

# QAMP 2021 : Ecosystem

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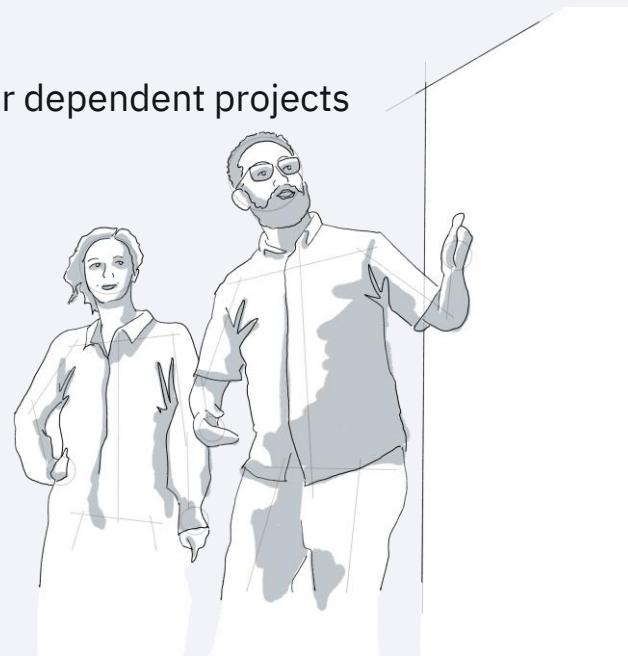
Mentees : Balaji Seetharaman & Michaël Rollin

Mentor : Iskandar Sitdikov



# Problem ?

- Community getting bigger and more and more project appear that need to be recognized and supported
  - But not a single list of them
- Constant evolvment of framework may lead to breaking changes for dependent projects



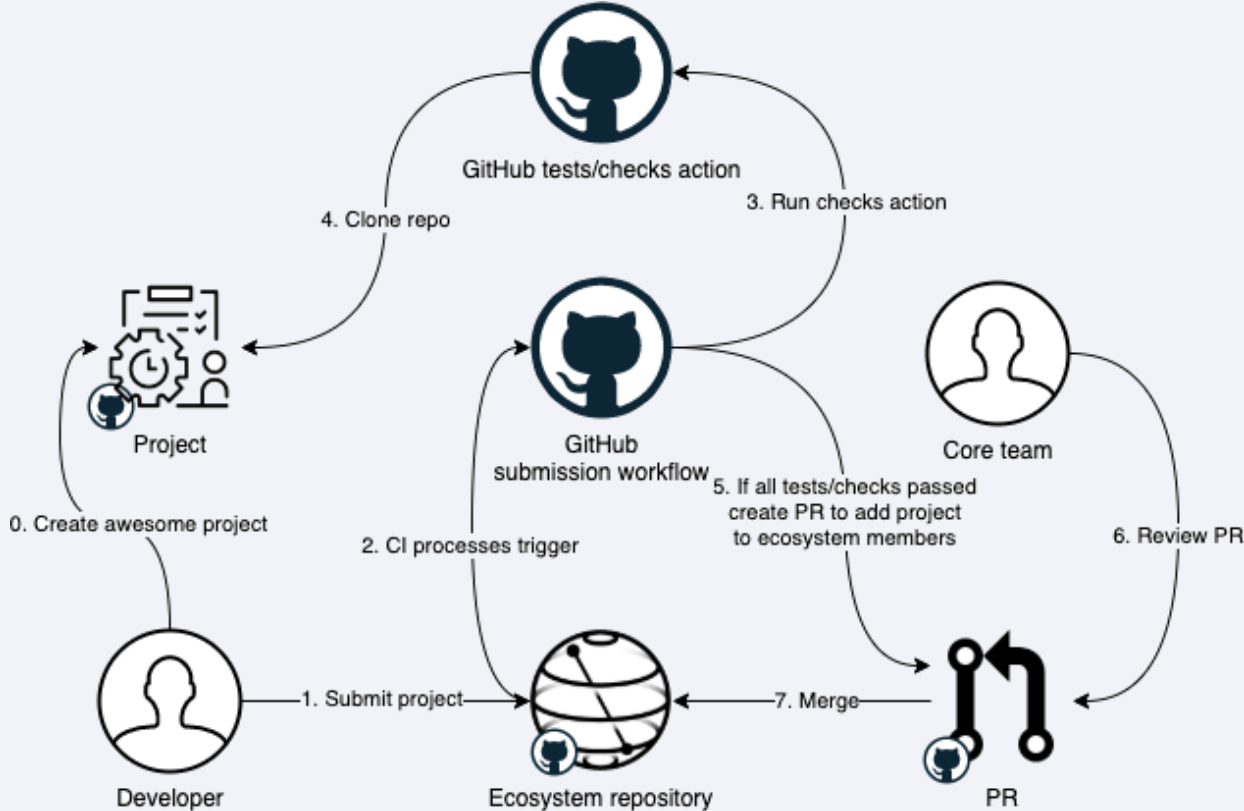
# Solution → Ecosystem !



The Ecosystem consists of projects, tools, utilities, libraries and tutorials from a broad community of developers and researchers. The goal of the Ecosystem is to recognize, support and accelerate development of quantum technologies using Qiskit.

- ❑ Tests check / weekly maintainability reports (runs tests against stable and dev version of Qiskit and notify of any breaking changes)
- ❑ Database to get together every project using qiskit (IBM, community, external, ...)
- ❑ Badging of approval projects by Qiskit
- ❑ Sharing projects everywhere we want

# Submission workflow



# Submission workflow



The screenshot shows the GitHub interface for the repository `mickahell/qiskit-ecosystem_template`. The repository is a public template with 2 unwatched items, 1 star, and 0 forks. The main branch is selected, showing 1 branch and 0 tags. A commit by `mickahell` titled "Update README.md" is highlighted, with commit hash `c9da488` and 16 commits in total.

File Name	Commit Message	Last Commit
<code>.github/workflows</code>	--yes	last month
<code>src</code>	lint	last month
<code>tests</code>	lint for tests	last month
<code>.coveragerc</code>	hide files add	last month
<code>.gitignore</code>	hide files add	last month
<code>.pylintrc</code>	lint	last month
<code>LICENSE</code>	Initial commit	last month
<code>README.md</code>	Update README.md	16 days ago
<code>ecosystem.json</code>	typo	last month
<code>requirements-dev.txt</code>	add tpl files	last month
<code>requirements.txt</code>	add tpl files	last month
<code>setup.cfg</code>	add tpl files	last month
<code>setup.py</code>	add tpl files	last month
<code>tox.ini</code>	add tpl files	last month

The README.md content is partially visible, showing the repository name `Qiskit Ecosystem` and the template name `qiskit-ecosystem_template`. The title of the README is `Qiskit Ecosystem project template`.

**About**  
Template for project to be include in the Qiskit Ecosystem

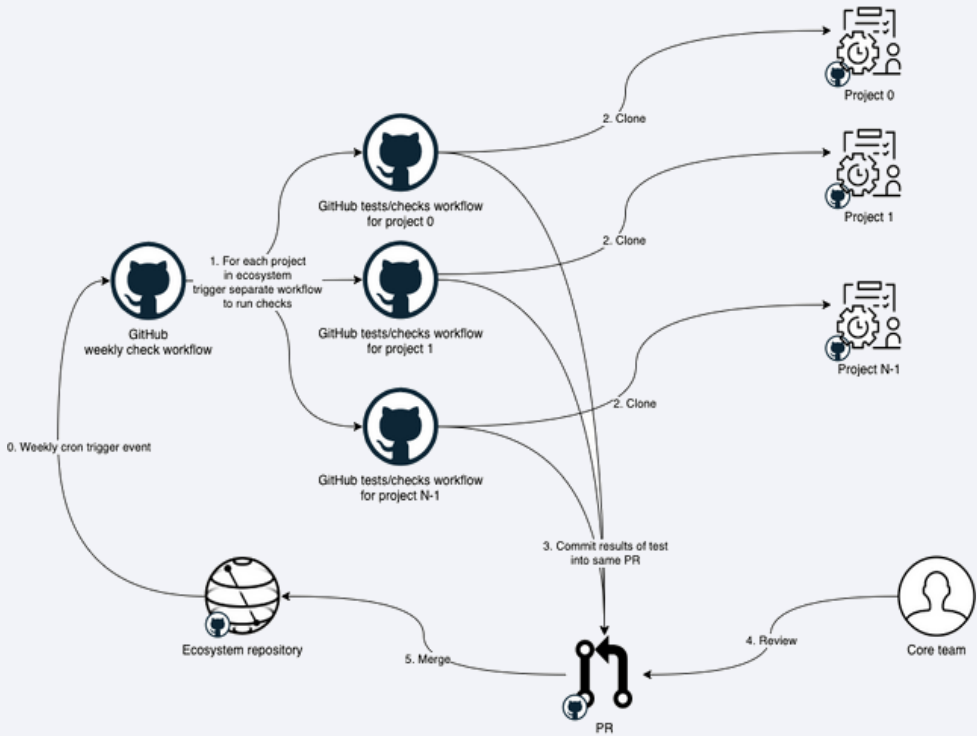
ecosystem integration  
quantum-computing qiskit

Readme  
Apache-2.0 License

**Languages**

- Python 100.0%

# Weekly check workflow



# Weekly check workflow



qiskit-community / ecosystem (Public)

Code Issues 13 Pull requests 1 Discussions Actions Projects 1 Wiki Security Insights Settings

main 4 branches 0 tags

Go to file Add file Code

github-actions and IceKhan13 Batch checks for 2021\_11\_22\_16\_28 (#94) 43a26ea 14 days ago 44 commits

.github	Badging system (#83)	17 days ago
badges	Batch badges for 2021_11_19_21_40 (#91)	17 days ago
docs	Configuration for ecosystem members (#8)	3 months ago
ecosystem	Batch checks for 2021_11_22_16_28 (#94)	14 days ago
resources	Issue 47   Config: add language version support (#75)	last month
tests	Badging system (#83)	17 days ago
.coveragerc	Issue 15   CI: Submission workflow (#46)	2 months ago
.gitignore	Project: initial project setup (#3)	4 months ago
.pylintrc	prettifying the logger (#51)	2 months ago
CODE_OF_CONDUCT.md	Project: initial project setup (#3)	4 months ago
CONTRIBUTING.md	Configuration for ecosystem members (#8)	3 months ago
LICENSE	Initial commit	4 months ago
README.md	Issue 44   add more project readme (#95)	14 days ago
check_time.txt	Batch checks for 2021_11_22_16_28 (#94)	14 days ago
manager.py	Issue 15   CI: Submission workflow (#46)	2 months ago
requirements-dev.txt	Issue 16   Workflows: batch repo check workflow (#48)	2 months ago
requirements.txt	Bug submission ci (#61)	last month
setup.cfg	Project: initial project setup (#3)	4 months ago

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quantum-computing

Readme

Apache-2.0 License

Code of conduct

Releases

No releases published

Create a new release

Packages

No packages published

Publish your first package

Contributors 5

# Badges workflow



qiskit-community / ecosystem Public Watch 4 Star 6 Fork 4

[Code](#) [Issues 13](#) [Pull requests 2](#) [Discussions](#) [Actions](#) [Projects 1](#) [Wiki](#) [Security](#) [Insights](#) [Settings](#)

main 4 branches 0 tags [Go to file](#) [Add file](#) [Code](#)

	github-actions and IceKhan13 Batch checks for 2021_12_06_15_25 (#99) ... 1f89590 2 minutes ago 45 commits
	.github Badging system (#83) 17 days ago
	badges Batch badges for 2021_11_19_21_40 (#91) 17 days ago
	docs Configuration for ecosystem members (#8) 3 months ago
	ecosystem Batch checks for 2021_12_06_15_25 (#99) 2 minutes ago
	resources Issue 47   Config: add language version support (#75) last month
	tests Badging system (#83) 17 days ago
	.coveragerc Issue 15   CI: Submission workflow (#46) 2 months ago
	.gitignore Project: initial project setup (#3) 4 months ago
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	CODE_OF_CONDUCT.md Project: initial project setup (#3) 4 months ago
	CONTRIBUTING.md Configuration for ecosystem members (#8) 3 months ago
	LICENSE Initial commit 4 months ago
	README.md Issue 44   add more project readme (#95) 14 days ago
	check_time.txt Batch checks for 2021_12_06_15_25 (#99) 2 minutes ago
	manager.py Issue 15   CI: Submission workflow (#46) 2 months ago
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**Releases**

No releases published  
[Create a new release](#)

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**Contributors 5**



Explore  
*research assets*  
from Qiskit and the Qiskit  
community

## qiskit MAIN meta

Apache 2.0

Qiskit is an open-source SDK for working with quantum computers at the level of circuits, algorithms, and application modules. Qiskit is made up of elements that work together to enable quantum computing. This is a simple meta-package to install the elements of Qiskit altogether.

	dev	stable		
terra 0.16	pass	pass	styles	pass
terra 0.17	fail	pass	coverage	fail
terra 0.18	fail	pass		

## qiskit-terra MAIN circuit pulse

Apache 2.0

Terra is the foundation on which the rest of Qiskit is built.

	dev	stable		
terra 0.16	pass	pass	styles	pass
terra 0.17	fail	pass	coverage	fail
terra 0.18	fail	pass		

## qiskit-aer MAIN simulation

Apache 2.0

Aer provides high-performance quantum computing simulators with realistic noise models.

	dev	stable		
terra 0.16	pass	pass	styles	pass
terra 0.17	fail	pass	coverage	fail
terra 0.18	fail	pass		

## qiskit-optimization MAIN algorithms optimization

Apache 2.0

Qiskit Optimization is an open-source framework that covers the whole range from high-level modeling of optimization problems, with automatic conversion of problems to different required representations, to a suite of easy-to-use quantum optimization algorithms that are ready to run on classical simulators, as well as on real quantum devices via Qiskit.

	dev	stable		
terra 0.16	pass	pass	styles	pass
terra 0.17	fail	pass	coverage	fail

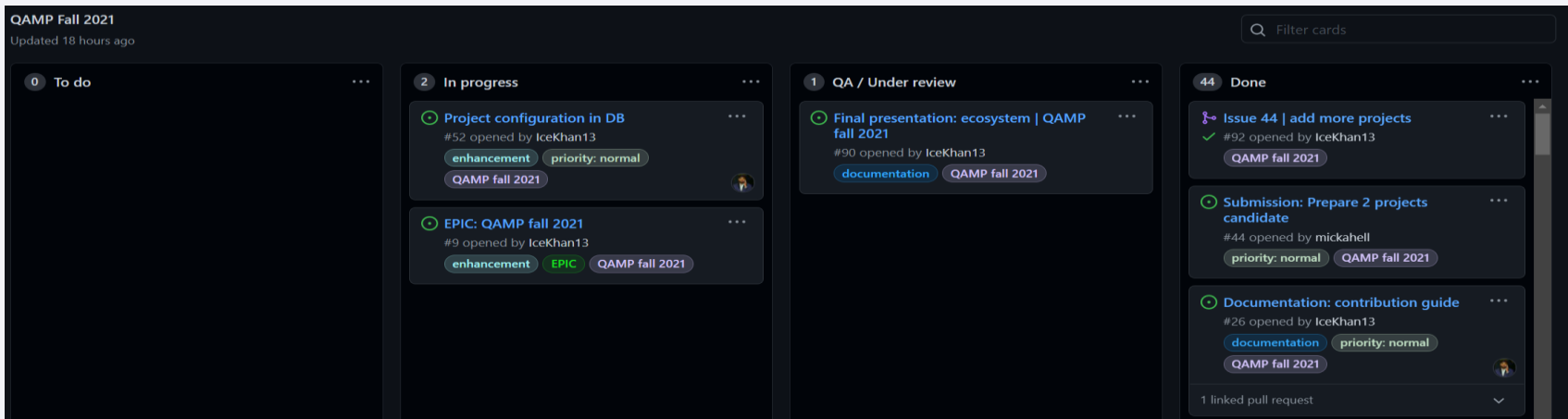
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	dev	stable		
terra 0.16	pass	pass	styles	pass

# Current state



## Function US

- Base scripts
- CI processes

6 projects add

## No-functional US

- Tests improving
- Documentation

## Quality US

- Templating project

# Next step

- Launch Ecosystem page on [qiskit.org](https://qiskit.org)
- Add more projects
- Add the possibility to have non-python projects

```
from qiskit import QuantumCircuit, execute
from qiskit import IBMQ
from qiskit.providers.fake_provider import FakeMumbai
from qiskit.providers.fake_provider import FakeMumbaiV2

# Choose a real device to simulate from IBMQ provider
provider = IBMQ.load_account()
backend = provider.get_backend('ibmq_16mq')
coupling_map = backend.configuration().coupling_map

# Generate an Asap noise model for device
noise_model = NoiseModel.from_backend(backend)
basic_gates = noise_model.basis_gates

# Generate 3-qubit GKP state
num_qubits = 3
circuit = QuantumCircuit(3)
circuit.h(0)
circuit.cx(0, 1)
circuit.cx(1, 2)
circuit.measure([0, 1, 2], [0, 1, 2])

# Perform noisy simulation
backend = provider.get_backend('ibmq_16mq')
job = execute(circuit, backend,
              coupling_map=coupling_map,
              noise_model=noise_model,
              basis_gates=basis_gates)
result = job.result()

print(result.get_counts())
```

# Thanks for your attention !

Balaji, Michaël & Iskandar

