

Proving probabilistic properties of gossip protocols for systems with an arbitrary number of processes

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Abstract

Verification of randomised distributed protocols (such as gossip protocols) can be carried out using probabilistic model checking. However, model checking is limited in that it can only verify systems with a fixed number of processes. The problem of verifying the family of systems of size N , for any N , is known as the parameterised model checking problem and has been shown to be undecidable. We restrict our attention to verifying certain probabilistic properties of two gossip-style protocols, making use of the probabilistic model checking tool, PRISM. We reason about how the underlying model of the system (a Markov Chain) 'grows' with the size of the system in order to prove the properties hold for any number of processes.