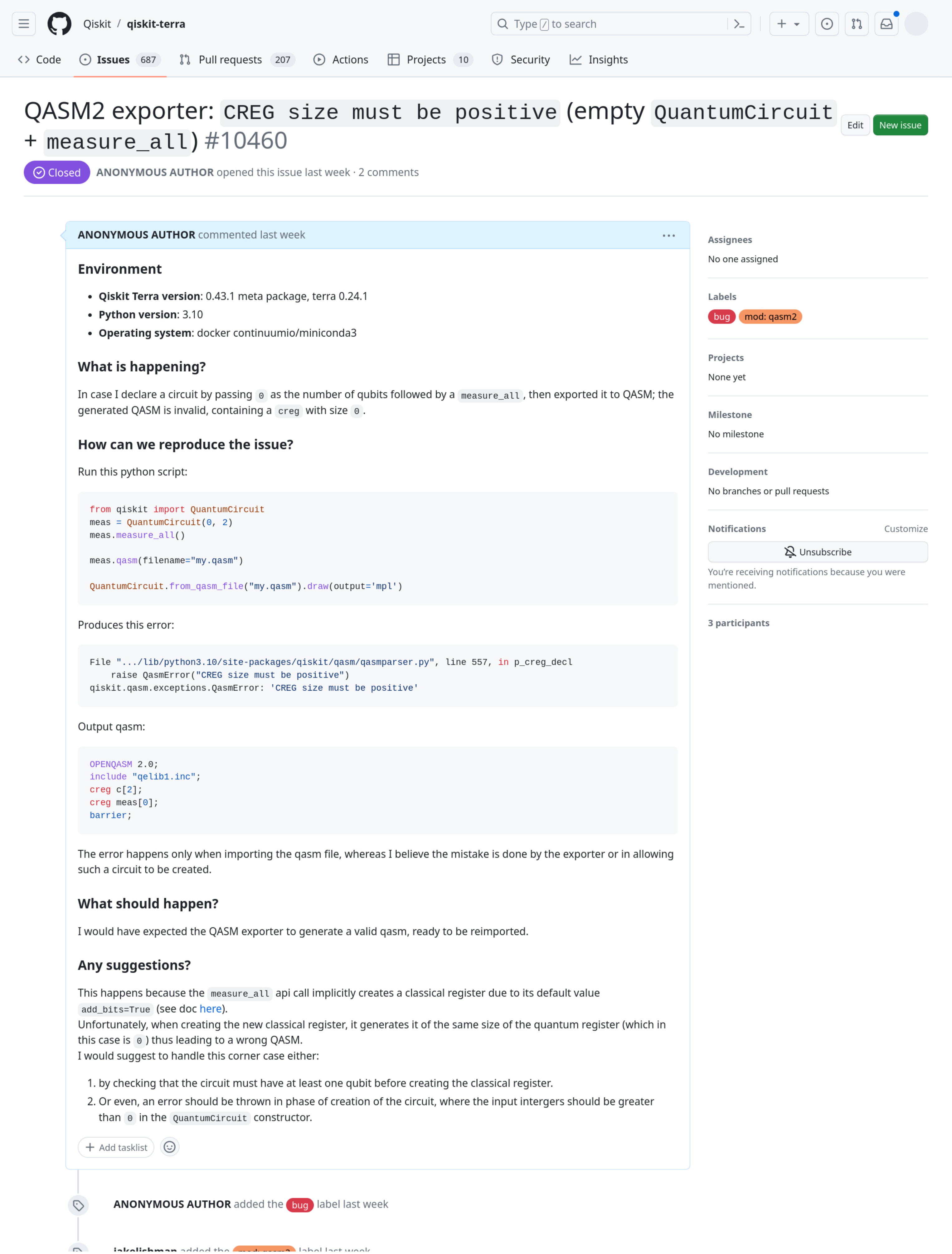

QASM2 exporter: `CREG size must be positive` (empty `QuantumCircuit` + `measure_all`) #10460

Closed **ANONYMOUS AUTHOR** opened this issue last week · 2 comments

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?

In case I declare a circuit by passing `0` as the number of qubits followed by a `measure_all`, then exported it to QASM; the generated QASM is invalid, containing a `creg` with size `0`.

How can we reproduce the issue?

Run this python script:

```
from qiskit import QuantumCircuit
meas = QuantumCircuit(0, 2)
meas.measure_all()

meas.qasm(filename="my.qasm")

QuantumCircuit.from_qasm_file("my.qasm").draw(output='mpl')
```

Produces this error:

```
File ".../lib/python3.10/site-packages/qiskit/qasm/qasmparser.py", line 557, in p_creg_decl
    raise QasmError("CREG size must be positive")
qiskit.qasm.exceptions.QasmError: 'CREG size must be positive'
```

Output qasm:

```
OPENQASM 2.0;
include "qelib1.inc";
creg c[2];
creg meas[0];
barrier;
```

The error happens only when importing the qasm file, whereas I believe the mistake is done by the exporter or in allowing such a circuit to be created.

What should happen?

I would have expected the QASM exporter to generate a valid qasm, ready to be reimported.

Any suggestions?

This happens because the `measure_all` api call implicitly creates a classical register due to its default value `add_bits=True` (see doc here).
Unfortunately, when creating the new classical register, it generates it of the same size of the quantum register (which in this case is `0`) thus leading to a wrong QASM.
I would suggest to handle this corner case either:

1. by checking that the circuit must have at least one qubit before creating the classical register.
2. Or even, an error should be thrown in phase of creation of the circuit, where the input intergers should be greater than `0` in the `QuantumCircuit` constructor.

ANONYMOUS AUTHOR added the bug label last week

jakelishman added the mod: qasm2 label last week

Assignees

No one assigned

Labels

bug mod: qasm2

Projects

None yet

Milestone

No milestone

Development

No branches or pull requests

Notifications

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3 participants

jakelishman added the mod: qasm2 label last week

Abhiraj-Shrotriya commented last week

@jakelishman @ANONYMOUS AUTHOR
Is an empty quantum circuit (circuit with no qubits) useful at all? I don't think it is. If this is the case, we can raise an error if a circuit with 0 qubits/ Quantum Registers is made. I would like to solve this issue and contribute to Qiskit. Can you please assign me?
Thank you.

jakelishman commented last week Member

A `QuantumCircuit` with no quantum bits is still valid, as is a register with zero bits. The bug here is in the (old) OpenQASM 2 parser - a zero-width register is valid per the letter of the OQ2 spec, so it shouldn't have been rejected. It probably stems from days when Qiskit itself wouldn't permit zero-length registers.

The new parser (`qiskit.qasm2.load{,s}`) handles this correctly, and `QuantumCircuit.from_qasm_{str,file}` have been switched to use that in #9955 (due to be released in Terra 0.25 next week), so I'll mark this as "fixed"; we're not going to merge any changes to the old OQ2 parser now.

Thanks for finding the bug, and thanks for the interest in contributing to Qiskit. If you're looking for issues to contribute to, you can look at the "good first issue" label in this repository.

jakelishman closed this as completed last week

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