Mirax: a new Android RAT turning infected devices into potential residential proxy nodes

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Key Points

- **New Maas spreading:** Mirax has emerged as a sophisticated Malware-as-a-Service (MaaS) offering, specifically targeting Android devices across Europe. It is actively marketed and distributed through underground malware forums. At the time of writing, Cleafy Threat Intelligence Team has seen **multiple campaigns targeting Spanish-speaking countries** and reaching over 200.000 accounts through Meta advertisements.
- **Remote Access functionalities & Dynamic HTML Overlays:** Mirax integrates advanced Remote Access Trojan (RAT) capabilities, allowing threat actors to fully interact with compromised devices in real time. This includes executing commands, navigating the user interface, and monitoring activity. A key feature is its use of dynamically fetched HTML overlays from its command-and-control (C2) infrastructure, which are rendered over legitimate applications.
- **Expanding RAT with Residential Proxy:** Beyond traditional RAT behavior, Mirax enhances its operational value by turning infected devices into residential proxy nodes. Leveraging SOCKS5 protocol support and Yamux multiplexing, it establishes persistent proxy channels that allow attackers to route their traffic through the victim's real IP address. This capability enables operators to bypass geolocation-based restrictions, evade fraud detection systems, and conduct malicious activities (such as account takeovers or transaction fraud) with increased anonymity and legitimacy.
- **Keylogging & Keyguard exfiltration:** Mirax incorporates comprehensive surveillance features, including continuous keylogging to capture all user input across applications. In addition, it gathers detailed information about the device's keyguard (lock screen), including PIN length, pattern structure, and biometric usage.

Executive Summary

Mirax is a newly identified Android Remote Access Trojan (RAT) and banking malware that has rapidly gained traction within the cybercriminal ecosystem. Publicly promoted on underground forums since December 19, 2025, it has been actively monitored by the Cleafy Threat Intelligence team since March 2026, when **multiple campaigns targeting primarily Spanish-speaking regions were observed**. Unlike typical MaaS offerings, **Mirax is distributed through a highly controlled and exclusive model**, limited to a small number of affiliates. Access appears to be prioritized for Russian-speaking actors with established reputations in underground communities, indicating a deliberate effort to maintain operational security and campaign effectiveness.

From a capability standpoint, Mirax represents a significant evolution beyond traditional Android banking trojans. While retaining core RAT functionalities, it introduces a more structured, commercially driven "business model"

featuring tiered subscription plans and ongoing feature development. **One of its most notable innovations is the integration of SOCKS-based residential proxy functionality** directly into the malware. This allows infected devices to be repurposed as proxy nodes, enabling threat actors to route malicious traffic through legitimate residential IP addresses and thereby evade geolocation restrictions and fraud detection mechanisms.

This convergence of RAT and proxy capabilities reflects a broader shift in the threat landscape. While residential proxy abuse has historically been associated with compromised IoT devices and low-cost Android hardware such as smart TVs, **Mirax marks a new phase by embedding this functionality within a full-featured banking trojan**. This approach not only increases the monetization potential of each infection but also expands the operational scope of attackers, who can now leverage compromised devices for both direct financial fraud and as infrastructure for wider cybercriminal activities.

How Mirax is Distributed

Mirax distribution consists of multiple stages that reveal an interesting trend followed by other affiliates and threat actors. The dropper pages are promoted through Meta Advertisement. The victims are lured to click ads appearing on their social media applications (Facebook, Instagram, Messenger, Threads, …) and to download the malicious dropper. All the URLs implement multiple checks to verify that they are accessed from mobile devices, to prevent automated scans from revealing their nature. The droppers are hosted using GitHub releases, with different backup links and daily package updates. Upon successful installation, the dropper unpacks itself and installs the malicious payload. It leverages commercial-grade obfuscation via Golden Encryption (aka GoldCrypt) and starts operating via WebSockets.

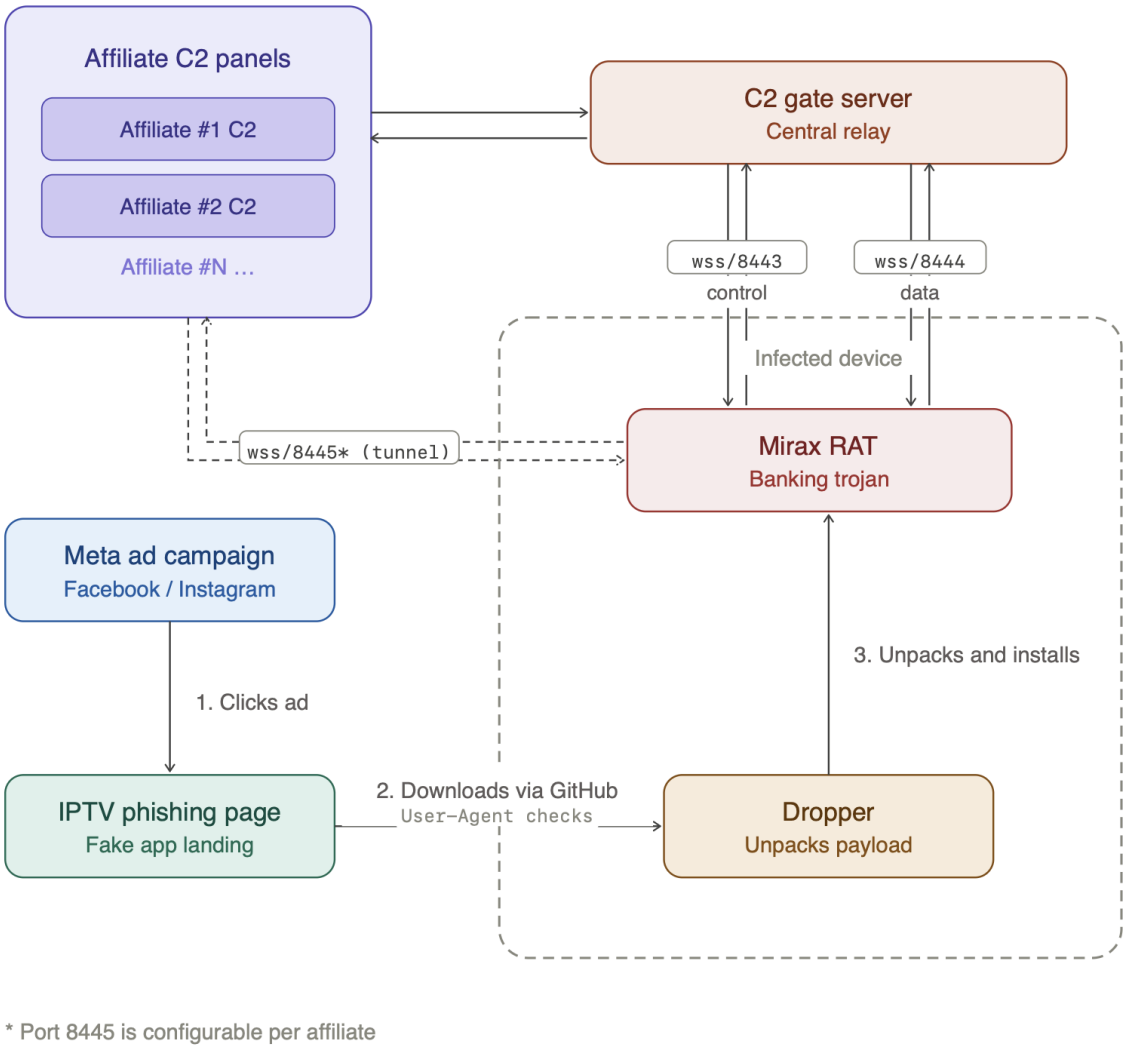


Figure 1 - Mirax attack chain overview

The delivery websites are promoted through Meta Ads (Facebook and Instagram). This distribution vector has become a common choice for Android banking trojans, enabling threat actors to reach a large audience quickly and with less effort. Furthermore, the choice of decoy, an illegal sports streaming application, reveals a clear understanding of the target demographic: since these apps are not available on the Google Play Store, users are already conditioned to sideload APKs from unknown sources, which makes social engineering much easier.

The dropper is distributed via phishing websites claiming to offer IPTV application services. Downloads are restricted to mobile devices, enforced by checking specific HTTP headers and parameters.

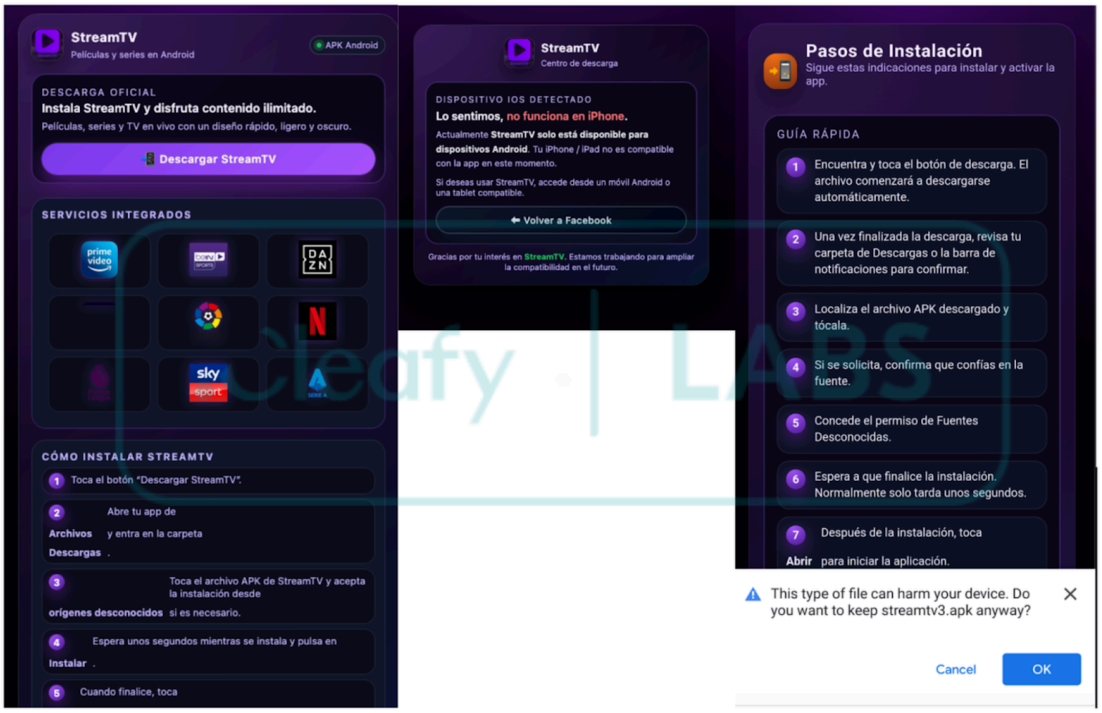


Figure 2 - Device checks on installation

The analysis showed that the **ADs had collectively reached more than 200,000 accounts**, as reported in the next Figure:

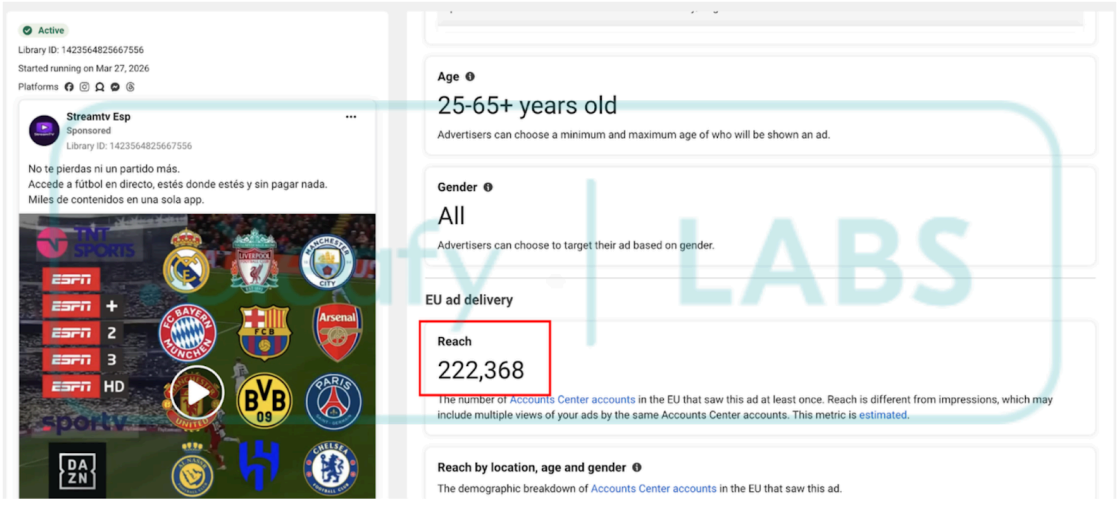


Figure 3 - Meta Advertisement reach

One interesting aspect of this delivery campaign is the **abuse of GitHub for hosting the dropper applications**. The affiliates leverage the Releases page to distribute and update their applications. Notably, new updates are pushed to pre-existing releases rather than creating new ones, likely as an evasion technique to hinder automated crawlers from easily retrieving fresh samples. The analysis revealed that while the samples' hashes changed daily, the application content remained unchanged, suggesting automated repacking or signature rotation to evade hash-based detection. Over the observed period, the Releases page contained multiple applications, starting with five and growing to over ten as the campaign matured.

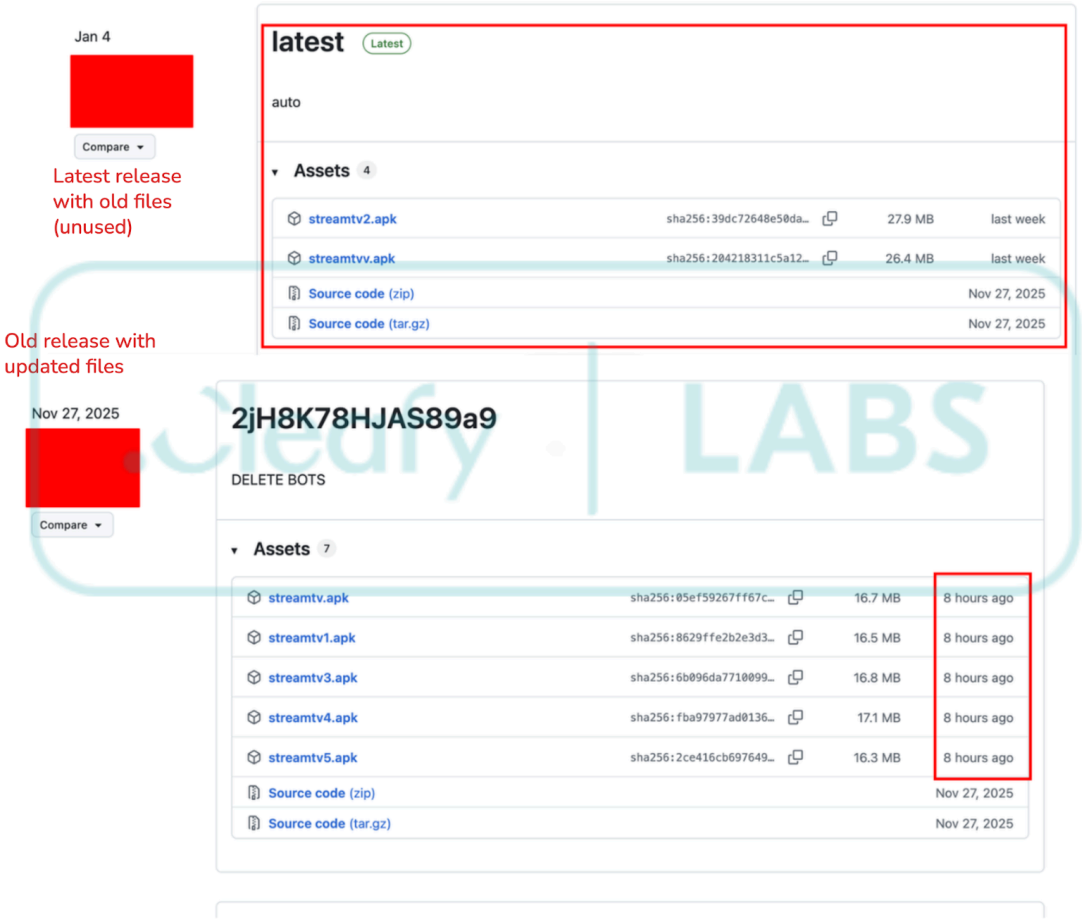


Figure 4 - GitHub releases pages

Additional campaigns were observed leveraging different decoy themes, including IoT utilities and NSFW applications. However, the sports streaming campaign analyzed in this report provided the most comprehensive set of indicators and operational insights.

Technical Analysis

Builder Configuration

Mirax's installation procedure is quite common in modern Android malware: it follows a two-stage process and uses a dropper to hide the actual malware and its aggressive permissions requests. Thanks to the documentation released by the malware developers, it was possible to confirm the infection chain. In the malware documentation, they provided multiple screenshots that describe the builder's features, specify the different options for the dropper, and show the final implant. Please note that some of the following screenshots are taken directly from the malware documentation page.

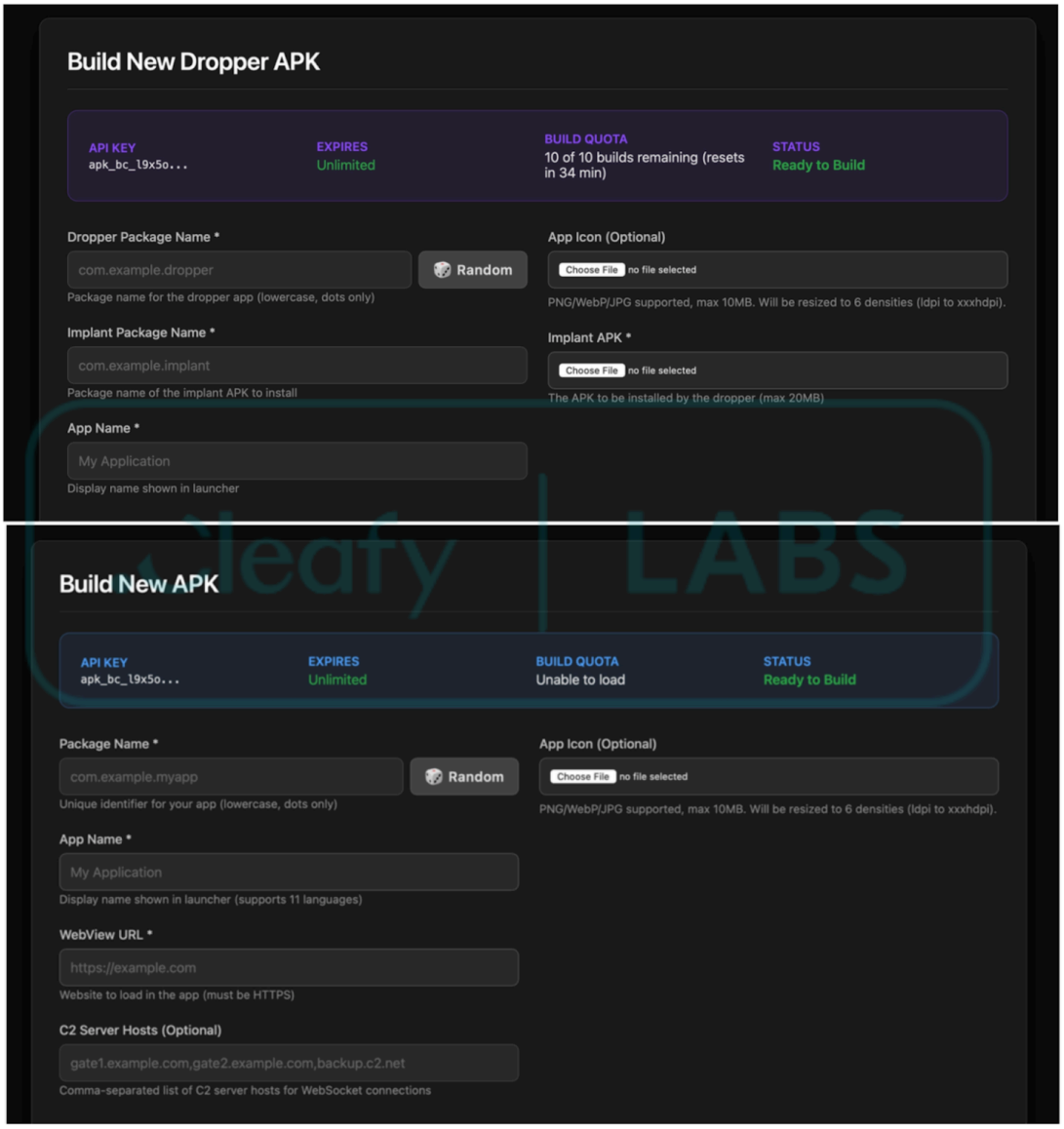


Figure 5 - Builder features

One interesting section of the documentation explains the different packer options that the builder offers: **Virbox** and **Golden Encryption**. While the former is easy to detect thanks to multiple indicators in the code, Golden Encryption (also known as Golden Crypt) is not well documented but is widely used and promoted on underground malware forums. This packer was also used in Albiriox, and the Cleafy team noted that the samples analyzed in this campaign follow the same unpacking patterns. Although this information could not be confirmed with full certainty, it can be reasonably assumed that the packer detailed below is Golden Crypt. The analysis will contain a description of this packer and its indicators.

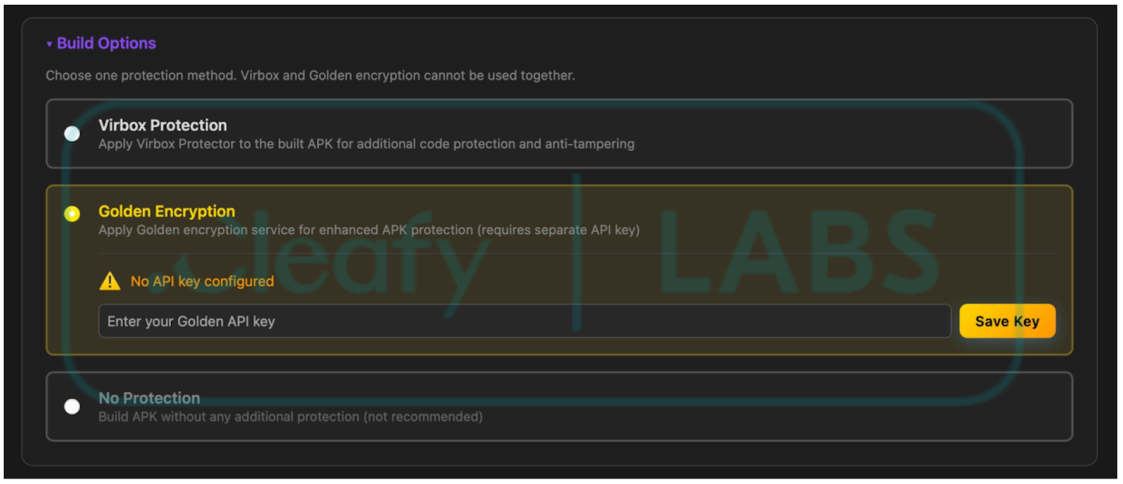


Figure 6 - Mirax packers

Moreover, the image below shows a section of the builder, confirming that the malware loads a WebView with a custom HTML page when Accessibility Services have been granted, as observed during analysis.

Figure 7 - Launch section of the builder

Code Analysis

Mirax implements a multi-step unpacking flow that attempts to hide malicious code via .dex dynamic loading and obfuscation. The packer used in the samples analyzed can be attributed to GoldCrypt, based on information provided by the malware developers and on similarities with other families that use the same techniques.

The dropper disguises itself as an IPTV application. The application requires the user to enable installation from Unknown Sources to install the final implant. This page is loaded in a WebView, as reported in the following Figure.

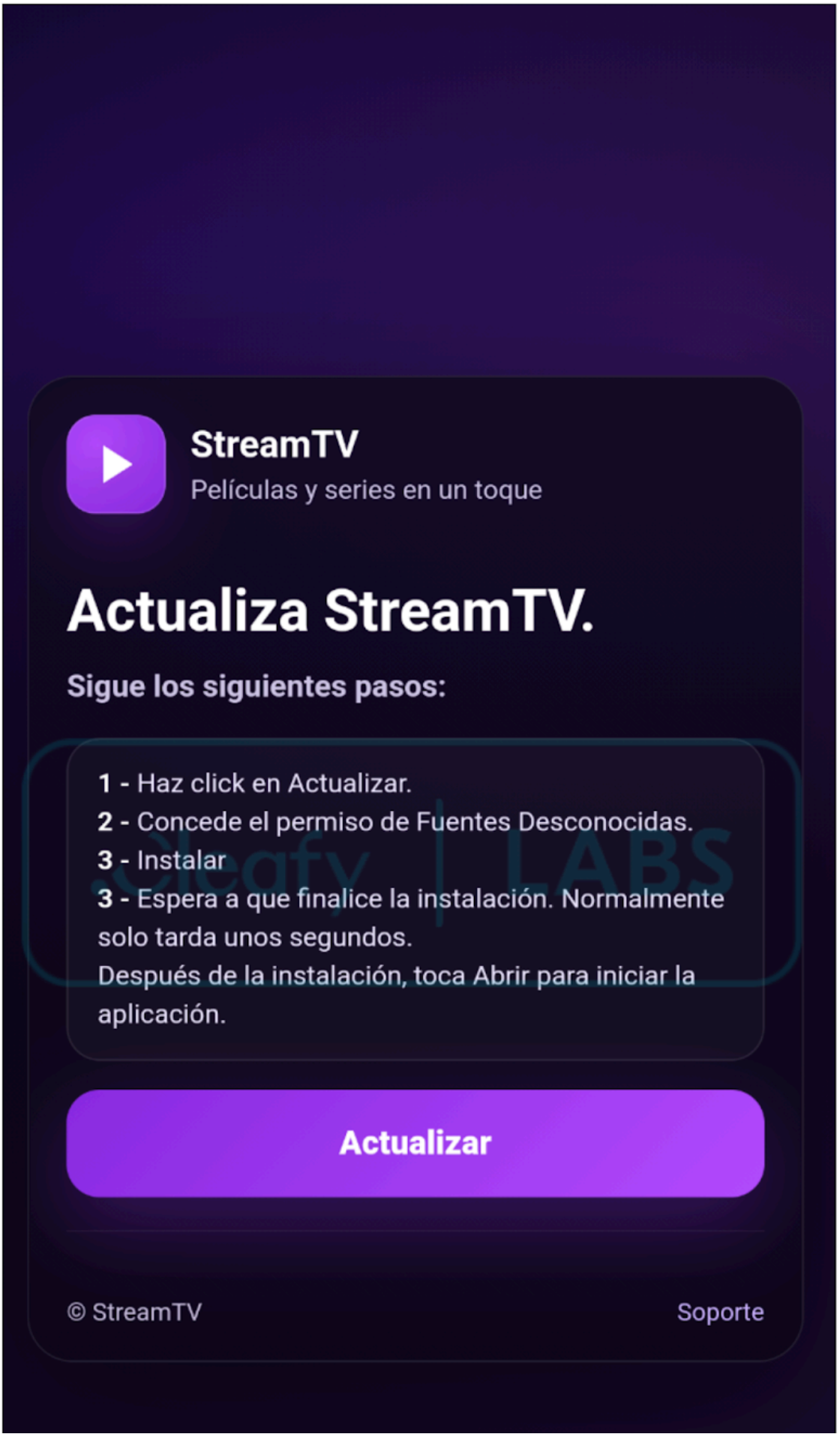

StreamTV
Películas y series en un toque
Actualiza StreamTV.
Sigue los siguientes pasos:
1 - Haz click en Actualizar.
2 - Concede el permiso de Fuentes Desconocidas.
3 - Instalar
3 - Espera a que finalice la instalación. Normalmente solo tarda unos segundos.
Después de la instalación, toca Abrir para iniciar la aplicación.
Actualizar
© StreamTV
Soporte

Figure 8 - Front door page of the dropper

The extraction of the final malware payload is a sophisticated, multi-stage operation engineered specifically to bypass conventional security analysis and automated sandboxing tools.

The dropper Android Package (APK) does not contain the malicious code in the code section. Instead, it holds an encrypted Dalvik Executable (.dex) file. The payload is hidden inside a file with a valid asset extension, loaded, and decrypted using RC4 and a hardcoded key.

```
public class Haspectneed extends Application {
    public static int b = 701590;

    /* renamed from: c, reason: collision with root package name */
    public static int f65c = 398939;
    public static int d = 876319;
    public static int e = 973501;
    public static int f = 935086;
    public static int g = 470429;
    public static int h = 520049;
    public static int i = 799891;
    public static int j = 464481;
    public static int k = 744862;
    public int[] z;
    public boolean l = true;
    public boolean m = true;
    public boolean n = true;
    public int o = 531189;
    public int p = 945301;
    public Context q = null;
    public String r = "mushroom";
    public String s = "kmmWMMo.html";
    public int t = 215106;
    public int u = 613024;
    public int v = 791642;
    public int w = 811825;
    public int x = 0;
    public int y = 0;
    public int A = 871927;
    public int B = 152041;
    public int C = 293371;
    public int D = 609609;
    public int E = 971158;
    public int F = 681983;
    public int G = 168122;
    public String H = "bl¦izyybl—bl«heen/yqybl¦bl—rxwpexedzqbl«/koumesbl¦bl—bl«flld/bl¦kqtdwtrfbcbl—bl«dwbljwmic
    public String I = "ZoKlOw";

    public static void b(String str, String str2) throws IOException, SecurityException {
        try {
```

Hardcoded RC4 key

Encrypted .dex file

File path

Figure 9 - Decryption logic

This encapsulated file is strategically buried deep within the APK's directory structure. A key component of the evasion technique is the use of an obfuscated, deeply nested folder path whose names contain uncommon characters. This specific technique aims to confound static analysis tools, making the encrypted payload difficult to locate and extract.

The extraction process is initiated upon the application's execution. The dropper application component is programmed to locate the encrypted .dex file from its hidden location within the obscure folder structure. Once located, the file is extracted from the APK container and prepared for decryption.

The core decryption mechanism uses the **RC4** stream cipher. The cryptographic key is embedded directly within the application's class. The extracted and encrypted .dex file is fed through the RC4 routine using this embedded key, resulting in the plain-text, fully functional final .dex payload.

After successful decryption, the malicious .dex file contains the complete set of instructions to extract and install the final .apk file, contained in the res/raw/ folder. This file is encrypted using XOR with a hardcoded key in BuildConfig; the dropper decrypts the payload and proceeds with the installation. The malware developers claim that the final APK (the implant) may also be delivered from a remote server. This is also confirmed by the application's code: the configuration file contains a variable called IMPLANT_DOWNLOAD_URL that may contain this information. In the campaigns analyzed, this functionality was not active, and the implant was embedded inside the dropper application.

Figure 10 - XOR decryption key

When the malware is installed, it masquerades as a video playback utility and prompts the user to enable Accessibility Settings.

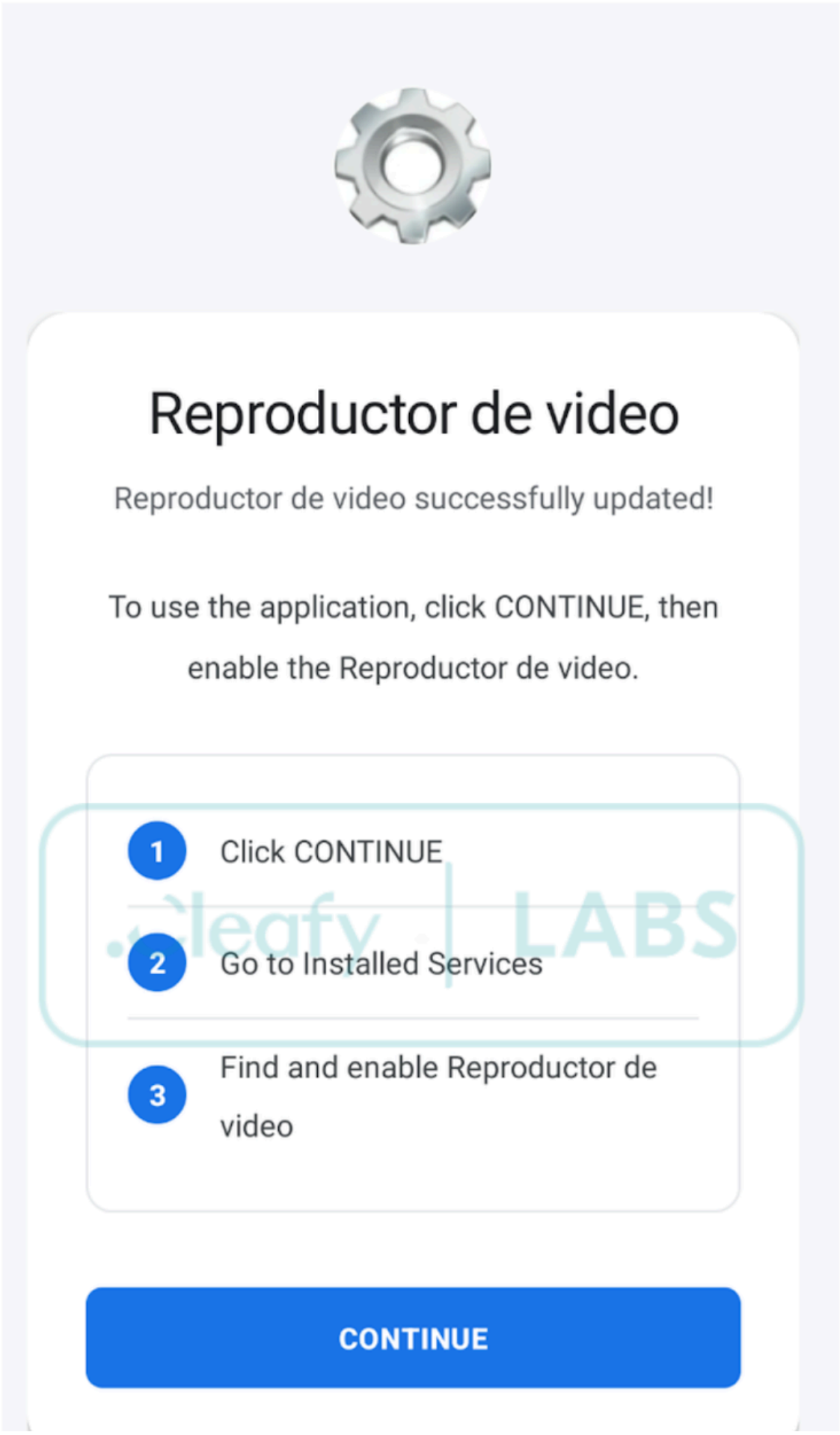

Reproductor de video
Reproductor de video successfully updated!
To use the application, click CONTINUE, then enable the Reproductor de video.
1
Click CONTINUE
2
Go to Installed Services
3
Find and enable Reproductor de video
CONTINUE

Figure 11 - Malware entry point

The malware extraction uses the same packing technique as the dropper (.dex extraction and decryption). When Accessibility services are enabled, the malware starts running in the background and displays a custom HTML page to the user, indicating that installation was not successful. Moreover, it leverages black overlays to disable security features and establish persistence.

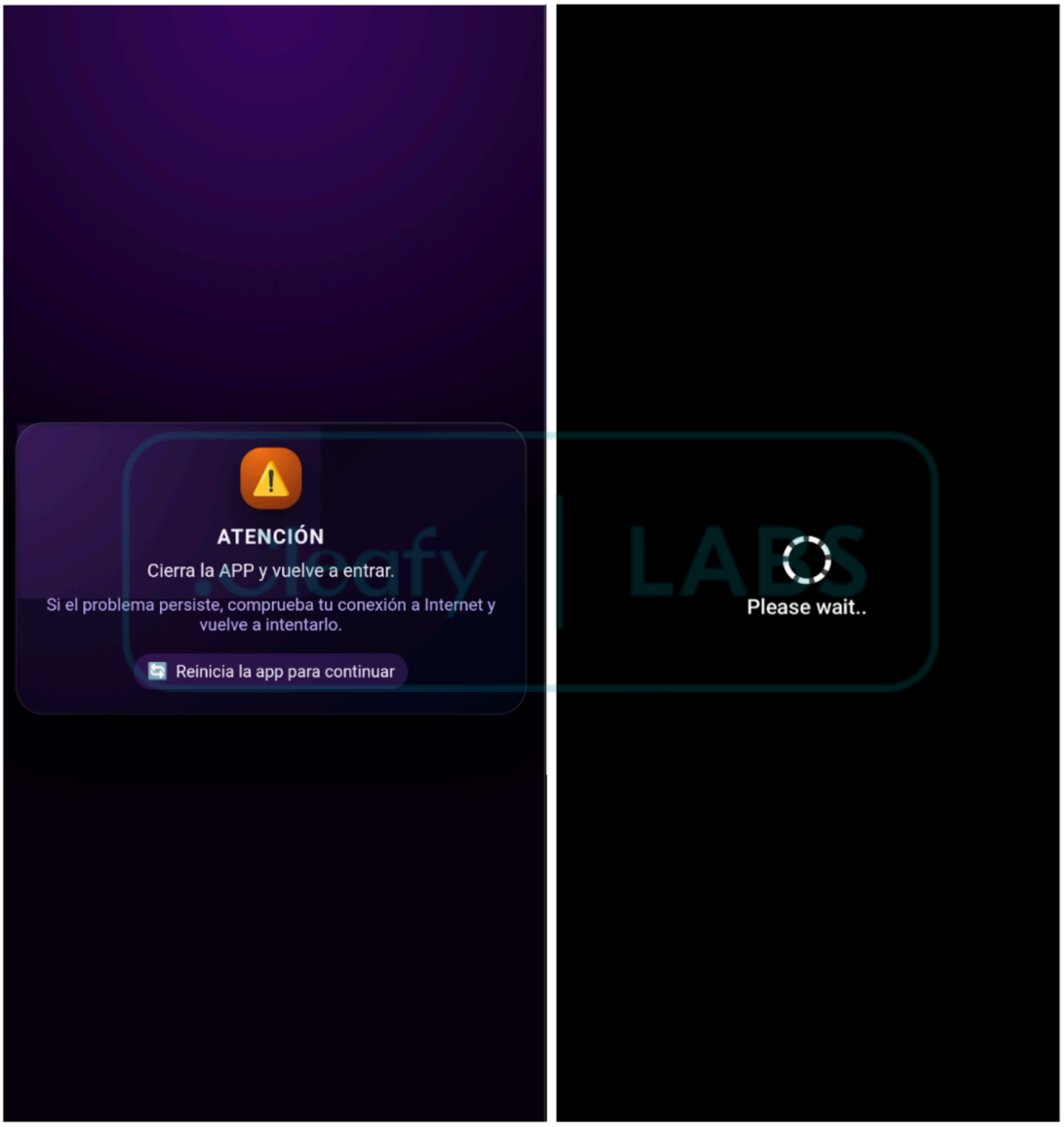
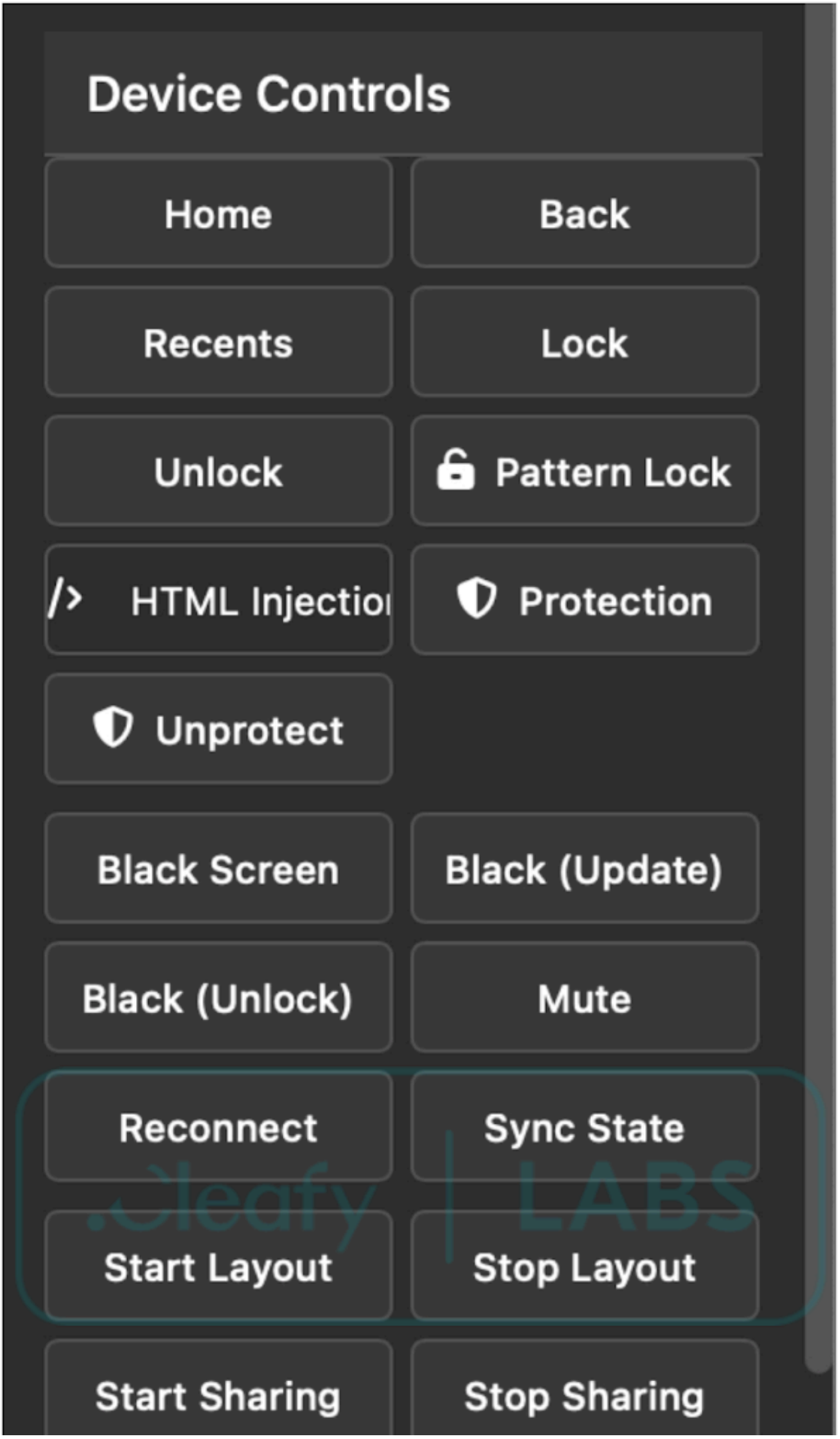


Figure 12 - HTML pages and overlay

Mirax RAT Functionalities

By analyzing the malware's source code and available documentation, it is possible to identify a list of commands used to remotely control the device, exfiltrate data, and spy on victims. An overview of the main features is listed below.


Device Controls
Home
Back
Recents
Lock
Unlock
Pattern Lock
HTML Injectio
Protection
Unprotect
Black Screen
Black (Update)
Black (Unlock)
Mute
Reconnect
Sync State
Start Layout
Stop Layout
Start Sharing
Stop Sharing

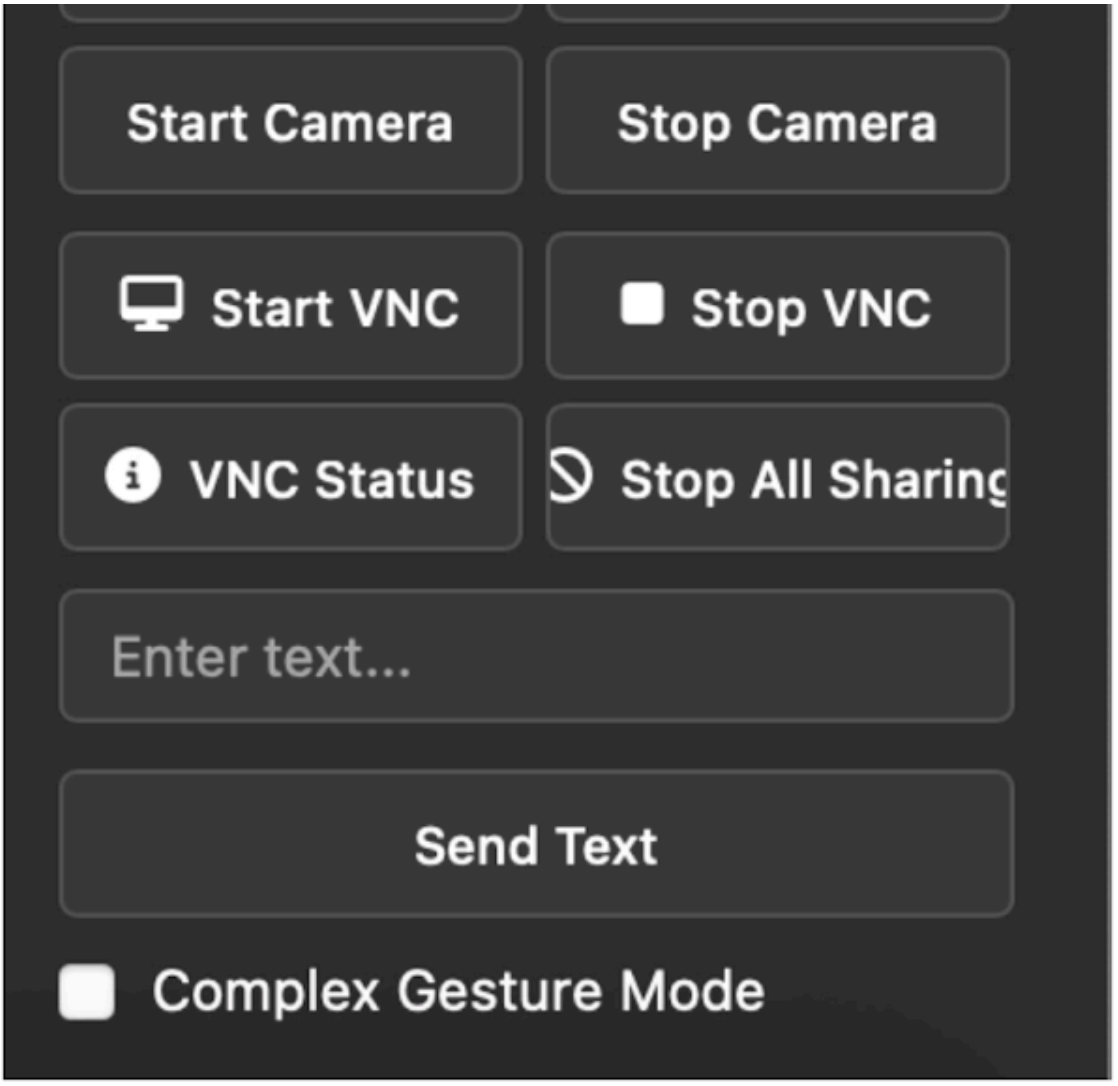


Figure 13 - Remote console commands

1. **HTML Overlay Injection / Black Screen Overlay / Notification**: One of the malware's core features is the ability to inject malicious HTML/JS overlays over legitimate applications to steal credentials and other sensitive data from users. The malware also allows showing notifications coming from specific app packages.
2. **Screen Capture & VNC**: These commands allow the attacker to view the screen in real-time and control the device remotely.
3. **System Navigation & UI Control**: These commands leverage Accessibility Services to perform navigation actions on the device.
4. **App Management**: The malware manages the device's applications, uninstalling those that may detect it or prevent its uninstallation.
5. **Spyware & Data Exfiltration**: The malware's capabilities include spyware modules that attempt to exfiltrate text data and camera images from the victim's device.
6. **SOCKS5 Proxy**: The malware also allows the operator to start a SOCKS5 proxy connection from the infected device and transform it into a residential proxy node.

C2 Communication

The malware uses two (or three, if a residential proxy is enabled) distinct WebSocket connections to manage remote activities and data exfiltration. More specifically:

- WebSocket on port **8443**, endpoint /control, is used to manage remote access and execute remote commands.
- WebSocket on port **8444** endpoint /data, is used to manage remote streaming and data exfiltration.
- WebSocket on port **8445** (or custom) endpoint /tunnel (or custom), is used to set up the residential proxy using SOCKS5. This connection is made directly to a specific relay server owned by the operators.

The malware's documentation explicitly states that it uses a C2 Gate server, acting as a proxy between infected devices and the affiliates' true C2 servers. As a result, all the analyzed samples from the campaign contact the same domain, and the gate server can then redirect traffic accordingly.

C2 communication via websockets is bidirectional: the target phone periodically sends information about the device's status and the installed malware. The server, on the other hand, can push various commands to activate functionalities, retrieve specific information, or load different configurations. For example, the server can push new HTML templates based on the installed applications and start collecting passwords and app PINs. This behavior makes it difficult to retrieve the complete list of all the target applications. Nevertheless, based on the server response, the total number of targeted applications is 182 (and growing over time). It was possible to retrieve HTML overlays for multiple Spanish banking applications and Crypto applications. The list is included in the Appendix.

{

"type":"installed_apps_response",

"commandId":"getInstalledApps_1773840323864_y2smk1x64",

"timestamp":1773840331121,

"success":true,

"total_apps_count":182,

"launcher_apps_detected":21,

"returned_apps_count":21,

"user_apps_count":5,

"system_apps_count":16,

"filtered_apps_count":0,

"apps":[{"app_name":

...

],

...

}

The malware supports multiple languages, but the developers explicitly state that this Trojan is incompatible with CIS countries due to app restrictions that prevent it from functioning correctly. The campaign analyzed in this article targets Spanish-speaking individuals. By analyzing the reach of the Meta ads, the sole target country appears to be Spain, but this RAT is rapidly expanding, and future campaigns may target other countries. The list of available languages is shown in the Appendix.

Residential Proxy Capabilities within a RAT

During the analysis of the malware, the developers' communication channel (Telegram channel) guided the investigation and provided useful information regarding the updates and improvements made to Mirax. An update to the software introduced new capabilities, accompanied by a revised pricing structure. Notably, one of the most peculiar new features allows the creation of a SOCKS5 proxy that routes traffic from the compromised device to a designated server. Moreover, they used a custom implementation of Yamux multiplexing over the WebSocket-based channel, allowing multiple connections through a single channel. As a result, the malware operator would have been able to establish a residential proxy connection between the phone and their server, and use it to spoof their IP addresses, masking their malicious activities and expanding the attack surface to targets beyond the mobile device.

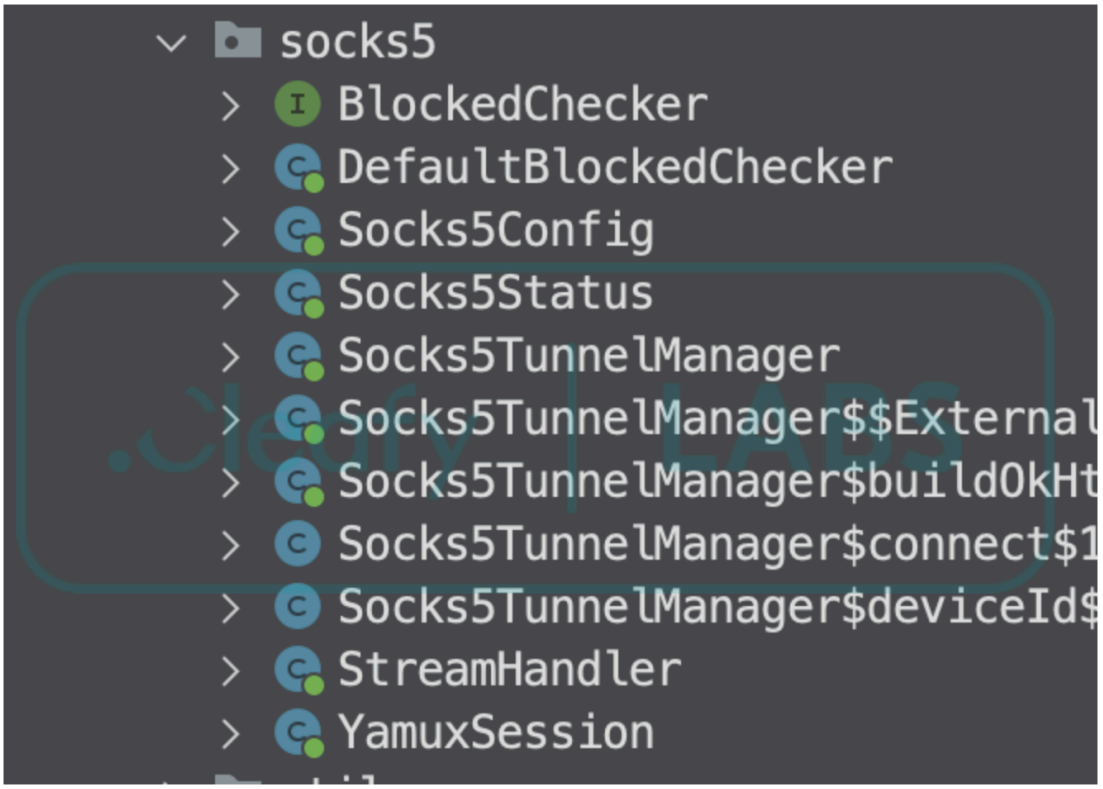


Figure 14 - Residential proxy classes

The phenomenon of residential proxies has gotten more attention recently (Google, Trendmicro, Nokia), thanks to the number of IoT devices connected to the internet that could consume network bandwidth and be transformed into botnets. The Android ecosystem is particularly susceptible to this type of exploitation due to the large number of low-cost IoT devices, such as inexpensive Android TVs, that are often sold with lax security protocols. These devices are ideal targets for use as residential proxy nodes. Residential proxies can also be embedded via third-party SDKs embedded in pirated software of free VPN applications. An attacker can pay to gain access to these nodes and use the bandwidth to access the internet from a reputable IP address or, in some cases, exploit the ability to access the local network to discover vulnerable devices connected to it, perform lateral movement, and expand their attack surface.

Beyond the rise of residential proxy in the context of IoT devices, the introduction of this functionality into a malware RAT like Mirax is a novelty that warrants attention. While the analysis did not reveal any use of this functionality, it is still valuable to consider the motivations behind adding it to a RAT and the implications for highly targeted sectors like banks and similar institutions. An attacker who obtains access to the mobile device via a RAT infection could leverage its persistence beyond its well-known functionalities and use it as an exit node to access the internet via a reputable IP address, which could lead to multiple attacks, such as password spraying and DDoS. Another interesting case is when the victim refuses to use Accessibility services but keeps the app installed. In this case, the app still needs to function in the background, but obtaining this permission is easier. In this scenario, the attack would not be completely successful, but the operators may still gain some value from it.

Conclusions

The analysis of the Mirax Remote Access Trojan (RAT) highlights several interesting points concerning the evolution of modern Android malware. The promotion on underground forums shifted from a broad Maas to a "**private MaaS**" model, restricting the distribution to trusted parties. As a result, the malware could **remain undercover for a longer period** without risking any unwanted leaks.

The campaign analyzed in this article revealed that threat actors are effectively **abusing legitimate platforms to promote, host, and distribute malware**, reaching hundreds of thousands of accounts in a short period of time. Moreover, these platforms allow malware distributors to **continuously push new advertisements without risk of being caught**, thanks to multiple header checks that prevent automated services from reaching the true delivery pages **and to cycling through multiple samples to bypass hash-based checks**.

The **introduction of SOCKS5** and residential proxy functionality into an Android RAT is groundbreaking for several reasons. Firstly, malware developers recognize the profitability of residential proxies, as they can obscure the origin IP address, making it appear to originate from legitimate subnets. Furthermore, a residential proxy application needs fewer permissions than a Remote Access Trojan (RAT). This reduced requirement allows the threat actor to deploy it even if the full infection process is incomplete. Consequently, the actor avoids losing these devices entirely and can maintain their inclusion in the botnet.

Appendix - IOCs

APKs

SHA 256	Name	Package	Description
53de68ebec281e7233bffc52199b22ec2dba463eec3b29d4c399838e18daecbf	StreamTV	org.lgvvfj.pluscqpuj	Dropper
88e6e4a5478a3ee7bfdfc5e7614ae6f3f121e0d470741a9cc84a111fe9b266db	Reproductor de video	org.yjeiwd.plusdc71	Malware
759eed82699b86b6a792a63ccc76c2fa5ed71720b89132abdead9753f5d7bd11	StreamTV	org.dawme.secure5ny	Dropper
29577570d18409d93fa2517198354716740b19699eb5392bfaa265f2f6b91896	Reproductor de video	org.azgaw.managergst1d	Malware

Network

IoC	Type	Description
descarga-smtr[.]net	Domain	Delivery Page
ilovepng[.]info	Domain	C2
wss://ilovepng[.]info:8443/control	URL	C2 real-time commands
wss://ilovepng[.]info:8444/data	URL	C2 exfiltration

C2 Commands

Command	Description
addExternalHtmlTemplate	Adds an external HTML overlay template.
addHtmlInjectionConfig	Binds a target package to an HTML overlay.
back	Simulates pressing the Back button to navigate to the previous screen.
blackScreen	Toggles a "black screen overlay" to hide malicious activity from the user.
blackScreen_unlock	Removes the black screen overlay and restores normal view.
blackScreen_updating	Displays a fake updating message on the black overlay.
blockApp	Blocks the user from opening a specific application.
camera_status	Gets the status of the camera.

Command	Description
checkExternalTemplateExists	Checks if a template exists locally.
collectSmsNow	Triggers an immediate upload of all stored SMS messages.
disableHtmlInjection	Disables the phishing overlay system.
disableNeverSleep	Restores normal screen timeout behavior.
disableUninstallProtection	Disables the anti-uninstallation protection.
enableHtmlInjection	Enables the overlay system for phishing/credential theft.
enableNeverSleep	Forces the device screen to stay on indefinitely.
enableUninstallProtection	Prevents the user from uninstalling the malware.
forceReconnect	Forces the malware to reconnect to its Command & Control server.
getBlockedApps	Gets the list of blocked applications.
getAvailableCameras	Gets the list of available cameras.
getCameraStatus	Reports whether the camera service is currently active.
getClipboard	Retrieves the current content of the system clipboard.
getDeviceState	Collects system metadata (battery, network, OS version).
getExternalTemplatesList	Gets the list of templates stored in the external memory.
getExternalTemplatesPath	Gets the path of the templates stored in the external memory.
getHtmlInjectionStatus	Gets the status of HTML injection engine.
getHtmlTemplates	Lists available phishing templates stored locally.
getInstalledApps	Retrieves a list of all applications installed on the device.
getKeyguardInfo	Reports the current lock screen configuration (PIN, Pattern).
getLockStatus	Gets the type and status of the device lock screen.
getPermissions	Reports the status of various Android permissions.
getSmsPermissions	Gets the status of SMS permissions.
getSmsStatus	Gets the status of the SMS collection engine.
getVncScreenSharingStatus	Gets the status of the VNC screen sharing engine.
home	Simulates pressing the physical Home button to return to the home screen.

Command	Description
layout_updates_restart	Restarts screen update monitoring.
layout_updates_start	Starts sending details of the screen data as JSON to the C2.
layout_updates_stop	Stops sending screen data updates.
listCameras	Lists all camera sensors available on the device.
lockDevice	Immediately locks the device screen.
mute	Toggles the device audio to mute to hide notification sounds.
openApp	Launches a specific application by its package name.
ping	Heartbeat mechanism.
recents	Simulates pressing the Recent Apps button to show the app switcher.
removeExternalHtmlTemplate	Removes an HTML template stored in the external memory.
removeHtmlInjectionConfig	Removes a phishing target configuration.
requestPermission	Triggers a system dialog to request a specific permission.
rescanHtmlTemplates	Rescans storage for new or manually updated phishing templates.
resetHtmlInjectionCounters	Resets the counter of the overlays stored.
resetLockCaptured	Restarts the lock screen capturing engine.
setClipboard	Sets the system clipboard with provided text.
setLockType	Sets the type of fake lock screen to show to the victim.
showNotification	Shows a notification.
socks5_enable	Starts/Stops the residential proxy connection.
socks5_status_request	Gets the status of the residential proxy.
startCamera	Activates the background camera to capture photos or video.
startScreenSharing	Starts capturing and streaming the device screen to the C2 server.
startSmsCollection	Starts the service that intercepts and uploads SMS messages.
startVncScreenSharing	Starts a VNC-based interactive screen sharing session.
stopAllScreenSharing	Stops all screen sharing (standard and VNC).
stopCamera	Deactivates the background camera service.

Command	Description
stopScreenSharing	Stops the active screen sharing session.
stopSmsCollection	Stops the SMS interception service.
stopVncScreenSharing	Stops the VNC screen sharing session.
swipe	Performs a remote "swipe" gesture between two points.
switchClient	
tap	Performs a remote "tap" gesture at specific (x, y) coordinates.
testHtmlInjection	Manually triggers a phishing overlay for a specific app.
unblockApp	Unblocks a previously restricted application.
uninstallPackage	Attempts to uninstall a specific app.
unlockDevice	Attempts to unlock the device screen using stored or captured credentials.
updateExternalHtmlTemplate	Updates an existing HTML overlay stored in the external memory.
wakeDevice	Wakes up the device screen and brings it out of sleep mode.

Target Countries (Languages)

Language
Chinese
Italian
German
Israeli
Hungarian
Japanese
Polish
Portuguese
Spanish
Slovenian

Language
French
