

Opt. Lvl. 2: commutation analysis

Cannot apply operation: reset

#10482

Closed

ANONYMOUS AUTHOR opened this issue last week · 1 comment

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Environment

- **Qiskit Terra version:** 0.43.1 meta package, terra 0.24.1
- **Python version:** 3.10
- **Operating system:** docker continuumio/miniconda

What is happening?

Transpiling (opt.lvl.2) a circuit with `initialize()` with a quantum state that should behave like a `reset()` leads to an error.

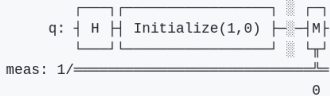
How can we reproduce the issue?

Run this python script:

```
from qiskit import QuantumCircuit, QuantumRegister, transpile
qreg = QuantumRegister(1, 'q')
circuit = QuantumCircuit(qreg)
circuit.h(qreg[0])
# this crashes:
quantum_state = [1, 0]
circuit.initialize(quantum_state, qreg[0])
# this works (although equivalent in principle):
# circuit.reset(qreg[0])
circuit.measure_all()

print(circuit.draw())
res = transpile(circuit, optimization_level=2)
```

Produces this output and error:



```
Traceback (most recent call last):
  File "/myfile.py", line 13, in <mod
ule>
    File ".../qiskit/compiler/transpiler.py", line 380, in transpile
    File ".../qiskit/compiler/transpiler.py", line 462, in _serial_transpile_circuit
    File ".../qiskit/transpiler/passmanager.py", line 537, in run
    File ".../qiskit/transpiler/passmanager.py", line 231, in run
    File ".../qiskit/transpiler/passmanager.py", line 292, in _run_single_circuit
    File ".../qiskit/transpiler/runningpassmanager.py", line 125, in run
    File ".../qiskit/transpiler/runningpassmanager.py", line 169, in _do_pass
    File ".../qiskit/transpiler/runningpassmanager.py", line 173, in _do_pass
    File ".../qiskit/transpiler/runningpassmanager.py", line 227, in _run_this_pass
    File ".../qiskit/transpiler/passes/optimization/commutation_analysis.py", line 75, in run
    File ".../qiskit/circuit/commutation_checker.py", line 135, in commute
    File ".../qiskit/quantum_info/operators/operator.py", line 85, in _init__
    File ".../qiskit/quantum_info/operators/operator.py", line 614, in _init_instruction
    File ".../qiskit/quantum_info/operators/operator.py", line 691, in _append_instruction
    File ".../qiskit/quantum_info/operators/operator.py", line 658, in _append_instruction
qiskit.exceptions.QiskitError: 'Cannot apply Operation: reset'
```

The variant with `reset()` instead of `initialize()` works fine.

What should happen?

The transpiler should not crash but rather recognize that the initialize is a reset operation and handle it in the same way. Please correct me if I am wrong, the `initialize([1, 0], qreg[0])` should be equivalent to `reset(qreg[0])` and both should initialize the qubit to the `|0>` state (assuming that the default state of a qubit is `|0>`). Source: [initialize](#) and [reset](#).

Any suggestions?

What about adding a pass that converts all the `initialize()` operations to `reset()` operations (whenever applicable)

Assignees

No one assigned

Labels

bug

Projects

None yet

Milestone

No milestone

Development

No branches or pull requests

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2 participants

What about adding a pass that converts all the `initialize()` operations to `reset()` operations (wherever applicable) before the transpiler starts?

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🔖 **ANONYMOUS AUTHOR** added the **bug** label last week

jakelishman commented last week

Member ...

Duplicate of [#8050](#)

😊 1

🔖 **jakelishman** marked this as a duplicate of [#8050](#) last week

🔒 **jakelishman** closed this as not planned last week

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