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1. **Do Customized Android Frameworks Keep Pace with Android?**
Liu, Pei; Fazzini, Mattia; Grundy, John; Li, Li **Source:** *Proceedings - 2022 Mining Software Repositories Conference, MSR 2022*, p 376-387, 2022, *Proceedings - 2022 Mining Software Repositories Conference, MSR 2022*; **ISBN-13:** 9781450393034; **DOI:** 10.1145/3524842.3527963; **Conference:** 2022 Mining Software Repositories Conference, MSR 2022, May 23, 2022 - May 24, 2022; **Sponsor:** Association for Computing Machinery (ACM); IEEE Computer Society; JetBrains; Special Interest Group on Software Engineering (ACM SIGSOFT); Technical Council on Software Engineering (IEEE TCSE); **Publisher:** Institute of Electrical and Electronics Engineers Inc.

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Abstract:
To satisfy varying customer needs, device vendors and OS providers often rely on the open-source nature of the Android OS and offer customized versions of the Android OS. When a new version of the Android OS is released, device vendors and OS providers need to merge the changes from the Android OS into their customizations to account for its bug fixes, security patches, and new features. Because developers of customized OSs might have made changes to code locations that were also modified by the developers of the Android OS, the merge task can be characterized by conflicts, which can be time-consuming and error-prone to resolve. To provide more insight into this critical aspect of the Android ecosystem, we present an empirical study that investigates how eight open-source customizations of the Android OS merge the changes from the Android OS into their projects. The study analyzes how often the developers from the customized OSs merge changes from the Android OS, how often the developers experience textual merge conflicts, and the characteristics of these conflicts. Furthermore, to analyze the effect of the conflicts, the study also analyzes how the conflicts can affect a randomly selected sample of 1,000 apps. After analyzing 1,148 merge operations, we identified that developers perform these operations for 9.7% of the released versions of the Android OS, developers will encounter at least one conflict in 41.3% of the merge operations, 58.1% of the conflicts required developers to change the customized OSs, and 64.4% of the apps considered use at least one method affected by a conflict. In addition to detailing our results, the paper also discusses the implications of our findings and provides insights for researchers and practitioners working with Android and its customizations.

Main Heading: Mergers and acquisitions **Controlled terms:** Android (operating system) - Customer satisfaction - Open source software

Uncontrolled terms: Android customization - Bug fixes - Customer need - Customisation - Empirical studies - Error prones - Merge operations - Open-source - Security patches

Classification Code: 723 Computer Software, Data Handling and Applications

Funding details: Number: DE200100016,DP200100020,FL190100035, Acronym: ARC, Sponsor: Association pour la Recherche sur le Cancer;

Funding text: This work is supported by ARC Laureate Fellowship FL190100035, Discovery Early Career Researcher Award DE200100016, Discovery Project DP200100020.

Database: Compendex