Title: HideMyApp: Hiding the Presence of Sensitive Apps on Android

Abstract:

Millions of users use mobile fitness apps on their devices to monitor their health and well-being. As the popularity of such apps continues to grow, there are many challenges to privacy and security that impede their potential. HideMyApp (HMA) is Proposed as an easy and practical solution to conceal the presence of sensitive apps from other applications. It was also designed and implemented to check the robustness. Running the apps using HMA requires no changes to the apps or the OS.

Analysis of Android System:

Due to Android’s open design, any app can easily check for a specific app or collect the entire list of installed apps on the phone, even without any permissions, and can expose a significant amount of metadata that can reveal a lot of information about the user. Analysis also reveals that free apps are more likely to demand these data and that third-party libraries (libs) are the key requesters of the list of installed applications.Survey of 2017 popular apps in the Google Play Store shows that around 57% of these apps explicitly query for the list of installed apps. Average users has over 80 apps installed on their phones, almost all of which are free, there is a high likelihood that untrusted third parties will get the list of installed apps.

Use Case:

HideMyApp(HMA) can be used in an organization such as a consortium of hospitals where authorized developers collaborating with the hospitals can publish and update their mHealth apps. It consists of an HMA app store where these mHealth apps can be published and a client app called HMA Manager to anonymously (un)install, use, and to update the apps selected from the HMA app store.

System Description:

To hide the presence of sensitive apps, they are not registered in the OS; instead, their container apps are registered. If users open their default launcher for the Android app, container apps with icons and random names will only be seen. To solve this problem The HMA Manager app keeps track of the one-to - one mapping between sensitive apps and their container apps at the time of installation. Using the mappings, the HMA Manager app can display the container apps to users with their sensitive apps ' original icons and labels. The **HMA App Store** accepts requests to download and upgrade apps from HMA Manager users and returns them to container apps. The HMA App Store generates an empty app with a standard app icon, a random package name and tag to produce a container app for a specific APK, and it imports into the app the lib and the code for the user-level virtualization. The App Store extracts the permissions declared by the sensitive app and declares them in the manifest file of the container app. To enable the container app to launch the sensitive APK, app components (activities, services, broadcast receivers, and content providers) declared by the sensitive app need to be declared in the manifest file of the container app. The HMA App Store could specify a rule to follow for app developers to have the same settings for all applications.

Analysis on HMA:

HMA effectively protects the core attributes of sensitive apps. No app on the smartphone can get the package name,resources, shared libraries, developers’ signatures and developers’ signing certificates of the app installed via HMA. This system cannot support the case of sensitive apps using content providers to share data with other apps. This is because in order to do so, the container apps need to declare the URIs of their content providers in their manifest files, and these URIs can uniquely identify apps. The sensitive apps must relay their traffic through the HMA App Store servers to prevent an app with VPN capability from fingerprinting sensitive apps based on the IP addresses in the IP package header.

Name: Anant Bhandari UID: 2019430004

Name: Shreyam Shah UID: 2019430011

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Proceeding - 28th USENIX Security Symposium, August 14 to 16 2019, Santa Clara ,CA,USA.