Towards more efficient CNOTs: a comparison of unitary and dynamic routing on noisy intermediate scale quantum computers

Recent quantum computers have dramatically increased their qubit count, now reaching upwards of 400 qubits. Meanwhile, qubit connectivity on certain architectures such as IBM's has decreased to reduce noise. Consequently, current quantum computers heavily rely on unitary permutations to implement two-qubit gates between non-adjacent qubits. This increases the circuit depth and gate count which negatively impacts the error-rate. To overcome this limitation, we investigate the potential of IBM's Dynamic Circuits capabilities to assist unitary routing methods for long range two-qubit gates implementations.

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