

Becoming a Pro

IN Mobile Applications Testing



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Testing Strategies for Mobile Apps

Security Test EXTRA

Workshop : ANSWER THESE QUESTIONS

- 1. What do you consider to be the biggest security issues with mobile phones?*
- 2. How seriously are consumers and companies taking these threats?*
- 3. What can be done about these threats?*



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- Attacks on mobile devices range in volume and severity, but all have the potential to cause chaos at both a device and network level.

Just like in the conventional fixed Internet world, attacks come in all shapes and sizes – such as:

- Phishing (criminals attempt to trick users into sharing passwords etc)
- Spyware (tracks user's activity, perhaps selling data to advertisers)
- Worms (a program that copies itself onto multiple devices via network connections)
- Trojans (a program that looks genuine but hides malicious intent)
- Man-In-The-Middle Attacks (where a criminal intercepts and manipulates messages between two devices or device and computer).

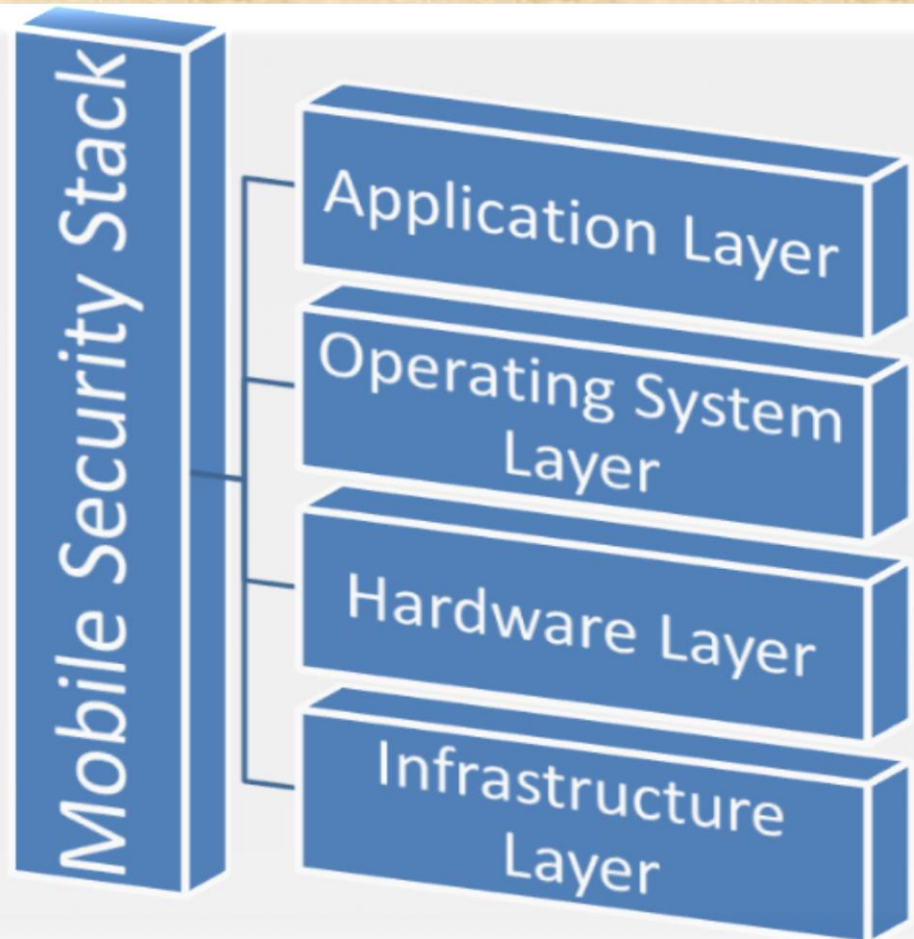
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The Mobile Code Security Stack

- The mobile code security stack can be broken up into four distinct layers.
- Each layer of the mobile code security model is responsible for the security of its defined components and nothing more.
- The upper layers of the stack rely on all lower layers to ensure that their components are appropriately safe

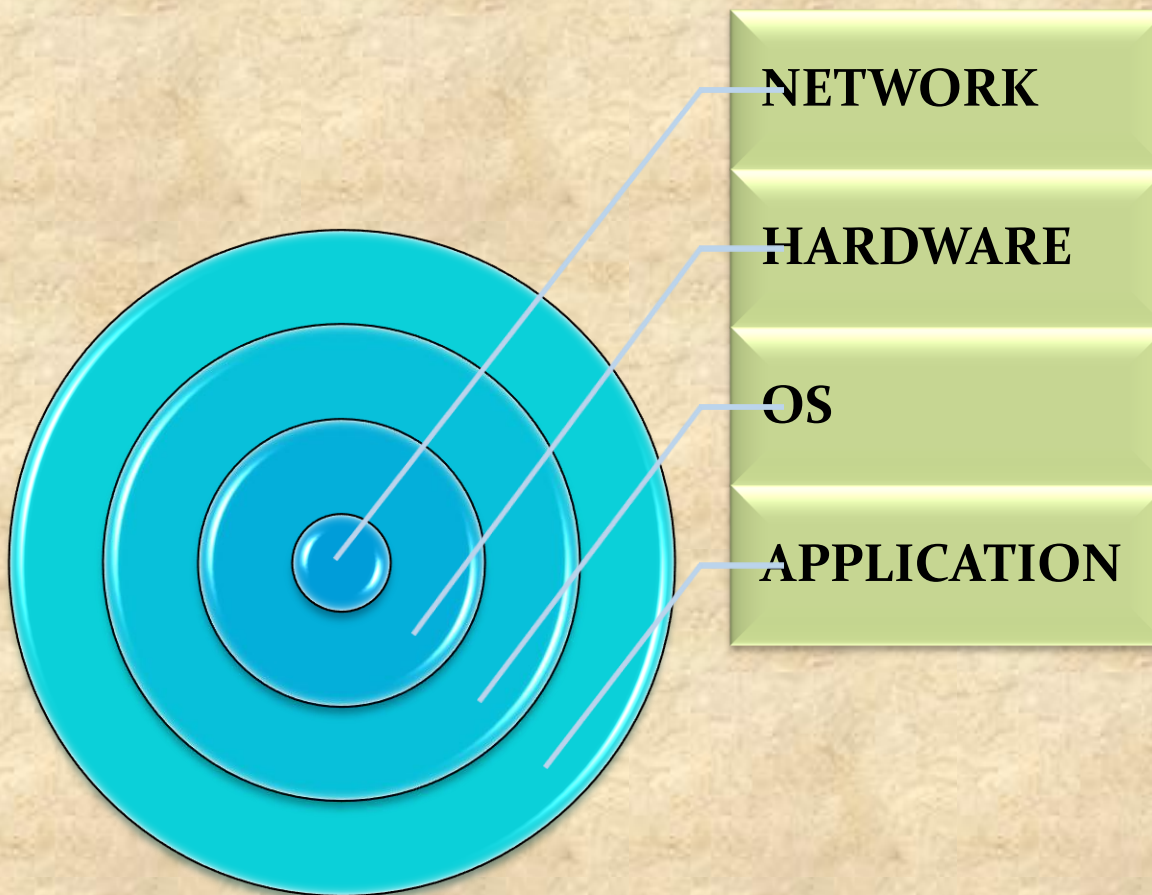


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Mobile Device Risks at Every Layer



Example :

Your device isn't rooted but all your email and pictures are stolen, your location is tracked, and your phone bill is much higher than usual.

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What is OWASP ?

- The Open Web Application Security project is an online community which creates freely-available articles, methodologies, documentation, tools, and technologies in the field of Web App Security

OWASP Top Ten:

- The Top Ten was first published in 2003 and is regularly updated.
- Its goal is to raise awareness about application security by identifying some of the most critical risks facing organizations.
- The Top 10 project is referenced by many standards, books, tools, and organizations, including MITRE, PCI DSS, Defense Information Systems Agency, FTC, and many more.

CWE – COMMON WEAKNESS ENUMERATION :
<https://cwe.mitre.org/about/>

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Security Test EXTRA- OWASP TOP TEN

There are two main categories of mobile code security risks:

MALICIOUS FUNCTIONALITY

- The category of malicious functionality is a list of unwanted and dangerous mobile code behaviors that are stealthily placed in a Trojan app that the user is tricked into installing.
- Users think they are installing a game or utility and instead get hidden spyware, phishing UI or unauthorized premium dialing.

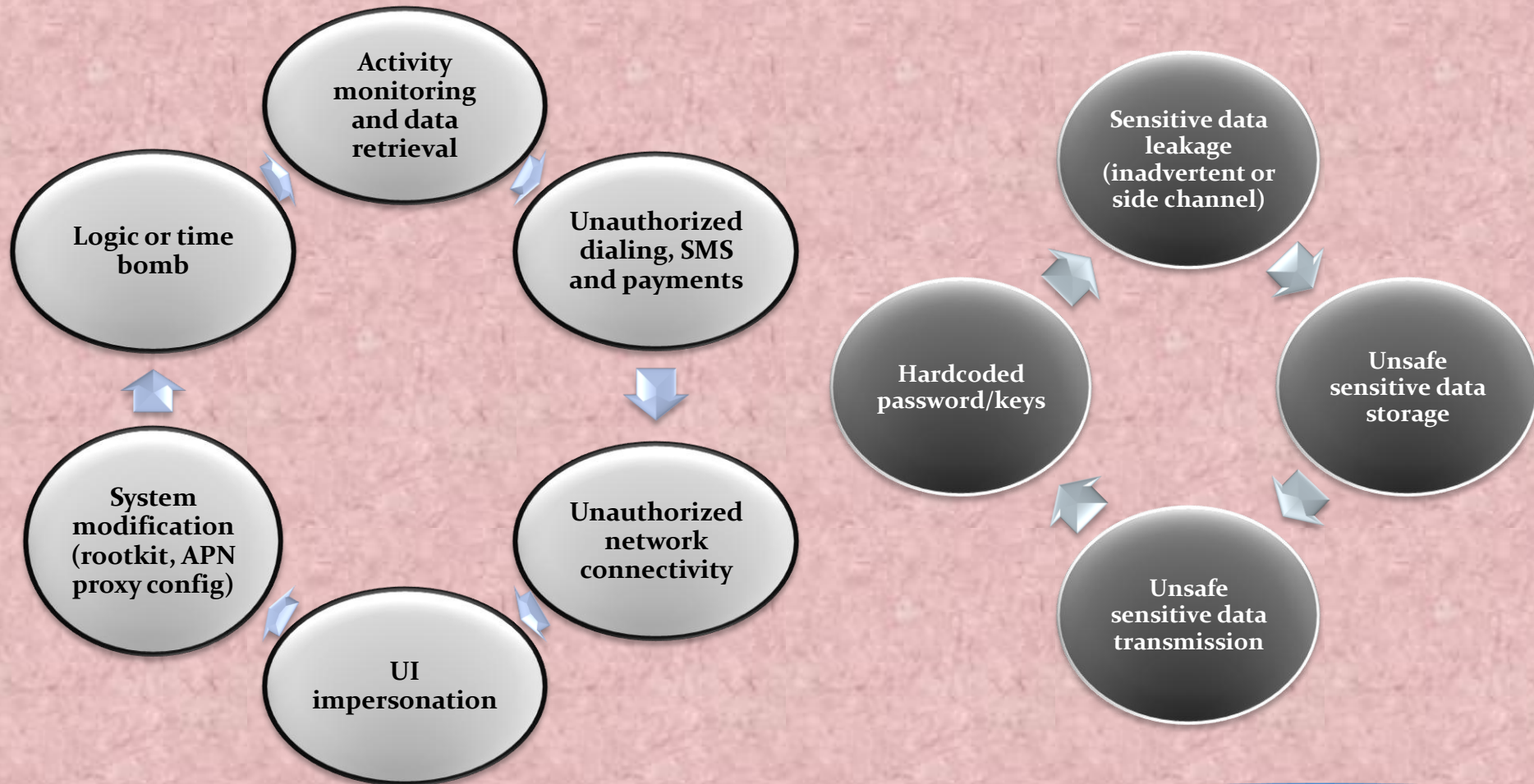
VULNERABILITIES.

- The category of Mobile Security vulnerabilities are errors in design or implementation that expose the mobile device data to interception and retrieval by attackers.
- Mobile code security vulnerabilities can also expose the mobile device or the cloud applications used from the device to unauthorized access.

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Malicious Functionality

Vulnerabilities

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1. Activity monitoring and data retrieval RISKS

EMAIL SPAM sent to 3rd Party addresses

Monitoring phone calls/MIC recording

Stored data, contact list or saved email messages retrieved.

Examples

attackers can monitor and intercept:

- Messaging (SMS and Email)
- Audio (calls and open microphone recording)
- Video (still and full-motion)
- Location – Contact list
- Call history
- Browsing history
- Input
- Data files

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2. Unauthorized Dialing, SMS, and Payments RISKS

Directly monetize from a compromised device

Premium rate phone calls, premium rate SMS texts mobile payments

SMS text message as a spreading vector for worms.

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3. Unauthorized network connectivity RISKS

Mobile devices are designed for communication

Therefore Spyware or other malicious functionality typically requires exfiltration to be of benefit to the attacker.

Examples

examples of communication channels attackers can use for distribution of a malicious SW:

- Email
- SMS
- HTTP (Hypertext Transfer Protocol) get/post
- TCP (Transmission Control Protocol) socket
- UDP (User Datagram Protocol) socket
- DNS (Domain Name Server) exfiltration
- Bluetooth
- Blackberry Messenger

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4. UI impersonation RISKS

Similar to phishing - attacks that impersonating website of their bank or online service.

Web view applications on the mobile device can proxy to legitimate website.

Malicious app creates UI that impersonates phone's native UI or the UI of a legitimate application.

Victim is asked to authenticate and ends up sending their credentials to an attacker.

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5.System modification RISKS

Malicious applications will often attempt to modify the system configuration to hide their presence.

This is often called rootkit behavior.

System Configuration changes also make certain attacks possible.

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6. Logic or Time Bomb RISKS

Logic or time bombs are classic backdoor techniques that trigger malicious activity based on a specific event, device usage or time.

When a logic bomb is programmed to execute when a specific date is reached, it is referred to as a time bomb. Time bombs are usually programmed to set off when important dates are reached

A logic bomb is a piece of malicious code that executes when specific trigger conditions are met. A typical example would be a program that monitors a company's payroll system, and attacks the company if a specific employee is terminated.

ALL SECURITY DATABASE : <https://www.security-database.com/cwe.php?page=26&action=list>

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7. Sensitive Data Leakage RISKS

Sensitive data leakage can be either inadvertent or side channel.

A legitimate apps usage of device information and authentication credentials can be poorly implemented thereby exposing this sensitive data to 3rd parties.

Location

Owner ID info: name, number, device ID

Authentication credentials

Authorization tokens

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8. Unsafe Sensitive Data Storage RISKS

Mobile apps often store sensitive data:

Banking and payment system PIN numbers, credit card numbers, or online service passwords.

Sensitive data should always be stored encrypted.

- Make use of strong cryptography to prevent data being stored in a manner that allows retrieval.

- Storing sensitive data without encryption on removable media such as a micro SD card is especially risky.

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9. Unsafe Sensitive Data Transmission RISKS

It is important that sensitive data is encrypted in transmission lest it be eavesdropped by attackers.

Mobile devices are especially susceptible because they use wireless communications exclusively and often public WiFi, which is known to be insecure.

SSL is one of the best ways to secure sensitive data in transit

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10. Hardcoded password/keys RISKS

The use of hardcoded passwords or keys is sometimes used as a shortcut by developers to make the application easier to implement, support, or debug.

Once this hardcoded password is discovered through reverse engineering it renders the security of the application or the systems it authenticates to with this password ineffective.

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2016 OWASP Release Candidate (not yet official)

M1 - Improper Platform Usage

M2 - Insecure Data Storage

M3 - Insecure Communication

M4 - Insecure Authentication

M5 - Insufficient Cryptography

M6 - Insecure Authorization

M7 - Client Code Quality

M8 - Code Tampering

M9 - Reverse Engineering

M10 - Extraneous Functionality

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CREATE CHECK LIST BEFORE

Phone identifiers such as (IMSI or IMEI)

Address Book

Account Details

E-mail

Stock application data

Banking Data

GPS Location(s)

Web History

User's Dictionary

Images

Notes

Calendar Appointments

Call Logs

Encryption Keys

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SUMMARY

Functional

- Validation of Functionality
- Smoke / Regressions Testing
- Offline access testing
- Negative Testing

Non Functional

- Network Strength / Outage / Recovery
- Different NW Types
- Peripheral Testing

Interoperability (IOP)

- Voice / SMS interrupts
- Notifications
- Battery /Cable Removal

Memory Leak

- Memory Usage
- Memory Leaks
- Garbage Collection

Performance Testing

- CPU Usage testing
- Network Usage
- Page Render time or activity Render time

Usability Testing

- User Experience
- Competitive Analysis
- Expert Review

Installation Testing

- New App Install
- Uninstall and **Reinstall**
- Upgrade testing

Security Testing

- OWASP Vulnerabilities
- Dynamic Testing
- Static Code Analysis
- Data Encryption

Language Testing

- Validation for Locales
- Images and Text
- Currencies, time zones etc.
- Context