

Efficient test execution in End to End testing

Smart Resource-aware End to End Test Cases Orchestration

Cristian Augusto ⋈ augustocristian@uniovi.es

University of Oviedo http://giis.uniovi.es/



Scope and Research Question

E2E Testing is expensive in resource terms frequently the resources are containerized and deployed for each test case (causing underusage).

Use Case: Execution of suites with multiple E2E tests and resources → avoid resource oversubscribing and reduce costs.

RQ - Can a smart characterization, aggrupation, and scheduling of the test cases achieve savings in resource usage?

Resource

"Physical, logical and/or computational entities required by the execution of one or more test cases"

Resource **Attributes** for example:

- Replaceable
- Elasticity
- Elasticity Cost
- Access Mode

Resource-aware End to end Test ORCHestration (RETORCH): Processes

Resource Identification

Identification of the different resources that each test caseightharpoonuprequires.

Seeks to discover the hidden dependencies between tests

Grouping

Clustering of test cases with a compatible resource usage.

Test Cases + Resources= **TGroups**

Scheduling

Smart distribution of the test cases. The TGroups several test cases and resources. TJobs are parallelized to achieve savings in terms of time

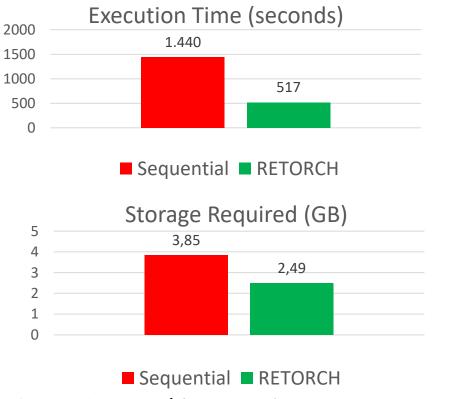
Deployment

Configuration of the CI environment (Jenkins) are divided into a TJobs with for the execution. The TJobs are scheduled in several instances avoiding unnecessary redeployments and saving resources

Results

ElasTest demonstrator: FullTeaching

- 19 E2E tests.
- 10 resources.
- Access modes → read, read-write, dynamic, no-access...



RQ: RETORCH achieves savings:

Execution time → 64% RETORCH savings deploying compatible parallel test cases

Storage → 35% → RETORCH savings (re)deploying fewer containers.

Publications

C. Augusto, J. Morán, A. Bertolino, C. de la Riva, and J. Tuya, 'RETORCH: Resource-Aware End-to-End Test Orchestration', QUATIC, 2019 C. Augusto, J. Morán, A. Bertolino, C. de la Riva, and J. Tuya, 'RETORCH: An Approach for Resource-Aware Orchestration of End-to-End Test Cases', Soft. Quality Journal, 2020