

# MESA: Scalable Runtime Verification Tool Using Actors

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## Abstract

This work presents our runtime verification approach implemented by the tool MESA (MESsage-based System Analysis) which allows for using concurrent monitors to check for properties specified in linear temporal logic and finite state machines. We employ the actor programming model to implement MESA where monitors are captured by concurrent actors that communicate via messaging. The paper also presents a case study where MESA is used to monitor flights in National Airspace System of United States using live air traffic data stream. The case study which motivated this work in the first place shows that our approach is effective. We also perform empirical study by conducting experiments using monitoring systems with different numbers of concurrent monitors and different layers of indexing. This paper describes our experiments, evaluates our results, and discusses challenges faced during the study. The evaluation shows our approach is scalable.