



CSCS

Centro Svizzero di Calcolo Scientifico
Swiss National Supercomputing Centre

ETH zürich



ReFrame: A Regression Testing Tool for HPC Systems

Regression testing BoF, SC17

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Regression Testing of HPC Systems

Why is it so important?

- Ensures quality of service
- Reduces downtime
- Early detection of problems

Regression Testing of HPC Systems

But it's a painful story

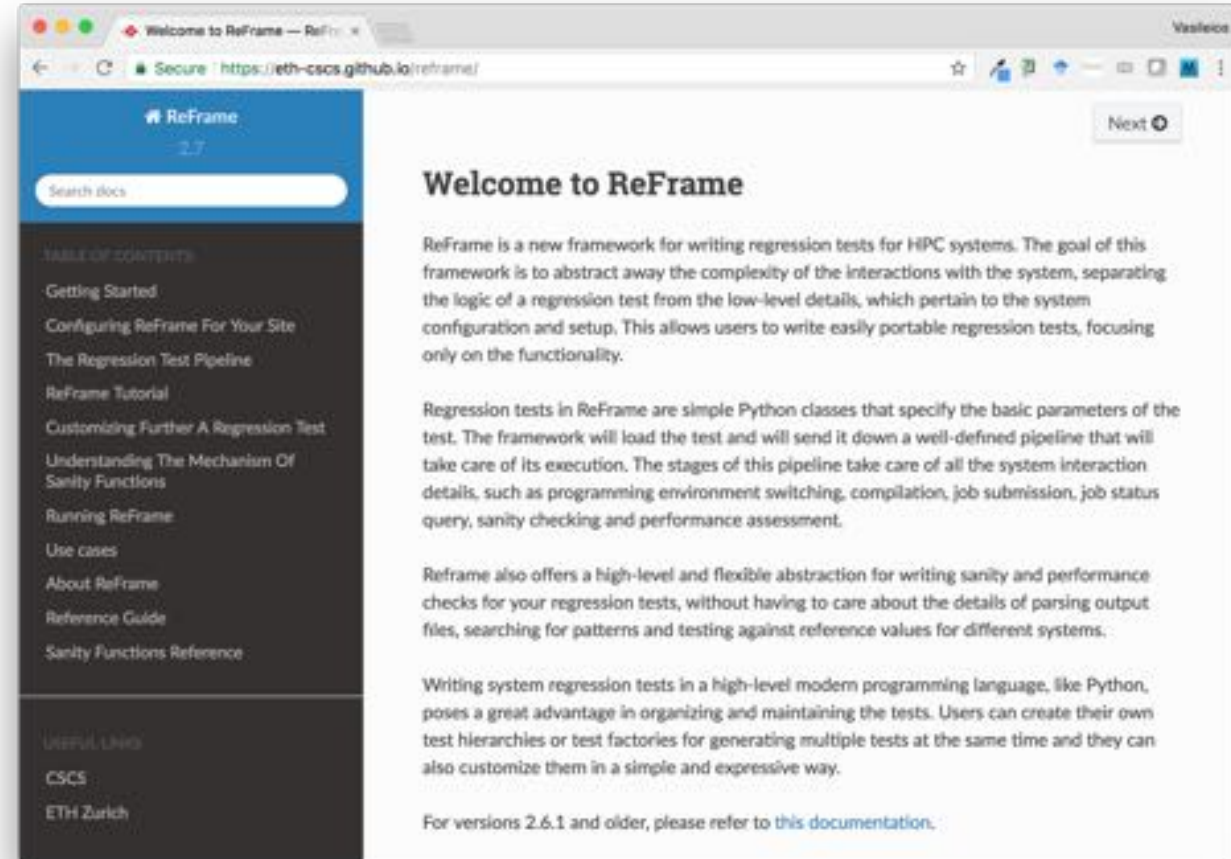
- In-house custom solutions per center
- Non portable monolithic regression tests
 - Tightly coupled to the system configuration and programming environments
- Large maintenance overhead
 - Replicated code of the system interaction details
 - Test's logic is lost in unrelated lower level details

Reluctance to implement new regression tests!

What Is ReFrame?

A new regression framework that

- allows writing portable HPC regression tests in Python,
- abstracts away the system interaction details,
- lets users focus solely on the logic of their test.

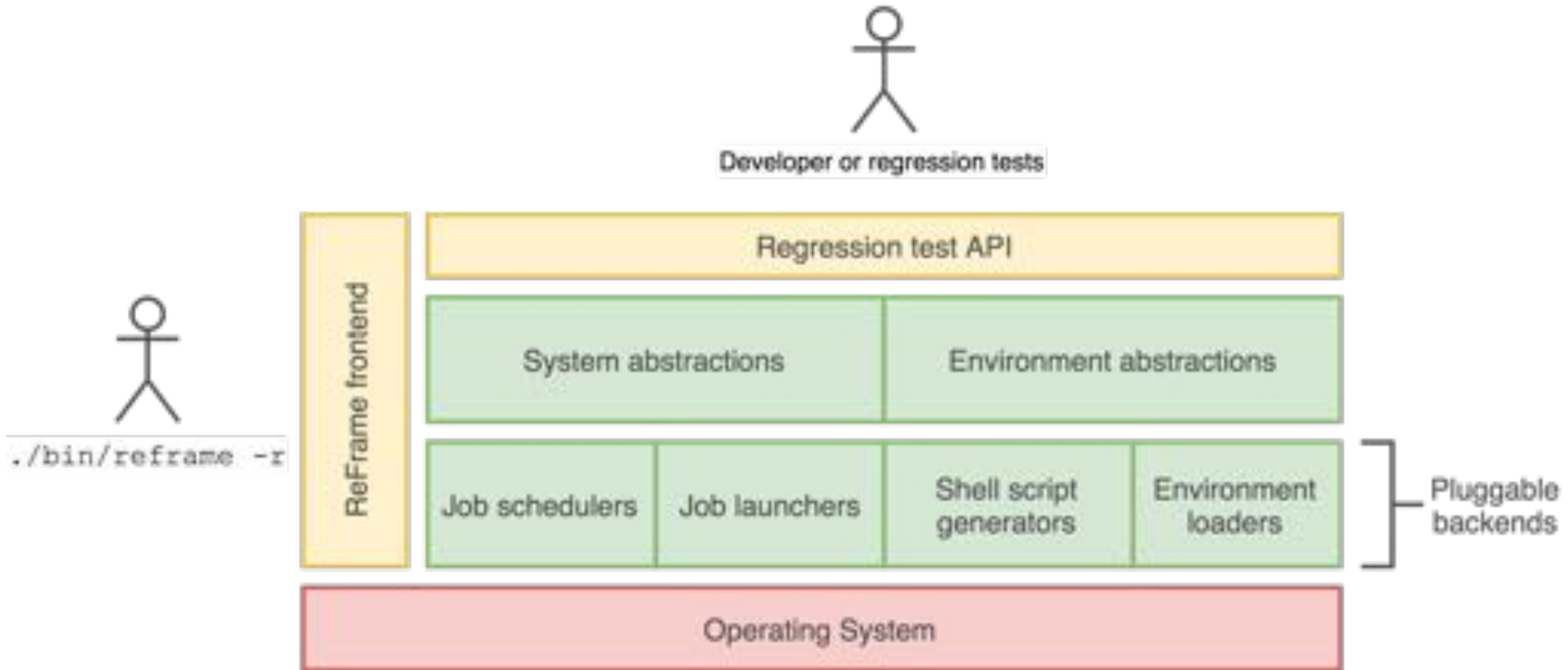


<https://github.com/eth-cscs/reframe>

Design Goals

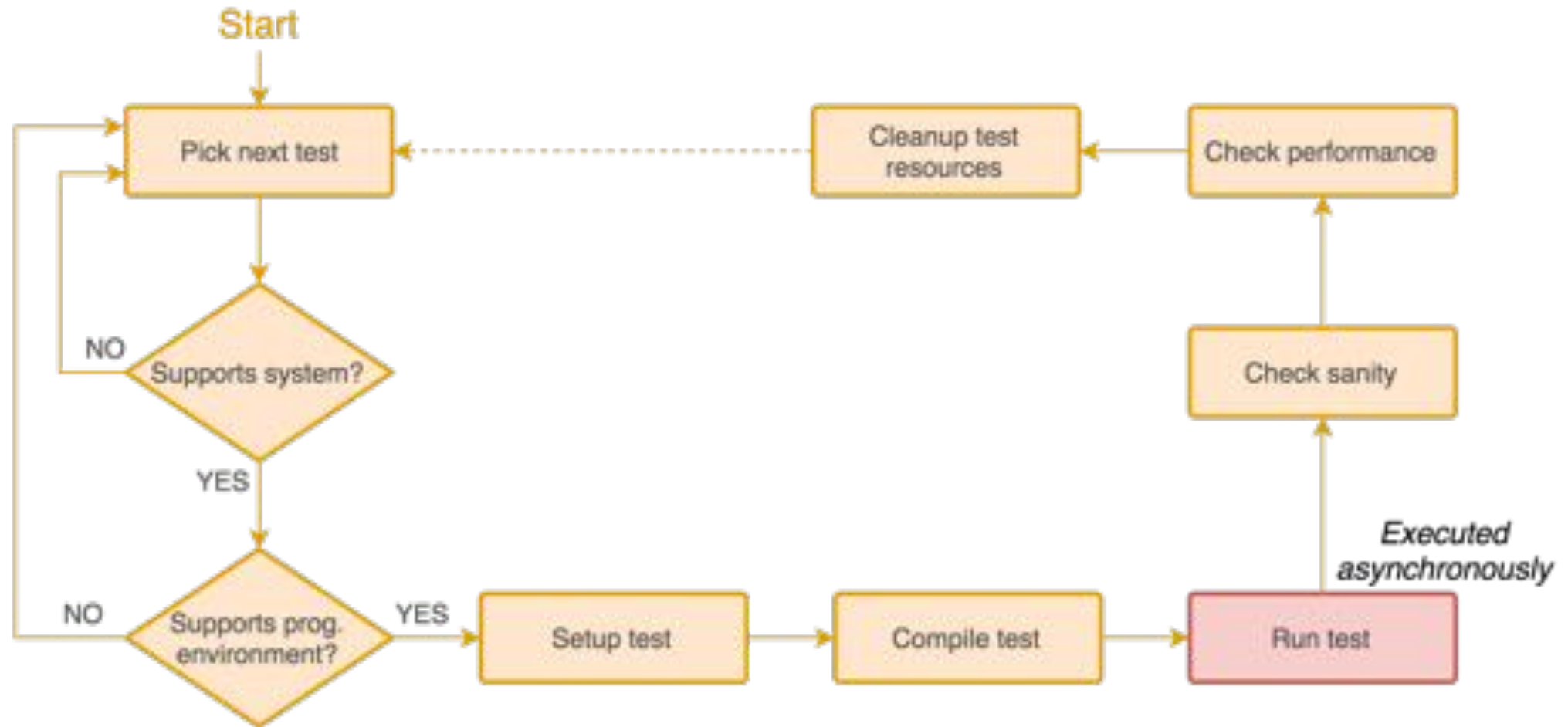
- Productivity
- Portability
- Speed and Ease of Use
- Robustness

ReFrame's architecture



The Regression Test Pipeline

A series of well defined phases that each regression test goes through



Key Features

- Support for Slurm
- Support for sanity and performance tests
- Flexible organization of the regression tests
- Rich command-line interface
- Progress and results reports
- Asynchronous execution of regression tests
- Complete documentation

Demo Time

1. Running ReFrame
2. How a regression test written in ReFrame looks like?

[Go to demo](#)

The CSCS Use Case

- ReFrame is used to test continuously all major systems in production
- Wide variety of performance and sanity tests implemented
 - Applications
 - Libraries
 - Programming environment tests
 - I/O benchmarks
 - Tools and debuggers
 - Job submission tests
- Two execution modes
 - **Production:** A wide aspect of the sanity and performance tests running daily overnight
 - **Maintenance:** Key functionality and performance tests run before and after maintenances

The CSCS Use Case

Comparison to our former shell script based solution

Maintenance Burden	Shell-script based suite	ReFrame
Total size of tests	14635 loc	2985 loc
Average test file size	179 loc	93 loc
Average effective test size	179 loc	25 loc

5x reduction in the amount of code of regression tests

Summary

ReFrame makes writing regression tests for HPC systems an easy task!

- Actively developed, monthly release cycle
- The standard way of testing systems at CSCS
- Publicly available at <https://github.com/eth-cscs/reframe>

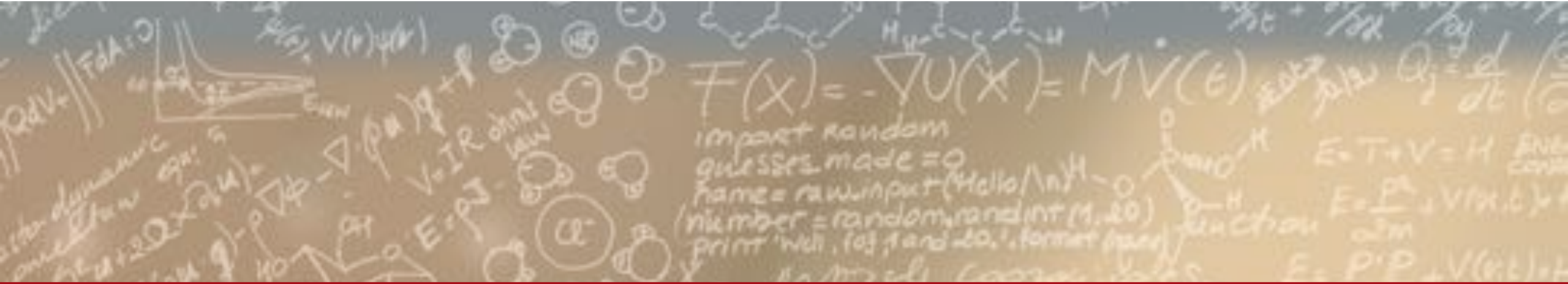
Try it out and give us some feedback!



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Thank you for your attention.