# 1. A large-scale study of application incompatibilities in android

Cai, Haipeng (1); Zhang, Ziyi (1); Li, L. (2); Fu, Xiaoqin (1)

**Author affiliation:** (1) Washington State University, Pullman, United States (2) Monash University, Australia

**Abstract:** The rapid expansion of the Android ecosystem is accompanied by continuing diversification of platforms and devices, resulting in increasing incompatibility issues which damage user experiences and impede app development productivity. In this paper, we conducted a large-scale, longitudinal study of compatibility issues in 62,894 benign apps developed in the past eight years, to understand the symptoms and causes of these issues. We further investigated the incompatibilities that are actually exercised at runtime through the system logs and execution traces of 15,045 apps. Our study revealed that, among others, (1) compatibility issues were prevalent and persistent at both installation and run time, with greater prevalence of run-time incompatibilities, (2) there were no certain Android versions that consistently saw more or less app incompatibilities than others, (3) installation-time incompatibilities were strongly correlated with the minSdkVersion specified in apps, while run-time incompatibilities were most significantly correlated with the underlying platform's API level, and (4) installation-time incompatibilities were mostly due to apps' use of architecture-incompatible native libraries, while run-time incompatibilities were mostly due to API changes during SDK evolution. We offered further insights into app incompatibilities, as well as recommendations on dealing with the issues for bother developers and end users of Android apps. © 2019 Association for Computing Machinery. (48 refs)

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