

# Tutorial: Testing of RESTful Web APIs

1. **Introduction.** REST APIs, OpenAPI Specification, RESTful API testing.
2. **Manual testing.** Overview of popular tools in industry.
  - a. **REST Assured.** Popular JUnit library for system-level testing of REST APIs.
  - b. **Postman.** Reference platform for API lifecycle management (dev, test, deploy, etc.)
3. **Automated testing.** Overview of powerful research tools.
  - a. **RESTler.** Black-box fuzzing, developed by Microsoft.
  - b. **EvoMaster.** White-box testing with evolutionary algorithms.
  - c. **RESTest.** Black-box testing with varied customizable strategies.
    - i. Test data generators and test case generators.
    - ii. Test oracle generation (with Juan Carlos Alonso).
4. **Continuous online testing with RESTest.**
  - a. **Intro.** The RESTest testing ecosystem.
  - b. **Demo.** Testing commercial APIs with bots.
  - c. **Results.** Hundreds of bugs in commercial APIs.
5. **Conclusion.** Recap, additional resources, research opportunities.

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Alberto Martín López is a postdoctoral fellow at the Schaffhausen Institute of Technology (SIT) and the Università della Svizzera Italiana (USI), in Switzerland. He belongs to the Software Testing and Analysis Research (STAR) group, led by Professor Mauro Pezzè. Before that, he did a PhD in Software Engineering at the SCORE Unit of Excellence of the University of Seville, from where he also obtained a Bachelor degree in Telecommunications Engineering and a Master's degree in Software Engineering and Technology. He was also a Fulbright fellow at the University of California, Berkeley (USA) and an external lecturer at the Kristiania University College (Oslo, Norway). The main research interests of Alberto Martín López span varied topics within the areas of software testing and service-oriented systems, including field testing, web API testing, AI4SE and smart ecosystems, among others. He is the author and main developer of the registered tool RESTest, a comprehensive framework for automated black-box testing of RESTful web APIs, thanks to which he and his team have found numerous bugs in commercial APIs such as YouTube, Yelp, GitHub, and more. He has published in some of the main conferences and journals related to his field such as ESEC/FSE, ICSOC, TSE and TSC. To know more about Alberto, visit his personal website: <https://personal.us.es/amarlop>.