Opt. Lvl. 2: commutation analysis `Cannot apply Operation: reset` #10482

Edit New issue

Closed **ANONYMOUS AUTHOR** opened this issue last week · 1 comment

ANONYMOUS AUTHOR commented last week

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:

```
     ┌─┐┌──────────────────┐ ┌─┐
  q: ┤ H ├ Initialize(1,0) ├─┤M├
     └─┘└──────────────────┘ └╥┘
meas: 1/═══════════════════════╩═
                               0
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

Notifications Customize

Unsubscribe

You're receiving notifications because you authored the thread.

2 participants

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

+ Add tasklist

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

Write Preview

Leave a comment

Attach files by dragging & dropping, selecting or pasting them.

Comment

Remember, contributions to this repository should follow its contributing guidelines, security policy, and code of conduct.