Android Security Terrorization

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Abstract: Nowadays Smartphone’s are booming in the market, almost every second person on the earth carries this small computer everyday with them. Smartphone OS like android and iOS are showing us the glimpse of the future. Android has already gained significant advantage in terms of market share because of its features, one of them being the open source OS makes it free and allows persons to customize it, but with such great advantages comes a biggest threat which is security issues. This paper will present the security issues of Android Smartphone’s.

Keywords: Android, Android Security, Threats, Security Terrorization. Smartphone

1. Introduction

Android is a open source OS for Smartphone’s which was initially released as Android beta in November 2007. Developed by the Open Handset Alliance (visibly led by Google), based on Linux platform. The first commercial version Android 1.0 was launched in September 2008. Android is the operating system that runs almost one million phones and tablets. Since these devices make our lives sweet each android version is named after a desert.

• Alpha (1.0)
• Beta (1.1)
• Cupcake (1.5)
• Donut (1.6)
• Eclair (2.0–2.1)
• Froyo (2.2–2.2.3)
• Gingerbread (2.3–2.3.7)
• Honeycomb (3.0–3.2.6)
• Ice Cream Sandwich (4.0–4.0.4)
• Jelly Bean (4.1–4.3.1)
• KitKat (4.4–4.4.4, 4.4W–4.4W.2)
• Lollipop (5.0–5.1.1)

Android is a victim of its own success, not just in the way it has attracted malicious attention, but in its very nature. The main advantage of using android is its openness, which in terms puts it at risk of security. This demands the study of the Security terorrization for Android and let the user be aware of how to be careful against such terorrization. The open nature of Android and its large user base have made it an attractive and profitable platform to attack. Common exploits and tool kits on the OS can be utilized across a wide number of devices, meaning that attackers can perform exploits en masse and re-use attack vectors. The paper explains architecture of Android, overview of Android, current state of Android and security terorrization of Android.

2. Architecture of Android

2.1. Linux Kernel

Kernel of Android is Linux 2.6 core which, Similar to a desktop computer running Linux, the Android kernel will take care of power and memory management, device drivers, process management, networking, and security. The Android kernel is available at http://android.git.kernel.oro

2.2. Libraries and Android Run-time

This layer is mainly associated with the process running. The core library provides most of the features of Java programming language. Additionally, each program of Android has a separate Dalvik’s Java virtual machine environment.
2.3. Application Framework

This layer is developed specifically for allowing developers full access to the core application framework used by the API. It consists of a range of services and system structure which include Active Manager, Windows Manager, View system, Contents Provider, Package Manager, Resource Manage, and so on.

2.4. Applications

The application component of the Android operating system is the closest to the end user. This is where the Contacts, Phone, Messaging, and Angry Birds apps live. As a developer, your finished product will execute in this space by using the API libraries and the Dalvik VM. This includes a core application package, such as Email Client, Web Browser etc.

3. Overview of Android

Android is the operating system that powers more than one million smartphones and tablets. It was designed in November 2007 as Android beta. The first marketable version was released in September 2008. Android is under ongoing development by Google and the Open Handset Alliance (OHA), and has seen a number of updates to its base operating system since its initial release. Since Android is making our lives much sweeter all its released are named after a desert. Given are the versions of Android OS and main features of the release.

- **Cupcake (1.5)**
  - Bluetooth A2DP
  - AVRCP support
  - Soft-keyboard with text-prediction
  - Record/watch videos

- **Donut (1.6)**
  - Gesture framework
  - Turn-by-turn navigation

- **Eclair (2.0–2.1)**
  - HTML
  - Digital zoom
  - Microsoft Exchange support
  - Bluetooth 2.1
  - Live Wallpapers
  - Updated UI

- **Froyo (2.2–2.2.3)**
  - Speed improvements
  - JIT implementation
  - USB Tethering
  - Applications installation to the expandable memory
  - Upload file support in the browser
  - Animated GIF

- **Gingerbread (2.3–2.3.7)**
  - Updated UI
  - Improved keyboard ease of use
  - Improved copy/paste
  - Improved power management
  - Social networking features
  - Near Field Communication support
  - Native VoIP/SIP support
  - Video call support
  - **Honeycomb (3.0–3.2.6)**
    - Multi core support
    - Better tablet support
    - Updated 3D UI
    - Customizable home screen
    - Recent applications viewing
    - Redone keyboard layout
    - Media/Picture transport protocol
    - Google Talk video chat
    - Google eBooks

- **Ice Cream Sandwich (4.0–4.0.4)**
  - Facial recognition (Face Unlock)
  - UI use Hardware acceleration
  - Better voice recognition (dictating/Voice typing)
  - Web browser, allows up to 16 tabs
  - Updated launcher (customizable)
  - Android Beam app to exchange data through NFC

- **Jelly Bean (4.1–4.3)**
  - Google Now
  - Voice Search
  - Speed enhancements
  - Camera app improvements

- **KitKat (4.4)**
  - Screen recording
  - New Translucent system UI
  - Enhanced notification access

- **Lollipop (5.0)**
  - More tangible interaction
  - Security
  - Power saving
  - Customization

4. Current State of Android

As the figure 2 suggests the market share of Android OS is increasing every year. Comparing year 2011 with 2015 almost 10% market share increased in Android. Its expected to grow even more. The reason behind it is the openness of android. Android is leading the market with 58.1% market share. Android is the most popular OS amongst any other smartphone OS.

5. Security Threats
Given are the list of threats that may arise in any smartphone with Android OS.

5.1. User as admin

Install apps, grant app permissions, download data, and access unprotected networks - The user can reign free over their Android domain without restriction.

5.2. The Android Market

Google’s verification processes for applications entering their market have been shown to be woefully lacking over the last year or two, leading to a number of malware-infected apps and games being made legitimately available to users.

5.3. Gateway to PC

Any Android device can be connected to a PC via a USB cable, laying out the contents of its SD card for read/write/delete. The SD card itself as removable storage can be easily accessed directly as well. Indeed these methods could be utilised themselves for bringing malware into a corporate network, for downloading malicious content on to a PC or sucking up data as soon as it is connected.

5.4. Application Permissions

In the form of a pop up, the user may see these notifications as a nuisance, a delay in accessing the newly downloaded Angry Birds levels. Or they may simply not understand the nature of the requests. Common permissions that may (read: should!) raise an eyebrow would include ‘Read/Send SMS’, ‘Access Fine Location’, ‘Access IMEI, phone identity’, ‘Brick’ (required to disable the device in trace and wipe apps), ‘Access camera’, and so on. Such requests may be integral to functionality, but could equally be recording calls and transmitting sign-in credentials.

5.5. Malicious Application Injections

Data/process transfers between virtualised application environments are handled by a protocol of implicit and explicit intents. Transmission or interception of an intent by a malicious application can result in data being compromised as the target app will respond to the string, potentially resulting in data loss.

5.6. Third Party Applications

One of the great things about Android is choice in terms of standard functionality, such as address books, messaging, keyboards, etc. I’m sure no one in the information security industry would need an explanation as to why it might not be a good idea to use an untrusted third party keyboard or password manager. In a rapidly growing OS environment it can be difficult to identify reputable vendors, and considering the nature of the Android community, can you trust a bedroom programmer with your credentials? Even reputable services can get mobile applications wrong, both Facebook8 and Twitter9 transmit mobile app data in the clear, i.e. without encryption, on nearly all devices. This happens despite the development of such security measures for web app versions.

5.7. Rooting

Rooting an Android device is akin to jail-breaking an iPhone, it opens up additional functionality and services to users. The process of gaining root access, requires the device to be switched from S-On to S-Off (where S = security). Additionally, root is a common exploit used by malicious applications to gain system-level access to your Android. DroidKungFu is one such threat that can root a system and install applications at that level, it escapes detection by utilising encryption and decryption to deliver a payload.

5.8. Wi-Fi

The vulnerability of Android devices running 2.3.3 to compromise on unprotected Wi-Fi networks apparently came as a surprise to many11 – it shouldn’t have, when is this practice ever safe?! Beyond highlighting the need for better consumer security awareness, it leads to some other considerations around secure Wi-Fi access. Ideally sign in credentials should always be completed over a secured network, but sometimes this isn’t enough. FaceNiff is an easily downloadable application that allows the user to intercept the social networking logins of any Android on their network12. The only way this exploit won’t work is if the user is utilising SSL. Furthermore, devices running 2.3 (or rooted older devices) can act as a Wi-Fi hotspot – as an Information Security Manager, how happy would you be about unverified users and devices connecting to a smartphone with a corporate footprint?

5.9. Remote installation

All versions of Android were at one point vulnerable to the remote writing of malicious JavaScript to the SD card through accessing an infected web page13 – an html download does not prompt for user confirmation on the OS, it simply happens. This is now restricted to versions 2.2 and below as the issue was addressed by Google in the Gingerbread (2.3) update. For devices still operating versions below as the issue was addressed by Google in the

6. Conclusion

The booming trend of smartphones and its wide adoption to market has increased the chances of security threats. The paper explored the current state of Android and its architecture along with the common security threats of Android OS.

References


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