Android ICC security smells

1st presentation

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Motivation

Goal → Spread awareness and fundamentally reduce the attack surface in Android

- Smartphones more widespread and vulnerable
- Android widely used - billions of users could be affected
- Security concerns are often overridden by other concerns
- Android ICC - Inter-Component Communication

Introduction

- 12 security “smells” (issues)
- Linting tool needs to be assessed
- Metadata explored and evaluated
- Placement of smells in apps investigated
- Based on a dataset of open-source apps (F-Droid)

Manual analysis

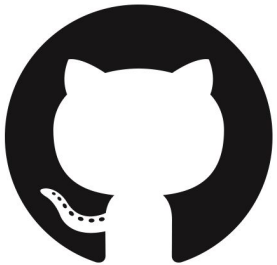
Goal → How reliable is the developed linting tool?

- 100 apps analysed manually
- Evaluate smells reported by lint
- Investigate occurrence of symptoms
- Important: Vulnerability potential of individual smells?

Contributor affiliation

Goal → Find correlation between # of contributors and # of smells

- Manual search for Github repositories of around 700 apps
- C# script using Octokit Github API
- Output: All contributors of individual Github repositories



App updates

Goal → Find whether updates affect projects positively, negatively or not at all

- Manual analysis of apps that received updates
- Look at lint differences between versions
- Check: have security smells changed?

Influence of project age and Activity

Goal → Show differences between more mature and younger apps, more and less frequent updated apps

- C# Octokit program, as for contributor affiliation
- Script extracts all commits + metadata
- It evaluates:
  - Commit ID
  - Timestamp
  - Author
  - Commit message

Unreported smells

Goal → Find out if the unreported smells are true negatives or not

- Search for unreported smells using regular expressions
- Example:
  - Mitigation of SM04 “Unauthorized Intent”
  - grep --include \AndroidManifest.xml -E -rn 'android\:exported|\<service' *
  - Searches for keywords android:exported and <service in all AndroidManifest.xml files in all sub-directories.
- Manual evaluation of unclear cases

Placement of smells

Goal → How are the smells spread out in the different categories? What can we find from this?

- Analyse location of smells, collect the following metadata:
  - Enclosing method
  - Class
  - Package
- Extend linting tool to extract these parameters

Summary

- Further aspect of security smells need to be analyzed
- Part of effort to spread awareness of security issues in android apps
- Evaluate efficiency and correctness of linting tool
- “Human” factors (contributors etc.): How do they affect security?
- Assess if location of smells shows any patterns