

VeriFx: Correct Replicated Data Types for the Masses (Artifact)

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Abstract

Our related article presents our novel verification language, called VeriFx. We used VeriFx to implement and verify 51 Conflict-Free Replicated Data Types (CRDTs) and 9 Operational Transformation (OT) functions.

This artifact bundles the implementation of the

various CRDTs and OT functions described in the article. The artifact also contains a Docker file that can be used to reproduce the verification results (Table 1 and 2 in the article). In addition, the artifact can also be used to run custom VeriFx programs and verify their correctness.

2012 ACM Subject Classification Software and its engineering → Domain specific languages; Computing methodologies → Distributed programming languages; Theory of computation → Distributed algorithms

Keywords and phrases distributed systems, eventual consistency, replicated data types, verification

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Related Conference 37th European Conference on Object-Oriented Programming (ECOOP 2023), July 17–21, 2023, Seattle, Washington, United States

Evaluation Policy The artifact has been evaluated as described in the ECOOP 2023 Call for Artifacts and the ACM Artifact Review and Badging Policy.

1 Scope

This artifact can be used to reproduce the verification results from the paper. In particular, it can be used to reproduce the results from Table 1 for the CRDTs [2] and the results from Table 2 for the OT functions [1]. The artifact also enables programmers to write custom VeriFx programs and run them to verify their correctness.

2 Content

The artifact package includes:

- VeriFx source code of the CRDTs and OT functions we implemented and verified.
- A docker image that can be used to:
 - reproduce the verification results outlined in the paper (i.e. runs all proofs)
 - experiment with VeriFx by verifying the proofs defined in your own VeriFx code



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3 Getting the artifact

The artifact endorsed by the Artifact Evaluation Committee is available free of charge on the Dagstuhl Research Online Publication Server (DROPS). In addition, the artifact is also available at: <https://zenodo.org/record/7982416>.

4 Tested platforms

This artifact requires you to have Docker installed on your machine. The artifact has been tested on Linux and on an intel-based Mac. We know that the provided Docker image does not run on Macbook M1 neither M2, but it should run on intel-based Macbooks.

5 License

The artifact is available under the Creative Commons Attribution 4.0 International Public License.

6 MD5 sum of the artifact

6392663a5f33678865415c7bbe46a0f9

7 Size of the artifact

152 MB

References

- 1 C. A. Ellis and S. J. Gibbs. Concurrency control in groupware systems. In *Proceedings of the 1989 ACM SIGMOD International Conference on Management of Data*, SIGMOD '89, pages 399–407, New York, NY, USA, 1989. Association for Computing Machinery. doi:10.1145/67544.66963.
- 2 Marc Shapiro, Nuno Preguiça, Carlos Baquero, and Marek Zawirski. Conflict-free Replicated Data Types. In Xavier Défago, Franck Petit, and Vincent Villain, editors, *13th Int. Symp. on Stabilization, Safety, and Security of Distributed Systems, SSS'11*, pages 386–400, Grenoble, France, 2011. Springer-Verlag.