

Mobile Devices have made us the most monitored individuals in history

SEM2220 - Assignment 4

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1 Introduction

There has been a lot of news in the press in the last year about surveillance programs run by many countries security agencies, particularly focused on the collection of phone records by the National Security Agency (NSA)[1].

It comes as no surprise that this has brought about the question:

“Have mobile devices made us the most monitored individuals in history?”

To fully understand the depth of this question, one must consider the technical methods which are employed to monitor mobile devices and how these methods differ across different mobile platforms. In hand with this, one must investigate the methods for preventing unwanted monitoring on mobile devices and how effective these methods really are.

Finally there are many legal and professional issues which govern the collection of data from mobile devices; but there are also a host of ethical and social issues which legal and professional element cannot, necessarily, cover.

Of course monitoring of data, especially from mobile devices, doesn't have to be used for nefarious purposes. Applications commonly use data mining techniques to provide a better experience for their users and cloud services are so popular that imagining a world where all a users data is stored solely on a single device is almost impossible.

2 Technical Methods for Monitoring Mobile Devices

Because of the structure of the Global System for Mobile Communications (GSM), any mobile device which accesses the mobile network can be tracked to, at worst, the nearest cell tower. In fact the NSA is known to use this data to track targets and identify possible accomplices[2]. There are also other stories of UK public organisations performing similar actions[3][4].

Though this is a worrying concept, there is some important information that the U.S. has given in [5] which denies that any information collected cannot be used to target any individual without a prior specific and documented reason to do so. In the case of monitoring of non-U.S. citizens there must also be a agreement with the country of their citizenship.

It is the monitoring which the users agrees to have performed upon them that is perhaps more worrying.

Mobile devices, especially tablets and smart phones, have a range of sensors which third-party applications may be able to access. These sensors typically include a camera, microphone, WiFi antenna and GPS system. As technology progresses the accuracy of these sensors is increasing and other sensors such as accelerometers are becoming more prevalent.

It could, therefore, be easy for an attacker to write a malicious application which simply monitored the GPS location of a person or recorded their conversations through the microphone. Or even use any of these systems combined to gather a lot of sensitive data.

There have been cases which have been formally investigated[6] in which legitimate applications collect data from users on the side, which are then sold to other companies for advertisement revenue.

However, a lot of applications have legitimate uses for these sensors. Most applications require network access to load data from external servers. More specific applications, which perform tasks like route tracking, will require the use of more than one of these sensors.

So how do mobile platforms allow developers to access these systems when they have legitimate reasons?

Modern mobile platforms typically have some sort of security system and ways in which applications can be given access to secure elements of the mobile device. Most of these platforms sandbox third-party application allowing the kernel to control the access to the various facilities of the device.

2.1 Android Security Facilities

[7] describes the methods the Android system uses to secure the environment. The main advantage Android gains in this area is that uses Security-Enhanced Linux (SELinux), which confines the access of programs based on different policies.

Android adds many features on top of this, the most applicable of these to the question of monitoring is the permission model. For a third party application to access protected APIs such as GPS positioning or network connections they must implicitly define which of these elements they require in the manifest file of the application.

This information is displayed to the user when they first install the application and when the application updates to add new access to secure APIs.

There are also certain APIs which are not available to third-party applications, but which may be used by pre-installed applications if they are signed as part of the OS.

Because applications are sandboxed from one another it should be an impossible task to gain confidential information from another application, unless it provides it somehow.

2.2 iOS Security Facilities

2.3 Windows 8 Phone Security Features

3 Protection Against Unwanted Monitoring

4 Implications of Mobile-based Monitoring

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