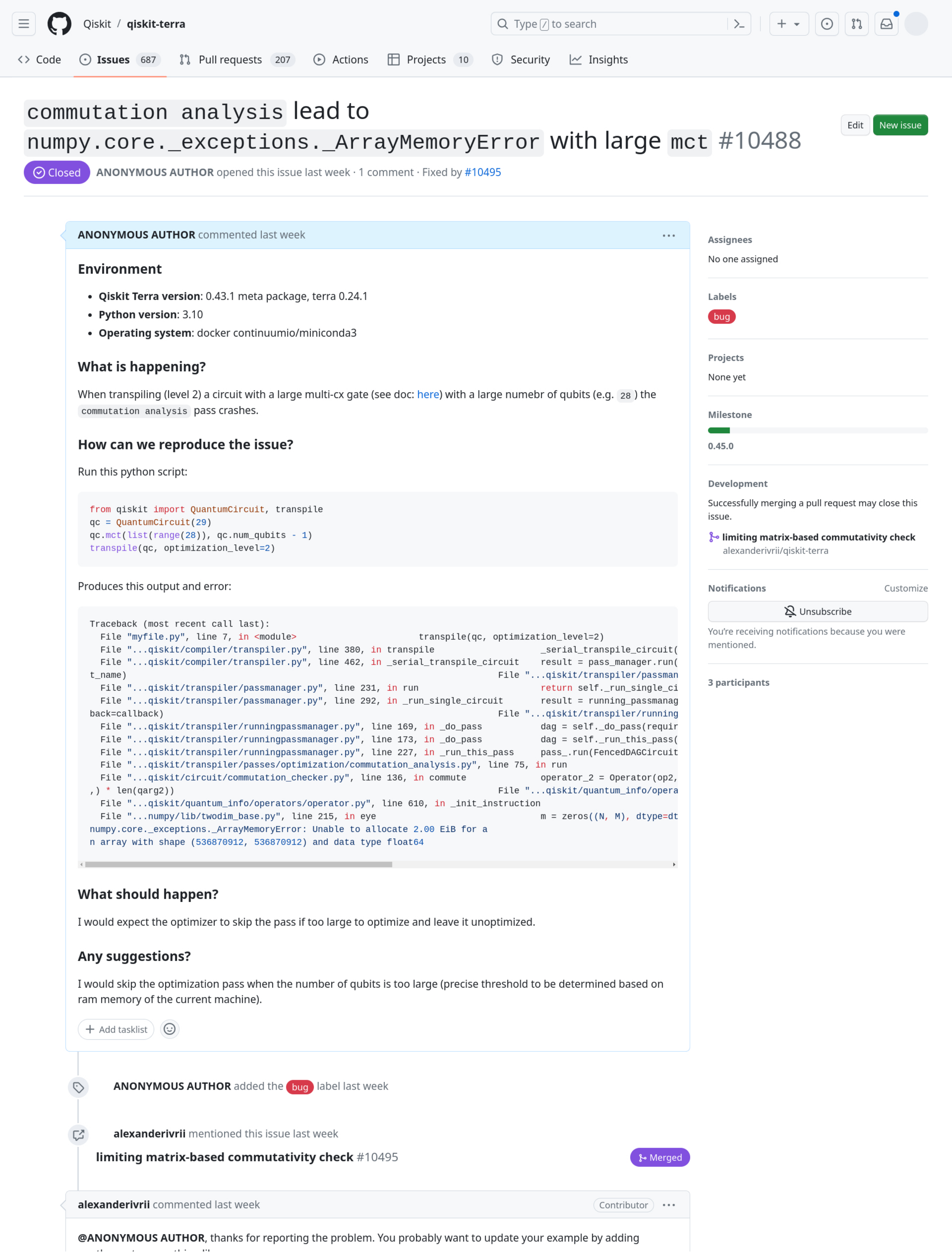

`commutation analysis` lead to `numpy.core._exceptions._ArrayMemoryError` with large `mct` #10488

Closed **ANONYMOUS AUTHOR** opened this issue last week · 1 comment · Fixed by #10495

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/miniconda3

What is happening?

When transpiling (level 2) a circuit with a large multi-cx gate (see doc: here) with a large numebr of qubits (e.g. `28`) the `commutation analysis` pass crashes.

How can we reproduce the issue?

Run this python script:

```
from qiskit import QuantumCircuit, transpile
qc = QuantumCircuit(29)
qc.mct(list(range(28)), qc.num_qubits - 1)
transpile(qc, optimization_level=2)
```

Produces this output and error:

```
Traceback (most recent call last):
  File "myfile.py", line 7, in <module>                       transpile(qc, optimization_level=2)
  File "...qiskit/compiler/transpiler.py", line 380, in transpile                    _serial_transpile_circuit(
  File "...qiskit/compiler/transpiler.py", line 462, in _serial_transpile_circuit    result = pass_manager.run(
t_name)                                                                      File "...qiskit/transpiler/passman
  File "...qiskit/transpiler/passmanager.py", line 231, in run                       return self._run_single_ci
  File "...qiskit/transpiler/passmanager.py", line 292, in _run_single_circuit       result = running_passmanag
back=callback)                                                               File "...qiskit/transpiler/running
  File "...qiskit/transpiler/runningpassmanager.py", line 169, in _do_pass           dag = self._do_pass(requir
  File "...qiskit/transpiler/runningpassmanager.py", line 173, in _do_pass           dag = self._run_this_pass(
  File "...qiskit/transpiler/runningpassmanager.py", line 227, in _run_this_pass     pass_.run(FencedDAGCircuit
  File "...qiskit/transpiler/passes/optimization/commutation_analysis.py", line 75, in run
  File "...qiskit/circuit/commutation_checker.py", line 136, in commute              operator_2 = Operator(op2,
,) * len(qarg2))                                                             File "...qiskit/quantum_info/opera
  File "...qiskit/quantum_info/operators/operator.py", line 610, in _init_instruction
  File "...numpy/lib/twodim_base.py", line 215, in eye                               m = zeros((N, M), dtype=dt
numpy.core._exceptions._ArrayMemoryError: Unable to allocate 2.00 EiB for a
n array with shape (536870912, 536870912) and data type float64
```

What should happen?

I would expect the optimizer to skip the pass if too large to optimize and leave it unoptimized.

Any suggestions?

I would skip the optimization pass when the number of qubits is too large (precise threshold to be determined based on ram memory of the current machine).

ANONYMOUS AUTHOR added the bug label last week

alexanderivrii mentioned this issue last week

limiting matrix-based commutativity check #10495 Merged

alexanderivrii commented last week Contributor

@ANONYMOUS AUTHOR, thanks for reporting the problem. You probably want to update your example by adding

Assignees

No one assigned

Labels

bug

Projects

None yet

Milestone

0.45.0

Development

Successfully merging a pull request may close this issue.

limiting matrix-based commutativity check
alexanderivrii/qiskit-terra

Notifications

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3 participants

another gate, something like:

```
from qiskit import QuantumCircuit, transpile
qc = QuantumCircuit(29)
qc.mct(list(range(28)), qc.num_qubits - 1)
qc.h(0)
transpile(qc, optimization_level=2)
```

otherwise there would be no possible commutation relations to check.

I have pushed a simple fix in #10495, though instead of limiting the number of qubits for the pass I am only limiting the number of qubits for individual matrix-multiplication checks.

jakelishman closed this as completed in #10495 last week

kdk added this to the **0.45.0** milestone last week

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