

Security of Android Sleep States

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Motivation

To save battery, Android phones spend most of their time in some kind of sleep state. When the screen is off, Android delays background work (Doze), restricts rarely used apps (App Standby), and the CPU enters low-power idle states or suspends entirely. Apps can keep the phone awake with wakelocks, and alarms or incoming push messages wake it up again. These sleep and wake-up patterns depend on what the user and their apps are doing, and on desktop CPUs, idle states have already been shown to leak information. The question is: what can an unprivileged app learn by observing when and how an Android phone sleeps?

The topic is open: you can look at different sleep mechanisms and decide the direction together with your advisor.

Goals and Tasks

- Learn how Android power management works (Doze, App Standby, wakelocks, CPU idle and suspend) and read related research.
- Find out which sleep-related signals an unprivileged app can observe and what they could reveal, e.g., incoming messages.
- Write a small Android test app to measure sleep and wake-up behavior and analyze possible leaks.



Literature

- Android Developers
  Optimize for Doze and App Standby
  https://developer.android.com/training/monitoring-device-state/doze-standby
- F. Rauscher et al.
  IdleLeak: Exploiting Idle State Side Effects for Information Leakage
  NDSS

Courses & Deliverables

- ☑ **Introduction to Scientific Working**
  Short report on background
  Short presentation
- ☑ **Bachelor Project**
  Project code and documentation
- ☑ **Bachelor's Thesis**
  Project code
  Thesis
  Final presentation

Recommended if you're studying

☑ CS ☑ ICE ☑ SEM

Prerequisites

- Basic operating system knowledge (processes, scheduling)
- Some programming experience (Java/Kotlin or C)
- Interest in mobile and system security

Advisor Contact

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