

2018 Research Interest/Project Ideas

Suresh Jagannathan

<http://gowthamk.github.io/Quelea/>

<http://www.cl.cam.ac.uk/~pes20/CompCertTSO/doc/>

Verification of Large-Scale Geo-Replicated Software Systems

Our research group has been focused on the foundational issue of verifying the safety and correctness of real-world systems, with particular focus on applications intended to execute on modern large-scale geo-replicated cloud environments. There have been a number of increasingly frequent and high-profile vulnerabilities recently reported for applications that execute within these environments. This is due in part to the challenges associated with programming in the presence of replicated (and globally inconsistent) state, the need to support weak (non-serializable) transactional semantics necessitated by performance and scaling requirements, robustly dealing with network partitions, etc.

We have begun an ambitious effort to develop foundational principles and associated implementations based on these principles to enable automated reasoning about such systems, and to provide strong verifiable guarantees on system correctness. The outcome of this work will be tools, insights, and methodologies that will allow modern-day distributed services and applications to be equipped with certified (machine-checked) correctness guarantees that ensure desired safety properties are preserved even in the presence of a complex, and potentially hostile, operating environment.