. We bring over 30 years of combined experience across multiple qubit modalities, including superconducting, trapped-ion, and neutral atoms.



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