

EvoMaster at REST League 2026 Tool Competition

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Abstract

EvoMaster is an open-source, search-based fuzzer aimed at Web APIs, including REST, GraphQL and RPC APIs. This paper presents and discusses EvoMaster's results when applied in the REST League 2026 tool competition.

CCS Concepts

• **Software and its engineering** → **Software verification and validation**; Search-based software engineering.

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1 Introduction

EvoMASTER is a search-based fuzzer for Web APIs, including REST, GraphQL and RPC [8]. It is open-source on GitHub, since 2016. For nearly a decade, it was the only fuzzer for REST APIs supporting *white-box* testing [1].

EvoMASTER is actively maintained, with currently more than 13 000 code commits, made by more than 15 people. Its published releases on GitHub have been downloaded more than 9 000 times.

EvoMASTER competed in the REST League 2026 Tool Competition, held at the 19th International Workshop on Search-Based and Fuzz Testing (SBFT), in 2026 [9]. This paper reports on such competition, based on *black-box* testing of REST APIs.

2 Latest Improvements

EvoMASTER is first, and foremost, a *white-box* testing tool. Recent work has been focused on white-box improvements, like handling of mocking external services [11].

Another major focus in recent years has been spreading its adoption in industry, including industry-academia collaborations with Fortune 500 enterprises such as Volkswagen [5] and Meituan [12]. Several further improvements were needed for a larger industrial adoption, like supporting Python test suite outputs and GitHub Actions [4]. Handling different kinds of authentication mechanisms [10], and verifying security aspects like access policy violations [6], have been other important topics investigated.

3 Competition Results

In the REST League 2026 Tool Competition, EvoMASTER arrived second, obtaining a *Silver API Tester* badge.

There are some aspects that need to be clarified:

(1) On one of the APIs, called *features-service*, EvoMASTER received a 0 score, with the justification: “*The tool makes the API container to crash (it only happens with the EvoMaster tool)*”. Without any further data (e.g., log files), it is unclear whether the issue was in the experiment infrastructure and not the tool.

(2) EvoMASTER only used the hardware provided by the competition settings. No external services (e.g., rented commercial LLMs) were used.

(3) Competition results were based on the HTTP calls made during the fuzzing session, and **NOT** on the execution of generated test cases. When it comes to *black-box* experiments, this can lead to non-trivial concerns [10].

(4) Fault detection was only based on 500 HTTP status code. Although this is reasonable, due to the complexity of evaluating other oracles in an independent, reliable way [10], there are many other automated oracles that some fuzzers implement [10], like validation of security properties (e.g., [6]).

(5) Regarding the detection of “unique errors”, EvoMASTER performed worst among the compared fuzzers. Unique error detection was based on some custom form of text analysis on the HTTP responses with 500 status code. However, to the best of our knowledge, no study in the literature has been made to verify the “false positive” rate of this custom metric. On APIs such as *features-service* (where EvoMASTER’s results were not collected), some fuzzers found hundreds of “unique” faults, with a resulting density of 1 “unique” fault every 4 lines of code. However, all fuzzers were evaluated with the same metrics, which is fair. But, fuzzers that keep repeating calls with 500 status code with small variations in their input might be advantaged if the “unique” faults are false positives in the end. No data on the number of endpoints, with at least 1 HTTP calls leading to a 500, was provided, to see how results would look like if indeed there were false positives.

4 Conclusions

In this paper, we have discussed EvoMASTER’ results at the REST League 2026 Tool Competition, where EvoMASTER arrived second, obtaining a *Silver API Tester* badge.

Future work will aim at investigating the data of the competition (when it will be made available), in particular regarding how to handle the custom definition of “unique” errors, and how/if it impacts false positive classifications.

EvoMASTER is mainly a *white-box* fuzzer, based on evolutionary computation [2]. For *black-box* testing, it is mainly doing *random testing* with some basic consumer-producer linking of related HTTP operations [3]. Good results obtaining in black-box testing can be mainly attributed to its engineering maturity [7], especially in the handling of different aspects of OpenAPI schemas. As such, there are several areas for possible future improvements.

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