

ByTI: Simulation Environment for a Byzantine Timer for State-Machine Replication

Byzantine fault tolerance can handle not only crashing nodes but also nodes with arbitrary faulty behaviour (hacking, intrusions, sporadic and intermittent faults).

State-machine replication (SMR) can tolerate Byzantine failures by replicating a service onto multiple nodes and deploying a communication protocol that distributes requests to all replicas in the same order. Each replica node needs to run deterministically in order to achieve the same output in correct nodes.

For implementing a deterministic timer (wall clock, interval timer), we developed a heartbeat-based distributed algorithm called ByTI (Byzantine Time Intervals). In order to improve and visualise its behaviour, this project is supposed to develop a simulation environment for the ByTI algorithm.

The simulation environment should visualise the sent messages and its temporal distribution including the outcome of ByTI results (current time, interval lengths). The simulator should be able to simulate configurable message delays, delay distributions and predefined Byzantine behaviour. Further, the simulated algorithm should be adaptable in order to implement improvements. The student may decide on the technology used for implementation.



Project

8/16
CP

Knowledge about Byzantine failures is helpful but not required. Supervision and report can also be done in German.

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If you are interested or you need additional details, feel free to contact me or drop by for a non-binding chat.

