

ADRENALIN-RV: Android Runtime Verification using Load-time Weaving

Android has become one of the most popular operating systems for mobile devices. As the number of applications for the Android ecosystem grows, so is their complexity, increasing the need for runtime verification on the Android platform. Unfortunately, despite the presence of several runtime verification frameworks for Java bytecode, DEX bytecode used in Android does not benefit from such a wide support. While a few runtime verification tools support applications developed for Android, such tools offer only limited bytecode coverage and may not be able to detect property violations in certain classes. In this paper, we show that ADRENALIN-RV, our new runtime verification tool for Android, overcomes this limitation. In contrast to other frameworks, ADRENALIN-RV weaves monitoring code at load time and is able to instrument all loaded classes. In addition to the default classes inside the application package (APK), ADRENALIN-RV covers both the Android class library and libraries dynamically loaded from the storage, network, or generated dynamically, which related tools cannot verify. Evaluation results demonstrate the increased code coverage of ADRENALIN-RV with respect to other runtime validation tools for Android. Thanks to ADRENALIN-RV, we were able to detect violations that cannot be detected by other tools.

Contact: walter.binder@usi.ch