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Android逆向：动态调试

- 最新版本: v1.4.3
- 更新时间: 20231004

简介

介绍Android逆向开发期间，如何动态调试安卓程序。包括用AndroidStudio调试apk的smali代码、用LLDB调试安卓程序、用Frida调试安卓程序、编写Xposed模块去调试安卓程序。对于AndroidStudio调试安卓Smali代码，此处以YouTube为例，介绍主要步骤：确保安卓已root、调试工具选择、反编译出smali代码、确保app可调试、调试方式启动app、Android Studio中导入smali代码、给smali加断点、配置Android Studio项目、确保adb可获取进程列表、Android Studio调试app进程；对于LLDB调试安卓，包括下载安卓版lldb-server到电脑、把lldb-server传输下载到安卓手机中、电脑中运行lldb、用lldb连接安卓手机中的lldb-server、最后是开始用lldb调试安卓app进程。对于Frida调试安卓，包括初始化Frida调试环境、Frida调试安卓app，以及贴出几个实例包括LiftFileManager、DisplayDemo等。以及Frida方面的常见的问题和心得。然后是动态调试方面的一些常见问题和心得。以及其他一些分析调试工具，包括Unidbg、AndBug、redexer、Fino等；以及用于辅助调试的adb，比如用adb查看内存映射；最后加上心得和实例和附录的参考资料。

源码+浏览+下载

本书的各种源码、在线浏览地址、多种格式文件下载如下：

HonKit源码

- [crifan/android_re_dynamic_debug: Android逆向：动态调试](#)

如何使用此HonKit源码去生成发布为电子书

详见：[crifan/honkit_template: demo how to use crifan honkit template and demo](#)

在线浏览

- [Android逆向：动态调试 book.crifan.org](#)
- [Android逆向：动态调试 crifan.github.io](#)

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- [Android逆向：动态调试 Mobi](#)

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鸣谢

感谢我的老婆陈雪的包容理解和悉心照料，才使得我 `crifan` 有更多精力去专注技术专研和整理归纳出这些电子书和技术教程，特此鸣谢。

其他

作者的其他电子书

本人 `crifan` 还写了其他 150+ 本电子书教程，感兴趣可移步至：

[crifan/crifan_ebook_readme: Crifan的电子书的使用说明](#)

关于作者

关于作者更多介绍，详见：

[关于CrifanLi李茂 – 在路上](#)

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Android逆向动态调试概览

关于安卓逆向，之前已通过[安卓应用的安全和破解](#)进行了一定的介绍。

而安卓逆向期间，除了 `静态分析` 去研究 `反编译的代码` 外，想要了解安卓app的底层机制和逻辑，需要通过 `动态调试` 。

而目前安卓的动态调试的一些主要方法有：

- 用 `Android Studio` 去调试 (`apk` 反编译得到的) `smali` 代码
- 用 `LLDB` 调试安卓app
- 用 `Frida` 调试安卓app
- 给安卓app编写 `Xposed` 插件，去调试hook逻辑
 - 详见：[Xposed插件开发 · 安卓逆向调试：Xposed框架](#)

此教程主要就是介绍这方面的详细内容。

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安卓逆向动态调试的总体思路

TODO:

【未解决】Android的YouTube逆向：研究request请求api和protobuf相关部分代码

此处介绍安卓逆向的总体思路：

- 找到要hook的点 = 找到核心代码的入口点
 - 对于Android来说，往往是 `java` 中相关的 基础的类， 内置的类
 - 比如
 - 网络请求 类
 - `url` 相关的类
 - 比如
 - `new URL`
 - 字符串 相关的类
 - 可能会用到URL拼接，其内部涉及到 字符串 的拼接
 - 比如
 - `append`
 - `getBytes`
 - `String builder`
 - 再去动态调试逻辑，hook代码逻辑
 - 相关工具：`Xposed`、`frida`、`LLDB`、`AS` 等
 - 期间配合抓包
 - 先要 抓包 找相关 `url`
 - 后续才知道要过滤哪些url

找到要hook的点

其中关于找到要hook的点，值得就是：

- `java`层：找到对应的，实现你要的功能的类
 - 其中切入点，可以从Java基础的类去入手
 - 详见下面的解释
- Native层=C/C++代码= `so` 库文件：找到C/C++的函数

Java基础的内置的类

URL

```
URL myURL = new URL("http://example.com/pages/");
URL page1URL = new URL(myURL, "page1.html");
URL page2URL = new URL(myURL, "page2.html");
```

或:

```
new URL("http", "example.com", "/pages/page1.html");
```

或:

```
//URLDemo.java
import      *;

public class URLEDemo {

    public static void main(String[] args) {
        try {
            URL url = new URL ("http://www.javatpoint.com/java-tutorial");

            System.out.println("Protocol: " + url.getProtocol());
            System.out.println("Host Name: " + url.getHost());
            System.out.println("Port Number: " + url.getPort());
            System.out.println("File Name: " + url.getFile());
        } catch (Exception e) {
            System.out.println(e);
        }
    }
}
```

或:

```
import      *;

URL url = new URL("/a-guide-to-java-sockets");

URL home = new URL("http://baeldung.com");
URL url = new URL(home, "a-guide-to-java-sockets");
```

或:

```
@Test
public void givenBaseUrl_whenCreatesRelativeUrl_thenCorrect() {
    URL baseUrl = new URL("http://baeldung.com");
    URL relativeUrl = new URL(baseUrl, "a-guide-to-java-sockets");

    assertEquals("http://baeldung.com/a-guide-to-java-sockets",
                relativeUrl.toString());
}
```

或:

```
URL url = new URL(yourUrl, "/api/v1/status.xml");
```

或:

```
URL domain = new URL("http://example.com");
URL url = new URL(domain + "/files/resource.xml");
```

hook插件与开发

TODO:

- 把如何用Xposed写Android的hook插件的帖子整理过来
 -
 - 【已解决】Android 11的Magisk中安装EdXposed 0.5.2.2结果失败：请先从Magisk Manager中安装
Riru Installation failed
 - 【已解决】在Android 11中安装EdXposed框架
-

- Android的Hook插件开发框架
 - Xposed
 - Cydia Substrate

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用AndroidStudio调试smali详细步骤

TODO:

- Smalise
 - 【记录】试用VSCode的smali插件：Smalise
-

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详细步骤

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确保安卓已root

确保安卓设备已root:

此处之前买的二手的 Google Pixel 3 , 已root:

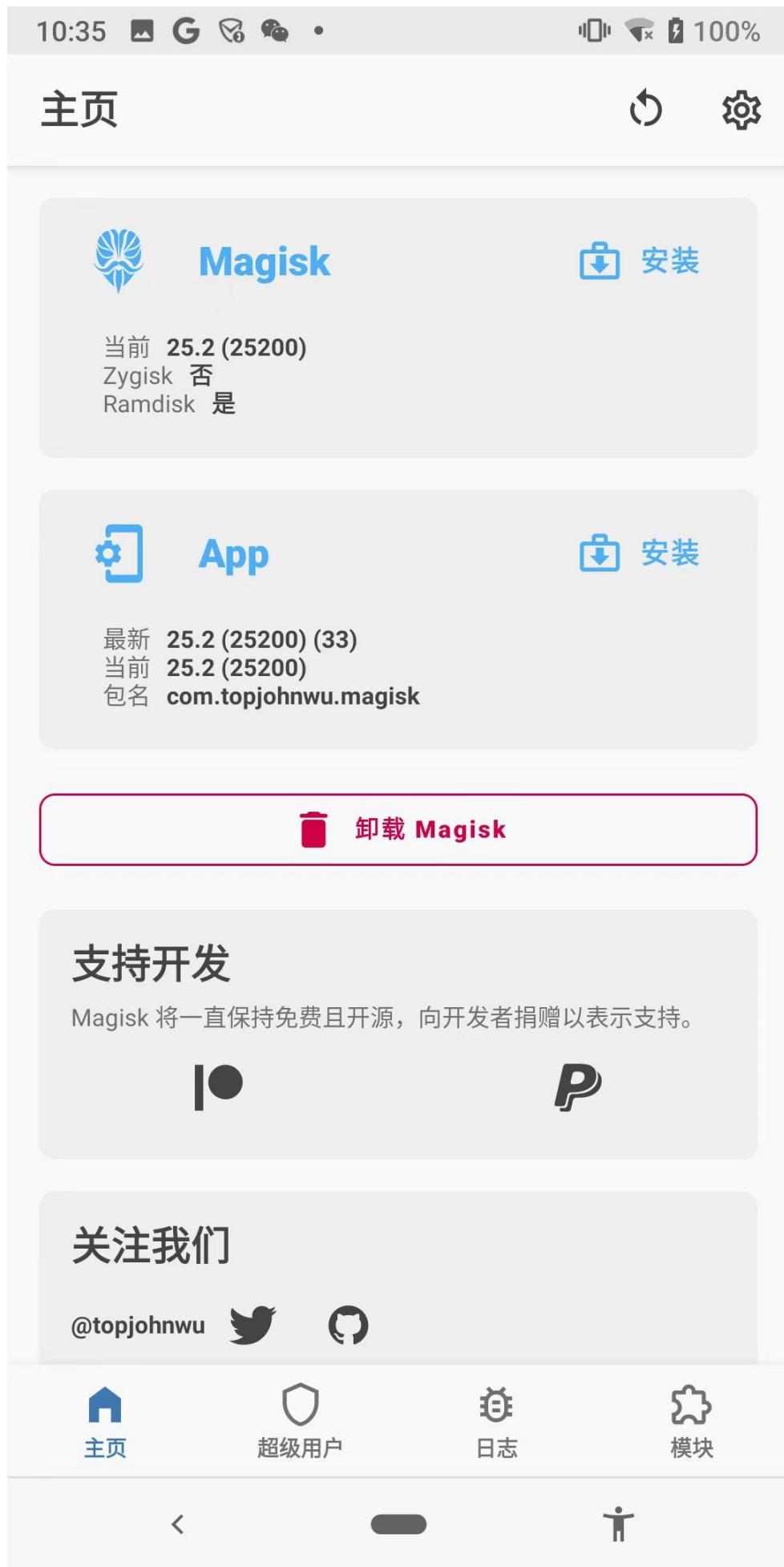


自带安装了：

- Magisk Manager
 - 图
 -



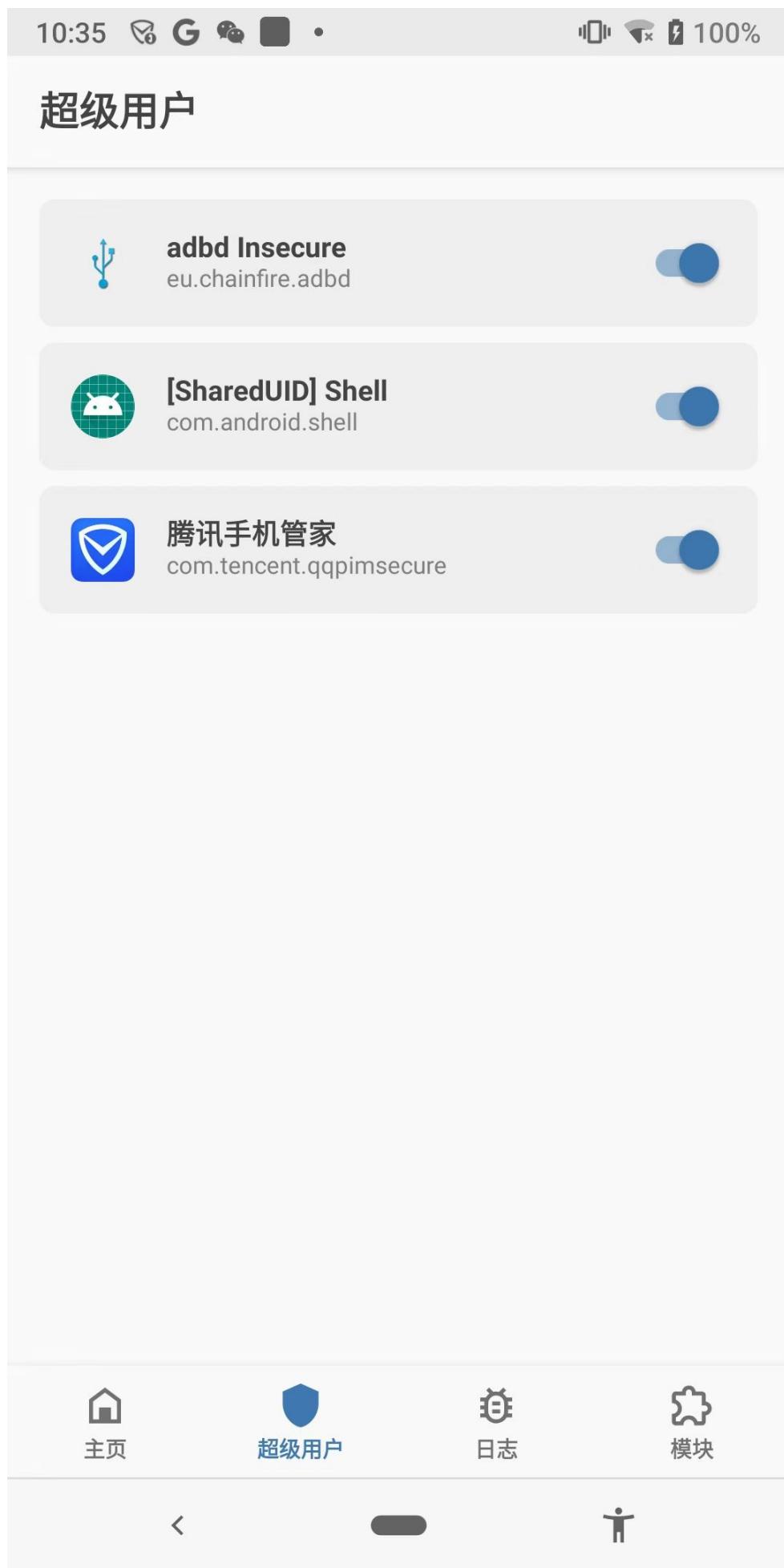




- 升级后是： Magisk
 - 内部包含：
 - Magisk (的框架)
 - App = Manager : 管理配置界面的app

且已给相关app授权了root权限：

- (对应着) adb shell 中首次 su 后，即可申请 root权限，允许后，此处就会出现：
 - Shell = com.android.shell
 -



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调试工具选择

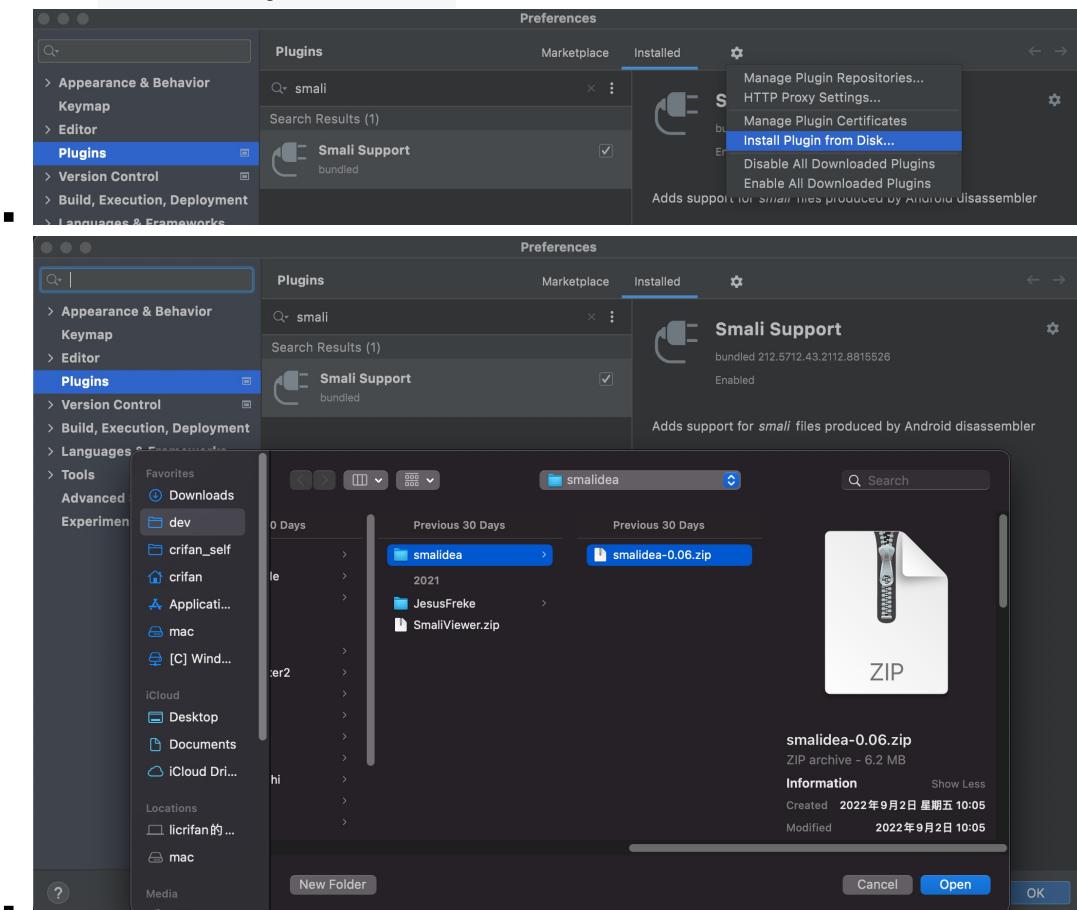
- 调试安卓apk 的工具/环境
 - Android Studio + smalidea 插件: 调试 smali
 - JDB : 调试 Smali
 - IDA : 调试 dex
 - Qtrace

此处选择，相对易用的：

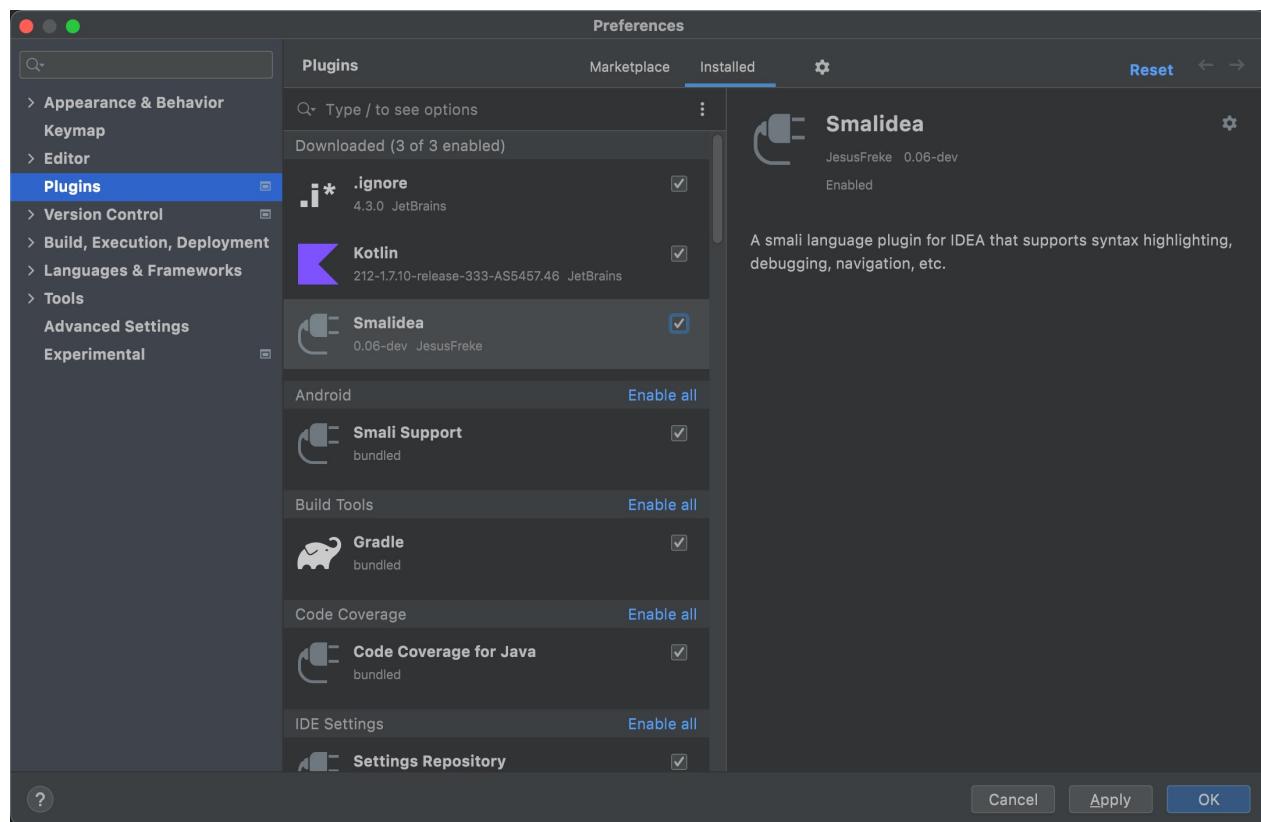
- Android Studio + smalidea 插件: 调试 smali

Android Studio中安装smali插件 smalidea

- 安装AS插件： Smalidea
 - AS中搜索并点击安装 Smalidea
 - 手动下载zip从再手动安装
 - 从JesusFreke / smalidea / Downloads — Bitbucket 下载插件压缩包文件
 - <https://bitbucket.org/JesusFreke/smalidea/downloads/smalidea-0.06.zip>
 - 然后AS中 Install Plugin from Disk



-> 安装后的 Smalidea 插件：



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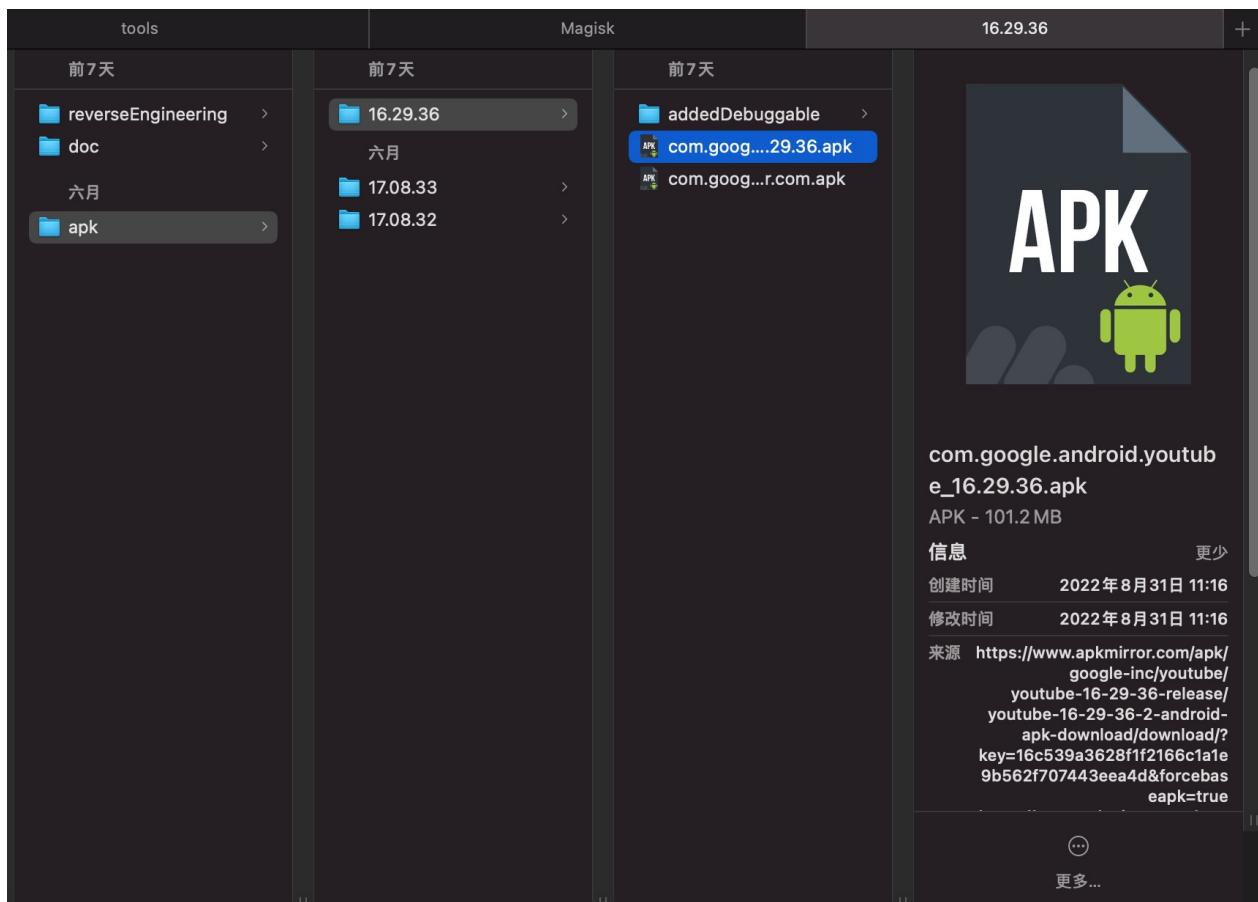
反编译出smali

反编译 apk , 得到 smali 源码

常见反编译工具：

- **Apktool**
 - 直接1步：apk to smali
- **baksmali**
 - 要2步：先 apk to dex, 再 dex to smali

此处用 apktool 去反编译YouTube的apk：



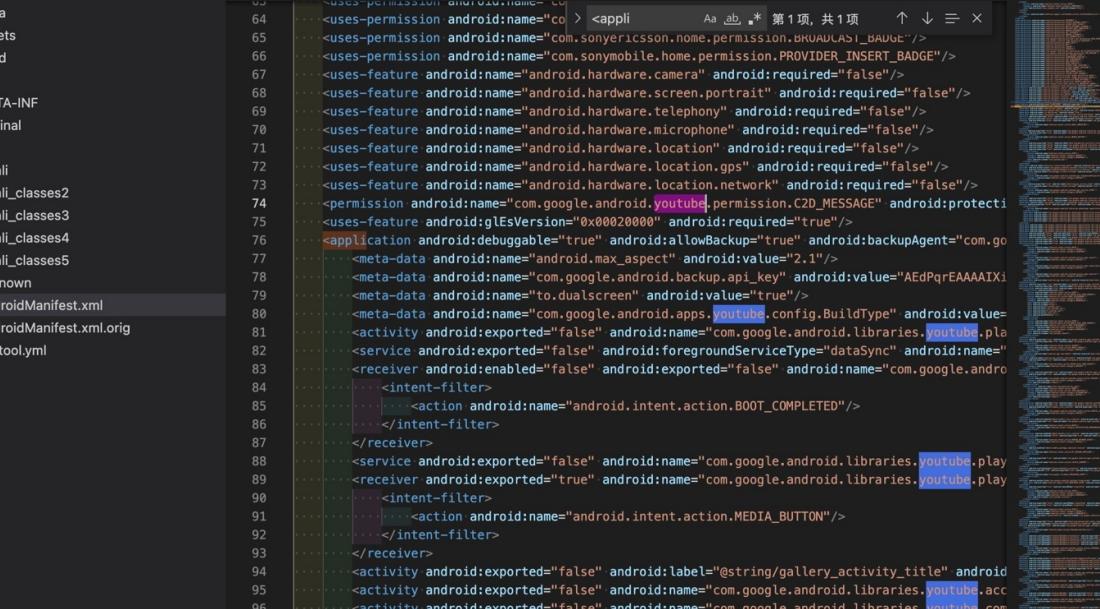
去反编译得到包含 smali 源码的目录：

```
apktool d --use-aapt2 ../../apk/16.29.36/com.google.android.youtube_16.29.36.apk
```

如果要指定输出目录，也可以加上 -o

```
apktool d --use-aapt2 ../../apk/16.29.36/com.google.android.youtube_16.29.36.apk -o com.google.android.youtube_16.29.36_aapt2
```

输出的目录的内容：



The screenshot shows the AndroidManifest.xml file for the com.google.android.youtube_16.29.36 APK. The manifest file contains the following key components:

- Permissions:** The file includes several permission declarations, such as `<uses-permission android:name="com.sonyericsson.home.permission.BLUETOOTH_PRIVILEGE"/>`, `<uses-permission android:name="com.sonymobile.home.permission.PROVIDER_INSERT_BADGE"/>`, and `<uses-permission android:name="com.google.android.youtube.permission.C2D_MESSAGE" android:protectionLevel="signature|signatureOrSystem"/>`.
- Features:** It lists various hardware and system features required by the application, including camera, screen orientation, microphone, location, GPS, and network.
- Activities:** The manifest defines multiple activities, including the main activity (`<activity android:name=".MainActivity" android:label="@string/app_name" android:icon="@mipmap/ic_launcher" android:theme="@style/AppTheme" android:windowSoftInputMode="adjustPan"/>`) and other specific activities like `<activity android:name=".YouTubeActivity" android:label="YouTube" android:icon="@mipmap/ic_launcher" android:theme="@style/AppTheme" android:windowSoftInputMode="adjustPan"/>`.
- Services:** There are several services defined, such as `<service android:name="com.google.android.apps.youtube.config.BuildType" android:exported="false" android:foregroundServiceType="dataSync" android:process=":config" android:targetApi="24"/>` and `<service android:name="com.google.android.libraries.youtube.playback.service.PlaybackService" android:exported="false" android:foregroundServiceType="dataSync" android:process=":playback" android:targetApi="24"/>`.
- Receivers:** The manifest includes several receivers, including broadcast receivers for `BOOT_COMPLETED` and `MEDIA_BUTTON` events, and a service receiver for `INTENT_ACTION_APP_UPGRADE`.
- Intent Filters:** Many of the components have intent filters attached to them, defining the actions and categories they respond to.

- 一个或多个 smali 目录
 - 注：每个 smali 目录，对应着 apk 内部的 dex 文件
 - AndroidManifest.xml
 - 文本模式的，有 apk 核心的配置和参数

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app可调试

TODO:

- 【已解决】安卓逆向：如何让YouTube的apk可以被调试
- 【已解决】安卓让apk可调试：修改全局系统属性ro.debuggable
- 【已解决】安卓逆向：用MagiskHide Props Config实现全局apk可调试
- 【未解决】安卓逆向：让apk可调试之通过XPosed插件
- 【未解决】尝试用BDOpener修改ro.debuggable使得apk可调试
- 【已解决】用Magisk插件MagiskHide Props Config去设置ro.debuggable实现全局app可调试
- 【已解决】Google Pixel3安卓手机中MagiskHide Props Config中没有ro.debuggable属性可设置
- 【未解决】安卓逆向：用mprop修改属性ro.debuggable让apk可调试
- 【未解决】安卓逆向：用rootadb的setpropex修改属性ro.debuggable让apk可调试
- 【未解决】mprop提示报错：inject position not found, may be already patched

确保app 可调试 = debuggable :

让app可调试，有多种方式：

- 针对 特定app 可调试
 - app代码中 AndroidManifest.xml 加上 android:debuggable="true"
 - 思路：往往是（ apktool 等）反编译得到源码，修改后，再重新打包回去
 - 缺点：对于稍微复杂点的apk，往往重新打包的过程中会出错，会很麻烦
- 全局可调：安卓系统中所有app进程都可调试
 - 实现思路：修改系统全局属性 ro.debuggable
 - 具体方法
 - 修改 boot.img，重新刷入
 - 说明：比较折腾的一种。不推荐，虽然也可以一劳永逸，但是比较折腾，刷机操作失误还容易变砖
 - mprop
 - 已基本失效，放弃
 - XPosed 插件
 - xinstaller
 - Xdebuggable
 - BuildProp Enhancer
 - XDebug
 - Magisk
 - Magisk
 - 命令行： magisk resetprop ro.debuggable 1
 - 缺点：重启后失效
 - Magisk 插件
 - MagiskHide Props Config
 - 用 props 去修改 ro.debuggable=1

此处选择，相对方便操作和效果更好的：

MagiskHide Props Config

- Magisk的插件
 - MagiskHide Props Config

10:36



G



100%

模块



从本地安装

ADB Root

v1, 作者 Denis Efremov (@evdenis)



Allows to "adb root" regardless of props settings and skips
usb keys auth. Kind of "adbd Insecure" as a Magisk Module.
Arm64 only.

移除

MagiskHide Props Config

v6.1.2-v137, 作者 Didgeridoohan



Change your device's fingerprint, to pass SafetyNet's CTS
Profile check. Set/reset MagiskHide sensitive prop values.
Change any prop values easily, and set your own custom
props.

移除

Riru - EdXposed

v0.5.2.2_4683-master, 作者 solohsu, MlgmXyysd



Another enhanced implementation of Xposed Framework.
Supports Android 8.0, 8.1, 9, 10, 11 or above. Requires Riru
v23 or above installed. Telegram: @EdXposed

移除



主页



超级用户



日志



模块



安装后，去安卓设备端的命令行（adb shell 进去）运行：

```
props
```

根据提示，去（先新增再）修改为： ro.debuggable=1

核心的选择是：

- 5 - Add/edit custom props
 - n - New custom prop
 - ro.debuggable
 - y - Yes
 - 1
 - y

最后查看属性，确保修改成功：

```
> adb shell getprop ro.debuggable
1
```

AndroidManifest.xml加debugable属性

顺带介绍另外一种，虽然不推荐，但是大家常提到的方式：

- app代码中 AndroidManifest.xml 加上 android:debuggable="true"

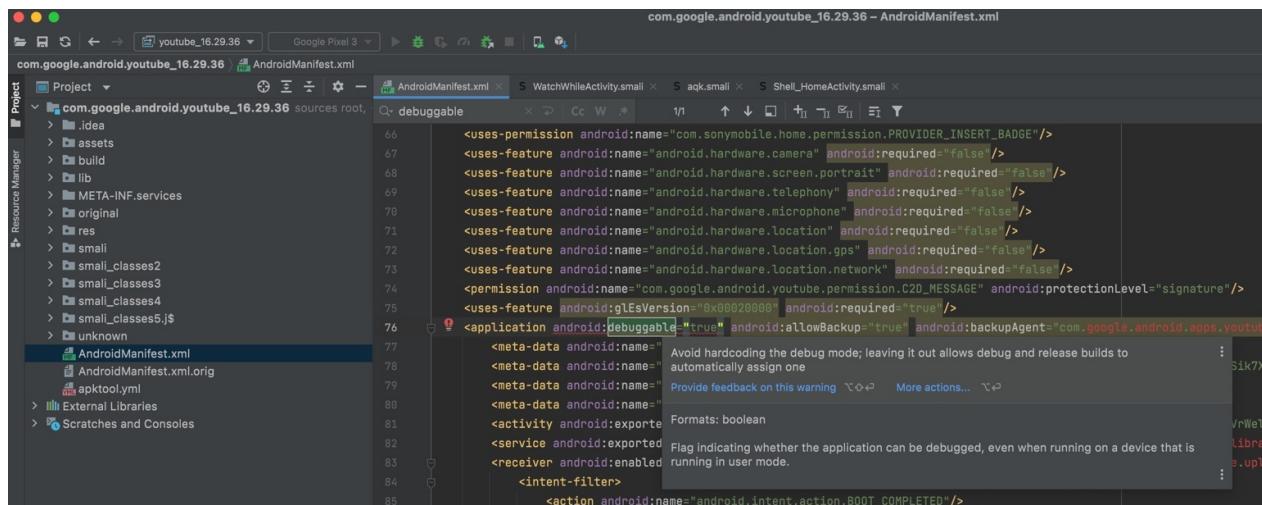
思路：

把apktool反编译后的代码中的

```
AndroidManifest.xml
```

去修改，加上：

```
android:debugable="true"
```



然后再用apktool重新打包出apk（有失败的风险）

安装到安卓手机中，成为可调试的app

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调试方式启动app

以调试方式启动app：

- 目的：这样启动的app，才可以被调试，方便被调试

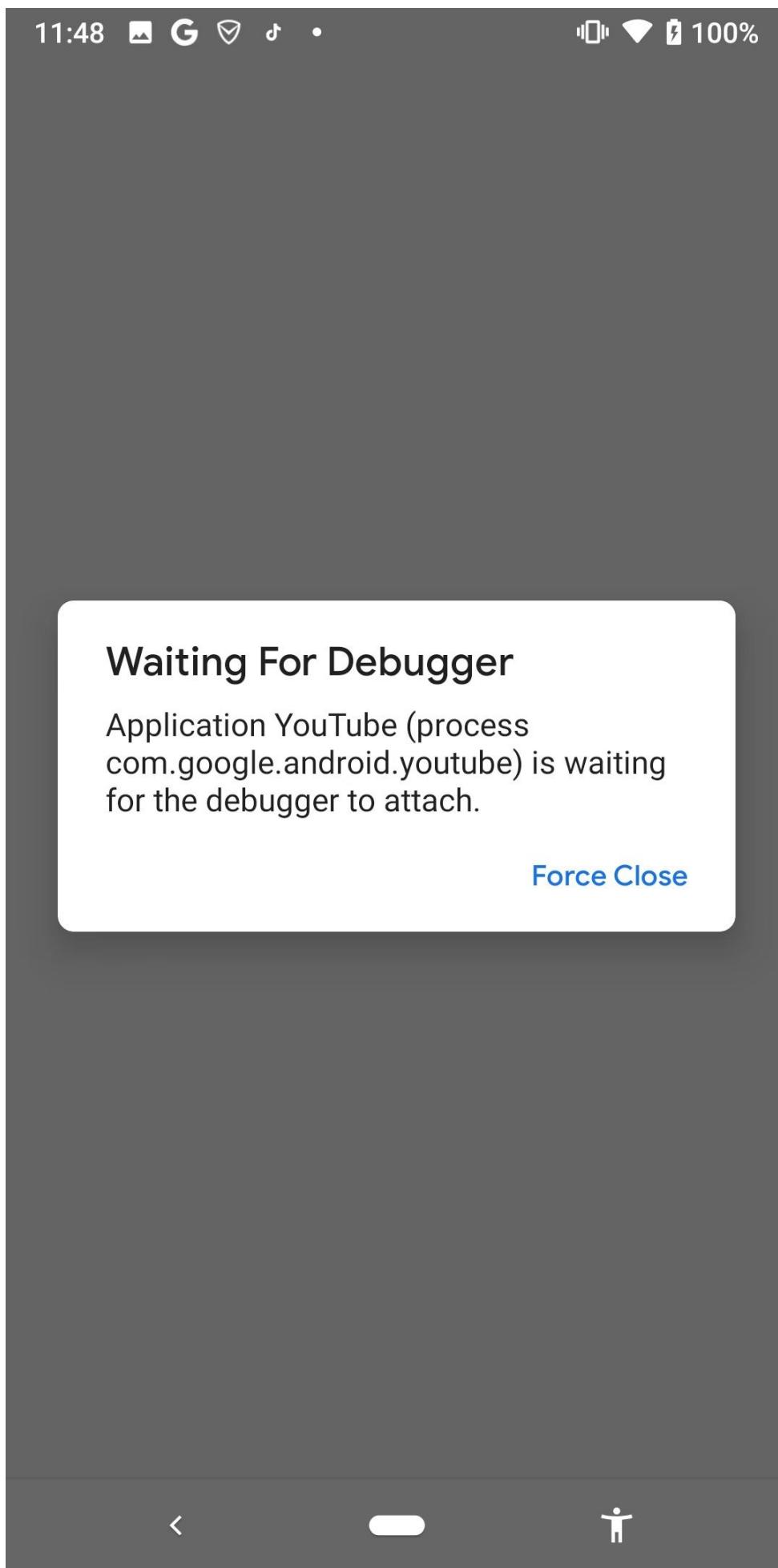
此处以调试方式启动 YouTube 的app：

```
adb shell am start -D -n com.google.android.youtube/com.google.android.apps.youtube.app.application.Shell_HomeActivity
```

说明：

- -D : 表示 debug 模式
- com.google.android.youtube/com.google.android.apps.youtube.app.application.Shell_HomeActivity
 - com.google.android.youtube
 - app包名=package
 - com.google.android.apps.youtube.app.application.Shell_HomeActivity
 - app的主页面=MainActivity

以调试模式启动后的效果：



启动后，app没有立刻正常运行，而是显示 Waiting For Debugger

并且：此界面不会消失，直到对应的debugger调试器连接上，开始调试，此界面才消失，才继续开始运行app

说明：

如何获取app的包名

Youtube 包名： com.google.android.youtube

- 方式1： pm

举例：

```
~` adb shell pm list packages -f | grep youtube
package:/data/app/com.google.android.youtube-9Nw_99XIZz2jZh7Lyor2SKQ/base.apk com.google.android.youtube
```

- 方式2： aapt

```
` aapt dump badging com.google.android.youtube_16.29.36.apk | grep package
package: name='com.google.android.youtube' versionCode='1522263488' versionName='16.29.36' compileSdkVersion='31' compileSdkVersionCodename='12'
```

如何获取app的MainActivity

app的首页的 activity，一般被叫做 MainActivity

一般情况是： apktool 逆向导出的 xml 格式的 AndroidManifest.xml 中，找到 android.intent.action.MAIN 所属于的 activity，就是 MainActivity

-» 此处YouTube的情况稍微特殊点：

AndroidManifest.xml

```
<activity exported="true" name="com.google.android.apps.youtube.app.application.Shell_HomeActivity" theme="@style/Theme.YouTube.Launcher"/>
<activity-alias exported="true" name="com.google.android.youtube.HomeActivity" targetActivity="com.google.android.apps.youtube.app.application.Shell_HomeActivity"/>
<activity-alias exported="true" name="com.google.android.youtube.app.application.Shell$HomeActivity" targetActivity="com.google.android.apps.youtube.app.application.Shell_HomeActivity"/>
<activity-alias exported="true" name="com.google.android.youtube.app.honeycomb.Shell$HomeActivity" targetActivity="com.google.android.apps.youtube.app.application.Shell_HomeActivity">
    <intent-filter>
        <action name="android.intent.action.MAIN"/>
        <category name="android.intent.category.DEFAULT"/>
        <category name="android.intent.category.LAUNCHER"/>
```

```
</intent-filter>
```

找到：

- android.intent.action.MAIN

所属的activity是：

- com.google.android.youtube.app.honeycomb.Shell\$HomeActivity

其是个别名 alias， 对应着 真正的activity = MainActivity 是：

- com.google.android.apps.youtube.app.application.Shell_HomeActivity

TODO:

- 【已解决】获取安卓apk应用的app的主界面activity即MainActivity

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AS中导入smali代码

导入带 smali 源码的目录到 Android Studio 作为新项目：

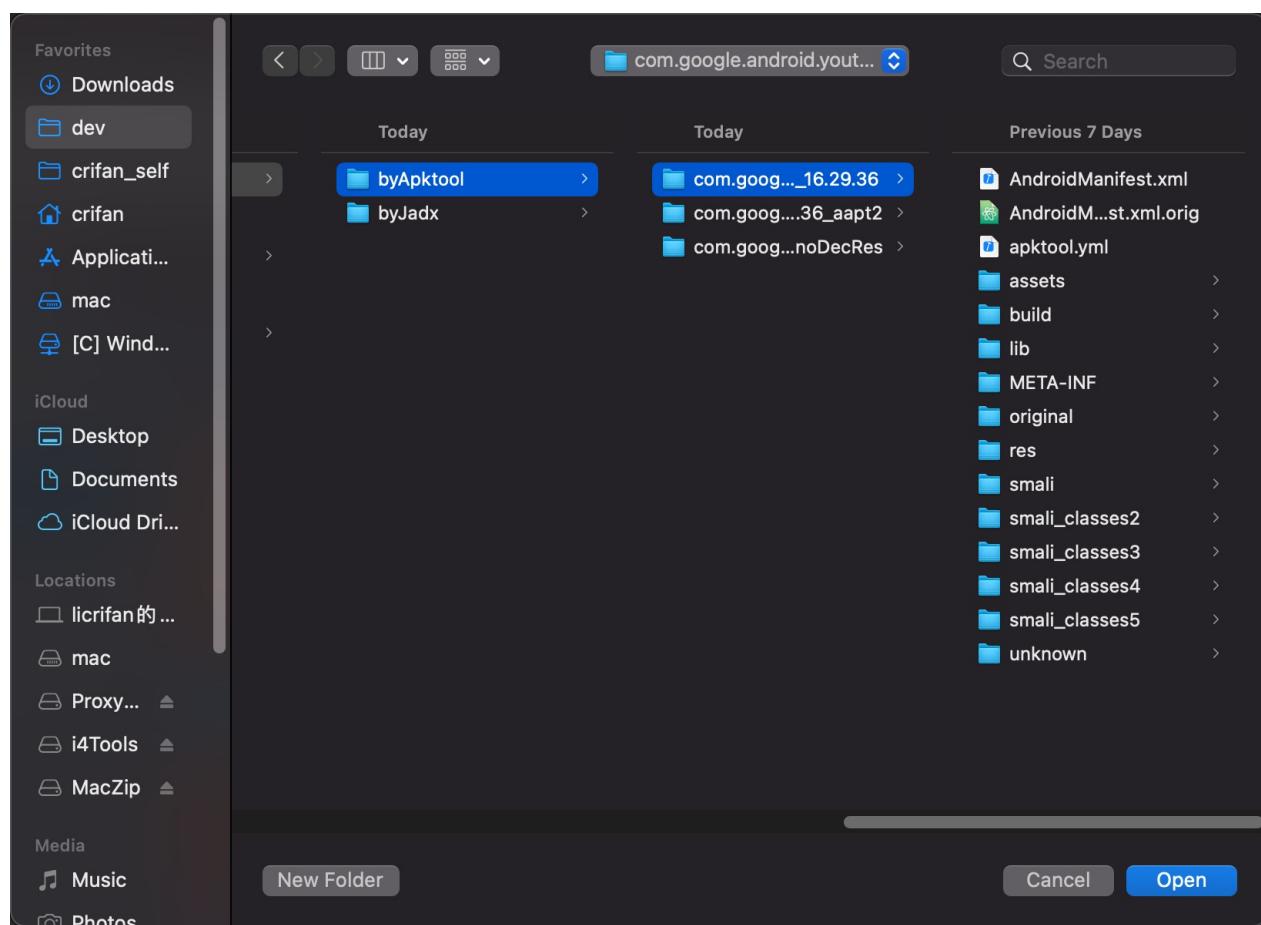
导入smali的源码：

新版 Android Studio 的 Welcome to Android Studio 欢迎对话框中，点击：

- Open

◦

去选择对应的， Apktool 反编译后的输出的目录：



导入后，即可：

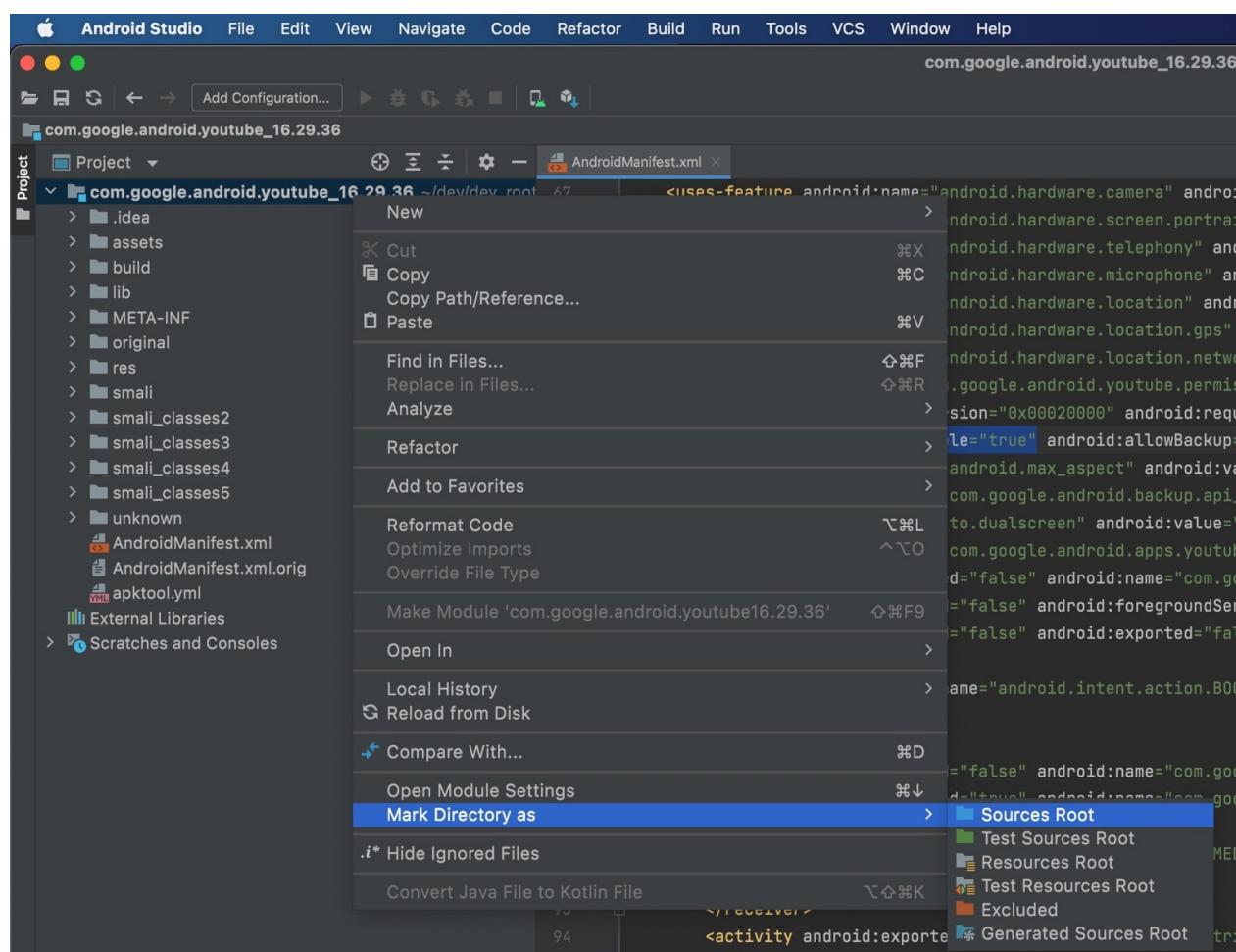
```

<uses-feature android:name="android.hardware.camera" android:required="false"/>
<uses-feature android:name="android.hardware.screen.portrait" android:required="false"/>
<uses-feature android:name="android.hardware.telephony" android:required="false"/>
<uses-feature android:name="android.hardware.microphone" android:required="false"/>
<uses-feature android:name="android.hardware.location" android:required="false"/>
<uses-feature android:name="android.hardware.location.gps" android:required="false"/>
<uses-permission android:name="com.google.android.youtube.permission.C2D_MESSAGE" android:protectionLevel="signature"/>
<uses-feature android:glEsVersion="0x00020000" android:required="true"/>
<application android:debuggable="true" android:allowBackup="true" android:backupAgent="com.google.android.apps.youtube.app.application.YouTubeBackupAgent" android:<br/>
    <meta-data android:name="com.google.android.backup.api_key" android:value="AEfPqrEAAAIX158ScnYbhPAPls40jkS1k7XGNcn8YqfZfg"/><br/>
    <meta-data android:name="to_dualscreen" android:value="true"/><br/>
    <meta-data android:name="com.google.android.apps.youtube.config.BuildType" android:value="RELEASE"/><br/>
    <activity android:exported="false" android:name="com.google.android.libraries.youtube.player.features.g1.VrWelcomeActivity" android:theme="@style/Theme.YouTube.Pr<br/>
    <service android:exported="false" android:foregroundServiceType="dataSync" android:name="com.google.android.libraries.youtube.upload.service.UploadService"/><br/>
    <receiver android:enabled="false" android:exported="false" android:name="com.google.android.libraries.youtube.upload.service.UploadsBootReceiver"><br/>
        <intent-filter><br/>
            <action android:name="android.intent.action.BOOT_COMPLETED"/><br/>
        </intent-filter><br/>
    </receiver><br/>
    <service android:exported="false" android:name="com.google.android.libraries.youtube.player.background.service.BackgroundPlayerService"/><br/>
    <receiver android:exported="true" android:name="com.google.android.libraries.youtube.player.ui.mediasession.MediaButtonIntentReceiver$DefaultMediaButtonInten<br/>
        <intent-filter><br/>
            <action android:name="android.intent.action.MEDIA_BUTTON"/><br/>
        </intent-filter><br/>
    </receiver><br/>
    <activity android:exported="false" android:label="@string/gallery_activity_title" android:name="com.google.android.libraries.youtube.edit.gallery.GalleryActivity" an<br/>
    <activity android:exported="false" android:name="com.google.android.libraries.youtube.account.image.CropActivity" android:theme="@style/Theme.YouTube.CropActivity"/><br/>
    <activity android:exported="false" android:name="com.google.android.libraries.youtube.comment.image.ImageGalleryActivity" android:theme="@style/Theme.YouTube.Gallery<br/>
    <activity android:exported="true" android:launchMode="singleInstance" android:name=".net.openid.apauth.RedirectUriReceiverActivity" android:process="" android:theme="<br/>
        <intent-filter><br/>
            <action android:name="android.intent.action.VIEW"/><br/>
            <category android:name="android.intent.category.DEFAULT"/><br/>
            <category android:name="android.intent.category.BROWSABLE"/><br/>
            <data android:scheme="vnd.youtube.gdi"/><br/>
        </intent-filter><br/>
    </activity><br/>
    <meta-data android:name="analytics.safelisted_events" android:resource="@array/firebase_safelisted_events"/><br/>
    <meta-data android:name="com.google.android.youtube.lifecycle_token" android:enabled="false" android:exported="false" android:multiprocess="true" android:<br/>

```

然后把根目录设置为源代码根目录：

Mark Directory as Source Root



注：其实不需要像别人说的：

- 一定要：

- 只导入smali代码到项目中
- 只能把smali代码所在目录去mark as source root

而是：

- 只要当前项目中包含了smali代码

即可。

TODO:

- 【已解决】安卓AS调试apk的smali：导入apktool反编译的源码作为项目代码

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给smali加断点

给Smali代码加断点：

- 先(重点)是：找到要加断点的地方
- 再去加断点

如何找到要加断点的位置？

要在哪里加断点？

才能实现，app运行时触发到断点而停下来，供自己调试

一般逻辑是：

- 找到最有可能运行到的代码的逻辑对应的地方
 - 入口的 MainActivity
 - 前面的：如何获取app的 MainActivity，已经解释过
 - 此处 YouTube 就是： com.google.android.apps.youtube.app.application.Shell_HomeActivity
 - 或者是你调试时看到的顶层页面

获取顶层页面的activity

```
adb shell dumpsys activity top | grep --color=always ACTIVITY
...
ACTIVITY com.google.android.youtube/com.google.android.apps.youtube.app.watchwhile.WatchWhileActivity 781cc07 pid:20720
```

-》

- 此处 YouTube 的顶层页面是：
 - com.google.android.apps.youtube.app.watchwhile.WatchWhileActivity

然后就可以去，此处 Apktool 反编译后的，smali 的源码所在位置了：

- com.google.android.youtube_16.29.36
 - smali_classes2/com/google/android/apps/youtube/app/application/Shell_HomeActivity.smali
 - smali_classes2/com/google/android/apps/youtube/app/watchwhile/WatchWhileActivity.smali

找到了smali文件位置

给哪些函数打断点？

再说说：具体给哪些函数打断点

-》代码运行才能，才容易触发到断点停下来（我们才好调试）

这部分涉及到安卓的正向开发知识

概述是：

- onResume
- onStart
- getLifecycle
- 等等

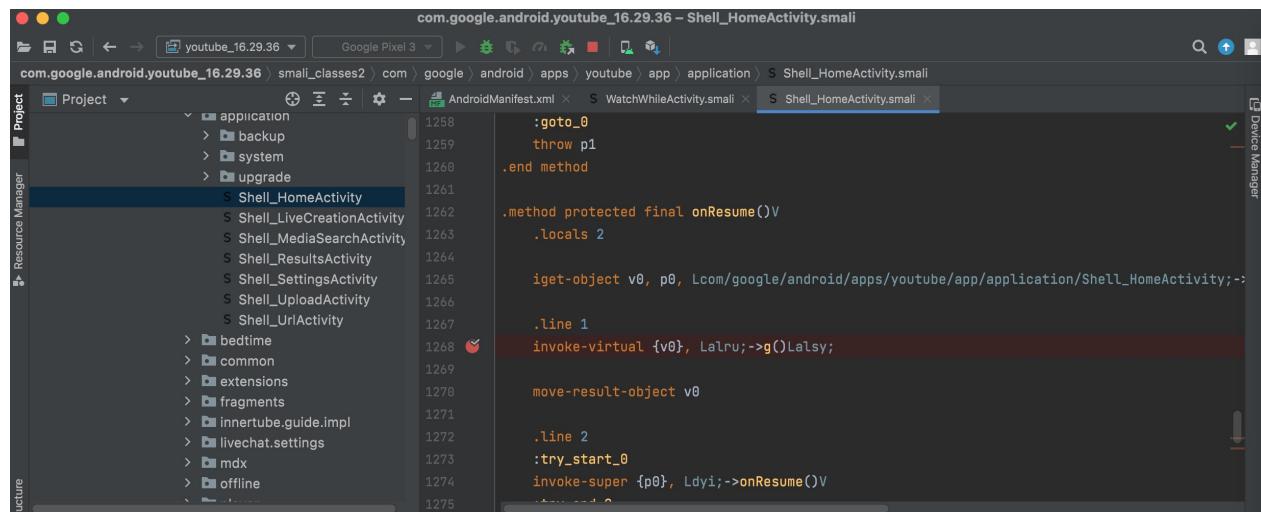
如此，去找：

- com.google.android.youtube_16.29.36
 - smali_classes2/com/google/android/apps/youtube/app/application/Shell_HomeActivity.smali
 - smali_classes2/com/google/android/apps/youtube/app/watchwhile/WatchWhileActivity.smali

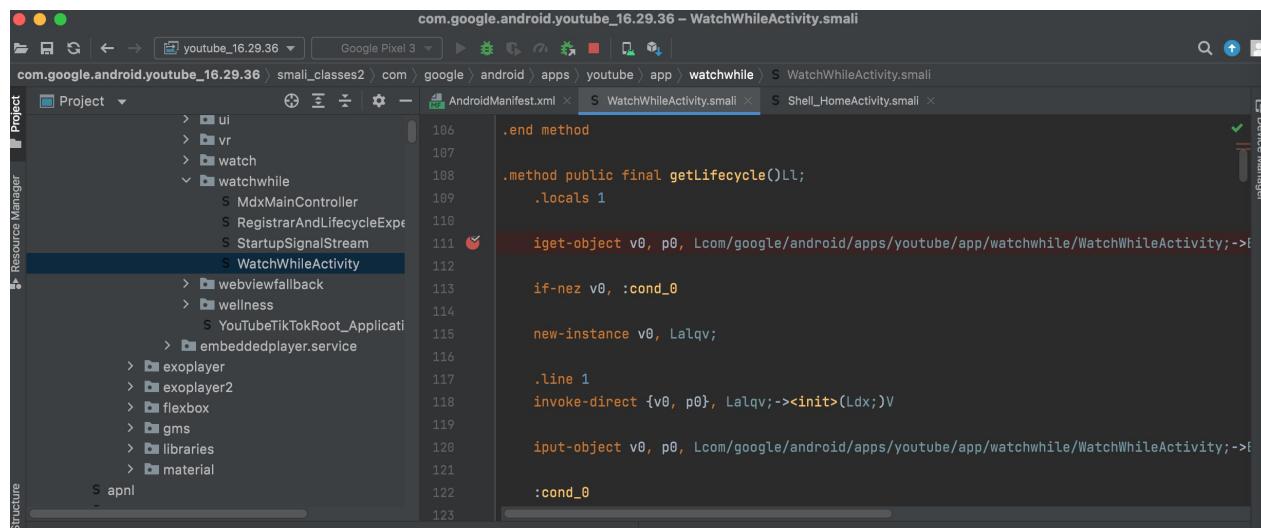
的

- onResume
- onStart
- getLifecycle

等函数，去打断点：



```
com.google.android.youtube_16.29.36 - Shell_HomeActivity.smali
Project  com.google.android.youtube_16.29.36  smali_classes2/com/google/android/apps/youtube/app/application/Shell_HomeActivity.smali
Resource Manager  AndroidManifest.xml  WatchWhileActivity.smali  Shell_HomeActivity.smali
Structure  Project  Application  application  backup  system  upgrade  Shell_HomeActivity  Shell_LiveCreationActivity  Shell_MediaSearchActivity  Shell_ResultsActivity  Shell_SettingsActivity  Shell_UploadActivity  Shell_UrlActivity  bedtime  common  extensions  fragments  innertube.guide.impl  livechat.settings  mdx  offline
1258 :goto_0
1259     throw p1
1260 .end method
1261
1262 .method protected final onResume()V
1263     .locals 2
1264
1265     igure-object v0, p0, Lcom/google/android/apps/youtube/app/application/Shell_HomeActivity;-->
1266
1267     .line 1
1268     invoke-virtual {v0}, Lcom/google/android/apps/youtube/app/application/Shell_HomeActivity;-->Lalsy;
1269
1270     move-result-object v0
1271
1272     .line 2
1273     :try_start_0
1274     invoke-super {p0}, Ldyi;-->onResume()V
1275
```



```
com.google.android.youtube_16.29.36 - WatchWhileActivity.smali
Project  com.google.android.youtube_16.29.36  WatchWhileActivity.smali  Device Manager
Resource Manager  AndroidManifest.xml  WatchWhileActivity.smali  Shell_HomeActivity.smali
Structure  watchwhile  106 .end method
           > ui
           > vr
           > watch
           > watchwhile
           > S MdxMainController
           > S RegistrarAndLifecycleExpe
           > S StartupSignalStream
           > S WatchWhileActivity
           > S webviewfallback
           > S wellness
           > S YouTubeTikTokRoot_Applicati
           > S embeddedplayer.service
           > S exoplayer
           > S exoplayer2
           > S flexbox
           > S gms
           > S libraries
           > S material
           S apnl
           -
106     .end method
107
108     .method public final getLifecycle()Ll;
109     .locals 1
110
111     ige-object v0, p0, Lcom/google/android/apps/youtube/app/watchwhile/WatchWhileActivity;->{ :cond_0
112
113     if-nez v0, :cond_0
114
115     new-instance v0, Lalqv;
116
117     .line 1
118     invoke-direct {v0, p0}, Lalqv;-><init>(Ldx;)V
119
120     igit-object v0, p0, Lcom/google/android/apps/youtube/app/watchwhile/WatchWhileActivity;->{ :cond_0
121
122
123
```

TODO:

【已解决】Android Studio调试Smali：给YouTube的smali代码加断点

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配置AS项目

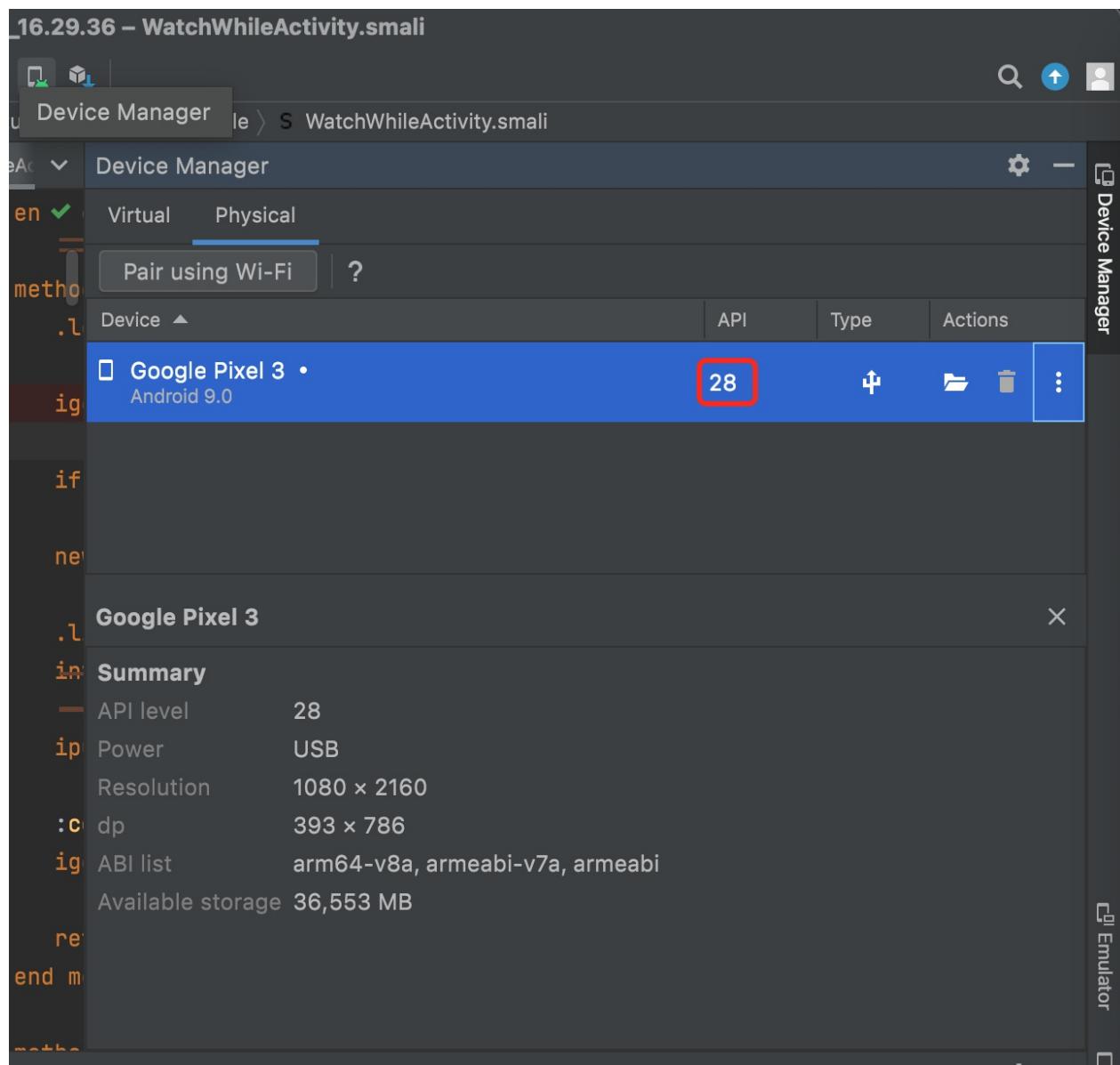
Android Studio项目初始化配置

主要是：

File -> Project Structure -> Project Settings -> Project SDK :

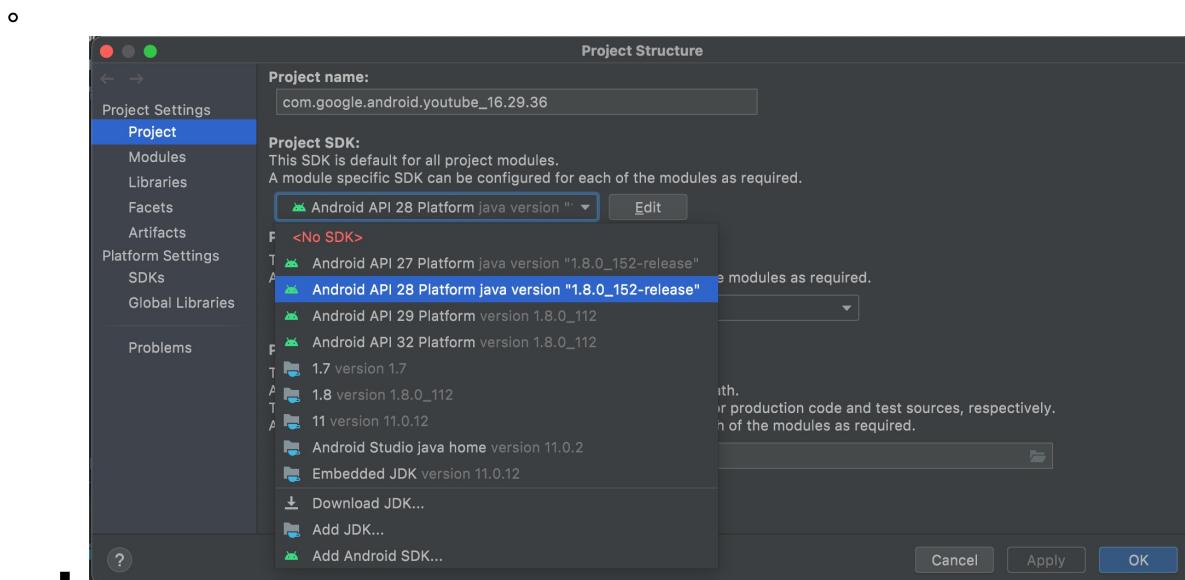
设置为和安卓设备的 Android API Level = sdkVersion 一致的值：

此处：Android设备是 Google Pixel 3 , API是 Android 9 = Android API 28



所以设置为：

- Android API 28 Platform



TODO:

- 【基本解决】安卓AS调试apk的smali: 新建和设置远程调试配置
- 【已解决】安卓AS调试apk的smali: 初始化配置AS调试环境

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adb可获取进程列表

确保adb可以获取到安卓设备的进程列表

确保：

```
adb shell ps
```

可以获取到：

- 安卓设备中的进程的列表

目的：防止后续无法看到进程，无法调试

比如，我此处的遇到的特殊情况：

adb shell 的子命令，包括 ps，无法直接运行（要么报错，要么没权限，要么没返回结果）

则意味着后续 Android Studio 中 Attach Debugger to Android Process 的 Choose Process 中，无法看到设备的进程列表，就无法继续调试。

TODO：

- 【已解决】Android Studio和DDMS中看不到安卓设备中的所有进程
- 【已解决】Mac中运行adb shell无需su超级用户即可正常运行输出结果
- 【未解决】Android Studio调试报错：Unable to open debugger port localhost handshake failed connection prematurely closed
- 【未解决】Android Studio中smali断点不生效无法触发断点

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AS调试app进程

TODO:

- 查看参数变量值
 - 【已解决】Android Studio调试Smali代码：如何查看函数的局部变量临时变量的值
 - 【已解决】Android Studio调试Smali代码：如何查看函数的全部参数的值
 - 【已解决】Android 11的Google Pixel3中AS调试YouTube的Smali代码
 - 【已解决】Android Studio调试smali代码：查看变量值出错internal error
-

Android Studio中调试设备端的app进程

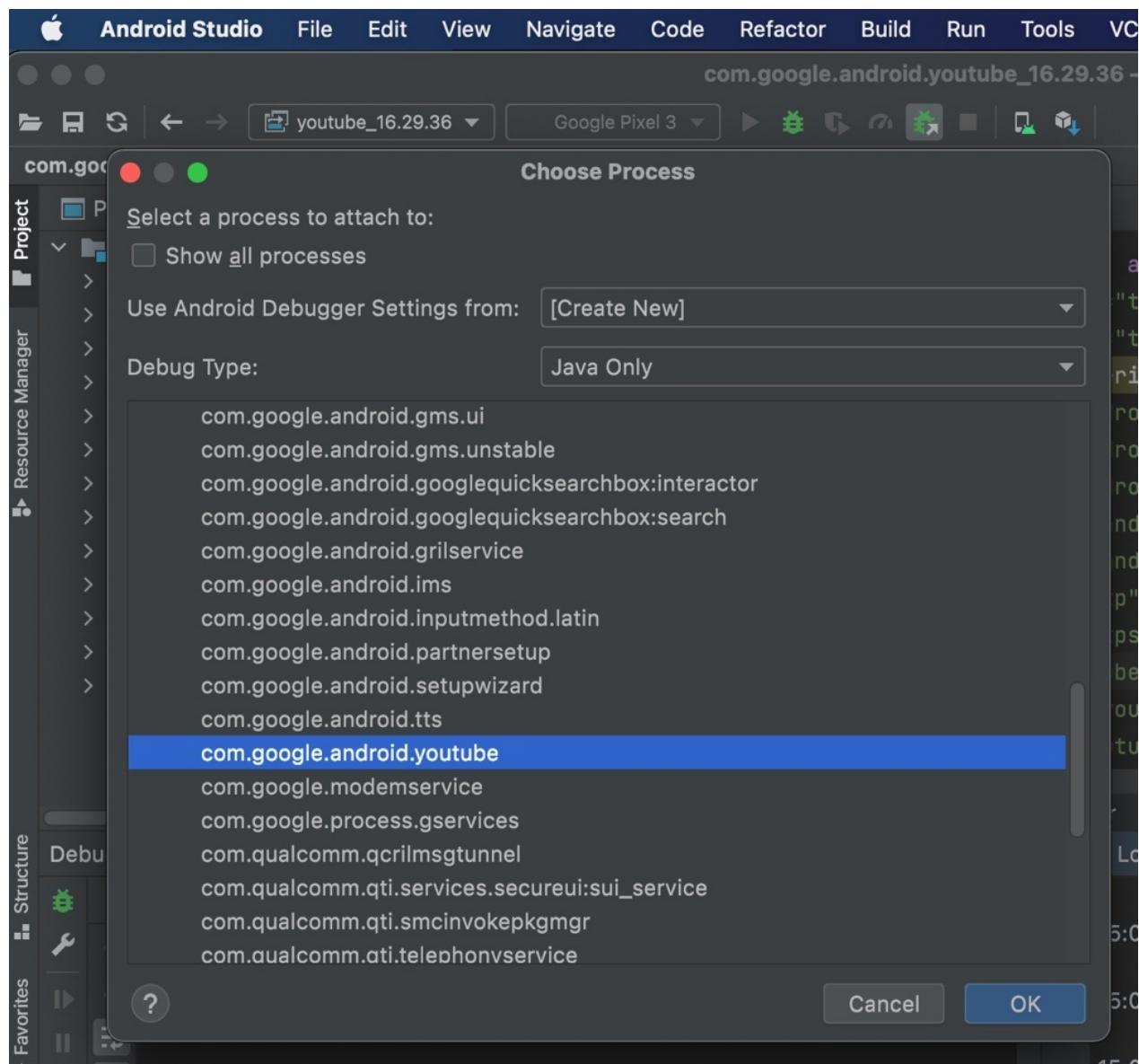
- Attach Debugger to Android Process

◦

进入 Choose Process 弹框页面

正常会显示出安卓设备，且会列出设备中可调试的众多进程

选择对应的要调试（此处是 YouTube）的进程：



即可顺利启动调试

并触发之前加的断点了：

The screenshot displays two instances of the Android Studio debugger interface. The top instance is focused on the `onResume` method of the `WatchWhileActivity`. The bottom instance is focused on the `getLifecycle` method of the same activity. Both instances show the variable inspection tool and the event log, which contains an error message indicating a failed handshake with the debugger port.

如果没启动或断点没生效，则重新点击调试

有时候，至少此处经常发生：点击了一次 `Attach Debugger to Android Process + OK`，虽然启动了 YouTube，但是无法调试进程

所以经常需要再去重新点击一次 `Attach Debugger to Android Process + OK`，然后就可以正常调试，触发断点了

但是其实感觉是：没有真正挂上安卓手机中YouTube的进程，因为此时YouTube的app端还在正常运行
感觉是此处调试环境还是有点问题的，有空再去深究原因。

TODO:

- 【基本解决】安卓AS调试apk的smali: 新建和设置远程调试配置
- 【已解决】安卓AS调试apk的smali: 初始化配置AS调试环境
- 【未解决】用Android Studio调试YouTube的smali代码: request请求发送相关的位置
- 【未解决】用root的安卓手机OPPO R11s去配合Android Studio调试YouTube的Smali代码
- 【已解决】安卓YouTube逆向: 搭建安卓apk动态调试环境

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调试Smali实例

此处介绍安卓AndroidStudio去调试Smali代码的实例。

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调试安卓Youtube的smali

此处贴出，Android Studio 动态调试 YouTube 的 Smali 的完整的项目代码：

[crifan/AndroidYouTubeDynamicDebug: 安卓逆向动态调试YouTube \(github.com\)](#)

供参考。

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调试Smali心得

AndroidStudio调试Smali代码

TODO:

- smali断点不生效
 - 【未解决】再次出现AS调试Google Pixel3中的YouTube的问题：Smali断点不生效
 - 【记录】Android 11的Google Pixel3中确认adb shell是否工作正常
 - 【未解决】尝试解决Android Studio中smali断点不生效：调试相关设置
 - 【未解决】尝试解决Android Studio中smali断点不生效：smali文件类型File type
 - 【未解决】尝试解决Android Studio中smali断点不生效：卸载重装smalidea插件
 - 【未解决】尝试解决Android Studio中smali断点不生效：故意打开ADM的DDMS有冲突多试试
 - 【未解决】尝试解决Android Studio中smali断点不生效：Android Studio中adb相关设置
 - 【未解决】尝试解决Android Studio中smali断点不生效：用DDMS和monitor配合试试
 - 【未解决】尝试解决Android Studio中smali断点不生效：USB数据线和端口相关
 - 【未解决】Android Studio调试Smali：通过Remote JVM Debug的attach to remote VM的调试按钮去调试
 - 【已解决】Android Device Monitor的DDMS中看不到app包名进程的名称都是问号
 - 【未解决】尝试解决Android Studio中smali断点不生效：JDWP进程相关
 - 【未解决】尝试解决Android Studio中smali断点不生效：Smali插件相关

安卓逆向期间，折腾Android Studio去调试smali代码，其实更麻烦的不在于搞懂本身的流程，而在于：

找到一个好用的调试设备：已root好的，可以顺利调试的安卓手机

因为期间遇到Google Pixel 3的adb异常，导致adb shell各种命令无法正常运行，包括adb的ps无法正常获取进程列表

从而导致后续调试时AS中看不到进程，折腾了很长时间，才确认，就是adb方面的问题导致的。

解决了该问题了，AS中能attach到进程，后续就顺利多了。

并且另外Google Pixel 3本身不稳定，导致虽然开始能调试，但是后来出现开发者选项崩溃的问题，无法进入设置了。对于正常安卓逆向开发，也有很大影响。

总之：还是要找个靠谱的root后的安卓手机，才能保证后续安卓逆向的顺利。

如何调试Smali代码逻辑

TODO:

- 【记录】用Android Studio调试YouTube的smali代码：smali/anwu.smali
- 【记录】用Android Studio调试YouTube的smali代码：smali_classes2/azfv.smali
- 【记录】用Android Studio调试YouTube的smali代码：smali/anuh.smali
- 【记录】用Android Studio调试YouTube的smali代码：smali_classes2的WatchWhileActivity.smali
-

- 【记录】用AS调试YouTube的Smali代码：调试相关业务逻辑
- 【未解决】给AS调试YouTube的Smali代码：加url过滤
- 【已解决】Xposed如何hook混淆后的安卓应用中的类名和函数名

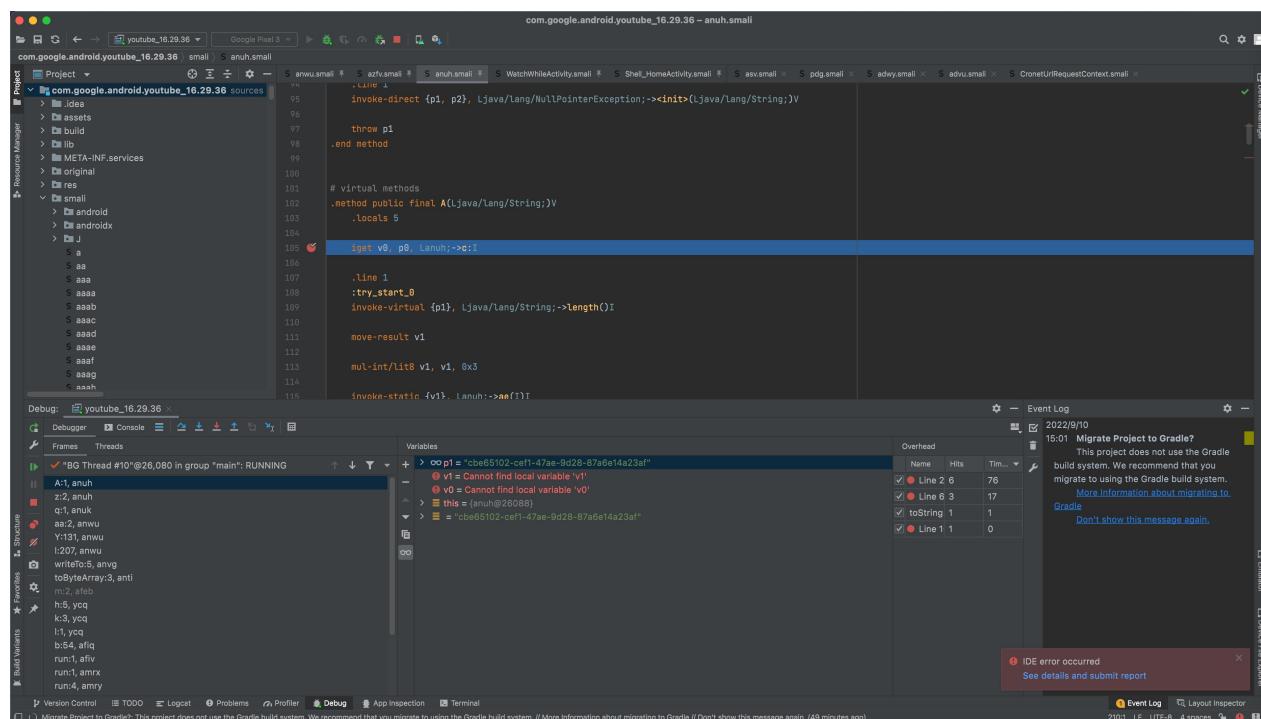
调试Smali常见问题

用AS去调试Smali期间，时不时的遇到一些错误，整理如下：

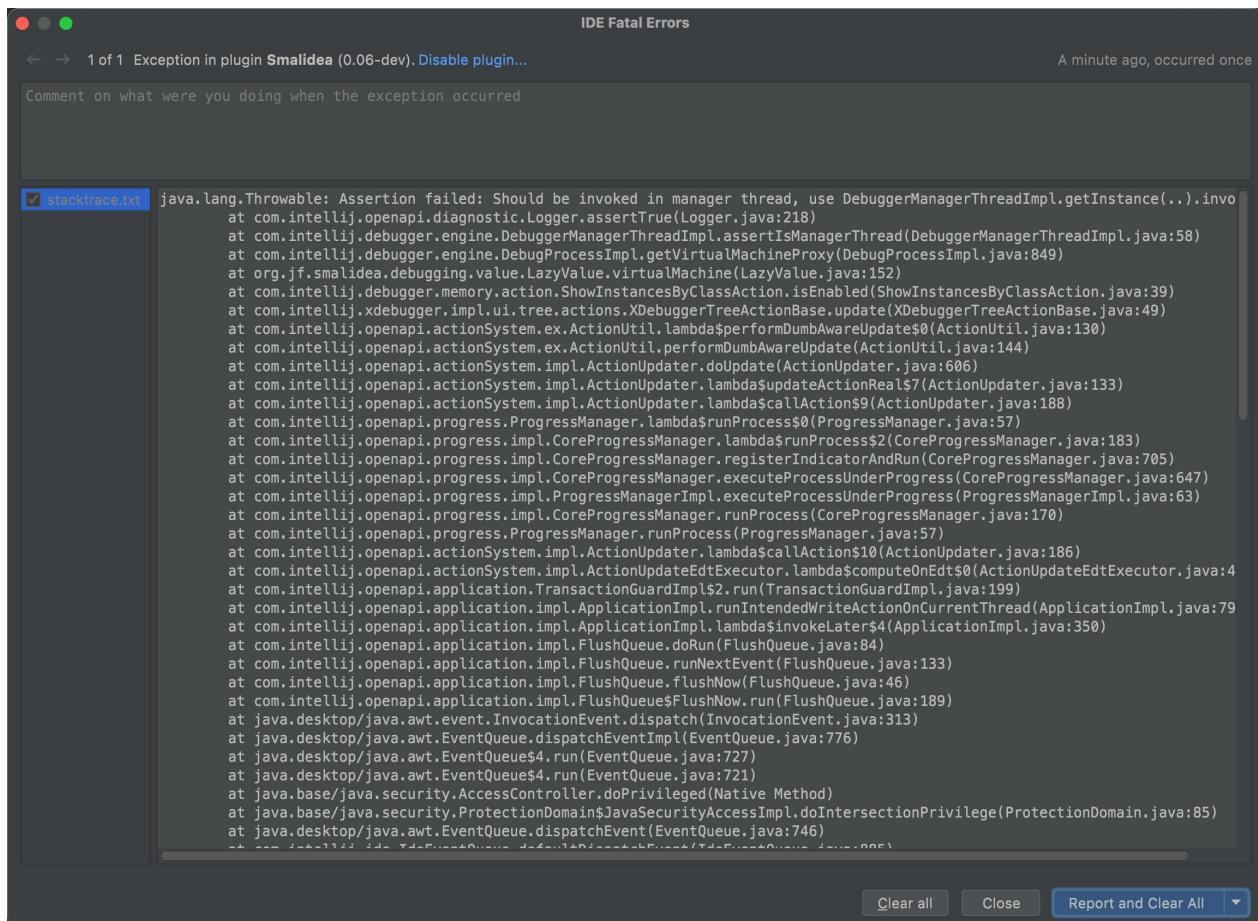
IDE error occurred See details and submit report

- 现象：AS中用Smalidea插件调试smali代码期间，突然的出现报错

IDE error occurred
See details and submit report



点击 [See details and submit report](#)，看到详情：



Exception in plugin Smalidea

```
java.lang.Throwable: Assertion failed: Should be invoked in manager thread, use Debugge
rManagerThreadImpl.getInstance(..).invoke...
    at com.intellij.openapi.diagnostic.Logger.assertTrue(Logger.java:218)
    at com.intellij.debugger.engine.DebuggerManagerThreadImpl.assertIsManagerThread(Debug
erManagerThreadImpl.java:58)
    at com.intellij.debugger.engine.DebugProcessImpl.getVirtualMachineProxy(DebugProce
sImpl.java:849)
    at org.jf.smalidea.debugging.value.LazyValue.virtualMachine(LazyValue.java:152)
    at com.intellij.debugger.memory.action.ShowInstancesByClassAction.isEnabled(ShowIns
tancesByClassAction.java:39)
    at com.intellij.xdebugger.impl.ui.tree.actions.XDebuggerTreeActionBase.update(XDebu
ggerTreeActionBase.java:49)
    at com.intellij.openapi.actionSystem.ex.ActionUtil.lambda$performDumbAwareUpdate$0(
ActionUtil.java:130)
    at com.intellij.openapi.actionSystem.ex.ActionUtil.performDumbAwareUpdate(ActionUti
l.java:144)
    at com.intellij.openapi.actionSystem.impl.ActionUpdater.doUpdate(ActionUpdater.java
:606)
    at com.intellij.openapi.actionSystem.impl.ActionUpdater.lambda$updateActionReal$7(A
ctionUpdater.java:133)
    at com.intellij.openapi.actionSystem.impl.ActionUpdater.lambda$callAction$9(ActionU
pdater.java:188)
    at com.intellij.openapi.progress.ProgressManager.lambda$runProcess$0(ProgressManage
r.java:57)
    at com.intellij.openapi.progress.impl.CoreProgressManager.lambda$runProcess$2(CoreP
rogressManager.java:183)
```

```

    at com.intellij.openapi.progress.impl.CoreProgressManager.registerIndicatorAndRun(C
oreProgressManager.java:705)
    at com.intellij.openapi.progress.impl.CoreProgressManager.executeProcessUnderProgre
ss(CoreProgressManager.java:647)
    at com.intellij.openapi.progress.impl.ProgressManagerImpl.executeProcessUnderProgre
ss(ProgressManagerImpl.java:63)
    at com.intellij.openapi.progress.impl.CoreProgressManager.runProcess(CoreProgressMa
nager.java:170)
    at com.intellij.openapi.progress.ProgressManager.runProcess(ProgressManager.java:57)

    at com.intellij.openapi.actionSystem.impl.ActionUpdater.lambda$callAction$10(Action
Updater.java:186)
    at com.intellij.openapi.actionSystem.impl.ActionUpdateEdtExecutor.lambda$computeOnE
dt$0(ActionUpdateEdtExecutor.java:45)
    at com.intellij.openapi.application.TransactionGuardImpl$2.run(TransactionGuardImpl
.java:199)
    at com.intellij.openapi.application.impl.ApplicationImpl.runIntendedWriteActionOnCu
rrentThread(ApplicationImpl.java:794)
    at com.intellij.openapi.application.impl.ApplicationImpl.lambda$invokeLater$4(Appli
cationImpl.java:350)
    at com.intellij.openapi.application.impl.FlushQueue.doRun(FlushQueue.java:84)
    at com.intellij.openapi.application.impl.FlushQueue.runNextEvent(FlushQueue.java:133
)
    at com.intellij.openapi.application.impl.FlushQueue.flushNow(FlushQueue.java:46)
    at com.intellij.openapi.application.impl.FlushQueue$FlushNow.run(FlushQueue.java:189
)
    at java.desktop/java.awt.event.InvocationEvent.dispatch(InvocationEvent.java:313)
    at java.desktop/java.awt.EventQueue.dispatchEventImpl(EventQueue.java:776)
    at java.desktop/java.awt.EventQueue$4.run(EventQueue.java:727)
    at java.desktop/java.awt.EventQueue$4.run(EventQueue.java:721)
    at java.base/java.security.AccessController.doPrivileged(Native Method)
    at java.base/java.security.ProtectionDomain$JavaSecurityAccessImpl.doIntersectionPr
ivilege(ProtectionDomain.java:85)
    at java.desktop/java.awt.EventQueue.dispatchEvent(EventQueue.java:746)
    at com.intellij.ide.IdeEventQueue.defaultDispatchEvent(IdeEventQueue.java:885)
    at com.intellij.ide.IdeEventQueue._dispatchEvent(IdeEventQueue.java:754)
    at com.intellij.ide.IdeEventQueue.lambda$dispatchEvent$6(IdeEventQueue.java:441)
    at com.intellij.openapi.progress.impl.CoreProgressManager.computePrioritized(CorePr
ogressManager.java:825)
    at com.intellij.ide.IdeEventQueue.lambda$dispatchEvent$7(IdeEventQueue.java:440)
    at com.intellij.openapi.application.impl.ApplicationImpl.runIntendedWriteActionOnCu
rrentThread(ApplicationImpl.java:794)
    at com.intellij.ide.IdeEventQueue.dispatchEvent(IdeEventQueue.java:486)
    at com.intellij.openapi.actionSystem.impl.Utils.lambda$expandActionGroupImpl$1(Util
s.java:166)
    at com.intellij.openapi.actionSystem.impl.Utils.runLoopAndWaitForFuture(Utils.java:
530)
    at com.intellij.openapi.actionSystem.impl.Utils.expandActionGroupImpl(Utils.java:159
)
    at com.intellij.openapi.actionSystem.impl.Utils.fillMenu(Utils.java:244)
    at com.intellij.openapi.actionSystem.impl.ActionPopupMenuImpl$MyMenu.lambda$updateC
hildren$1(ActionPopupMenuImpl.java:180)
    at com.intellij.util.TimeoutUtil.run(TimeoutUtil.java:104)
    at com.intellij.openapi.actionSystem.impl.ActionPopupMenuImpl$MyMenu.lambda$updateC
hildren$3(ActionPopupMenuImpl.java:179)
    at com.intellij.openapi.actionSystem.impl.Utils.performWithRetries(Utils.java:570)

```

```

    at com.intellij.openapi.actionSystem.impl.ActionPopupMenuImpl$MyMenu.updateChildren(
ActionPopupMenuImpl.java:178)
    at com.intellij.openapi.actionSystem.impl.ActionPopupMenuImpl$MyMenu.show(ActionPop
upMenuImpl.java:138)
    at com.intellij.ui.PopupHandler$2.invokePopup(PopupHandler.java:130)
    at com.intellij.ui.PopupHandler.mousePressed(PopupHandler.java:48)
    at java.desktop/java.awt.AWTEventMulticaster.mousePressed(AWTEventMulticaster.java:
288)
    at java.desktop/java.awt.AWTEventMulticaster.mousePressed(AWTEventMulticaster.java:
287)
    at java.desktop/java.awt.AWTEventMulticaster.mousePressed(AWTEventMulticaster.java:
287)
    at java.desktop/java.awt.AWTEventMulticaster.mousePressed(AWTEventMulticaster.java:
287)
    at java.desktop/java.awt.AWTEventMulticaster.mousePressed(AWTEventMulticaster.java:
287)
    at java.desktop/java.awt.Component.processMouseEvent(Component.java:6649)
    at java.desktop/javax.swing.JComponent.processMouseEvent(JComponent.java:3345)
    at com.intellij.ui.treeStructure.Tree.processMouseEvent(Tree.java:394)
    at com.intellij.ide.dnd.aware.DnDAwareTree.processMouseEvent(DnDAwareTree.java:44)
    at java.desktop/java.awt.Component.dispatchEvent(Component.java:6417)
    at java.desktop/java.awt.Container.dispatchEvent(Container.java:2263)
    at java.desktop/java.awt.Component.dispatchEventImpl(Component.java:5027)
    at java.desktop/java.awt.Container.dispatchEventImpl(Container.java:2321)
    at java.desktop/java.awt.Component.dispatchEvent(Component.java:4859)
    at java.desktop/java.awt.LightweightDispatcher.retargetMouseEvent(Container.java:49
18)
    at java.desktop/java.awt.LightweightDispatcher.processMouseEvent(Container.java:4544
)
    at java.desktop/java.awt.LightweightDispatcher.dispatchEvent(Container.java:4488)
    at java.desktop/java.awt.Container.dispatchEventImpl(Container.java:2307)
    at java.desktop/java.awt.Window.dispatchEventImpl(Window.java:2784)
    at java.desktop/java.awt.Component.dispatchEvent(Component.java:4859)
    at java.desktop/java.awt.EventQueue.dispatchEventImpl(EventQueue.java:778)
    at java.desktop/java.awt.EventQueue$4.run(EventQueue.java:727)
    at java.desktop/java.awt.EventQueue$4.run(EventQueue.java:721)
    at java.base/java.security.AccessController.doPrivileged(Native Method)
    at java.base/java.security.ProtectionDomain$JavaSecurityAccessImpl.doIntersectionPr
ivilege(ProtectionDomain.java:85)
    at java.base/java.security.ProtectionDomain$JavaSecurityAccessImpl.doIntersectionPr
ivilege(ProtectionDomain.java:95)
    at java.desktop/java.awt.EventQueue$5.run(EventQueue.java:751)
    at java.desktop/java.awt.EventQueue$5.run(EventQueue.java:749)
    at java.base/java.security.AccessController.doPrivileged(Native Method)
    at java.base/java.security.ProtectionDomain$JavaSecurityAccessImpl.doIntersectionPr
ivilege(ProtectionDomain.java:85)
    at java.desktop/java.awt.EventQueue.dispatchEvent(EventQueue.java:748)
    at com.intellij.ide.IdeEventQueue.defaultDispatchEvent(IdeEventQueue.java:885)
    at com.intellij.ide.IdeEventQueue.dispatchMouseEvent(IdeEventQueue.java:814)
    at com.intellij.ide.IdeEventQueue._dispatchEvent(IdeEventQueue.java:751)
    at com.intellij.ide.IdeEventQueue.lambda$dispatchEvent$6(IdeEventQueue.java:441)
    at com.intellij.openapi.progress.impl.CoreProgressManager.computePrioritized(CorePr
ogressManager.java:825)
    at com.intellij.ide.IdeEventQueue.lambda$dispatchEvent$7(IdeEventQueue.java:440)
    at com.intellij.openapi.application.impl.ApplicationImpl.runIntendedWriteActionOnCu
rrentThread(ApplicationImpl.java:794)

```

```
at com.intellij.ide.IdeEventQueue.dispatchEvent(IdeEventQueue.java:492)
at java.desktop/java.awt.EventQueue.pumpOneEventForFilters(EventDispatchThread.java:203)
at java.desktop/java.awt.EventQueue.pumpEventsForFilter(EventDispatchThread.java:124)
at java.desktop/java.awt.EventQueue.pumpEventsForHierarchy(EventDispatchThread.java:113)
at java.desktop/java.awt.EventQueue.pumpEvents(EventDispatchThread.java:109)
)
at java.desktop/java.awt.EventQueue.pumpEvents(EventDispatchThread.java:101)
)
at java.desktop/java.awt.EventQueue.run(EventDispatchThread.java:90)
```

- 原因：Smalidea插件的bug
- 解决办法：暂无

lldb调试安卓

此处介绍如何用LLDB去调试安卓app（进程）。

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Mac中：下载安卓版lldb-server

从网上下载lldb-server到Mac

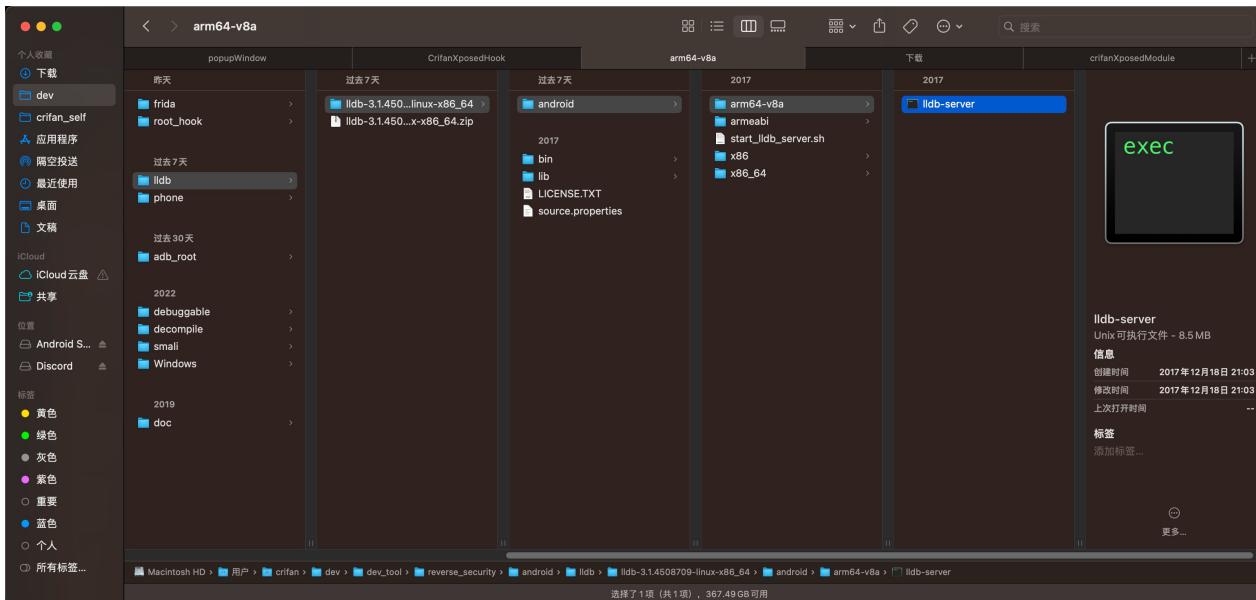
[Android SDK Offline: Android NDK LLDB Direct Download](https://dl.google.com/android/repository/lldb-3.1.4508709-darwin-x86_64.zip)

->

https://dl.google.com/android/repository/lldb-3.1.4508709-darwin-x86_64.zip

下载得到 lldb-3.1.4508709-darwin-x86_64.zip，解压后得到：

lldb-3.1.4508709-linux-x86_64/android/arm64-v8a/lldb-server



确认文件类型是ARM64的：

```
→ arm64-v8a ll
total 16568
-rwxr-xr-x@ 1 crifan  staff  8.1M 12 18  2017 lldb-server

→ arm64-v8a file lldb-server
lldb-server: ELF 64-bit LSB shared object, ARM aarch64, version 1 (SYSV), dynamically linked, interpreter /system/bin/linker64, BuildID[sha1]=16479c73b494c432c5f171db2bb68f29
e033f157, stripped
```

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Mac中：把lldb-server下载到安卓手机中

从Mac下载lldb-server到此处安卓手机Pixel5中：

```
adb push lldb-3.1.4508709-linux-x86_64/android/arm64-v8a/lldb-server /data/local/tmp
```

注：

- 此处安卓手机正常默认情况下，已有路径：`/data/local/tmp`
 - 专门供开发相关用途使用
- adb shell中可以确认

```
blueline:/data/local/tmp/ # ls -lh
total 4.0M
-rwxrwxrwx 1 shell shell 8.0M 2017-12-18 21:03 lldb-server
```

- 此处确保有 可执行权限 = x
 - 如果没有，则要去加上

```
chmod +x lldb-server
```

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安卓手机中：运行lldb-server

```
./lldb-server platform --server --listen unix-abstract:///data/local/tmp/dev/lldb_debug.sock &
```

注：

- 此处可以通过ps查看到进程的确在运行

```
blueline:/data/local/tmp/dev/lldb # ps -A | grep lldb
root      27860  7054 10779208 4628 __skb_wait_for_more_packets 0 S lldb-server
```

- 参数含义

- 概述

- COMMANDS

- v[ersion]
 - Prints lldb-server version and exits

- g[dbserver]
 - Runs the server using the gdb-remote protocol. LLDB can afterwards connect to the server using gdb-remote command

- p[latform]
 - Runs the platform server. LLDB can afterwards connect to the server using platform select, followed by platform connect

- PLATFORM COMMAND

- 语法

```
lldb-server p[latform] [options] -server -listen [[host]:port]
```

- CONNECTION

- --server
 - Run in server mode, handling multiple connections. If this is not specified, lldb-server will accept only one connection and exit when it is finished

- --listen <host>:<port>

- Hostname and port to listen on. Obligatory. If port is zero, a random port will be used

- --socket-file <path>

- Write the listening socket port number to the specified file

- 详解

- [lldb-server – Server for LLDB Debugging Sessions — The LLDB Debugger](#)

Mac中：用lldb客户端去连接lldb-server

- 进入=启动=运行 lldb

```
lldb
```

- 设置要连接的类型是：远端的安卓手机

```
platform select remote-android
```

- 输出举例

```
(lldb) platform select remote-android
Platform: remote-android
Connected: no
```

- 连接安卓（中的lldb-server）

```
platform connect unix-abstract-connect:///data/local/tmp/dev/lldb_debug.sock
```

- 输出举例

```
(lldb) platform connect unix-abstract-connect:///data/local/tmp/dev/lldb_debug.sock
Platform: remote-android
Triple: aarch64-unknown-linux-android
OS Version: 30 (4.9.248-gc4689af91bc5-ab7425221)
Hostname: localhost
Connected: yes
WorkingDir: /data/local/tmp/dev/lldb
Kernel: #0 SMP PREEMPT Fri Jun 4 06:01:28 UTC 2021
```

注：

- 可以用 platform list 查看全部的支持的类型有哪些

```
(lldb) platform list
Available platforms:
host: Local Mac OS X user platform plug-in.
remote-linux: Remote Linux user platform plug-in.
remote-android: Remote Android user platform plug-in.
remote-freebsd: Remote FreeBSD user platform plug-in.
remote-gdb-server: A platform that uses the GDB remote protocol as the communication transport.
darwin: Darwin platform plug-in.
remote-ios: Remote iOS platform plug-in.
remote-macosx: Remote Mac OS X user platform plug-in.
ios-simulator: iPhone simulator platform plug-in.
tvos-simulator: tvOS simulator platform plug-in.
watchos-simulator: Apple Watch simulator platform plug-in.
darwin-kernel: Darwin Kernel platform plug-in.
remote-tvos: Remote Apple TV platform plug-in.
```

```
remote-watchos: Remote Apple Watch platform plug-in.  
remote-bridgeos: Remote BridgeOS platform plug-in.  
host: Local Mac OS X user platform plug-in.  
remote-netbsd: Remote NetBSD user platform plug-in.  
remote-openbsd: Remote OpenBSD user platform plug-in.  
qemu-user: Platform for debugging binaries under user mode qemu  
remote-windows: Remote Windows user platform plug-in.
```

- 连接前后，都可以去查看和验证实际状态（是否是希望的已连接）

```
platform status
```

- 举例

- 连接前

```
(lldb) platform status  
Platform: remote-android  
Connected: no
```

- 连接后

```
(lldb) platform status  
Platform: remote-android  
Triple: aarch64-unknown-linux-android  
OS Version: 30 (4.9.248-gc4689af91bc5-ab7425221)  
Hostname: localhost  
Connected: yes  
WorkingDir: /data/local/tmp/dev/lldb  
Kernel: #0 SMP PREEMPT Fri Jun 4 06:01:28 UTC 2021
```

Mac中：用lldb调试安卓app进程

- 背景
 - 被测安卓的app
 - app名称: Lift File Manager
 - 包名: com.lift.filemanager.android
 - 主页面



然后可以用lldb去调试安卓app（进程）了：

```
process attach -p 24058
```

- 说明
 - attach : 当前用挂载模式（而不是spawn模式）
 - -p 24058
 - -p == --pid : 进程的PID
 - 24058 : 当前安卓app的（主）进程的PID

输出举例

- 命令行输出：

```
(lldb) process attach -p 24058
warning: (aarch64) /Users/crifan/.lldb/module_cache/remote-android/.cache/8B041FC2-79D5
-1089-00E4-8324BAFA5142/app_process64 No LZMA support found for reading .gnu_debugdata
section
warning: (aarch64) /Users/crifan/.lldb/module_cache/remote-android/.cache/1DEC5134-A095
-22F9-C83C-48DAE0AEC3BE/libandroid_runtime.so No LZMA support found for reading .gnu_de
bugdata section
warning: (aarch64) /Users/crifan/.lldb/module_cache/remote-android/.cache/52A96623-E462
-0961-84C4-425671CC1C5D/libbinder.so No LZMA support found for reading .gnu_debugdata s
ection
warning: (aarch64) /Users/crifan/.lldb/module_cache/remote-android/.cache/ED5D3D46-2F5F
-F1ED-D424-A588996F33C8/libcutils.so No LZMA support found for reading .gnu_debugdata s
ection
...
...
...
warning: (aarch64) /Users/crifan/.lldb/module_cache/remote-android/.cache/68482D47-6551
-C4A4-AE65-B2B4FC4E6ABA/libGLESv2_adreno.so No LZMA support found for reading .gnu_debu
gdata section
warning: (aarch64) /Users/crifan/.lldb/module_cache/remote-android/.cache/7A027C1B-6689
-FB13-BC4C-DDF60D309D9F/libl1vm_glnext.so No LZMA support found for reading .gnu_debugd
ata section
warning: (aarch64) /Users/crifan/.lldb/module_cache/remote-android/.cache/28A702E7-CF8C
-5CCC-2481-D2DD8B341E1B/libcompiler_rt.so No LZMA support found for reading .gnu_debugd
ata section
warning: (aarch64) /Users/crifan/.lldb/module_cache/remote-android/.cache/11A028BE-C11F
-BD95-B235-8593B25A1887/libwebviewchromium_loader.so No LZMA support found for reading
.gnu_debugdata section
Process 24058 stopped
* thread #1, name = 'er.android:sist', stop reason = signal SIGSTOP
  frame #0: 0x000000707075bf38 libc.so`__epoll_pwait + 8
libc.so`__epoll_pwait:
-> 0x707075bf38 <+8>: cmn    x0, #0x1, lsl #12          ; =0x1000
  0x707075bf3c <+12>: cneg   x0, x0, hi
  0x707075bf40 <+16>: b.hi  0x707075a820          ; __set_errno_internal
  0x707075bf44 <+20>: ret
thread #2, name = 'Signal Catcher', stop reason = signal SIGSTOP
  frame #0: 0x000000707075b978 libc.so`__rt_sigtimedwait + 8
libc.so`__rt_sigtimedwait:
-> 0x707075b978 <+8>: cmn    x0, #0x1, lsl #12          ; =0x1000
  0x707075b97c <+12>: cneg   x0, x0, hi
  0x707075b980 <+16>: b.hi  0x707075a820          ; __set_errno_internal
  0x707075b984 <+20>: ret
thread #3, name = 'perfetto_hprof_', stop reason = signal SIGSTOP
  frame #0: 0x000000707075acf4 libc.so`read + 4
libc.so`read:
-> 0x707075acf4 <+4>: svc    #0
  0x707075acf8 <+8>: cmn    x0, #0x1, lsl #12          ; =0x1000
  0x707075acfc <+12>: cneg   x0, x0, hi
  0x707075ad00 <+16>: b.hi  0x707075a820          ; __set_errno_internal
...
...
...
```

```
thread #21, name = 'queued-work-loo', stop reason = signal SIGSTOP
  frame #0: 0x000000707075bf38 libc.so`__epoll_pwait + 8
libc.so`__epoll_pwait:
-> 0x707075bf38 +8 : cmn    x0, #0x1, lsl #12          ; =0x1000
  0x707075bf3c +12 : cneg   x0, x0, hi
  0x707075bf40 +16 : b.hi   0x707075a820                  ; __set_errno_internal
  0x707075bf44 +20 : ret
Target 0: (app_process64) stopped.
Executable module set to "/Users/crifan/.lldb/module_cache/remote-android/.cache/8B041F
C2-79D5-1089-00E4-8324BAFA5142/app_process64".
Architecture set to: aarch64-unknown-linux-android.
(lldb)
```

- 截图

◦

◦

常见问题

error Connection shut down by remote side while waiting for reply to initial handshake packet

- 现象：lldb去连接安卓中lldb-server时报错：

```
(lldb) platform connect unix-abstract-connect:///data/local/tmp/dev/lldb/lldb_debug.sock
error: Connection shut down by remote side while waiting for reply to initial handshake packet
```

-
- 原因：此处Android 13已开启了SELinux，导致无法连接
- 解决办法：去关于SELinux
 - 有2种方式
 - 永久关闭：需要修改Android源码，重新编译ROM或boot.img
 - 此处暂时没条件，暂时放弃此路
 - 临时关闭：通过参数设置关闭
 - 具体命令

```
adb shell setenforce 0
```
 - 或：
 - 先 adb shell 进入shell，再 su 切换成root用户，再用 setenforce 0 去关闭 SELinux
 - （之前和之后都可以）用 getenforce 去确认=查看当前SELinux状态
 - Enforcing : SELinux已开启

```
1redfin:/data/local/tmp/dev/lldb # getenforce
Enforcing
```
 - Permissive : SELinux已关闭

```
redfin:/data/local/tmp/dev/lldb # getenforce
Permissive
```

心得

如何查看安卓app的进程的PID

有多种方式查看到，（当前正在运行的）安卓app的进程的PID：

- Mac中

```
frida-ps -Uai
```

- 其中可以看到自己已安装的安卓的app的详情：进程PID、app名称、包名

- 举例

```
→ LiftFileManager_jadx_AlarmManager frida-ps -Uai | grep lift
24058 Lift File Manager com.lift.filemanager.android
```

- 可以看到要测试的app的：

- 进程PID： 24058
- app名称： Lift File Manager
- 包名： com.lift.filemanager.android

- (安卓手机的) adb的shell中

```
ps -A | grep yourAndroidAppName
```

- 举例

```
redfin:/ # ps -A | grep lift
u0_a243      24058 1008 33543564 207388 do_epoll_wait      0 S com.lift.filema
nager.android
u0_a243      xxxx 1008 14793148 119908 do_epoll_wait      0 S com.lift.filema
nager.android:sist
u0_a243      xxxx 1008 14754236 139864 do_epoll_wait      0 S com.lift.filema
nager.android:dae
u0_a243      xxxx 1008 14734752 109496 do_epoll_wait      0 S com.lift.filema
nager.android:lift
```

- LiftFileManager的主进程PID是： 24058

如何用lldb调试程序

之后就是，如何用lldb调试的具体效果了。

举例：

去看看加载的image：

```
(lldb) image list -o -f
(lldb) image list -o -f
[ 0] 0x0000006524034000 /Users/crifan/.lldb/module_cache/remote-android/.cache/8B041FC
2-79D5-1089-00E4-8324BAFA5142/app_process64
[ 1] 0x0000007075ae9000 [vdso](0x0000007075ae9000)
[ 2] 0x0000007075aea000 /Users/crifan/.lldb/module_cache/remote-android/.cache/0714FD9
0-1698-1186-FE9E-FC2187186124/linker64
[ 3] 0x00000070728d6000 /Users/crifan/.lldb/module_cache/remote-android/.cache/1DEC513
4-A095-22F9-C83C-48DAE0AEC3BE/libandroid_runtime.so
[ 4] 0x000000706fe94000 /Users/crifan/.lldb/module_cache/remote-android/.cache/52A9662
```

```

3-E462-0961-84C4-425671CC1C5D/libbinder.so
[ 5] 0x000000707044c000 /Users/crifan/.lldb/module_cache/remote-android/.cache/ED5D3D4
6-2F5F-F1ED-D424-A588996F33C8/libcutils.so
[ 6] 0x0000007070e09000 /Users/crifan/.lldb/module_cache/remote-android/.cache/CE1E7F5
F-3909-217B-2745-8673575C5CBE/libhidlbase.so
[ 7] 0x0000007070f9e000 /Users/crifan/.lldb/module_cache/remote-android/.cache/661D436
6-5D5E-C814-EC19-1E5D951FE16A/liblog.so
[ 8] 0x0000007073549000 /Users/crifan/.lldb/module_cache/remote-android/.cache/5D6AF74
1-2421-1886-D954-D61C96514A46/libutils.so
[ 9] 0x000000706f681000 /Users/crifan/.lldb/module_cache/remote-android/.cache/584DB18
9-C827-EFEF-DD92-857A7E567C38/libwilhelm.so
[ 10] 0x0000007072800000 /Users/crifan/.lldb/module_cache/remote-android/.cache/0258740
B-928B-138C-E564-C516FD6B9141/libc++.so
[ 11] 0x00000070706c0000 /Users/crifan/.lldb/module_cache/remote-android/.cache/49090AE
5-9E6A-E37F-8BEA-E53C551820AD/libc.so
[ 12] 0x000000706f703000 /Users/crifan/.lldb/module_cache/remote-android/.cache/1B99BAD
0-6575-7949-B4B5-3A0C1FD55A0D/libm.so
[ 13] 0x000000706f956000 /Users/crifan/.lldb/module_cache/remote-android/.cache/316B312
0-5B8A-84EF-BC6D-1492C06AEEB8/libdl.so
[ 14] 0x0000007072482000 /Users/crifan/.lldb/module_cache/remote-android/.cache/01A12DD
5-2243-73ED-CC3A-74506F64A9C9/libbase.so
...
[ 265] 0x0000006dc2241000 /Users/crifan/.lldb/module_cache/remote-android/.cache/7A027C1
B-6689-FB13-BC4C-DDF60D309D9F/libllvmm-glnext.so
[ 266] 0x0000006dc1e86000 /Users/crifan/.lldb/module_cache/remote-android/.cache/EF21915
6-ADF1-D883-C02F-44E4C1FC04B2/libGLESv1_CM_adreno.so
[ 267] 0x0000006dc1e69000 /Users/crifan/.lldb/module_cache/remote-android/.cache/FFCCE96
5-AAA2-1D95-77F2-CF1708C764B7/eglSubDriverAndroid.so
[ 268] 0x0000006dc1d8b000 /Users/crifan/.lldb/module_cache/remote-android/.cache/28A702E
7-CF8C-5CCC-2481-D2DD8B341E1B/libcompiler_rt.so
[ 269] 0x0000006dc1d42000 /Users/crifan/.lldb/module_cache/remote-android/.cache/11A028B
E-C11F-BD95-B235-8593B25A1887/libwebviewchromium_loader.so
[ 270] JIT(0x99ddaa8b0)(0x00000000099ddaa8b0)
[ 271] JIT(0x99ddaa350)(0x00000000099ddaa350)
[ 272] JIT(0x99ddaa010)(0x00000000099ddaa010)
...
[ 338] JIT(0x95dd2cd0)(0x00000000095dd2cd0)
[ 339] JIT(0x95dd28d0)(0x00000000095dd28d0)
[ 340] JIT(0x95dd2450)(0x00000000095dd2450)
(lldb)

```

- 截图

◦

◦

其他更多关于LLDB的用法，详见独立子教程：

[主流调试器：LLDB](#)

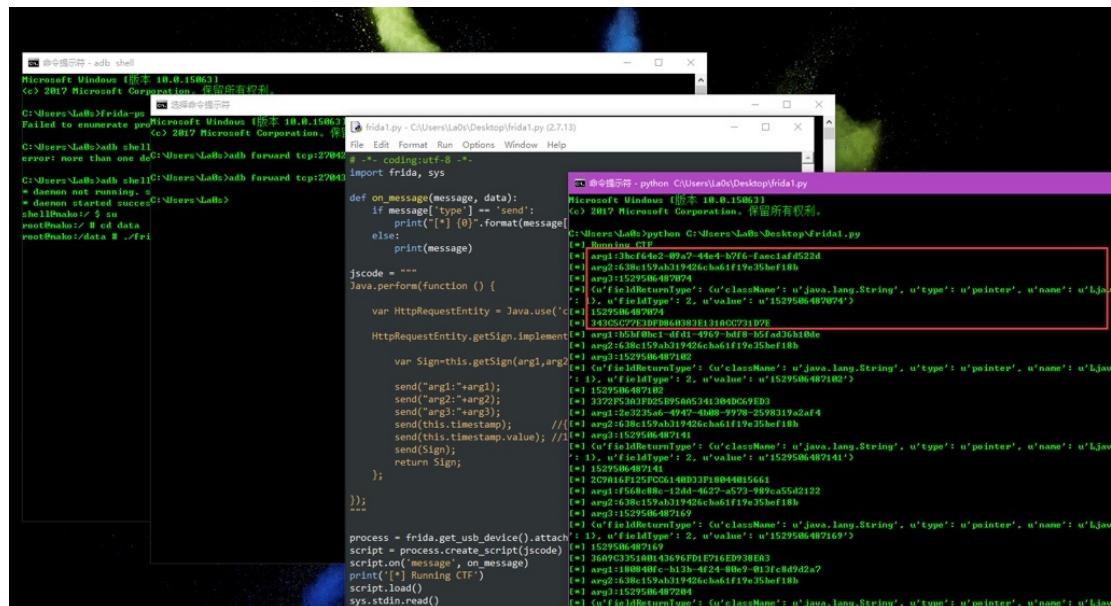
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Frida调试安卓

- Frida
 - 概述
 - iOS逆向和Android逆向中常用的动态调试工具之一
 - 用于动态调试程序逻辑，实现各种调试功能
 - 核心使用逻辑是 frida+js脚本，或 frida-trace 追踪函数执行过程
 - 以及高级的 Frida 的 Stalker 追踪函数实际运行过程等等
 - 主页
 - 官网
 - <https://frida.re/>
 - Github
 - <https://github.com/frida/frida>

◦ 截图

- Windows



- Mac

```

root@192.168.2.13 (ssh) 31% 65% 11 GB 4.1 kB 4.1 kB 3/14, 16:10 ..\ciDebug/frida (-zsh)
Failed to spawn: unable to find process with name 'Preferences'
* crifan@LicrifandeMacBook-Pro ~/dev/dev_root/iosReverse/AppleStore/Preferences.app/dynamicDebug/frida frida -U -l ./hookAccountLogin.js -n Preferences
    / [ ] Frida 16.0.10 - A world-class dynamic instrumentation toolkit
    | [ ] Commands:
    / [ ] help      -> Displays the help system
    . [ ] object?   -> Display information about 'object'
    . [ ] exit/quit -> Exit
    . [ ] More info at https://frida.re/docs/home/
    . [ ] Connected to iPhone (id=abdc0dd961c3cb96f5c4afe109de4eb48b88433a)
Failed to spawn: unable to find process with name 'Preferences'
* crifan@LicrifandeMacBook-Pro ~/dev/dev_root/iosReverse/AppleStore/Preferences.app/dynamicDebug/frida frida -U -l ./hookAccountLogin.js -n 18031
    / [ ] Frida 16.0.10 - A world-class dynamic instrumentation toolkit
    | [ ] Commands:
    / [ ] help      -> Displays the help system
    . [ ] object?   -> Display information about 'object'
    . [ ] exit/quit -> Exit
    . [ ] More info at https://frida.re/docs/home/
    . [ ] Connected to iPhone (id=abdc0dd961c3cb96f5c4afe109de4eb48b88433a)
Attaching...
+ AAUISignInViewController phoneNumberSupportedWithCompletion:[::]0x1b30c82f4
- AAUISignInViewController textField:shouldChangeCharactersInRange:replacementString:[::]0x1b30ce4bc
- AAUISignInViewController tableView:viewForHeaderInSection:[::]0x1b30ce40c
- AAUISignInViewController textFieldShouldReturn:[::]0xb30ce47c
- AAUISignInViewController _keyboardWillHide:[::]0xb30cd40
- AAUISignInViewController titleLabel:[::]0xb30c954c
- AAUISignInViewController _keyboardWillShow:[::]0xb30cd7e8
- AAUISignInViewController loadView:[::]0xb30c972c
- AAUISignInViewController setUsername:[::]0xb30c9ce8fc
- AAUISignInViewController sizeCategoryDidChange:[::]0xb30cd64
- AAUISignInViewController _handleDidContentSizeChange:[::]0xb30cd5ec
- AAUISignInViewController tableView:[::]0xb30ce80c
- AAUISignInViewController tableView: numberOfRowsInSectionInSection:[::]0xb30ce170
- AAUISignInViewController tableView:cellForRowAtIndexPath:[::]0xb30c97fc
- AAUISignInViewController tableView:[::]0xb30c9a70
- AAUISignInViewController delegate:[::]0xb30c9798
- AAUISignInViewController authenticationContext:[::]0xb30c92c4
- AAUISignInViewController _setEnabled:[::]0xb30cb778
- AAUISignInViewController _tableFooterView:[::]0xb30ca644
- AAUISignInViewController viewWillAppears:[::]0xb30cd7fc
- AAUISignInViewController tableView:willDisplayCell:forRowAtIndexPath:[::]0xb30ce3a8
- AAUISignInViewController remoteUIController:shouldLoadRequest:redirectResponse:[::]0xb30ce000
- AAUISignInViewController .cxx_destruct:[::]0xb30ce884
- AAUISignInViewController numberOfRowsInSectionTableview:[::]0xb30ce168
- AAUISignInViewController viewDidDisappear:[::]0xb30c91e1
- AAUISignInViewController traitCollectionDidChange:[::]0xb30ce5cc
- AAUISignInViewController initWithCoder:[::]0xb30c86dc
- AAUISignInViewController tableView:heightForRowAt IndexPath:[::]0xb30ce324
- AAUISignInViewController tableView:viewForFooterInSection:[::]0xb30ce440
- AAUISignInViewController tableView:cellForRowAt IndexPath:[::]0xb30ce1b0

```

- 详解

- 独立子教程

- 逆向调试利器：Frida

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初始化Frida开发环境

电脑端安装Frida

- 概述
 - Mac
 - 安装 frida (和 frida-tools)

```
pip3 install frida  
pip3 install frida-tools
```

- 或：已有frida，去升级到最新版

```
pip install --upgrade frida  
pip install --upgrade frida-tools
```

- 详解
 - 安装Frida · 逆向调试利器：Frida

此处已安装的（最新）Frida版本是： 16.1.3

```
→ ~ frida --version  
16.1.3
```

安卓手机中安装frida-server

由于之前手动从下载frida-server并放到安卓手机Pixel3中，结果后续会报错 Failed to enumerate processes connection closed，而无法使用

最后解决办法是：安装Magisk的插件：

[ViRb3/magisk-frida: Run frida-server on boot with Magisk, always up-to-date](#)

具体步骤：

下载到此处最新版的：

<https://github.com/ViRb3/magisk-frida/releases/download/16.1.3-1/MagiskFrida-16.1.3-1.zip>

得到： MagiskFrida-16.1.3-1.zip

（用adb push）传输到安卓手机中（的下载目录）

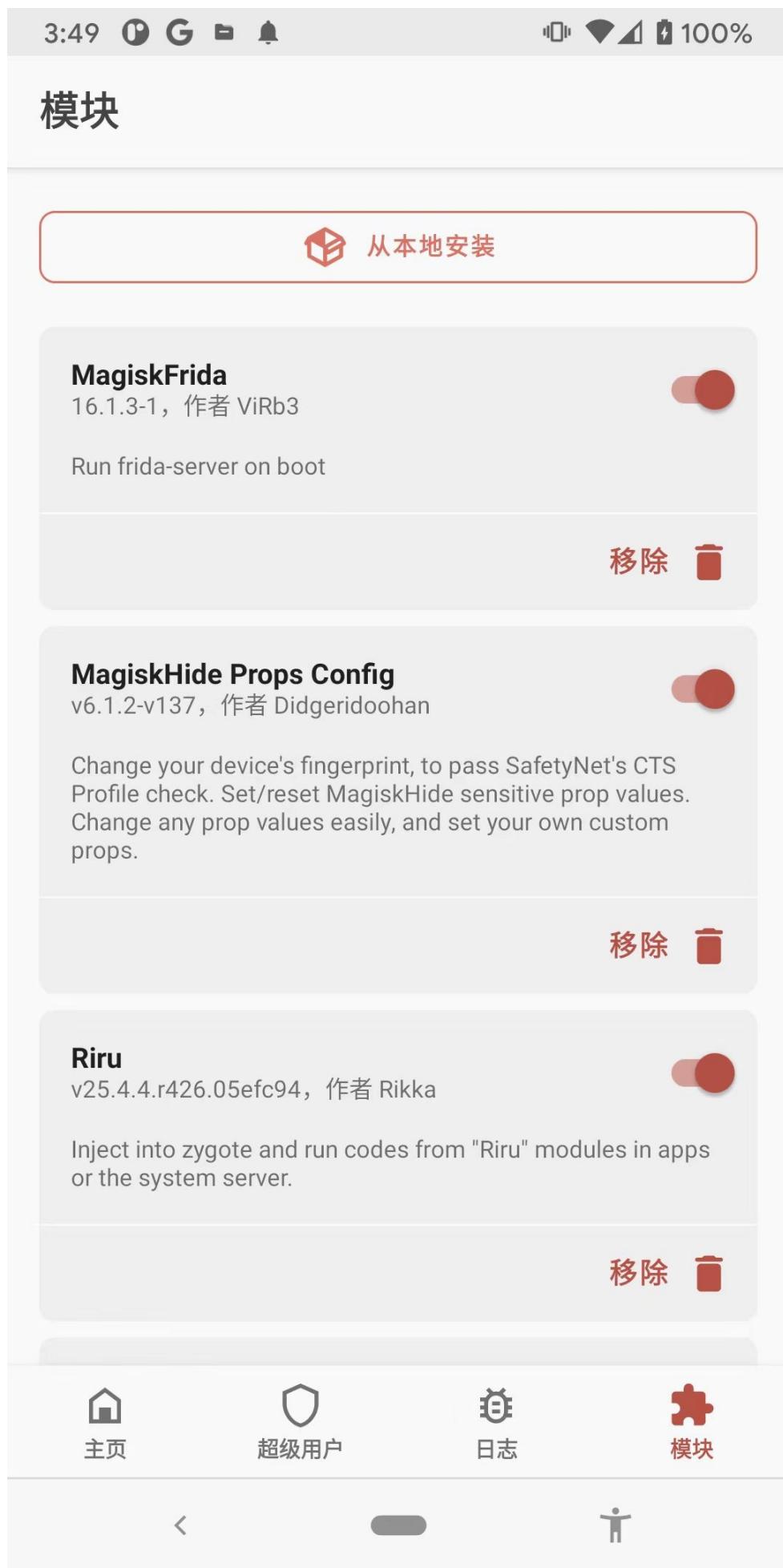
然后去：

Magisk -> 模块 -> 从本地安装 -> 找到并点击 MagiskFrida-16.1.3-1.zip -> 开始自动安装->重启

（以后）每次重启安卓手机后：

- 可以看到Magisk中的插件： MagiskFrida

◦



- 都会自动运行frida-server

```
blueline:/ # ps -A | grep frida
root          4408  1321 10877092  3696 do_sys_poll      0 S frida-server
```

后续即可正常使用 Frida :

Mac中用确认frida工具可用

- 可用的

- frida-ps

```
frida-ps -U
frida-ps -Uai
```

- frida

```
frida -U -F com.example.displaydemo
```

- frida-trace

```
frida-trace -U -F com.example.displaydemo -i open
```

- 不可用

- frida-ls

```
→ frida frida-ls -U
Failed to retrieve listing: Error: Invalid mode: 0x0
at I (agent.ts:274)
at L (agent.ts:274)
at ls (agent.ts:274)
at apply (native)
at <anonymous> (frida/runtime/message-dispatcher.js:13)
at c (frida/runtime/message-dispatcher.js:23)
```

- 暂时无法解决

Frida调试安卓app

用 frida 或 frida-trace 等工具去调试安卓应用：

找到安卓应用的包名或PID

```
frida-ps -Uai
```

找到此处的要调试的应用：

- 19384 DisplayDemo com.example.displaydemo
 - =>
 - app名: DisplayDemo
 - 包名: com.example.displaydemo
 - PID: 19384

用 frida 或 frida-trace 去调试

此处手动点击DisplayDemo这个app，确保在前台运行，然后去hook调试：

- frida

```
frida -U -F com.example.displaydemo
```

- 效果



- frida-trace

```
frida-trace -U -F com.example.displaydemo -i open
frida-trace -U -f com.example.displaydemo -i JIN_OnLoad -i RegisterNatives -i open
-i openat
```

- 效果

```

frida-trace -U -F com.example.displaydemo -i open
adb [adb] 341 ~ (-zsh) 342 .._e_scripts/ida (-zsh) 343 .MacOS/plugins (-zsh) 344 .._l/demoApk/apk (-zsh) 345 .._android/frida (-zsh) 346 frida-trace (Python) 347
--runtime {qjs,v8} script runtime to use
--debug enable the Node.js compatible script debugger
--squench-crash if enabled, will not dump crash report to console
-O FILE, --options-file FILE
text file containing additional command line options
--version show program's version number and exit
-l SCRIPT, --load SCRIPT
load SCRIPT
-P PARAMETERS_JSON, --parameters PARAMETERS_JSON
parameters as JSON, same as Gadget
-C USER_CMODULE, --cmodule USER_CMODULE
load CMODULE
--toolchain {any,internal,external}
Module toolchain to use when compiling from source code
-c CODESHARE_URI, --codeshare CODESHARE_URI
load CODESHARE_URI
-e CODE, --eval CODE evaluate CODE
-q quiet mode (no prompt) and quit after -l and -
-t TIMEOUT, --timeout TIMEOUT
seconds to wait before terminating in quiet mode
-pause leave main thread paused after spawning program
-o LOGFILE, --output LOGFILE
output to log file
--externalize externalize the script before exit
--exit-on-error exit with code 1 after encountering any exception in the SCRIPT
--kill-on-exit kill the spawned program when Frida exits
--auto-perform wrap entered code with Java.perform
--auto-reload Enable auto reload of provided scripts and c module (on by default, will be required in the future)
--no-auto-reload Disable auto reload of provided scripts and c module
* frida
* frida-frida-trace -U -F com.example.displaydemo -i open
Instrumenting...
open: Auto-generated handler at "/Users/crifan/dev/dev_tool/reverse_security/android/frida/_handlers/_/libc.so/open.js"
Started tracing 1 function. Press Ctrl+C to stop.
* TID 0x4bd8 /
24006 ms open(path="/data/misc/profiles/cr/0/com.example.displaydemo/primary.prof", oflag=0x80002)
24939 ms open(path="/proc/self/cwdline", oflag=0x80000)
24940 ms open(path="/proc/self/cwdline", oflag=0x80000)
24940 ms open(path="/proc/self/cwdline", oflag=0x80000)
/* TID 0x4bb8 */
26331 ms open(path="/data/app/-Oy0-UMCL5dEcMjvR5ylw==/com.example.displaydemo-ExZ8U1Y8u89h_Mod1C_Q==/lib/arm64/libtacker.so", oflag=0x0)
26334 ms open(path="/data/app/-Oy0-UMCL5dEcMjvR5ylw==/com.example.displaydemo-ExZ8U1Y8u89h_Mod1C_Q==/base.apk", oflag=0x80000)
/* TID 0x4e77 */
26410 ms open(path="/etc/cpufreq", oflag=0x80000)
26412 ms open(path="/data/vendor/gpu/adreno.config.txt", oflag=0x0)
26412 ms open(path="/data/vendor/gpu/adreno.config.txt", oflag=0x0)
26412 ms open(path="/yamato.panel.txt", oflag=0x0)
26412 ms open(path="/data/vendor/gpu/yamato.panel.txt", oflag=0x0)
26412 ms open(path="/data/misc/gpu/yamato.panel.txt", oflag=0x0)

frida-trace -U -f com.example.displaydemo -i JIN_OnLoad -i RegisterNatives -i
~ (-zsh) 341 ~ (-zsh) 342 .._e_scripts/ida (-zsh) 343 .MacOS/plugins (-zsh) 344 .._l/demoApk/apk (-zsh) 345 .._android/frida (-zsh) 346 .._android/frida (-zsh) 347 frida-trace (Python) 348
Lost login: Fri Jul 28 15:05:12 on ttys025
* frida-trace frida-trace -U -f com.example.displaydemo -i JIN_OnLoad -i RegisterNatives -i open -i open
Instrumenting...
open: Auto-generated handler at "/Users/crifan/dev/dev_root/androidReverse/popupSDK_1/libtacker/dynamicDebug/frida/_handlers/_/libc.so/open.js"
open: Auto-generated handler at "/Users/crifan/dev/dev_root/androidReverse/popupSDK_1/libtacker/dynamicDebug/frida/_handlers/_/libc.so/openat.js"
Started tracing 2 functions. Press Ctrl+C to stop.
* TID 0x8dd1 /
795 ms open(path="/data/app/-Oy0-UMCL5dEcMjvR5ylw==/com.example.displaydemo-ExZ8U1Y8u89h_Mod1C_Q==/base.apk", oflag=0x80000)
805 ms open(path="/data/misc/edpo_A2N_rK2b3PtnBqarf/cache/Edpooker_d80f73e34d17c301b40fcd9795d5a600856521.jar", oflag=0x0)
805 ms open(path="/data/misc/edpo_A2N_rK2b3PtnBqarf/cache/Edpooker_d80f73e34d17c301b40fcd9795d5a600856521.jar", oflag=0x0)
813 ms open(path="/proc/self/cwdline", oflag=0x80000)
815 ms open(path="/data/app/-Oy0-UMCL5dEcMjvR5ylw==/com.example.displaydemo-ExZ8U1Y8u89h_Mod1C_Q==/base.apk", oflag=0x0)
815 ms open(path="/data/app/-Oy0-UMCL5dEcMjvR5ylw==/com.example.displaydemo-ExZ8U1Y8u89h_Mod1C_Q==/base.apk", oflag=0x0)
815 ms open(path="/open/com.android.art/javalib/arm64/boot.art", oflag=0x0)
815 ms open(path="/system/framework/arm64/boot-framework.art", oflag=0x0)
821 ms open(path="/data/app/-Oy0-UMCL5dEcMjvR5ylw==/com.example.displaydemo-ExZ8U1Y8u89h_Mod1C_Q==/base.apk", oflag=0x0)
821 ms open(path="/system/framework/arm64/boot-framework.art", oflag=0x0)
822 ms open(path="/system/framework/arm64/boot-framework.art", oflag=0x0)
/* TID 0x8dc4 */
842 ms open(path="/data/vendor/gpu/esx_config.com.example.displaydemo.txt", oflag=0x0)
842 ms open(path="/data/vendor/gpu/esx_config.txt", oflag=0x0)
842 ms open(path="/data/misc/gpu/esx_config.com.example.displaydemo.txt", oflag=0x0)
842 ms open(path="/data/misc/gpu/esx_config.txt", oflag=0x0)
/* TID 0x8dc4 */
976 ms open(path="/data/vendor/gpu/esx_config.com.example.displaydemo.txt", oflag=0x0)
976 ms open(path="/data/vendor/gpu/esx_config.txt", oflag=0x0)
977 ms open(path="/data/vendor/gpu/adreno.config.txt", oflag=0x0)
977 ms open(path="/data/misc/gpu/adreno.config.txt", oflag=0x0)
977 ms open(path="/yamato.panel.txt", oflag=0x0)
977 ms open(path="/data/misc/gpu/yamato.panel.txt", oflag=0x0)
977 ms open(path="/data/vendor/gpu/esx_config.com.example.displaydemo.txt", oflag=0x0)
977 ms open(path="/data/vendor/gpu/esx_config.txt", oflag=0x0)
977 ms open(path="/data/misc/gpu/esx_config.com.example.displaydemo.txt", oflag=0x0)
978 ms open(path="/data/vendor/gpu/esx_config.txt", oflag=0x0)
978 ms open(path="/data/misc/gpu/esx_config.com.example.displaydemo.txt", oflag=0x0)
978 ms open(path="/sys/devices/system/cpu/cpufreq/cpufreq_max_freq", oflag=0x0)
979 ms open(path="/sys/devices/system/cpu/cpufreq/cpufreq_max_freq", oflag=0x0)
979 ms open(path="/sys/devices/system/cpu/cpufreq/cpufreq_max_freq", oflag=0x0)

```

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示例

此处贴出一些，用Frida去调试安卓应用的，相关实例演示。

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LiftFileManager

用 frida 加 js 脚本去调试 com.lift.filemanager.android = LiftFileManager :

命令

```
frida -U -f com.lift.filemanager.android -l hook_LiftFileManager.js
```

js脚本代码

- hook_LiftFileManager.js

```
/*
 * Update: 20230808
 * Usage:
 * frida -U -f com.lift.filemanager.android -l hook_LiftFileManager.js
 */

function processJniOnLoad(libraryName) {
    const funcSym = "JNI_OnLoad";
    const funcPtr = Module.findExportByName(libraryName, funcSym);
    console.log("funcSym=" + funcSym + ", funcPtr=" + funcPtr);

    console.log("[+] Hooking " + funcSym + "() @ " + funcPtr + "...");
    // jint JNI_OnLoad(JavaVM *vm, void *reserved);
    var funcHook = Interceptor.attach(funcPtr, {
        onEnter: function (args) {
            const vm = args[0];
            const reserved = args[1];
            console.log("[+]" + funcSym + "(" + vm + ", " + reserved + ") called");
        },
        onLeave: function (retval) {
            console.log("[+]\t= " + retval);
        }
    });
}

function processNativeFunc(libraryName, nativeFuncName) {
    const nativeFuncPtr = Module.findExportByName(libraryName, nativeFuncName);
    console.log("nativeFuncName=" + nativeFuncName + ", nativeFuncPtr=" + nativeFuncPtr);
    var nativeFuncHook = Interceptor.attach(nativeFuncPtr, {
        onEnter: function (args) {
            const args0 = args[0];
            console.log(nativeFuncName + " [+]" + args0);
        },
        onLeave: function (retval) {
            console.log("[+]\t= " + retval);
        }
    });
}
```

```

// hook normal C function
function hookCFunc(){

    // int execvp(const char *path, const char *arg0, ..., NULL);
    Interceptor.attach(Module.findExportByName(null, "execvp"), {
        onEnter: function (args) {
            var path = Memory.readCString(args[0]);
            var arg0 = Memory.readCString(args[1]);
            var arg1 = Memory.readCString(args[2]);
            console.log("execvp: path=" + path + ", arg0=" + arg0 + ", arg1=" + arg1);
        },
        onLeave: function (args) {
        }
    });

    // int execv(const char *pathname, char *const argv[]);
    Interceptor.attach(Module.findExportByName(null, "execv"), {
        onEnter: function (args) {
            var pathname = Memory.readCString(args[0]);
            var argv = args[1];
            console.log("execv: pathname=" + pathname + ", argv=" + argv);
        },
        onLeave: function (args) {
        }
    });

    // int pthread_create(pthread_t *thread, const pthread_attr_t *attr, void *(*start_routine)(void*), void *arg);
    Interceptor.attach(Module.findExportByName(null, "pthread_create"), {
        onEnter: function (args) {
            var thread = args[0];
            var attr = args[1];
            var start_routine = args[2];
            var arg = args[3];
            console.log("pthread_create: thread=" + thread + ", attr=" + attr + ", start_routine=" + start_routine + ", arg=" + arg);
        },
        onLeave: function (retNewPid) {
            console.log("\t pthread_create retNewPid= " + retNewPid);
        }
    });

    // int clone(int (*fn)(void *_Nullable), void *stack, int flags, void *_Nullable arg,
    ... /* pid_t *_Nullable parent_tid, void *_Nullable tls, pid_t *_Nullable child_tid */ );
    Interceptor.attach(Module.findExportByName(null, "clone"), {
        onEnter: function (args) {
            var fn = args[0];
            var stack = args[1];
            var flags = args[2];
            var arg = args[3];
            console.log("clone: fn=" + fn + ", stack=" + stack + ", flags=" + flags + ", arg=" + arg);
        },
        onLeave: function (retval) {
    
```

```

    }
});

// pid_t fork(void);
Interceptor.attach(Module.findExportByName(null, "fork"), {
    onEnter: function (args) {
        console.log("fork called");
    },
    onLeave: function (retval) {
        console.log("\t fork retval= " + retval);
    }
});

// int posix_spawn(pid_t *pid, const char *path, const posix_spawn_file_actions_t *file_actions, const posix_spawnattr_t *attrp, char *const argv[], char *const envp[]);
Interceptor.attach(Module.findExportByName(null, "posix_spawn"), {
    onEnter: function (args) {
        var pid = args[0];
        var path = Memory.readCString(args[1]);
        var file_actions = args[2];
        var attrp = args[3];
        var argv = args[4];
        var envp = args[5];
        console.log("posix_spawn: pid=" + pid + ", path=" + path + ", file_actions=" + file_actions + ", attrp=" + attrp + ", argv=" + argv + ", envp=" + envp);
    },
    onLeave: function (retval) {
    }
});

// int posix_spawnp(pid_t *pid, const char *file, const posix_spawn_file_actions_t *file_actions, const posix_spawnattr_t *attrp, char *const argv[], char *const envp[]);
Interceptor.attach(Module.findExportByName(null, "posix_spawnp"), {
    onEnter: function (args) {
        var pid = args[0];
        var file = Memory.readCString(args[1]);
        var file_actions = args[2];
        var attrp = args[3];
        var argv = args[4];
        var envp = args[5];
        console.log("posix_spawnp: pid=" + pid + ", file=" + file + ", file_actions=" + file_actions + ", attrp=" + attrp + ", argv=" + argv + ", envp=" + envp);
    },
    onLeave: function (retval) {
    }
});

// int sigaction(int signum, const struct sigaction *_Nullable restrict act, struct sigaction *_Nullable restrict oldact);
Interceptor.attach(Module.findExportByName(null, "sigaction"), {
    onEnter: function (args) {
        var signum = args[0];
        var actP = args[1];
        var oldactP = args[2];
        console.log("sigaction: signum=" + signum + ", actP=" + actP + ", oldactP=" + oldactP);
    }
});

```

```

    },
    onLeave: function (args) {
    }
});

// int remove(const char *path);
Interceptor.attach(Module.findExportByName(null, "remove"), {
    onEnter: function (args) {
        var path = Memory.readCString(args[0]);
        console.log("remove: path=" + path);
    },
    onLeave: function (args) {
    }
});

// FILE *fopen(const char *restrict pathname, const char *restrict mode);
Interceptor.attach(Module.findExportByName(null, "fopen"), {
    onEnter: function (args) {
        var pathname = Memory.readCString(args[0]);
        var mode = Memory.readCString(args[1]);
        console.log("fopen: pathname=" + pathname + ", mode=" + mode);
    },
    onLeave: function (args) {
    }
});

// int open(const char *pathname, int flags, mode_t mode);
Interceptor.attach(Module.findExportByName(null, "open"), {
    onEnter: function (args) {
        var path = Memory.readCString(args[0]);
        var oflags = args[1];
        console.log("open: path=" + path + ", oflags=" + oflags);
    },
    onLeave: function (retFd) {
        console.log("\t open retFd=" + retFd);
    }
});

// int flock(int fd, int operation);
Interceptor.attach(Module.findExportByName(null, "flock"), {
    onEnter: function (args) {
        var fd = args[0];
        var operation = args[1];
        console.log("flock: fd=" + fd + ", operation=" + operation);
    },
    onLeave: function (retval) {
    }
});

// int killpg(int pgrp, int sig);
Interceptor.attach(Module.findExportByName(null, "killpg"), {
    onEnter: function (args) {
        var pgrp = args[0];
        var sig = args[1];
        console.log("killpg: pgrp=" + pgrp + ", sig=" + sig);
    },
}
);

```

```

    onLeave: function (args) {
    }
});

// // ssize_t read(int fd, void buf[.count], size_t count);
// Interceptor.attach(Module.findExportByName(null, "read"), {
//   onEnter: function (args) {
//     var fd = args[0];
//     var buf = args[1];
//     var count = args[2];
//     console.log("read: fd=" + fd + ", buf=" + buf + ", count=" + count);
//   },
//   onLeave: function (args) {
//   }
// });

// ssize_t pread(int fildes, void *buf, size_t nbytes, off_t offset);
Interceptor.attach(Module.findExportByName(null, "pread"), {
  onEnter: function (args) {
    var fildes = args[0];
    var buf = args[1];
    var nbytes = args[2];
    var offset = args[3];
    console.log("pread: fildes=" + fildes + ", buf=" + buf + ", nbytes=" + nbytes + ", offset=" + offset);
  },
  onLeave: function (args) {
  }
});

// // ssize_t write(int fildes, const void *buf, size_t nbytes);
// Interceptor.attach(Module.findExportByName(null, "write"), {
//   onEnter: function (args) {
//     var fildes = args[0];
//     var buf = args[1];
//     var nbytes = args[2];
//     console.log("write: fildes=" + fildes + ", buf=" + buf + ", nbytes=" + nbytes);
//   },
//   onLeave: function (args) {
//   }
// });

// ssize_t pwrite(int fildes, const void *buf, size_t nbytes, off_t offset);
Interceptor.attach(Module.findExportByName(null, "pwrite"), {
  onEnter: function (args) {
    var fildes = args[0];
    var buf = args[1];
    var nbytes = args[2];
    var offset = args[3];
    console.log("pwrite: fildes=" + fildes + ", buf=" + buf + ", nbytes=" + nbytes + ", offset=" + offset);
  },
  onLeave: function (args) {
  }
});

```

```

// int close(int fd);
Interceptor.attach(Module.findExportByName(null, "close"), {
    onEnter: function (args) {
        var fd = args[0];
        console.log("close: fd=" + fd);
    },
    onLeave: function (retval) {
    }
});

// int pipe(int pipefd[2]);
Interceptor.attach(Module.findExportByName(null, "pipe"), {
    onEnter: function (args) {
        var pipefdArray = args[0];
        console.log("pipe: pipefdArray=" + pipefdArray);
    },
    onLeave: function (retval) {
    }
});

const KnownStrLis = [
    "",
    "CurrencyMap/US/0/",
    "CurrencyMap/CN/0/",
    "CurrencyMap/CN/",
    "CurrencyMap/",
    "CurrencyMap",
    "CN",
    "US",
    "/",
    "0",
    "id",
    "zh_CN_#HANS",
    "zh_Hans_CN",
    "zh",
    "Hans",
    "HANS",
]
]

// char *strcpy(char *restrict dst, const char *restrict src);
Interceptor.attach(Module.findExportByName(null, "strcpy"), {
    onEnter: function (args) {
        var dst = Memory.readCString(args[0]);
        var src = Memory.readCString(args[1]);
        if (KnownStrLis.includes(src)) {
            console.log("strcpy: dst=" + dst + ", src=" + src);
        }
    },
    onLeave: function (args) {
    }
});

// char *strncpy(char *dest, const char *src, size_t count);
Interceptor.attach(Module.findExportByName(null, "strncpy"), {
    onEnter: function (args) {
        var dest = Memory.readCString(args[0]);

```

```

        var src = Memory.readCString(args[1]);
        var count = args[2];
        console.log("strncpy: dest=" + dest + ", src=" + src + ", count=" + count);
    },
    onLeave: function (args) {
    }
});

// char *strcat(char *restrict dst, const char *restrict src);
Interceptor.attach(Module.findExportByName(null, "strcat"), {
    onEnter: function (args) {
        var dst = Memory.readCString(args[0]);
        var src = Memory.readCString(args[1]);
        console.log("strcat: dst=" + dst + ", src=" + src);
    },
    onLeave: function (args) {
    }
});

// // pid_t getpid(void);
// Interceptor.attach(Module.findExportByName(null, "getpid"), {
//     onEnter: function (args) {
//         // console.log("getpid called");
//     },
//     onLeave: function (retPid) {
//         console.log("\t getpid retPid=" + retPid);
//     }
// });

// pid_t getppid(void);
Interceptor.attach(Module.findExportByName(null, "getppid"), {
    onEnter: function (args) {
        console.log("getppid called");
    },
    onLeave: function (retval) {
        console.log("\t getppid retval=" + retval);
    }
});

// pid_t setsid(void);
Interceptor.attach(Module.findExportByName(null, "setsid"), {
    onEnter: function (args) {
        console.log("setsid called");
    },
    onLeave: function (retval) {
        console.log("\t setsid retval=" + retval);
    }
});

// void *dlopen(const char *filename, int flags);
Interceptor.attach(Module.findExportByName(null, "dlopen"), {
    onEnter: function (args) {
        var filename = Memory.readCString(args[0]);
        var flags = args[1];
        console.log("dlopen: filename=" + filename + ", flags=" + flags);
    },
}
);

```

```

        onLeave: function (args) {
    }
});

}

function waitForLibLoading(libraryName) {
    var isLibLoaded = false;

    hookCFunc();

    Interceptor.attach(Module.findExportByName(null, "android_dlopen_ext"), {
        onEnter: function (args) {
            var libPath = Memory.readCString(args[0]);
            var flags = args[1];
            var info = args[2];
            console.log("android_dlopen_ext: libPath=" + libPath + ", flags=" + flags + " " +
, info=" + info);
            if (libPath.includes(libraryName)) {
                console.log("[+] Loading library " + libPath + "...");
                isLibLoaded = true;
            }
        },
        onLeave: function (args) {
            if (isLibLoaded) {
                processJniOnLoad(libraryName);

                // public static native void display(Application application);
                const nativeFuncName = "Java_com_aSIIoEMUzSX_fukjRx_Nzilsxr_DYphTcg"
                processNativeFunc(libraryName, nativeFuncName);

                isLibLoaded = false;
            }
        }
    });
}

Java.perform(function() {
    const libraryName = "libRehADGd.so";
    waitForLibLoading(libraryName);
});

```

输出

截图

- (之前某次的) 截图

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log日志

```
→ frida frida -U -f com.lift.filemanager.android -l hook_LiftFileManager.js

    / _|  Frida 16.1.3 - A world-class dynamic instrumentation toolkit
    |(_|
    > -| Commands:
  / / _|   help      -> Displays the help system
  + + +|   object?   -> Display information about 'object'
  + + +|   exit/quit -> Exit

  + + +| More info at https://frida.re/docs/home/

  + + +| Connected to Pixel 3 (id 91BX1VSA3)
Spawned `com.lift.filemanager.android` Resuming main thread
[Pixel 3::com.lift.filemanager.android] -> open: path=/data/app/~~gJRGEMcdzVg-RT9Vfcj4AA
=~/com.lift.filemanager.android-viAUZmvMdgKc2Zy2M8FibQ=/base.apk, oflags=0x80000
open: path=/data/misc/edxp_A2NLrKZb3PtmBqrf/cache/EdHooker_d80f73e34da17c301b40feab7995
d5a6a0b56621.jar, oflags=0x0
open: path=/data/misc/edxp_A2NLrKZb3PtmBqrf/cache/EdHooker_d80f73e34da17c301b40feab7995
d5a6a0b56621.jar, oflags=0x0
open: path=/proc/self/cmdline, oflags=0x80000
open: path=/data/app/~~gJRGEMcdzVg-RT9Vfcj4AA=/com.lift.filemanager.android-viAUZmvMdg
Kc2Zy2M8FibQ=/base.apk, oflags=0x80000
open: path=/product/overlay/NavigationBarMode2Button/NavigationBarMode2ButtonOverlay.ap
k, oflags=0x80000
pthread_create: thread=0x7fe513f228, attr=0x7fe513f260, start_routine=0x6ddf1e6b3c, arg=
0x6f4f35ffc0
clone: fn=0x707076fd0c, stack=0x6d6daf4cc0, flags=0x3d0f00, arg=0x6d6daf4cc0
pthread_create: thread=0x7fe513f258, attr=0x7fe513f290, start_routine=0x6ddf1e6b3c, arg=
0x6f4f35ffc0
clone: fn=0x707076fd0c, stack=0x6d6daf4cc0, flags=0x3d0f00, arg=0x6d6daf4cc0
```

```

pthread_create: thread 0x7fe513f2a8, attr=0x7fe513f2e0, start_routine=0x6ddf1e6b3c, arg=0x6f4f35c820
clone: fn 0x707076fd0c, stack 0x6d6c9eacc0, flags=0x3d0f00, arg=0x6d6c9eacc0
pthread_create: thread 0x6d6c9ea3c8, attr=0x6d6c9ea400, start_routine=0x6ddf1e6b3c, arg=0x6f4f361b90
clone: fn 0x707076fd0c, stack 0x6d6b8e0cc0, flags=0x3d0f00, arg=0x6d6b8e0cc0
open: path /data/user/0/com.lift.filemanager.android/shared_prefs/frc_1:565703110738:android:37ec4862ed1c78d044af8b_firebase_settings.xml, oflags=0x0
pthread_create: thread 0x7fe513f1e8, attr=0x7fe513f220, start_routine=0x6ddf1e6b3c, arg=0x6f4f365330
clone: fn 0x707076fd0c, stack 0x6d6a7d6cc0, flags=0x3d0f00, arg=0x6d6a7d6cc0
pthread_create: thread 0x6d6c9ea388, attr=0x6d6c9ea3c0, start_routine=0x6ddf1e6b3c, arg=0x6f4f366f00
clone: fn 0x707076fd0c, stack 0x6d6a8e0cc0, flags=0x3d0f00, arg=0x6d6a8e0cc0
pthread_create: thread 0x6d6c9ea388, attr=0x6d6c9ea3c0, start_routine=0x6ddf1e6b3c, arg=0x6f4f363760
clone: fn 0x707076fd0c, stack 0x6d6a6cccc0, flags=0x3d0f00, arg=0x6d6a6cccc0
pthread_create: thread 0x6d6c9ea388, attr=0x6d6c9ea3c0, start_routine=0x6ddf1e6b3c, arg=0x6f4f36c270
clone: fn 0x707076fd0c, stack 0x6d6a5c2cc0, flags=0x3d0f00, arg=0x6d6a5c2cc0
open: path /data/user/0/com.lift.filemanager.android/files/frc_1:565703110738:android:37ec4862ed1c78d044af8b_firebase_defaults.json, oflags=0x0
open: path /data/user/0/com.lift.filemanager.android/files/frc_1:565703110738:android:37ec4862ed1c78d044af8b_firebase_fetch.json, oflags=0x0
open: path /data/user/0/com.lift.filemanager.android/files/frc_1:565703110738:android:37ec4862ed1c78d044af8b_firebase_activate.json, oflags=0x0
pthread_create: thread 0x7fe513f258, attr=0x7fe513f290, start_routine=0x6ddf1e6b3c, arg=0x6f4f36de40
pthread_create: thread 0x6d6daf4348, attr=0x6d6daf4380, start_routine=0x6ddf1e6b3c, arg=0x6f4f361b90
clone: fn 0x707076fd0c, stack 0x6d6b6e0cc0, flags=0x3d0f00, arg=0x6d6b6e0cc0
clone: fn 0x707076fd0c, stack 0x6d6b5d6cc0, flags=0x3d0f00, arg=0x6d6b5d6cc0
open: path /proc/6929/timerslack_ns, oflags=0x88241
android_dlopen_ext: libPath /data/user_de/0/com.google.android.gms/app_chimera/m/00000047/oat/arm64/DynamiteLoader.odex, flags=0x2, info=0x6d6daf3b58
open: path /proc/6930/timerslack_ns, oflags=0x88241
open: path /data/user_de/0/com.google.android.gms/app_chimera/m/00000047/oat/arm64/DynamiteLoader.vdex, oflags=0x0
open: path /data/user/0/com.lift.filemanager.android/files/.com.google.firebaseio.crashlytics.files.v2:com.lift.filemanager.android/com.crashlytics.settings.json, oflags=0x0
open: path /data/user_de/0/com.google.android.gms/app_chimera/m/00000047/DynamiteLoader.apk, oflags=0x0
open: path /data/user_de/0/com.google.android.gms/app_chimera/m/00000047/DynamiteLoader.apk, oflags=0x0
open: path /apex/com.android.art/javalib/arm64/boot.art, oflags=0x0
open: path /system/framework/arm64/boot-framework.art, oflags=0x0
open: path /data/user_de/0/com.google.android.gms/app_chimera/m/00000047/oat/arm64/DynamiteLoader.art, oflags=0x0
pthread_create: thread 0x7fe513f1e8, attr=0x7fe513f220, start_routine=0x6ddf1e6b3c, arg=0x6f4f36a6a0
clone: fn 0x707076fd0c, stack 0x6d6b3bcc0, flags=0x3d0f00, arg=0x6d6b3bcc0
open: path /proc/6931/timerslack_ns, oflags=0x88241
pthread_create: thread 0x7fe513f1f8, attr=0x7fe513f230, start_routine=0x6ddf1e6b3c, arg=0x6f4f368ad0

```

```

clone: fn 0x707076fd0c, stack 0x6d6b2b2cc0, flags 0x3d0f00, arg 0x6d6b2b2cc0
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags 0x4
2
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK
FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkmWM30GQwNDRhZjh1.json, oflags 0x0
pthread_create: thread 0x6d6b2b2408, attr 0x6d6b2b2440, start_routine 0x6ddf1e6b3c, arg
0x6f4f3715e0
clone: fn 0x707076fd0c, stack 0x6d6b1a8cc0, flags 0x3d0f00, arg 0x6d6b1a8cc0
pthread_create: thread 0x6d6b2b2598, attr 0x6d6b2b25d0, start_routine 0x6ddf1e6b3c, arg
0x6f4f36fa10
clone: fn 0x707076fd0c, stack 0x6d6b09ecc0, flags 0x3d0f00, arg 0x6d6b09ecc0
open: path /proc/6933/timerslack_ns, oflags 0x88241
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags 0x4
2
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK
FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkmWM30GQwNDRhZjh1.json, oflags 0x0
pthread_create: thread 0x7fe513f0f8, attr 0x7fe513f130, start_routine 0x6ddf1e6b3c, arg
0x6f4f374d80
clone: fn 0x707076fd0c, stack 0x6d6af94cc0, flags 0x3d0f00, arg 0x6d6af94cc0
pthread_create: thread 0x7fe513f508, attr 0x7fe513f540, start_routine 0x6ddf1e6b3c, arg
0x6f4f3731b0
clone: fn 0x707076fd0c, stack 0x6d6ae8acc0, flags 0x3d0f00, arg 0x6d6ae8acc0
open: path /proc/meminfo, oflags 0x0
pthread_create: thread 0x6d6ae8a3b8, attr 0x6d6ae8a3f0, start_routine 0x6ddf1e6b3c, arg
0x6f4f376950
clone: fn 0x707076fd0c, stack 0x6d6ad80cc0, flags 0x3d0f00, arg 0x6d6ad80cc0
open: path /data/app/~~H9XVwTH8sAvVL5p5cBHHzw=/com.google.android.gms-EalbGKD7CDLYvLNBy1KTSQ= /base.apk, oflags 0x80000
pthread_create: thread 0x7fe513f808, attr 0x7fe513f840, start_routine 0x6ddf1e6b3c, arg
0x6f4f378520
clone: fn 0x707076fd0c, stack 0x6d6ac76cc0, flags 0x3d0f00, arg 0x6d6ac76cc0
open: path /data/user/0/com.lift.filemanager.android/databases/com.google.android.datatransport.events, oflags 0xa0042
open: path /data/app/~~H9XVwTH8sAvVL5p5cBHHzw=/com.google.android.gms-EalbGKD7CDLYvLNBy1KTSQ= /split_config.xhdpi.apk, oflags 0x80000
open: path /data/app/~~H9XVwTH8sAvVL5p5cBHHzw=/com.google.android.gms-EalbGKD7CDLYvLNBy1KTSQ= /split_config.zh.apk, oflags 0x80000
open: path /data/user/0/com.lift.filemanager.android/shared_prefs/FirebaseHeartBeatW0RF
RkFVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkmWM30GQwNDRhZjh1.xml, oflags 0x0
pthread_create: thread 0x7fe513f3a8, attr 0x7fe513f3e0, start_routine 0x6ddf1e6b3c, arg
0x6f4f37a0f0
clone: fn 0x707076fd0c, stack 0x6d6ad80cc0, flags 0x3d0f00, arg 0x6d6ad80cc0
open: path /data/user/0/com.lift.filemanager.android/files/.com.google.firebaseio.crashlytics.files.v2:com.lift.filemanager.android/open-sessions/64D0B857022700011AB6F3CB35D4C1
92/report, oflags 0x241
open: path /data/user/0/com.lift.filemanager.android/files/.com.google.firebaseio.crashlytics.files.v2:com.lift.filemanager.android/open-sessions/64D0B857022700011AB6F3CB35D4C1
92/start-time, oflags 0x241
open: path /data/user/0/com.lift.filemanager.android/files/.com.google.firebaseio.crashlytics.files.v2:com.lift.filemanager.android/initialization_marker, oflags 0xc2
android_dlopen_ext: libPath /system/framework/oat/arm64/org.apache.http.legacy.odex, flags 0x2, info 0x6d6ac749a8
open: path /data/user/0/com.lift.filemanager.android/no_backup/androidx.work.workdb, oflags 0xa0042
pthread_create: thread 0x7fe513f558, attr 0x7fe513f590, start_routine 0x6ddf1e6b3c, arg
0x6f4f376950

```

```

clone: fn 0x707076fd0c, stack 0x6d6a7d6cc0, flags=0x3d0f00, arg=0x6d6a7d6cc0
open: path=/data/user/0/com.lift.filemanager.android/shared_prefs/com.facebook.sdk.appEventPreferences.xml, oflags=0x0
android_dlopen_ext: libPath=/data/user_de/0/com.google.android.gms/app_chimera/m/00000004c/oat/arm64/MeasurementDynamite.odex, flags=0x2, info=0x6d6daf3838
open: path=/system/framework/oat/arm64/org.apache.http.legacy.vdex, oflags=0x0
open: path=/system/framework/org.apache.http.legacy.jar, oflags=0x0
open: path=/data/user/0/com.lift.filemanager.android/no_backup/androidx.work.workdb-wal, oflags=0xa0042
open: path=/data/user/0/com.lift.filemanager.android/no_backup/androidx.work.workdb-shm, oflags=0x80042
open: path=/data/user_de/0/com.google.android.gms/app_chimera/m/00000004c/oat/arm64/MeasurementDynamite.vdex, oflags=0x0
open: path=/data/user_de/0/com.google.android.gms/app_chimera/m/00000004c/MeasurementDynamite.apk, oflags=0x0
open: path=/system/framework/org.apache.http.legacy.jar, oflags=0x0
open: path=/data/user_de/0/com.google.android.gms/app_chimera/m/00000004c/MeasurementDynamite.apk, oflags=0x0
open: path=/apex/com.android.art/javalib/arm64/boot.art, oflags=0x0
open: path=/data/user_de/0/com.google.android.gms/app_chimera/m/00000004c/MeasurementDynamite.apk, oflags=0x80000
open: path=/system/framework/arm64/boot-framework.art, oflags=0x0
open: path=/system/framework/oat/arm64/org.apache.http.legacy.art, oflags=0x0
pthread_create: thread=0x7fe513f558, attr=0x7fe513f590, start_routine=0x6ddf1e6b3c, arg=0x6f4f376950
clone: fn 0x707076fd0c, stack 0x6d6a7d6cc0, flags=0x3d0f00, arg=0x6d6a7d6cc0
open: path=/data/user/0/com.lift.filemanager.android/shared_prefs/com.facebook.sdk.USER_SETTINGS.xml, oflags=0x0
android_dlopen_ext: libPath=/system/framework/oat/arm64/com.android.media.remotedisplay.odex, flags=0x2, info=0x6d6ac749a8
open: path=/data/user/0/com.lift.filemanager.android/no_backup/androidx.work.workdb, oflags=0xa0042
pthread_create: thread=0x7fe513f5f8, attr=0x7fe513f630, start_routine=0x6ddf1e6b3c, arg=0x6f4f376950
clone: fn 0x707076fd0c, stack 0x6d6b8e0cc0, flags=0x3d0f00, arg=0x6d6b8e0cc0
open: path=/data/user/0/com.lift.filemanager.android/no_backup/androidx.work.workdb-wal, oflags=0xa0042
open: path=/system/framework/oat/arm64/com.android.media.remotedisplay.vdex, oflags=0x0
open: path=/system/framework/com.android.media.remotedisplay.jar, oflags=0x0
open: path=/system/framework/com.android.media.remotedisplay.jar, oflags=0x0
open: path=/apex/com.android.art/javalib/arm64/boot.art, oflags=0x0
open: path=/system/framework/arm64/boot-framework.art, oflags=0x0
open: path=/system/framework/oat/arm64/com.android.media.remotedisplay.art, oflags=0x0
pthread_create: thread=0x6d6b8e01c8, attr=0x6d6b8e0200, start_routine=0x6ddf1e6b3c, arg=0x6f4f37bcc0
clone: fn 0x707076fd0c, stack 0x6d6a7d6cc0, flags=0x3d0f00, arg=0x6d6a7d6cc0
pthread_create: thread=0x7fe513f508, attr=0x7fe513f540, start_routine=0x6ddf1e6b3c, arg=0x6f4f381030
clone: fn 0x707076fd0c, stack 0x6d5ccb2cc0, flags=0x3d0f00, arg=0x6d5ccb2cc0
open: path=/dev/urandom, oflags=0x80000
open: path=/data/user/0/com.lift.filemanager.android/shared_prefs/com.facebook.internal.preferences.APP_GATEKEEPERS.xml, oflags=0x0
open: path=/data/user/0/com.lift.filemanager.android/no_backup/androidx.work.workdb-wal, oflags=0xa0042
android_dlopen_ext: libPath=/system/framework/oat/arm64/com.android.location.provider.odex, flags=0x2, info=0x6d6ac749a8

```

```

pthread_create: thread 0x7fe513f5f8, attr=0x7fe513f630, start_routine=0x6ddf1e6b3c, arg=0x6f4f381030
clone: fn 0x707076fd0c, stack 0x6d6a7d6cc0, flags=0x3d0f00, arg=0x6d6a7d6cc0
pthread_create: thread 0x7fe513f658, attr=0x7fe513f690, start_routine=0x6ddf1e6b3c, arg=0x6f4f37bcc0
clone: fn 0x707076fd0c, stack 0x6d5ccb2cc0, flags=0x3d0f00, arg=0x6d5ccb2cc0
pthread_create: thread 0x7fe513f678, attr=0x7fe513f6b0, start_routine=0x6ddf1e6b3c, arg=0x6f4f37d890
clone: fn 0x707076fd0c, stack 0x6d5aac4cc0, flags=0x3d0f00, arg=0x6d5aac4cc0
pthread_create: thread 0x6d5ccb24d8, attr=0x6d5ccb2510, start_routine=0x6ddf1e6b3c, arg=0x6f4f382c00
pthread_create: thread 0x7fe513f678, attr=0x7fe513f6b0, start_routine=0x6ddf1e6b3c, arg=0x6f4f387f70
clone: fn 0x707076fd0c, stack 0x6d597bacc0, flags=0x3d0f00, arg=0x6d597bacc0
clone: fn 0x707076fd0c, stack 0x6d598c4cc0, flags=0x3d0f00, arg=0x6d598c4cc0
pthread_create: thread 0x7fe513f6b8, attr=0x7fe513f6f0, start_routine=0x6ddf1e6b3c, arg=0x6f4f3863a0
clone: fn 0x707076fd0c, stack 0x6d566b0cc0, flags=0x3d0f00, arg=0x6d566b0cc0
open: path /system/framework/oat/arm64/com.android.location.provider.vdex, oflags=0x0
open: path /data/user/0/com.lift.filemanager.android/shared_prefs/com.facebook.internal.preferences.APP_SETTINGS.xml, oflags=0x0
open: path /system/framework/com.android.location.provider.jar, oflags=0x0
pthread_create: thread 0x6d566b03b8, attr=0x6d566b03f0, start_routine=0x6ddf1e6b3c, arg=0x6f4f3847d0
open: path /system/framework/com.android.location.provider.jar, oflags=0x0
clone: fn 0x707076fd0c, stack 0x6d555a6cc0, flags=0x3d0f00, arg=0x6d555a6cc0
pthread_create: thread 0x6d6ad805b8, attr=0x6d6ad805f0, start_routine=0x6ddf1e6b3c, arg=0x6f4f38d2e0
pthread_create: thread 0x7fe513f758, attr=0x7fe513f790, start_routine=0x6ddf1e6b3c, arg=0x6f4f38eeb0
open: path /apex/com.android.art/javalib/arm64/boot.art, oflags=0x0
open: path /system/framework/arm64/boot-framework.art, oflags=0x0
open: path /system/framework/oat/arm64/com.android.location.provider.art, oflags=0x0
clone: fn 0x707076fd0c, stack 0x6d54392cc0, flags=0x3d0f00, arg=0x6d54392cc0
clone: fn 0x707076fd0c, stack 0x6d5449cccc0, flags=0x3d0f00, arg=0x6d5449cccc0
pthread_create: thread 0x6d566b0418, attr=0x6d566b0450, start_routine=0x6ddf1e6b3c, arg=0x6f4f390a80
clone: fn 0x707076fd0c, stack 0x6d598c4cc0, flags=0x3d0f00, arg=0x6d598c4cc0
open: path /data/user/0/com.lift.filemanager.android/files/AppEventsLogger.persistedevents, oflags=0x0
open: path /data/user/0/com.lift.filemanager.android/shared_prefs/LifeSharedPreferences.xml, oflags=0x0
android_dlopen_ext: libPath=/data/app/~~H9XVwTH8sAvVL5p5cBHHzw==/com.google.android.gms-EalbGkD7CDLYvLNBy1KTSQ==/oat/arm64/base.odex, flags=0x2, info=0x6d6ac74b18
open: path /data/app/~~H9XVwTH8sAvVL5p5cBHHzw==/com.google.android.gms-EalbGkD7CDLYvLNBy1KTSQ==/oat/arm64/base.vdex, oflags=0x0
open: path /data/app/~~H9XVwTH8sAvVL5p5cBHHzw==/com.google.android.gms-EalbGkD7CDLYvLNBy1KTSQ==/base.apk, oflags=0x0
open: path /data/app/~~H9XVwTH8sAvVL5p5cBHHzw==/com.google.android.gms-EalbGkD7CDLYvLNBy1KTSQ==/base.apk, oflags=0x0
open: path /apex/com.android.art/javalib/arm64/boot.art, oflags=0x0
open: path /system/framework/arm64/boot-framework.art, oflags=0x0
open: path /data/app/~~H9XVwTH8sAvVL5p5cBHHzw==/com.google.android.gms-EalbGkD7CDLYvLNBy1KTSQ==/oat/arm64/base.art, oflags=0x0
pthread_create: thread 0x6d6ac764c8, attr=0x6d6ac76500, start_routine=0x6ddf1e6b3c, arg=0x6f4f38eeb0

```

```

clone: fn 0x707076fd0c, stack 0x6d533d0cc0, flags 0x3d0f00, arg 0x6d533d0cc0
open: path /data/user/0/com.google.android.gms/shared_prefs/google_ads_flags.xml, oflags 0x0
open: path /data/app/~~RbAu5LfZALdc0diK1xs1uA=/com.google.android.trichromelibrary_579016631-9HB7aC3CI8mFFZlcY5ZSvA=/base.apk, oflags 0x0
pthread_create: thread 0x6d6daf3148, attr 0x6d6daf3180, start_routine 0x6ddf1e6b3c, arg=0x6f4f389b40
android_dlopen_ext: libPath /data/app/~~ebf60oj8iz0WmmF2AEomWW=/com.google.android.webview-bGRQSGrk1U6ssg_JAwBwSQ=/oat/arm64/base.odex, flags 0x2, info 0x7fe513d088
clone: fn 0x707076fd0c, stack 0x6d457b6cc0, flags 0x3d0f00, arg 0x6d457b6cc0
open: path /proc/6959/timerslack_ns, oflags 0x88241
open: path /data/app/~~ebf60oj8iz0WmmF2AEomWW=/com.google.android.webview-bGRQSGrk1U6ssg_JAwBwSQ=/oat/arm64/base.vdex, oflags 0x0
pthread_create: thread 0x6d6b8e0048, attr 0x6d6b8e0080, start_routine 0x6ddf1e6b3c, arg=0x6f4f38b710
clone: fn 0x707076fd0c, stack 0x6d533d0cc0, flags 0x3d0f00, arg 0x6d533d0cc0
open: path /data/app/~~ebf60oj8iz0WmmF2AEomWW=/com.google.android.webview-bGRQSGrk1U6ssg_JAwBwSQ=/base.apk, oflags 0x0
open: path /data/app/~~ebf60oj8iz0WmmF2AEomWW=/com.google.android.webview-bGRQSGrk1U6ssg_JAwBwSQ=/base.apk, oflags 0x0
open: path /apex/com.android.art/javalib/arm64/boot.art, oflags 0x0
open: path /system/framework/arm64/boot-framework.art, oflags 0x0
open: path /data/app/~~ebf60oj8iz0WmmF2AEomWW=/com.google.android.webview-bGRQSGrk1U6ssg_JAwBwSQ=/oat/arm64/base.art, oflags 0x0
android_dlopen_ext: libPath /data/user_de/0/com.google.android.gms/app_chimera/m/00000032/oat/arm64/dl-AdsFdrDynamite.integ_232400000100000.odex, flags 0x2, info 0x6d6ac75908
pthread_create: thread 0x6d457b5398, attr 0x6d457b53d0, start_routine 0x6ddf1e6b3c, arg=0x6f4f38eeb0
open: path /data/user_de/0/com.google.android.gms/app_chimera/m/00000032/oat/arm64/dl-AdsFdrDynamite.integ_232400000100000.vdex, oflags 0x0
clone: fn 0x707076fd0c, stack 0x6d435c7cc0, flags 0x3d0f00, arg 0x6d435c7cc0
open: path /proc/6961/timerslack_ns, oflags 0x88241
open: path /data/user/0/com.lift.filemanager.android/shared_prefs/com.google.android.gms.measurement.prefs.xml, oflags 0x0
open: path /data/app/~~ebf60oj8iz0WmmF2AEomWW=/com.google.android.webview-bGRQSGrk1U6ssg_JAwBwSQ=/base.apk, oflags 0x80000
open: path /data/user_de/0/com.google.android.gms/app_chimera/m/00000032/dl-AdsFdrDynamite.integ_232400000100000.apk, oflags 0x0
open: path /data/app/~~ebf60oj8iz0WmmF2AEomWW=/com.google.android.webview-bGRQSGrk1U6ssg_JAwBwSQ=/split_config.zh.apk, oflags 0x80000
open: path /data/app/~~RbAu5LfZALdc0diK1xs1uA=/com.google.android.trichromelibrary_579016631-9HB7aC3CI8mFFZlcY5ZSvA=/base.apk, oflags 0x80000
open: path /data/user_de/0/com.google.android.gms/app_chimera/m/00000032/dl-AdsFdrDynamite.integ_232400000100000.apk, oflags 0x0
open: path /apex/com.android.art/javalib/arm64/boot.art, oflags 0x0
open: path /data/app/~~ebf60oj8iz0WmmF2AEomWW=/com.google.android.webview-bGRQSGrk1U6ssg_JAwBwSQ=/base.apk, oflags 0x80000
open: path /system/framework/arm64/boot-framework.art, oflags 0x0
open: path /data/user_de/0/com.google.android.gms/app_chimera/m/00000032/oat/arm64/dl-AdsFdrDynamite.integ_232400000100000.art, oflags 0x0
open: path /data/app/~~ebf60oj8iz0WmmF2AEomWW=/com.google.android.webview-bGRQSGrk1U6ssg_JAwBwSQ=/split_config.zh.apk, oflags 0x80000
open: path /data/app/~~ebf60oj8iz0WmmF2AEomWW=/com.google.android.webview-bGRQSGrk1U6ssg_JAwBwSQ=/split_weblayer.apk, oflags 0x80000
open: path /data/app/~~RbAu5LfZALdc0diK1xs1uA=/com.google.android.trichromelibrary_579016631-9HB7aC3CI8mFFZlcY5ZSvA=/base.apk, oflags 0x80000

```

```

    android_dlopen_ext: libPath libmonochrome.so, flags 0x2, info 0x7fe513ec70
    open: path /data/user_de/0/com.google.android.gms/app_chimera/m/00000032/dl-AdsFdrDynam
    ite.integ_232400000100000.apk, oflags 0x80000
    pthread_create: thread 0x6d457b5718, attr=0x6d457b5750, start_routine=0x6ddf1e6b3c, arg=
    0x6f4f392650
    clone: fn 0x707076fd0c, stack 0x6d4308fcc0, flags=0x3d0f00, arg=0x6d4308fcc0
    open: path /proc/6962/timerslack_ns, oflags 0x88241
    open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x4
    2
    open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK
    FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkMWM30GQwNDRhZjh1.json, oflags=0x0
    open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x4
    2
    open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK
    FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkMWM30GQwNDRhZjh1.json, oflags=0x0
    open: path /data/user/0/com.lift.filemanager.android/databases/google_app_measurement_l
    ocal.db, oflags 0xa0042
    open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x4
    2
    open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK
    FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkMWM30GQwNDRhZjh1.json, oflags=0x0
    open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x4
    2
    open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK
    FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkMWM30GQwNDRhZjh1.json, oflags=0x0
    open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x4
    2
    open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK
    FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkMWM30GQwNDRhZjh1.json, oflags=0x0
    open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x4
    2
    open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK
    FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkMWM30GQwNDRhZjh1.json, oflags=0x0
    pthread_create: thread 0x7fe513ddb8, attr=0x7fe513ddf0, start_routine=0x6ddf1e6b3c, arg=
    0x6f4f382c00
    clone: fn 0x707076fd0c, stack 0x6d6ac76cc0, flags=0x3d0f00, arg=0x6d6ac76cc0
    pthread_create: thread 0x7fe513dac8, attr=0x7fe513db00, start_routine=0x6ddf1e6b3c, arg=
    0x6f4f38eeb0
    clone: fn 0x707076fd0c, stack 0x6d6ac76cc0, flags=0x3d0f00, arg=0x6d6ac76cc0
    open: path /data/app/~~ebf60oj8iz0WmmF2AEomWW=/com.google.android.webview-bGRQSGrk1U6s
    sg_JAwBwSQ=/lib/arm64/libmonochrome.so, oflags=0x0
    open: path /proc/6964/timerslack_ns, oflags=0x88241
    open: path /data/app/~~ebf60oj8iz0WmmF2AEomWW=/com.google.android.webview-bGRQSGrk1U6s
    sg_JAwBwSQ=/base.apk, oflags=0x80000
    android_dlopen_ext: libPath /data/app/~~ebf60oj8iz0WmmF2AEomWW=/com.google.android.web
    view-bGRQSGrk1U6ssg_JAwBwSQ=/base.apk /lib/arm64-v8a/libmonochrome.so, flags=0x2, info=
    0x7fe513d860
    open: path /data/app/~~ebf60oj8iz0WmmF2AEomWW=/com.google.android.webview-bGRQSGrk1U6s
    sg_JAwBwSQ=/lib/arm64/libwebviewchromium_plat_support.so, oflags=0x0
    open: path /data/app/~~RbAu5LfZALdcOdiK1xs1uA=/com.google.android.trichromelibrary_579
    016631-9HB7aC3CI8mFFZlcY5ZSV=/base.apk, oflags=0x80000
    open: path /system/lib64/libwebviewchromium_plat_support.so, oflags=0x0
    android_dlopen_ext: libPath /system/lib64/libwebviewchromium_plat_support.so, flags=0x2
    , info 0x7fe513d9b0
    pthread_create: thread 0x7fe513dbd8, attr=0x7fe513dc10, start_routine=0x6ddf1e6b3c, arg=
    0x6f4f382c00

```

```

clone: fn 0x707076fd0c, stack 0x6d43e7ecc0, flags=0x3d0f00, arg=0x6d43e7ecc0
open: path=/data/user/0/com.lift.filemanager.android/shared_prefs/WebViewChromiumPrefs.xml, oflags=0x0
pthread_create: thread=0x7fe513ddf8, attr=0x7fe513de30, start_routine=0x6ddf1e6b3c, arg=0x6f4f382c00
clone: fn 0x707076fd0c, stack 0x6d43e7ecc0, flags=0x3d0f00, arg=0x6d43e7ecc0
open: path=/data/app/~~ebf60oj8iz0WmmF2AEomWw=/com.google.android.webview-bGRQSGrk1U6s_sg_JAwBwSQ=/base.apk, oflags=0x80000
open: path=/data/app/~~ebf60oj8iz0WmmF2AEomWw=/com.google.android.webview-bGRQSGrk1U6s_sg_JAwBwSQ=/split_config.zh.apk, oflags=0x80000
open: path=/data/app/~~ebf60oj8iz0WmmF2AEomWw=/com.google.android.webview-bGRQSGrk1U6s_sg_JAwBwSQ=/split_weblayer.apk, oflags=0x80000
open: path=/product/overlay/NavigationBarMode2Button/NavigationBarMode2ButtonOverlay.apk, oflags=0x80000
open: path=/proc/meminfo, oflags=0x0
open: path=/data/user/0/com.lift.filemanager.android/app_webview/webview_data.lock, oflags=0x42
pthread_create: thread=0x7fe513e008, attr=0x7fe513e040, start_routine=0x6ddf1e6b3c, arg=0x6f4f378520
clone: fn 0x707076fd0c, stack 0x6d43e7ecc0, flags=0x3d0f00, arg=0x6d43e7ecc0
pthread_create: thread=0x7fe513e988, attr=0x7fe513e9c0, start_routine=0x6ddf1e6b3c, arg=0x6f4f394220
clone: fn 0x707076fd0c, stack 0x6d43d74cc0, flags=0x3d0f00, arg=0x6d43d74cc0
open: path=/proc/6968/timerslack_ns, oflags=0x88241
pthread_create: thread=0x6d43d744f8, attr=0x6d43d74530, start_routine=0x6ddf1e6b3c, arg=0x6f4f382c00
clone: fn 0x707076fd0c, stack 0x6d416fbcc0, flags=0x3d0f00, arg=0x6d416fbcc0
open: path=/proc/self/stat, oflags=0x80000
open: path=/proc/6969/timerslack_ns, oflags=0x88241
open: path=/proc/cpuinfo, oflags=0x80000
dlopen: filename=/data/app/~~ebf60oj8iz0WmmF2AEomWw=/com.google.android.webview-bGRQSGrk1U6ssg_JAwBwSQ=/base.apk /lib/arm64-v8a/libmonochrome.so, flags=0x5
sigaction: signum=0x6, actP=0x7fe513e408, oldactP=0x2002c40a8
sigaction: signum=0x7, actP=0x7fe513e408, oldactP=0x2002c40c8
sigaction: signum=0x8, actP=0x7fe513e408, oldactP=0x2002c40e8
sigaction: signum=0x4, actP=0x7fe513e408, oldactP=0x2002c4068
sigaction: signum=0xb, actP=0x7fe513e408, oldactP=0x2002c4148
sigaction: signum=0x1f, actP=0x7fe513e408, oldactP=0x2002c43c8
sigaction: signum=0x5, actP=0x7fe513e408, oldactP=0x2002c4088
open: path=/data/user/0/com.lift.filemanager.android/app_webview/pref_store, oflags=0x80000
open: path=/proc/cpuinfo, oflags=0x0
open: path=/proc/cpuinfo, oflags=0x0
open: path=/sys/devices/system/cpu/present, oflags=0x0
open: path=/sys/devices/system/cpu/possible, oflags=0x0
dlopen: filename=libc.so, flags=0x2
open: path=/data/user/0/com.lift.filemanager.android/app_webview/BrowserMetrics/BrowserMetrics-64D0B857-1AB6.pma, oflags=0x2
pthread_create: thread=0x7fe513e598, attr=0x7fe513e6e0, start_routine=0x6d83f30904, arg=0x2003b7ea0
clone: fn 0x707076fd0c, stack 0x6d41187cc0, flags=0x3d0f00, arg=0x6d41187cc0
pthread_create: thread=0x7fe513e408, attr=0x7fe513e550, start_routine=0x6d83f30904, arg=0x2003b7da0
clone: fn 0x707076fd0c, stack 0x6d41089cc0, flags=0x3d0f00, arg=0x6d41089cc0
pthread_create: thread=0x6d41089758, attr=0x6d410898a0, start_routine=0x6d83f30904, arg=0x2003b7a60

```

```
clone: fn 0x707076fd0c, stack 0x6d3be70cc0, flags=0x3d0f00, arg=0x6d3be70cc0
open: path=/proc/6838/stat, oflags=0x80000
pthread_create: thread 0x6d3be70758, attr=0x6d3be708a0, start_routine=0x6d83f30904, arg=0x2003b77a0
clone: fn 0x707076fd0c, stack 0x6d3ad42cc0, flags=0x3d0f00, arg=0x6d3ad42cc0
open: path=/proc/6838/stat, oflags=0x80000
open: path=/proc/6838/task/6838/stat, oflags=0x80000
open: path=/proc/6838/task/6848/stat, oflags=0x80000
open: path=/proc/6838/task/6849/stat, oflags=0x80000
open: path=/proc/6838/task/6851/stat, oflags=0x80000
open: path=/proc/6838/task/6852/stat, oflags=0x80000
open: path=/proc/6838/task/6853/stat, oflags=0x80000
open: path=/proc/6838/task/6854/stat, oflags=0x80000
pthread_create: thread 0x6d3ad42758, attr=0x6d3ad428a0, start_routine=0x6d83f30904, arg=0x2003b7620
open: path=/proc/6838/task/6855/stat, oflags=0x80000
clone: fn 0x707076fd0c, stack 0x6d39c14cc0, flags=0x3d0f00, arg=0x6d39c14cc0
open: path=/proc/6838/task/6892/stat, oflags=0x80000
open: path=/proc/6838/task/6893/stat, oflags=0x80000
open: path=/proc/6838/task/6894/stat, oflags=0x80000
open: path=/proc/6838/task/6895/stat, oflags=0x80000
open: path=/proc/6838/task/6896/stat, oflags=0x80000
open: path=/proc/6838/task/6897/stat, oflags=0x80000
open: path=/proc/6838/task/6898/stat, oflags=0x80000
open: path=/proc/6838/task/6899/stat, oflags=0x80000
open: path=/proc/6838/task/6900/stat, oflags=0x80000
open: path=/proc/6838/task/6901/stat, oflags=0x80000
open: path=/proc/6838/task/6917/stat, oflags=0x80000
open: path=/proc/6838/task/6918/stat, oflags=0x80000
open: path=/proc/6838/task/6919/stat, oflags=0x80000
open: path=/proc/6838/task/6920/stat, oflags=0x80000
open: path=/proc/6838/task/6922/stat, oflags=0x80000
open: path=/proc/6838/task/6923/stat, oflags=0x80000
open: path=/proc/6838/task/6926/stat, oflags=0x80000
open: path=/proc/6838/task/6927/stat, oflags=0x80000
open: path=/proc/6838/task/6928/stat, oflags=0x80000
open: path=/proc/6838/task/6929/stat, oflags=0x80000
open: path=/proc/6838/task/6930/stat, oflags=0x80000
open: path=/proc/6838/task/6931/stat, oflags=0x80000
open: path=/proc/6838/task/6932/stat, oflags=0x80000
open: path=/proc/6838/task/6933/stat, oflags=0x80000
pthread_create: thread 0x7fe513e558, attr=0x7fe513e6a0, start_routine=0x6d83f30904, arg=0x2003b7600
clone: fn 0x707076fd0c, stack 0x6d38b0dcc0, flags=0x3d0f00, arg=0x6d38b0dcc0
open: path=/proc/6838/task/6934/stat, oflags=0x80000
open: path=/proc/6838/task/6935/stat, oflags=0x80000
open: path=/proc/6838/task/6936/stat, oflags=0x80000
open: path=/proc/6838/task/6939/stat, oflags=0x80000
open: path=/proc/6838/task/6942/stat, oflags=0x80000
open: path=/proc/6838/task/6945/stat, oflags=0x80000
open: path=/proc/6838/task/6946/stat, oflags=0x80000
open: path=/proc/6838/task/6947/stat, oflags=0x80000
open: path=/proc/6838/task/6948/stat, oflags=0x80000
pthread_create: thread 0x7fe513e578, attr=0x7fe513e6c0, start_routine=0x6d83f30904, arg=0x2003b72e0
open: path=/proc/6838/task/6950/stat, oflags=0x80000
```

```

clone: fn 0x707076fd0c, stack 0x6d37a06cc0, flags=0x3d0f00, arg=0x6d37a06cc0
open: path=/proc/6838/task/6951/stat, oflags=0x80000
open: path=/proc/6838/task/6953/stat, oflags=0x80000
open: path=/proc/6838/task/6954/stat, oflags=0x80000
open: path=/proc/6838/task/6959/stat, oflags=0x80000
open: path=/proc/6838/task/6960/stat, oflags=0x80000
open: path=/proc/6838/task/6962/stat, oflags=0x80000
open: path=/proc/6838/task/6964/stat, oflags=0x80000
open: path=/proc/6838/task/6967/stat, oflags=0x80000
open: path=/proc/6838/task/6968/stat, oflags=0x80000
open: path=/proc/6838/task/6969/stat, oflags=0x80000
open: path=/proc/6838/task/6990/stat, oflags=0x80000
open: path=/proc/6838/task/6991/stat, oflags=0x80000
open: path=/proc/6838/task/6992/stat, oflags=0x80000
open: path=/sys/devices/system/cpu/cpu0/regs/identification/midr_el1, oflags=0x0
open: path=/proc/6838/task/6993/stat, oflags=0x80000
open: path=/proc/6838/task/6994/stat, oflags=0x80000
open: path=/proc/6838/task/6995/stat, oflags=0x80000
open: path=/proc/6838/task/6996/stat, oflags=0x80000
open: path=/sys/devices/system/cpu/cpu1/regs/identification/midr_el1, oflags=0x0
open: path=/sys/devices/system/cpu/cpu2/regs/identification/midr_el1, oflags=0x0
open: path=/sys/devices/system/cpu/cpu3/regs/identification/midr_el1, oflags=0x0
open: path=/sys/devices/system/cpu/cpu4/regs/identification/midr_el1, oflags=0x0
open: path=/sys/devices/system/cpu/cpu5/regs/identification/midr_el1, oflags=0x0
open: path=/sys/devices/system/cpu/cpu6/regs/identification/midr_el1, oflags=0x0
open: path=/sys/devices/system/cpu/cpu7/regs/identification/midr_el1, oflags=0x0
open: path=/sys/devices/system/cpu/cpu8/regs/identification/midr_el1, oflags=0x0
dlopen: filename libandroid.so, flags=0x2
dlopen: filename libmediandk.so, flags=0x2
dlopen: filename libandroid.so, flags=0x2
pthread_create: thread=0x7fe513e988, attr=0x7fe513ead0, start_routine=0x6d83f30904, arg=0x6a0001ce40
clone: fn 0x707076fd0c, stack 0x6d368ffcc0, flags=0x3d0f00, arg=0x6d368ffcc0
open: path=/system/etc/hosts, oflags=0x80000
pthread_create: thread=0x7fe513e958, attr=0x7fe513eaaa0, start_routine=0x6d83f30904, arg=0x6a0001cdc0
clone: fn 0x707076fd0c, stack 0x6d357f8cc0, flags=0x3d0f00, arg=0x6d357f8cc0
open: path=/data/user/0/com.lift.filemanager.android/cache/WebView/font_unique_name_table.pb, oflags=0x0
dlopen: filename libandroid.so, flags=0x2
open: path=/data/user/0/com.lift.filemanager.android/app_webview/Default/Preferences, oflags=0x80000
pthread_create: thread=0x7fe513e748, attr=0x7fe513e890, start_routine=0x6d83f30904, arg=0x6a0001d8a0
clone: fn 0x707076fd0c, stack 0x6d34698cc0, flags=0x3d0f00, arg=0x6d34698cc0
open: path=/data/data/com.lift.filemanager.android/app_webview/Default/Web Data, oflags=0xa8042
pthread_create: thread=0x7fe513dc68, attr=0x7fe513ddb0, start_routine=0x6d83f30904, arg=0x6a0001f680
clone: fn 0x707076fd0c, stack 0x6d33561cc0, flags=0x3d0f00, arg=0x6d33561cc0
open: path=/data/user/0/com.lift.filemanager.android/app_webview/Default/Local Storage/leveldb/LOG, oflags=0x241
open: path=/data/user/0/com.lift.filemanager.android/app_webview/Default/Local Storage/leveldb/LOCK, oflags=0x2
open: path=/data/user/0/com.lift.filemanager.android/app_webview/Default/Local Storage/leveldb/CURRENT, oflags=0x0

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```

open: path /data/user/0/com.lift.filemanager.android/app_webview/Default/Local Storage/
leveldb/MANIFEST-000001, oflags 0x0
pthread_create: thread 0x7fe513e0b8, attr 0x7fe513e200, start_routine 0x6d83f30904, arg
0x6a0013fae0
clone: fn 0x707076fd0c, stack 0x6d32442cc0, flags 0x3d0f00, arg 0x6d32442cc0
pthread_create: thread 0x7fe513e0b8, attr 0x7fe513e200, start_routine 0x6d83f30904, arg
0x6a0013fb60
clone: fn 0x707076fd0c, stack 0x6d3133bcc0, flags 0x3d0f00, arg 0x6d3133bcc0
open: path /data/user/0/com.lift.filemanager.android/app_webview/Default/Local Storage/
leveldb/MANIFEST-000001, oflags 0x401
open: path /data/user/0/com.lift.filemanager.android/app_webview/Default/Local Storage/
leveldb/000003.log, oflags 0x0
open: path /data/user/0/com.lift.filemanager.android/app_webview/Default/Local Storage/
leveldb/000003.log, oflags 0x401
pthread_create: thread 0x7fe513e478, attr 0x7fe513e5c0, start_routine 0x6d83f30904, arg
0x6a0013eb40
clone: fn 0x707076fd0c, stack 0x6d30234cc0, flags 0x3d0f00, arg 0x6d30234cc0
open: path /data/user/0/com.lift.filemanager.android/cache/WebView/Default/HTTP Cache/C
ode Cache/wasm/index, oflags 0x0
open: path /data/user/0/com.lift.filemanager.android/cache/WebView/Default/HTTP Cache/C
ode Cache/js/index, oflags 0x0
open: path /data/user/0/com.lift.filemanager.android/cache/WebView/Default/HTTP Cache/C
ode Cache/wasm/index, oflags 0xc1
open: path /data/user/0/com.lift.filemanager.android/cache/WebView/Default/HTTP Cache/C
ode Cache/js/index, oflags 0xc1
open: path /data/user/0/com.lift.filemanager.android/cache/WebView/Default/HTTP Cache/C
ode Cache/wasm/index-dir/the-real-index, oflags 0x0
open: path /data/user/0/com.lift.filemanager.android/cache/WebView/Default/HTTP Cache/C
ode Cache/js/index-dir/the-real-index, oflags 0x0
open: path /data/user/0/com.lift.filemanager.android/cache/WebView/Default/HTTP Cache/C
ode Cache/wasm/index-dir/temp-index, oflags 0x241
open: path /data/user/0/com.lift.filemanager.android/cache/WebView/Default/HTTP Cache/C
ode Cache/js/index-dir/temp-index, oflags 0x241
pthread_create: thread 0x7fe513ed08, attr 0x7fe513ed40, start_routine 0x6ddf1e6b3c, arg
0x6f4f39e900
clone: fn 0x707076fd0c, stack 0x6d2f12dcc0, flags 0x3d0f00, arg 0x6d2f12dcc0
pthread_create: thread 0x7fe513e618, attr 0x7fe513e650, start_routine 0x6ddf1e6b3c, arg
0x6f4f399590
clone: fn 0x707076fd0c, stack 0x6d2df4ecc0, flags 0x3d0f00, arg 0x6d2df4ecc0
pthread_create: thread 0x7fe513e848, attr 0x7fe513e990, start_routine 0x6d83f30904, arg
0x6a0013d820
clone: fn 0x707076fd0c, stack 0x6d2dfcacc0, flags 0x3d0f00, arg 0x6d2dfcacc0
pthread_create: thread 0x7fe513e048, attr 0x7fe513e080, start_routine 0x6ddf1e6b3c, arg
0x6f4f39cd30
clone: fn 0x707076fd0c, stack 0x6d2dec3cc0, flags 0x3d0f00, arg 0x6d2dec3cc0
open: path /data/user/0/com.lift.filemanager.android/files/frc_1:565703110738:android:3
7ec4862ed1c78d044af8b_firebase_defaults.json, oflags 0x241
pthread_create: thread 0x6d6a6cc4c8, attr 0x6d6a6cc500, start_routine 0x6ddf1e6b3c, arg
0x6f4f3a04d0
clone: fn 0x707076fd0c, stack 0x6d2dd80cc0, flags 0x3d0f00, arg 0x6d2dd80cc0
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags 0x4
2
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK
FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZD0zN2VjNDg2MmVkMWM3OGQwNDRhZjh1.json, oflags 0x0
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags 0x4
2

```

```

open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK
FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkmWM30GQwNDRhZjh1.json, oflags=0x0
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x4
2
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK
FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkmWM30GQwNDRhZjh1.json, oflags=0x0
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x4
2
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK
FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkmWM30GQwNDRhZjh1.json, oflags=0x0
pthread_create: thread 0x7fe513f678, attr=0x7fe513f6b0, start_routine=0x6ddf1e6b3c, arg=0x6f4f3a20a0
clone: fn 0x707076fd0c, stack 0x6d2dc6dcc0, flags=0x3d0f00, arg=0x6d2dc6dcc0
pthread_create: thread 0x7fe513f678, attr=0x7fe513f6b0, start_routine=0x6ddf1e6b3c, arg=0x6f4f3a3c70
clone: fn 0x707076fd0c, stack 0x6d2db63cc0, flags=0x3d0f00, arg=0x6d2db63cc0
pthread_create: thread 0x7fe513f678, attr=0x7fe513f6b0, start_routine=0x6ddf1e6b3c, arg=0x6f4f3a7410
clone: fn 0x707076fd0c, stack 0x6d2da59cc0, flags=0x3d0f00, arg=0x6d2da59cc0
pthread_create: thread 0x7fe513f678, attr=0x7fe513f6b0, start_routine=0x6ddf1e6b3c, arg=0x6f4f3a8fe0
clone: fn 0x707076fd0c, stack 0x6d2d94fcc0, flags=0x3d0f00, arg=0x6d2d94fcc0
pthread_create: thread 0x7fe513f678, attr=0x7fe513f6b0, start_routine=0x6ddf1e6b3c, arg=0x6f4f3aab0
clone: fn 0x707076fd0c, stack 0x6d2d833cc0, flags=0x3d0f00, arg=0x6d2d833cc0
pthread_create: thread 0x7fe513f678, attr=0x7fe513f6b0, start_routine=0x6ddf1e6b3c, arg=0x6f4f3ac780
clone: fn 0x707076fd0c, stack 0x6d2d729cc0, flags=0x3d0f00, arg=0x6d2d729cc0
pthread_create: thread 0x6d2db63448, attr=0x6d2db63480, start_routine=0x6ddf1e6b3c, arg=0x6f4f399590
open: path /data/app/~~gJRGEMcdzVg-RT9Vfcj4AA=/com.lift.filemanager.android-viAUZmvMdgKc2Zy2M8F1bQ=/lib/arm64/libobjectbox-jni.so, oflags=0x0
android_dlopen_ext: libPath /data/app/~~gJRGEMcdzVg-RT9Vfcj4AA=/com.lift.filemanager.android-viAUZmvMdgKc2Zy2M8F1bQ=/lib/arm64/libobjectbox-jni.so, flags=0x2, info=0x7fe513e700
clone: fn 0x707076fd0c, stack 0x6d2d5cbcc0, flags=0x3d0f00, arg=0x6d2d5cbcc0
open: path /data/data/com.lift.filemanager.android/files/objectbox/objectbox/lock.mdb, oflags=0x80042
open: path /data/data/com.lift.filemanager.android/files/objectbox/objectbox/data.mdb, oflags=0x42
open: path /data/data/com.lift.filemanager.android/files/objectbox/objectbox/data.mdb, oflags=0x81001
open: path /data/data/com.lift.filemanager.android/files/objectbox/objectbox/lock.mdb, oflags=0x80042
open: path /data/data/com.lift.filemanager.android/files/objectbox/objectbox/data.mdb, oflags=0x42
open: path /data/data/com.lift.filemanager.android/files/objectbox/objectbox/data.mdb, oflags=0x81001
pthread_create: thread 0x6d39c14758, attr=0x6d39c148a0, start_routine=0x6d83f30904, arg=0x6a0013d0a0
pthread_create: thread 0x7fe5143d18, attr=0x7fe5143e60, start_routine=0x6d83f30904, arg=0x6a0013eb20
clone: fn 0x707076fd0c, stack 0x6ce2ca4cc0, flags=0x3d0f00, arg=0x6ce2ca4cc0
clone: fn 0x707076fd0c, stack 0x6d2d045cc0, flags=0x3d0f00, arg=0x6d2d045cc0
pthread_create: thread 0x7fe5144dd8, attr=0x7fe5144de0, start_routine=0x707355dbf8, arg=0x6dff42da20

```

```
clone: fn 0x707076fd0c, stack 0x6ce0ba6cc0, flags=0x3d0f00, arg=0x6ce0ba6cc0
pthread_create: thread 0x7fe5144f40, attr=0x0, start_routine=0x706f43972c, arg=0x6def34
cd10
clone: fn 0x707076fd0c, stack 0x6ce0aa8cc0, flags=0x3d0f00, arg=0x6ce0aa8cc0
pthread_create: thread 0x6ce0ba6ab8, attr=0x0, start_routine=0x7071af09a0, arg=0x6def34
7190
clone: fn 0x707076fd0c, stack 0x6ce0aa8cc0, flags=0x3d0f00, arg=0x6ce0aa8cc0
open: path /data/vendor/gpu/esx_config_com.lift.filemanager.android.txt, oflags=0x0
open: path /data/vendor/gpu/esx_config.txt, oflags=0x0
open: path /data/misc/gpu/esx_config_com.lift.filemanager.android.txt, oflags=0x0
open: path /data/misc/gpu/esx_config.txt, oflags=0x0
pthread_create: thread 0x7fe51448a8, attr=0x7fe51448e0, start_routine=0x6ddf1e6b3c, arg=
0x6f4f3aff20
clone: fn 0x707076fd0c, stack 0x6ce0aa8cc0, flags=0x3d0f00, arg=0x6ce0aa8cc0
pthread_create: thread 0x6ce0aa83a8, attr=0x6ce0aa83e0, start_routine=0x6ddf1e6b3c, arg=
0x6f4f3ae350
clone: fn 0x707076fd0c, stack 0x6ce099ecc0, flags=0x3d0f00, arg=0x6ce099ecc0
open: path /data/user/0/com.lift.filemanager.android/shared_prefs/com.lift.filemanager.
android_preferences.xml, oflags=0x0
pthread_create: thread 0x7fe51443c8, attr=0x7fe5144400, start_routine=0x6ddf1e6b3c, arg=
0x6f4f3ae350
clone: fn 0x707076fd0c, stack 0x6cdffcdcc0, flags=0x3d0f00, arg=0x6cdffcdcc0
pthread_create: thread 0x6cdffcd3f8, attr=0x6cdffcd430, start_routine=0x6ddf1e6b3c, arg=
0x6f4f3b1af0
clone: fn 0x707076fd0c, stack 0x6cdfec3cc0, flags=0x3d0f00, arg=0x6cdfec3cc0
open: path /data/user/0/com.lift.filemanager.android/shared_prefs/admob.xml, oflags=0x0
pthread_create: thread 0x7fe5143858, attr=0x7fe5143890, start_routine=0x6ddf1e6b3c, arg=
0x6f4f3b1af0
clone: fn 0x707076fd0c, stack 0x6cdfec3cc0, flags=0x3d0f00, arg=0x6cdfec3cc0
pthread_create: thread 0x6cdffcd488, attr=0x6cdffcd4c0, start_routine=0x6ddf1e6b3c, arg=
0x6f4f3b5290
clone: fn 0x707076fd0c, stack 0x6cdfdb9cc0, flags=0x3d0f00, arg=0x6cdfdb9cc0
pthread_create: thread 0x7fe51442e8, attr=0x7fe5144320, start_routine=0x6ddf1e6b3c, arg=
0x6f4f3b8a30
clone: fn 0x707076fd0c, stack 0x6cdfcafcc0, flags=0x3d0f00, arg=0x6cdfcafcc0
open: path /data/user/0/com.google.android.gms/shared_prefs/admob_user_agent.xml, oflags
=0x0
pthread_create: thread 0x7fe5144368, attr=0x7fe51443a0, start_routine=0x6ddf1e6b3c, arg=
0x6f4f3b8a30
clone: fn 0x707076fd0c, stack 0x6cdfcafcc0, flags=0x3d0f00, arg=0x6cdfcafcc0
pthread_create: thread 0x7fe5144768, attr=0x7fe51447a0, start_routine=0x6ddf1e6b3c, arg=
0x6f4f3ba600
clone: fn 0x707076fd0c, stack 0x6cdfcafcc0, flags=0x3d0f00, arg=0x6cdfcafcc0
pthread_create: thread 0x7fe5144898, attr=0x7fe51448d0, start_routine=0x6ddf1e6b3c, arg=
0x6f4f3b6e60
clone: fn 0x707076fd0c, stack 0x6cdfba5cc0, flags=0x3d0f00, arg=0x6cdfba5cc0
pthread_create: thread 0x6cdffcd578, attr=0x6cdffcd5b0, start_routine=0x6ddf1e6b3c, arg=
0x6f4f3bc1d0
clone: fn 0x707076fd0c, stack 0x6cd99aacc0, flags=0x3d0f00, arg=0x6cd99aacc0
pthread_create: thread 0x7fe5144898, attr=0x7fe51448d0, start_routine=0x6ddf1e6b3c, arg=
0x6f4f3bf970
clone: fn 0x707076fd0c, stack 0x6cd98a0cc0, flags=0x3d0f00, arg=0x6cd98a0cc0
pthread_create: thread 0x6cdffcd4f8, attr=0x6cdffcd530, start_routine=0x6ddf1e6b3c, arg=
0x6f4f3bdda0
clone: fn 0x707076fd0c, stack 0x6cd6796cc0, flags=0x3d0f00, arg=0x6cd6796cc0
pthread_create: thread 0x6cdffcd3b8, attr=0x6cdffcd3f0, start_routine=0x6ddf1e6b3c, arg=
```

```

0x6f4f3c3110
clone: fn 0x707076fd0c, stack 0x6cd568ccc0, flags=0x3d0f00, arg=0x6cd568ccc0
pthread_create: thread 0x6cd568c3b8, attr=0x6cd568c3f0, start_routine=0x6ddf1e6b3c, arg=0x6f4f3c1540
clone: fn 0x707076fd0c, stack 0x6cd4582cc0, flags=0x3d0f00, arg=0x6cd4582cc0
pthread_create: thread 0x7fe5142008, attr=0x7fe5142150, start_routine=0x6d83f30904, arg=0x6a0012bc0
clone: fn 0x707076fd0c, stack 0x6cd4542cc0, flags=0x3d0f00, arg=0x6cd4542cc0
pthread_create: thread 0x6cd45428b8, attr=0x6cd4542a00, start_routine=0x6d83f30904, arg=0x6a0012afe0
clone: fn 0x707076fd0c, stack 0x6cd4444cc0, flags=0x3d0f00, arg=0x6cd4444cc0
dlopen: filename libGLESv2.so, flags=0x1
dlopen: filename libEGL.so, flags=0x1
dlopen: filename libEGL_adreno.so, flags=0x2
pthread_create: thread 0x7fe51449b8, attr=0x7fe51449f0, start_routine=0x6ddf1e6b3c, arg=0x6f4f3c8480
clone: fn 0x707076fd0c, stack 0x6cd42bdcc0, flags=0x3d0f00, arg=0x6cd42bdcc0
open: path /data/user/0/com.lift.filemanager.android/files/frc_1:565703110738:android:3
7ec4862ed1c78d044af8b_firebase_defaults.json, oflags=0x241
android_dlopen_ext: libPath /vendor/lib64/hw/gralloc.sdm845.so, flags=0x2, info=0x6cd453e048
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x42
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK
FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkmWM30GQwNDRhZjh1.json, oflags=0x0
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x42
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK
FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkmWM30GQwNDRhZjh1.json, oflags=0x0
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x42
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK
FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkmWM30GQwNDRhZjh1.json, oflags=0x0
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x42
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK
FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkmWM30GQwNDRhZjh1.json, oflags=0x0
open: path /data/vendor/gpu/esx_config_com.lift.filemanager.android.txt, oflags=0x0
open: path /data/vendor/gpu/esx_config.txt, oflags=0x0
open: path /data/misc/gpu/esx_config_com.lift.filemanager.android.txt, oflags=0x0
open: path /data/misc/gpu/esx_config.txt, oflags=0x0
pthread_create: thread 0x7fe5144c58, attr=0x7fe5144c90, start_routine=0x6ddf1e6b3c, arg=0x6f4f3ca050
clone: fn 0x707076fd0c, stack 0x6cd40fccc0, flags=0x3d0f00, arg=0x6cd40fccc0
open: path ./adreno_config.txt, oflags=0x0
open: path /data/vendor/gpu//adreno_config.txt, oflags=0x0
open: path /data/misc/gpu//adreno_config.txt, oflags=0x0
pthread_create: thread 0x6ce0aa7b08, attr=0x6ce0aa7b40, start_routine=0x6ddf1e6b3c, arg=0x6f4f3cd7f0
clone: fn 0x707076fd0c, stack 0x6cd3ff2cc0, flags=0x3d0f00, arg=0x6cd3ff2cc0
open: path ./yamato_panel.txt, oflags=0x0
open: path /data/vendor/gpu//yamato_panel.txt, oflags=0x0
open: path /data/misc/gpu//yamato_panel.txt, oflags=0x0
open: path /data/vendor/gpu/esx_config_com.lift.filemanager.android.txt, oflags=0x0
open: path /data/vendor/gpu/esx_config.txt, oflags=0x0
open: path /data/misc/gpu/esx_config_com.lift.filemanager.android.txt, oflags=0x0

```

```
open: path: /data/misc/gpu/esx_config.txt, oflags=0x0
open: path: /data/vendor/gpu/esx_config_com.lift.filemanager.android.txt, oflags=0x0
open: path: /data/vendor/gpu/esx_config.txt, oflags=0x0
open: path: /data/misc/gpu/esx_config_com.lift.filemanager.android.txt, oflags=0x0
open: path: /data/misc/gpu/esx_config.txt, oflags=0x0
open: path: /sys/devices/system/cpu/present, oflags=0x0
open: path: /sys/devices/system/cpu/cpu0/cpu_capacity, oflags=0x0
open: path: /sys/devices/system/cpu/cpu0/cpufreq/cpuinfo_max_freq, oflags=0x0
open: path: /sys/devices/system/cpu/cpu1/cpufreq/cpuinfo_max_freq, oflags=0x0
open: path: /sys/devices/system/cpu/cpu2/cpufreq/cpuinfo_max_freq, oflags=0x0
open: path: /sys/devices/system/cpu/cpu3/cpufreq/cpuinfo_max_freq, oflags=0x0
open: path: /sys/devices/system/cpu/cpu4/cpufreq/cpuinfo_max_freq, oflags=0x0
open: path: /sys/devices/system/cpu/cpu5/cpufreq/cpuinfo_max_freq, oflags=0x0
open: path: /sys/devices/system/cpu/cpu6/cpufreq/cpuinfo_max_freq, oflags=0x0
open: path: /sys/devices/system/cpu/cpu7/cpufreq/cpuinfo_max_freq, oflags=0x0
open: path: /sys/class/kgsl/kgsl-3d0/gpu_model, oflags=0x0
dlopen: filename: libGLESv2_adreno.so, flags=0x2
dlopen: filename: libGLESv1_CM_adreno.so, flags=0x2
open: path: /data/data/com.lift.filemanager.android/app_webview/Default/Cookies, oflags=0xa8042
open: path: /data/data/com.lift.filemanager.android/app_webview/Default/Cookies, oflags=0x0
open: path: /data/user/0/com.lift.filemanager.android/cache/WebView/Default/HTTP Cache/Cache_Data/index, oflags=0x0
open: path: /data/user/0/com.lift.filemanager.android/cache/WebView/Default/HTTP Cache/Cache_Data/index-dir/the-real-index, oflags=0x0
open: path: /data/user/0/com.lift.filemanager.android/cache/WebView/Default/HTTP Cache/Cache_Data/3804ac0efe04121c_0, oflags=0x2
open: path: /data/user/0/com.lift.filemanager.android/cache/WebView/Default/HTTP Cache/Cache_Data/3804ac0efe04121c_1, oflags=0x2
open: path: /data/user/0/com.lift.filemanager.android/cache/WebView/Default/HTTP Cache/Cache_Data/3804ac0efe04121c_s, oflags=0x2
open: path: /data/user/0/com.lift.filemanager.android/app_webview/Default/Session Storage/LOCK, oflags=0x2
open: path: /data/user/0/com.lift.filemanager.android/app_webview/Default/Session Storage/LOG, oflags=0x241
open: path: /data/user/0/com.lift.filemanager.android/app_webview/Default/Session Storage/LOCK, oflags=0x2
open: path: /data/user/0/com.lift.filemanager.android/app_webview/Default/Session Storage/LOCK, oflags=0x42
open: path: /data/user/0/com.lift.filemanager.android/app_webview/Default/Session Storage/MANIFEST-000001, oflags=0x241
open: path: /data/user/0/com.lift.filemanager.android/app_webview/Default/Session Storage, oflags=0x0
open: path: /data/user_de/0/com.lift.filemanager.android/code_cache/com.android.skia.shaders_cache, oflags=0x0
open: path: /data/user/0/com.lift.filemanager.android/databases/google_app_measurement_local.db, oflags=0xa0042
open: path: /data/user/0/com.lift.filemanager.android/app_webview/Default/Session Storage/000001.dbtmp, oflags=0x241
open: path: /data/user/0/com.lift.filemanager.android/app_webview/Default/Session Storage/CURRENT, oflags=0x0
open: path: /data/user/0/com.lift.filemanager.android/app_webview/Default/Session Storage/MANIFEST-000001, oflags=0x0
open: path: /data/user/0/com.lift.filemanager.android/app_webview/Default/Session Storage/MANIFEST-000001, oflags=0x401
```

```
open: path /data/user/0/com.lift.filemanager.android/app_webview/Default/Session Storage/000003.log, oflags 0x241
android_dlopen_ext: libPath /vendor/lib64/hw/android.hardware.graphics.mapper@2.0-impl-qti-display.so, flags 0x1, info 0x6ce0ba5fc8
dlopen: filename libadreno_utils.so, flags 0x2
open: path /data/user/0/com.lift.filemanager.android/cache/WebView/.com.google.Chrome.syx3nP, oflags 0xc2
open: path /data/user/0/com.lift.filemanager.android/cache/WebView/.com.google.Chrome.syx3nP, oflags 0x242
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags 0x42
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkMWM30GQwNDRhZjh1.json, oflags 0x0
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags 0x42
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkMWM30GQwNDRhZjh1.json, oflags 0x0
open: path /data/user/0/com.lift.filemanager.android/shared_prefs/com.lift.filemanager.android_preferences.xml, oflags 0x241
open: path /data/user/0/com.lift.filemanager.android/shared_prefs/com.google.android.gms.measurement.prefs.xml, oflags 0x241
open: path /data/user/0/com.lift.filemanager.android/app_webview/.com.google.Chrome.g10Own, oflags 0xc2
open: path /data/user/0/com.lift.filemanager.android/files/AppEventsLogger.persistedevents, oflags 0x0
open: path /data/user/0/com.lift.filemanager.android/files/.com.google.firebaseio.crashlytics.files.v2:com.lift.filemanager.android/open-sessions/64D0B857022700011AB6F3CB35D4C192/userlog.tmp, oflags 0x42
pthread_create: thread 0x6d3be6fbe8, attr 0x6d3be6fc20, start_routine 0x6ddf1e6b3c, arg 0x6f4f3cbc20
clone: fn 0x707076fd0c, stack 0x6cd3ae1cc0, flags 0x3d0f00, arg 0x6cd3ae1cc0
open: path /data/user/0/com.lift.filemanager.android/shared_prefs/AwOriginVisitLoggerPrefs.xml, oflags 0x0
open: path /data/user/0/com.lift.filemanager.android/files/.com.google.firebaseio.crashlytics.files.v2:com.lift.filemanager.android/open-sessions/64D0B857022700011AB6F3CB35D4C192/userlog, oflags 0x42
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags 0x42
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkMWM30GQwNDRhZjh1.json, oflags 0x0
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags 0x42
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkMWM30GQwNDRhZjh1.json, oflags 0x0
pthread_create: thread 0x6d598c3368, attr 0x6d598c33a0, start_routine 0x6ddf1e6b3c, arg 0x6f4f3cbc20
clone: fn 0x707076fd0c, stack 0x6cd3997cc0, flags 0x3d0f00, arg 0x6cd3997cc0
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags 0x42
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkMWM30GQwNDRhZjh1.json, oflags 0x0
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags 0x42
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkMWM30GQwNDRhZjh1.json, oflags 0x0
open: path /data/user/0/com.lift.filemanager.android/databases/google_app_measurement_1
```

```

ocal.db, oflags 0xa0042
open: path /data/user/0/com.lift.filemanager.android/databases/google_app_measurement_1
ocal.db, oflags 0xa0042
pthread_create: thread 0x6d38b0c3b8, attr=0x6d38b0c3f0, start_routine=0x6ddf1e6b3c, arg=0x6f4f3cbc20
clone: fn 0x707076fd0c, stack 0x6cd3957cc0, flags=0x3d0f00, arg=0x6cd3957cc0
open: path /data/user/0/com.lift.filemanager.android/cache/WebView/Default/HTTP Cache/Cache_Data/fbf7ad96532b1f6f_0, oflags=0x2
open: path /data/user/0/com.lift.filemanager.android/cache/WebView/Default/HTTP Cache/Cache_Data/fbf7ad96532b1f6f_1, oflags=0x2
open: path /data/user/0/com.lift.filemanager.android/cache/WebView/Default/HTTP Cache/Cache_Data/fbf7ad96532b1f6f_s, oflags=0x2
open: path /data/user/0/com.lift.filemanager.android/databases/google_app_measurement_1
ocal.db, oflags 0xa0042
pthread_create: thread 0x7fe5144238, attr=0x7fe5144270, start_routine=0x6ddf1e6b3c, arg=0x6f4f3d3d300
clone: fn 0x707076fd0c, stack 0x6cd37edcc0, flags=0x3d0f00, arg=0x6cd37edcc0
pthread_create: thread 0x6d2f12d308, attr=0x6d2f12d340, start_routine=0x6ddf1e6b3c, arg=0x6f4f3d7ed0
clone: fn 0x707076fd0c, stack 0x6cd36e3cc0, flags=0x3d0f00, arg=0x6cd36e3cc0
open: path /data/user/0/com.lift.filemanager.android/cache/WebView/Default/HTTP Cache/Cache_Data/47dd006ca3dbb334_0, oflags=0xc2
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x42
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRkFVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkMWM30GQwNDRhZjh1.json, oflags=0x0
open: path /data/misc/keychain/pubkey_blacklist.txt, oflags=0x0
open: path /data/misc/keychain/serial_blacklist.txt, oflags=0x0
open: path /system/etc/security/cacerts/f013ecaf.0, oflags=0x0
open: path /system/etc/security/cacerts/f013ecaf.0, oflags=0x0
pthread_create: thread 0x7fe5144f08, attr=0x7fe5144f40, start_routine=0x6ddf1e6b3c, arg=0x6f4f3d2b60
clone: fn 0x707076fd0c, stack 0x6cd35a0cc0, flags=0x3d0f00, arg=0x6cd35a0cc0
pthread_create: thread 0x6dc829768, attr=0x6dc829770, start_routine=0x707355dbf8, arg=0x6dff40a9b0
clone: fn 0x707076fd0c, stack 0x6d435c7cc0, flags=0x3d0f00, arg=0x6d435c7cc0
open: path /data/user/0/com.lift.filemanager.android/app_webview/BrowserMetrics-spare.pma.tmp, oflags=0x242
open: path /data/user/0/com.lift.filemanager.android/databases/google_app_measurement_1
ocal.db, oflags 0xa0042
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x42
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRkFVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkMWM30GQwNDRhZjh1.json, oflags=0x0

```

```
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x42
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRkFVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkMWM30GQwNDRhZjh1.json, oflags=0x0
open: path /data/user/0/com.lift.filemanager.android/databases/google_app_measurement_local.db, oflags=0xa0042
open: path /data/user/0/com.lift.filemanager.android/app_webview/.com.google.Chrome.XGSWVA, oflags=0xc2
open: path /data/user/0/com.lift.filemanager.android/databases/google_app_measurement_local.db, oflags=0xa0042
pthread_create: thread=0x6ce0ba6ab8, attr=0x0, start_routine=0x7071af09a0, arg=0x6def33c0b0
clone: fn=0x707076fd0c, stack=0x6dcf04bcc0, flags=0x3d0f00, arg=0x6dcf04bcc0
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x42
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRkFVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkMWM30GQwNDRhZjh1.json, oflags=0x0
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x42
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRkFVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkMWM30GQwNDRhZjh1.json, oflags=0x0
open: path /data/user/0/com.lift.filemanager.android/databases/google_app_measurement_local.db, oflags=0xa0042
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x42
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRkFVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkMWM30GQwNDRhZjh1.json, oflags=0x0
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x42
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRkFVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkMWM30GQwNDRhZjh1.json, oflags=0x0
pthread_create: thread=0x7fe5143638, attr=0x7fe5143670, start_routine=0x6ddf1e6b3c, arg=0x6f4f3b6e60
clone: fn=0x707076fd0c, stack=0x6dcee9fcc0, flags=0x3d0f00, arg=0x6dcee9fcc0
pthread_create: thread=0x6cdfdb9428, attr=0x6cdfdb9460, start_routine=0x6ddf1e6b3c, arg=0x6f4f33ef50
clone: fn=0x707076fd0c, stack=0x6dcdd95cc0, flags=0x3d0f00, arg=0x6dcdd95cc0
open: path /data/user/0/com.lift.filemanager.android/shared_prefs/pcvmsp.xml, oflags=0x0
open: path /data/user/0/com.lift.filemanager.android/shared_prefs/com.lift.filemanager.android_preferences.xml, oflags=0x241
open: path /data/user/0/com.lift.filemanager.android/shared_prefs/com.google.android.gms.measurement.xml, oflags=0x241
pthread_create: thread=0x6cdfdb9438, attr=0x6cdfdb9470, start_routine=0x6ddf1e6b3c, arg=0x6f4f3ca050
clone: fn=0x707076fd0c, stack=0x6dcdd95cc0, flags=0x3d0f00, arg=0x6dcdd95cc0
pthread_create: thread=0x6dcdd955c8, attr=0x6dcdd95600, start_routine=0x6ddf1e6b3c, arg=0x6f4f3bf970
clone: fn=0x707076fd0c, stack=0x6dcc8bcc0, flags=0x3d0f00, arg=0x6dcc8bcc0
pthread_create: thread=0x6cdfdb9278, attr=0x6cdfdb92b0, start_routine=0x6ddf1e6b3c, arg=0x6f4f3bc1d0
clone: fn=0x707076fd0c, stack=0x6dccb81cc0, flags=0x3d0f00, arg=0x6ccb81cc0
pthread_create: thread=0x7fe5143418, attr=0x7fe5143450, start_routine=0x6ddf1e6b3c, arg=0x6f4f33ef50
clone: fn=0x707076fd0c, stack=0x6dcca77cc0, flags=0x3d0f00, arg=0x6dcca77cc0
pthread_create: thread=0x6cdfdb9278, attr=0x6cdfdb92b0, start_routine=0x6ddf1e6b3c, arg=
```

```
0x6f4f33b7b0
clone: fn 0x707076fd0c, stack 0x6dcc96dcc0, flags=0x3d0f00, arg=0x6dcc96dcc0
open: path /data/user/0/com.lift.filemanager.android/app_pccache/5/AC7BC3562A445BE6E17C
D85D775DF427D4C01AD8/pcam.jar, oflags=0x0
pthread_create: thread 0x7fe5143318, attr=0x7fe5143350, start_routine=0x6ddf1e6b3c, arg=
0x6f4f3b8a30
clone: fn 0x707076fd0c, stack 0x6dcc7cccc0, flags=0x3d0f00, arg=0x6dcc7cccc0
pthread_create: thread 0x7fe5143318, attr=0x7fe5143350, start_routine=0x6ddf1e6b3c, arg=
0x6f4f340b20
open: path=/proc/7411/timerslack_ns, oflags=0x88241
open: path /data/user/0/com.lift.filemanager.android/app_pccache/5/AC7BC3562A445BE6E17C
D85D775DF427D4C01AD8/pcam.jar, oflags=0x0
clone: fn 0x707076fd0c, stack 0x6dcc6c2ccc0, flags=0x3d0f00, arg=0x6dcc6c2ccc0
pthread_create: thread 0x7fe5143318, attr=0x7fe5143350, start_routine=0x6ddf1e6b3c, arg=
0x6f4f338010
clone: fn 0x707076fd0c, stack 0x6dcc5afcc0, flags=0x3d0f00, arg=0x6dcc5afcc0
open: path=/proc/7412/timerslack_ns, oflags=0x88241
pthread_create: thread 0x7fe5143318, attr=0x7fe5143350, start_routine=0x6ddf1e6b3c, arg=
0x6f4f3863a0
open: path /data/user/0/com.lift.filemanager.android/app_pccache/5/AC7BC3562A445BE6E17C
D85D775DF427D4C01AD8/pcam.jar, oflags=0x0
open: path /proc/7413/timerslack_ns, oflags=0x88241
clone: fn 0x707076fd0c, stack 0x6dcc46ccc0, flags=0x3d0f00, arg=0x6dcc46ccc0
pthread_create: thread 0x7fe5143318, attr=0x7fe5143350, start_routine=0x6ddf1e6b3c, arg=
0x6f4f37d890
open: path /data/user/0/com.lift.filemanager.android/cache/volley/-1207530946-547165462
, oflags 0x0
clone: fn 0x707076fd0c, stack 0x6d5aac4cc0, flags=0x3d0f00, arg=0x6d5aac4cc0
open: path /proc/7415/timerslack_ns, oflags=0x88241
open: path /proc/7414/timerslack_ns, oflags=0x88241
pthread_create: thread 0x7fe5143728, attr=0x7fe5143760, start_routine=0x6ddf1e6b3c, arg=
0x6f4f3dd240
open: path /data/user/0/com.lift.filemanager.android/cache/volley/715414548-394311354,
oflags 0x0
clone: fn 0x707076fd0c, stack 0x6d587bacc0, flags=0x3d0f00, arg=0x6d587bacc0
open: path /data/user/0/com.lift.filemanager.android/app_pccache/5/AC7BC3562A445BE6E17C
D85D775DF427D4C01AD8/oat/pcam.jar.cur.prof, oflags=0xc2
open: path /data/user/0/com.lift.filemanager.android/cache/volley/-1727183717-967741021
, oflags 0x0
open: path /data/user/0/com.lift.filemanager.android/app_pccache/5/AC7BC3562A445BE6E17C
D85D775DF427D4C01AD8/pcbc, oflags=0x0
pthread_create: thread 0x7fe5143668, attr=0x7fe51436a0, start_routine=0x6ddf1e6b3c, arg=
0x6f4f387f70
clone: fn 0x707076fd0c, stack 0x6d556b0cc0, flags=0x3d0f00, arg=0x6d556b0cc0
pthread_create: thread 0x7fe5143668, attr=0x7fe51436a0, start_routine=0x6ddf1e6b3c, arg=
0x6f4f3d2b60
clone: fn 0x707076fd0c, stack 0x6d431a4cc0, flags=0x3d0f00, arg=0x6d431a4cc0
pthread_create: thread 0x7fe5143608, attr=0x7fe5143640, start_routine=0x6ddf1e6b3c, arg=
0x6f4f3dee10
clone: fn 0x707076fd0c, stack 0x6cd99aacc0, flags=0x3d0f00, arg=0x6cd99aacc0
open: path /data/app/~~gJRGEMcdzVg-RT9VfCj4AA~~/com.lift.filemanager.android-viAUZmvMdg
Kc2Zy2M8F1bQ=/base.apk, oflags=0x80000
pthread_create: thread 0x7fe5143668, attr=0x7fe51436a0, start_routine=0x6ddf1e6b3c, arg=
0x6f4f3db670
clone: fn 0x707076fd0c, stack 0x6cd98a0cc0, flags=0x3d0f00, arg=0x6cd98a0cc0
open: path /data/user/0/com.lift.filemanager.android/app_pccache/5/AC7BC3562A445BE6E17C
```

```

D85D775DF427D4C01AD8/pcam.jar, oflags 0x80000
pthread_create: thread 0x7fe51436a8, attr=0x7fe51436e0, start_routine=0x6ddf1e6b3c, arg=
0x6f4f3e25b0
clone: fn 0x707076fd0c, stack 0x6cd40fccc0, flags=0x3d0f00, arg=0x6cd40fccc0
pthread_create: thread 0x6cd98a02b8, attr=0x6cd98a02f0, start_routine=0x6ddf1e6b3c, arg=
0x6f4f3e5d50
clone: fn 0x707076fd0c, stack 0x6cc4000cc0, flags=0x3d0f00, arg=0x6cc4000cc0
pthread_create: thread 0x6cd40fc348, attr=0x6cd40fc380, start_routine=0x6ddf1e6b3c, arg=
0x6f4f3e09e0
clone: fn 0x707076fd0c, stack 0x6cc2ef6cc0, flags=0x3d0f00, arg=0x6cc2ef6cc0
pthread_create: thread 0x7fe5143668, attr=0x7fe51436a0, start_routine=0x6ddf1e6b3c, arg=
0x6f4f3e4180
clone: fn 0x707076fd0c, stack 0x6cc1decccc0, flags=0x3d0f00, arg=0x6cc1decccc0
open: path=/data/user/0/com.lift.filemanager.android/shared_prefs/paid_storage_sp.xml,
oflags 0x0
pthread_create: thread 0x7fe51435d8, attr=0x7fe5143610, start_routine=0x6ddf1e6b3c, arg=
0x6f4f3eb0c0
clone: fn 0x707076fd0c, stack 0x6cc0ce2cc0, flags=0x3d0f00, arg=0x6cc0ce2cc0
android_dlopen_ext: libPath /data/user/0/com.lift.filemanager.android/app_pccache/5/AC7
BC3562A445BE6E17CD85D775DF427D4C01AD8/pcam.jar /libd36668F50D9B1.so, flags=0x2, info=0x
6cdfdb8030
pthread_create: thread 0x7fe5143738, attr=0x7fe5143770, start_routine=0x6ddf1e6b3c, arg=
0x6f4f3e7920
clone: fn 0x707076fd0c, stack 0x6cc0bd8cc0, flags=0x3d0f00, arg=0x6cc0bd8cc0
pthread_create: thread 0x6cc0ce2418, attr=0x6cc0ce2450, start_routine=0x6ddf1e6b3c, arg=
0x6f4f3ecc90
clone: fn 0x707076fd0c, stack 0x6cbfacecc0, flags=0x3d0f00, arg=0x6cbfacecc0
open: path=/data/user/0/com.lift.filemanager.android/cache/WebView/Default/HTTP Cache/C
ache_Data/fb0a44f3e240ce58_0, oflags 0x2
open: path=/data/user/0/com.lift.filemanager.android/cache/WebView/Default/HTTP Cache/C
ache_Data/fb0a44f3e240ce58_1, oflags 0x2
open: path=/data/user/0/com.lift.filemanager.android/databases/google_app_measurement_l
ocal.db, oflags 0xa0042
open: path=/data/user/0/com.lift.filemanager.android/cache/WebView/Default/HTTP Cache/C
ache_Data/fb0a44f3e240ce58_s, oflags 0x2
open: path=/data/user/0/com.lift.filemanager.android/databases/google_app_measurement_l
ocal.db, oflags 0xa0042
open: path=/data/user/0/com.lift.filemanager.android/shared_prefs/admob.xml, oflags 0x2
41
open: path=/data/user/0/com.lift.filemanager.android/cache/WebView/Default/HTTP Cache/C
ache_Data/fbf7ad96532b1f6f_0, oflags 0x2
open: path=/data/user/0/com.lift.filemanager.android/cache/WebView/Default/HTTP Cache/C
ache_Data/fbf7ad96532b1f6f_1, oflags 0x2
open: path=/data/user/0/com.lift.filemanager.android/cache/WebView/Default/HTTP Cache/C
ache_Data/fbf7ad96532b1f6f_s, oflags 0x2
open: path=/proc/self/cmdline, oflags 0x80000
open: path=/proc/self/cmdline, oflags 0x80000
open: path=/proc/self/cmdline, oflags 0x80000
pthread_create: thread 0x6cc0ce1ec8, attr=0x6cc0ce1f00, start_routine=0x6ddf1e6b3c, arg=
0x6f4f3ee860
clone: fn 0x707076fd0c, stack 0x6d81d3dcc0, flags=0x3d0f00, arg=0x6d81d3dcc0
pthread_create: thread 0x6cc1dec478, attr=0x6cc1dec4b0, start_routine=0x6ddf1e6b3c, arg=
0x6f4f3f2000
clone: fn 0x707076fd0c, stack 0x6d81c33cc0, flags=0x3d0f00, arg=0x6d81c33cc0
open: path=/data/user/0/com.lift.filemanager.android/databases/google_app_measurement_l
ocal.db, oflags 0xa0042

```

```
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x42
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRkFVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkJMWM30GQwNDRhZjh1.json, oflags=0x0
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x42
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRkFVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkJMWM30GQwNDRhZjh1.json, oflags=0x0
open: path /data/user/0/com.lift.filemanager.android/databases/google_app_measurement_local.db, oflags=0xa0042
pthread_create: thread 0x7fe5143408, attr=0x7fe5143440, start_routine=0x6ddf1e6b3c, arg=0x6f4f3f3bd0
clone: fn 0x707076fd0c, stack 0x6d81929cc0, flags=0x3d0f00, arg=0x6d81929cc0
pthread_create: thread 0x6d556b0348, attr=0x6d556b0380, start_routine=0x6ddf1e6b3c, arg=0x6f4f3f0430
pthread_create: thread 0x7fe5143328, attr=0x7fe5143360, start_routine=0x6ddf1e6b3c, arg=0x6f4f3f57a0
clone: fn 0x707076fd0c, stack 0x6d8181fcc0, flags=0x3d0f00, arg=0x6d8181fcc0
clone: fn 0x707076fd0c, stack 0x6d81715cc0, flags=0x3d0f00, arg=0x6d81715cc0
pthread_create: thread 0x7fe51432c8, attr=0x7fe5143300, start_routine=0x6ddf1e6b3c, arg=0x6f4f3f7370
clone: fn 0x707076fd0c, stack 0x6d81b29cc0, flags=0x3d0f00, arg=0x6d81b29cc0
pthread_create: thread 0x6cd99aa418, attr=0x6cd99aa450, start_routine=0x6ddf1e6b3c, arg=0x6f4f3fc6e0
clone: fn 0x707076fd0c, stack 0x6d8160bcc0, flags=0x3d0f00, arg=0x6d8160bcc0
open: path /data/user/0/com.lift.filemanager.android/databases/google_app_measurement_local.db, oflags=0xa0042
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x42
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRkFVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkJMWM30GQwNDRhZjh1.json, oflags=0x0
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x42
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRkFVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkJMWM30GQwNDRhZjh1.json, oflags=0x0
open: path /data/user/0/com.lift.filemanager.android/databases/google_app_measurement_local.db, oflags=0xa0042
pthread_create: thread 0x6d8181f418, attr=0x6d8181f450, start_routine=0x6ddf1e6b3c, arg=0x6f4f3f8f40
clone: fn 0x707076fd0c, stack 0x6d81501cc0, flags=0x3d0f00, arg=0x6d81501cc0
open: path /data/user/0/com.lift.filemanager.android/databases/google_app_measurement_local.db, oflags=0xa0042
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x42
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRkFVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkJMWM30GQwNDRhZjh1.json, oflags=0x0
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x42
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRkFVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkJMWM30GQwNDRhZjh1.json, oflags=0x0
open: path /data/user/0/com.lift.filemanager.android/databases/google_app_measurement_local.db, oflags=0xa0042
pthread_create: thread 0x6cd99aa418, attr=0x6cd99aa450, start_routine=0x6ddf1e6b3c, arg=0x6f4f403620
clone: fn 0x707076fd0c, stack 0x6d813f7cc0, flags=0x3d0f00, arg=0x6d813f7cc0
open: path /data/user/0/com.lift.filemanager.android/databases/google_app_measurement_local.db, oflags=0xa0042
```

```
ocal.db, oflags 0xa0042
pthread_create: thread 0x6cdffcd418, attr=0x6cdffcd450, start_routine=0x6ddf1e6b3c, arg=
0x6f4f3fe2b0
clone: fn 0x707076fd0c, stack 0x6d810edcc0, flags=0x3d0f00, arg=0x6d810edcc0
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x4
2
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK
FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkmwm30GQwNDRhZjh1.json, oflags=0x0
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x4
2
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK
FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkmwm30GQwNDRhZjh1.json, oflags=0x0
open: path /data/user/0/com.lift.filemanager.android/databases/google_app_measurement_1
ocal.db, oflags 0xa0042
open: path /data/user/0/com.lift.filemanager.android/databases/google_app_measurement_1
ocal.db, oflags 0xa0042
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x4
2
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK
FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkmwm30GQwNDRhZjh1.json, oflags=0x0
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x4
2
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK
FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkmwm30GQwNDRhZjh1.json, oflags=0x0
open: path /data/user/0/com.lift.filemanager.android/databases/google_app_measurement_1
ocal.db, oflags 0xa0042
open: path /data/user/0/com.lift.filemanager.android/databases/google_app_measurement_1
ocal.db, oflags 0xa0042
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x4
2
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK
FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkmwm30GQwNDRhZjh1.json, oflags=0x0
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x4
2
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK
FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkmwm30GQwNDRhZjh1.json, oflags=0x0
open: path /data/user/0/com.lift.filemanager.android/databases/google_app_measurement_1
ocal.db, oflags 0xa0042
open: path /data/user/0/com.lift.filemanager.android/databases/google_app_measurement_1
ocal.db, oflags 0xa0042
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x4
2
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK
FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkmwm30GQwNDRhZjh1.json, oflags=0x0
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x4
2
open: path /data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK
FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkmwm30GQwNDRhZjh1.json, oflags=0x0
open: path /data/user/0/com.lift.filemanager.android/databases/google_app_measurement_1
ocal.db, oflags 0xa0042
open: path /data/user/0/com.lift.filemanager.android/databases/google_app_measurement_1
ocal.db, oflags 0xa0042
open: path /data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x4
2
```

```
2
open: path=/data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK
FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkJWM30GQwNDRhZjhhi.json, oflags=0x0
open: path=/data/user/0/com.lift.filemanager.android/files/generatefid.lock, oflags=0x4
2
open: path=/data/user/0/com.lift.filemanager.android/files/PersistedInstallation.W0RFRK
FVTFRd+MTo1NjU3MDMxMTA3Mzg6YW5kcm9pZDozN2VjNDg2MmVkJWM30GQwNDRhZjhhi.json, oflags=0x0
open: path=/data/user/0/com.lift.filemanager.android/databases/google_app_measurement_local.db, oflags=0xa0042
open: path=/data/user/0/com.lift.filemanager.android/app_webview/.com.google.Chrome.AIY
A7r, oflags=0xc2
open: path=/dev/urandom, oflags=0x80000
open: path=/data/user/0/com.lift.filemanager.android/cache/WebView/Default/HTTP Cache/C
ache_Data/index-dir/temp-index, oflags=0x241
[Pixel 3::com.lift.filemanager.android ]->
[Pixel 3::com.lift.filemanager.android ]-> pthead_create: thread=0x6dc829768, attr=0x
6dc829770, start_routine=0x707355dbf8, arg=0x6dff411640
clone: fn=0x707076fd0c, stack=0x6d81b29cc0, flags=0x3d0f00, arg=0x6d81b29cc0
[Pixel 3::com.lift.filemanager.android ]->
[Pixel 3::com.lift.filemanager.android ]->
[Pixel 3::com.lift.filemanager.android ]->
[Pixel 3::com.lift.filemanager.android ]-> open: path=/data/misc/profiles/cur/0/com.lif
t.filemanager.android/primary.prof, oflags=0x88002
open: path=/data/user/0/com.lift.filemanager.android/app_pccache/5/AC7BC3562A445BE6E17C
D85D775DF427D4C01AD8/oat/pcam.jar.cur.prof, oflags=0x88002
[Pixel 3::com.lift.filemanager.android ]->
[Pixel 3::com.lift.filemanager.android ]-> open: path=/data/user/0/com.lift.filemanager
.android/files/AppEventsLogger.persistedevents, oflags=0x0
```

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2023-08-15 21:49:45

DisplayDemo

用 frida-trace 调试安卓app: com.example.displaydemo

命令

```
frida-trace -U -f com.example.displaydemo -I libdl.so -I liblog.so -I libtacker.so -i o
pen -i openat -i dlopen
```

输出

截图

```
crifan@crifanlidembp:~/dev/dev_root/androidReverse/popupSDK_libtacker/dynamicDebug/frida/frida-trace
37334 ms __cfl_slowpath() /* TID 0x73c7 */
37334 ms | __android_log_print()
37334 ms | | __android_log_is_loggable()
37334 ms | | | __android_log_get_minimum_priority()
37334 ms | | | __android_log_write_log_message()
37334 ms | | | __android_log_logd_logger()
37334 ms | | | | __android_log_is_debuggable()
37335 ms __android_log_print() /* TID 0x73d5 */
37335 ms | __android_log_is_loggable()
37335 ms | | __android_log_get_minimum_priority()
37335 ms | | __android_log_write_log_message()
37335 ms | | __android_log_logd_logger()
37335 ms | | | __android_log_is_debuggable()
37336 ms __cfl_slowpath() /* TID 0x73c7 */
37336 ms __cfl_slowpath()
37336 ms __cfl_slowpath()
37336 ms __cfl_slowpath() /* TID 0x73c7 */
37339 ms __cfl_slowpath()
37339 ms __cfl_slowpath() /* TID 0x7497 */
37339 ms __cfl_slowpath()
37339 ms __cfl_slowpath() /* TID 0x73e8 */
39181 ms open(path="/data/user_de/0/com.example.displaydemo/code_cache/com.android.opengl.shaders_cache", oflag=0xc2)
39196 ms open(path="/data/user_de/0/com.example.displaydemo/code_cache/com.android.opengl.shaders_cache", oflag=0xc2)

/* TID 0x73e9 */
39255 ms open(path="/data/user_de/0/com.example.displaydemo/code_cache/com.android.skia.shaders_cache", oflag=0xc2)
39257 ms open(path="/data/user_de/0/com.example.displaydemo/code_cache/com.android.skia.shaders_cache", oflag=0xc2)
```

log日志

```
frida-trace -U -f com.example.displaydemo -I libdl.so -I liblog.so -I libtacker.so -i o
pen -i openat -i dlopen

__android_log_buf_write: Loaded handler at "/Users/crifan/dev/dev_root/androidReverse/p
opupSDK_libtacker/dynamicDebug/frida/frida-trace/__handlers__/liblog.so/__android_log_b
uf_write.js"
__android_log_is_debuggable: Loaded handler at "/Users/crifan/dev/dev_root/androidRever
se/popupSDK_libtacker/dynamicDebug/frida/frida-trace/__handlers__/liblog.so/__android_l
```

```

og_is_debuggable.js"
android_openEventTagMap: Loaded handler at "/Users/crifan/dev/dev_root/androidReverse/p
opupSDK_libtacker/dynamicDebug/frida/frida-trace/_handlers__/liblog.so/android_openEve
ntTagMap.js"
open: Loaded handler at "/Users/crifan/dev/dev_root/androidReverse/popupSDK_libtacker/d
ynamicDebug/frida/frida-trace/_handlers__/libc.so/open.js"
openat: Loaded handler at "/Users/crifan/dev/dev_root/androidReverse/popupSDK_libtacker/
dynamicDebug/frida/frida-trace/_handlers__/libc.so/openat.js"
Started tracing 82 functions. Press Ctrl+C to stop.
    /* TID 0x73a5 */
  628 ms  dlsym(handle 0x28d2598c92f4b5bd, symbol="Java_sun_nio_fs_UnixNativeDispatche
r_access0")
  641 ms  dlsym(handle 0x28d2598c92f4b5bd, symbol="Java_sun_nio_fs_UnixNativeDispatche
r_access0__JI")
  642 ms  dlsym(handle 0x18091f93b592f005, symbol="Java_sun_nio_fs_UnixNativeDispatche
r_access0")
  642 ms  dlsym(handle 0x18091f93b592f005, symbol="Java_sun_nio_fs_UnixNativeDispatche
r_access0__JI")
  642 ms  dlsym(handle 0xf61d9d184f5bd255, symbol="Java_sun_nio_fs_UnixNativeDispatche
r_access0")
  642 ms  dlsym(handle 0xf61d9d184f5bd255, symbol="Java_sun_nio_fs_UnixNativeDispatche
r_access0__JI")
  642 ms  dlsym(handle 0xf93963b9819f875f, symbol="Java_sun_nio_fs_UnixNativeDispatche
r_access0")
  642 ms  dlsym(handle 0xf93963b9819f875f, symbol="Java_sun_nio_fs_UnixNativeDispatche
r_access0__JI")
  642 ms  dlsym(handle 0xb6965c803b1ea0bf, symbol="Java_sun_nio_fs_UnixNativeDispatche
r_access0")
  642 ms  dlsym(handle 0xb6965c803b1ea0bf, symbol="Java_sun_nio_fs_UnixNativeDispatche
r_access0__JI")
  642 ms  dlsym(handle 0xf33483d7107b39b5, symbol="Java_sun_nio_fs_UnixNativeDispatche
r_access0")
  642 ms  dlsym(handle 0xf33483d7107b39b5, symbol="Java_sun_nio_fs_UnixNativeDispatche
r_access0__JI")
  642 ms  dlsym(handle 0x49a6c69ccf1943e5, symbol="Java_sun_nio_fs_UnixNativeDispatche
r_access0")
  642 ms  dlsym(handle 0x49a6c69ccf1943e5, symbol="Java_sun_nio_fs_UnixNativeDispatche
r_access0__JI")
  643 ms  dlsym(handle 0x12b477e61386e20d, symbol="Java_sun_nio_fs_UnixNativeDispatche
r_access0")
  643 ms  dlsym(handle 0x12b477e61386e20d, symbol="Java_sun_nio_fs_UnixNativeDispatche
r_access0__JI")
  643 ms  dlsym(handle 0x3cb81b9cf29f00eb, symbol="Java_sun_nio_fs_UnixNativeDispatche
r_access0")
  646 ms  __android_log_buf_write()
  646 ms  |__android_log_is_loggable()
  646 ms  |  __android_log_get_minimum_priority()
  646 ms  |  __android_log_write_log_message()
  646 ms  |  __android_log_logd_logger()
  646 ms  |  __android_log_is_debuggable()
  647 ms  __android_log_buf_write()
  647 ms  |__android_log_is_loggable()
  647 ms  |  __android_log_get_minimum_priority()
  647 ms  |  __android_log_write_log_message()
  647 ms  |  __android_log_logd_logger()
  647 ms  |  __android_log_is_debuggable()

```

```

. . .
1 ms | | | __android_log_is_debuggable()
651 ms open(path "/data/app/~Oy0-UMCLSaECmfJvvRSy1w==/com.example.displaydemo-EXz8
U1Y8uB9h_Modc1C_Q==/base.apk", oflag=0x80000)
657 ms __android_log_buf_write()

. . .
676 ms open(path "/proc/self/cmdline", oflag=0x80000)
679 ms dl_iterate_phdr()
679 ms android_dlopen_ext()
681 ms dlsym(handle 0x6c3b15dbd25a16d1, symbol="oatdata")
681 ms dlsym(handle 0x6c3b15dbd25a16d1, symbol="oatlastword")
681 ms dlsym(handle 0x6c3b15dbd25a16d1, symbol="oatdatabimgrelro")
681 ms dlerror()
681 ms dlsym(handle 0x6c3b15dbd25a16d1, symbol="oatbss")
681 ms dlerror()
681 ms dlsym(handle 0x6c3b15dbd25a16d1, symbol="oatdex")
681 ms dlsym(handle 0x6c3b15dbd25a16d1, symbol="oatdexlastword")
681 ms dl_iterate_phdr()
681 ms open(path "/data/app/~Oy0-UMCLSaECmfJvvRSy1w==/com.example.displaydemo-EXz8
U1Y8uB9h_Modc1C_Q==/oat/arm64/base.vdex", oflag=0x0)
683 ms open(path "/data/app/~Oy0-UMCLSaECmfJvvRSy1w==/com.example.displaydemo-EXz8
U1Y8uB9h_Modc1C_Q==/base.apk", oflag=0x0)
684 ms open(path "/apex/com.android.art/javalib/arm64/boot.art", oflag=0x0)
684 ms open(path "/system/framework/arm64/boot-framework.art", oflag=0x0)
684 ms open(path "/data/app/~Oy0-UMCLSaECmfJvvRSy1w==/com.example.displaydemo-EXz8
U1Y8uB9h_Modc1C_Q==/oat/arm64/base.art", oflag=0x0)

702 ms __android_log_buf_write()
702 ms | __android_log_is_loggable()
702 ms | | __android_log_get_minimum_priority()
702 ms | | __android_log_write_log_message()
702 ms | | __android_log_logd_logger()
702 ms | | | __android_log_is_debuggable()
703 ms __android_log_buf_write()
703 ms | __android_log_is_loggable()
703 ms | | __android_log_get_minimum_priority()
703 ms | | __android_log_write_log_message()
703 ms | | __android_log_logd_logger()
703 ms | | | __android_log_is_debuggable()
704 ms open(path "/data/app/~Oy0-UMCLSaECmfJvvRSy1w==/com.example.displaydemo-EXz8
U1Y8uB9h_Modc1C_Q==/base.apk", oflag=0x80000)
705 ms open(path "/product/overlay/NavigationBarMode2Button/NavigationBarMode2Butto
nOverlay.apk", oflag=0x80000)
712 ms __android_log_buf_write()
712 ms | __android_log_is_loggable()
712 ms | | __android_log_get_minimum_priority()
712 ms | | __android_log_write_log_message()
712 ms | | __android_log_logd_logger()
712 ms | | | __android_log_is_debuggable()
713 ms __android_log_buf_write()
713 ms | __android_log_is_loggable()
713 ms | | __android_log_get_minimum_priority()
713 ms | | __android_log_write_log_message()
713 ms | | __android_log_logd_logger()
713 ms | | | __android_log_is_debuggable()
718 ms __android_log_is_loggable()
718 ms | __android_log_get_minimum_priority()

```

```

        /* TID 0x73cb */
739 ms  dlsym(handle 0x8473cc9900a85ecd, symbol="InitEsxProfile")
739 ms  open(path "/data/vendor/gpu/esx_config_com.example.displaydemo.txt", oflag=0
x0)
739 ms  open(path "/data/vendor/gpu/esx_config.txt", oflag=0x0)
739 ms  open(path "/data/misc/gpu/esx_config_com.example.displaydemo.txt", oflag=0x0)

739 ms  open(path "/data/misc/gpu/esx_config.txt", oflag=0x0)
/* TID 0x73a5 */
752 ms  __android_log_buf_write()
753 ms  | __android_log_is_loggable()
753 ms  | | __android_log_get_minimum_priority()
753 ms  | | __android_log_write_log_message()
753 ms  | | __android_log_logd_logger()
753 ms  | | __android_log_is_debuggable()
769 ms  __cfi_slowpath()
769 ms  __cfi_slowpath()
783 ms  __cfi_slowpath()

* * *
964 ms  dladdr(addr 0x6dc20f4b08, info=0x6d6dbfc760)
964 ms  __android_log_print()
964 ms  | __android_log_is_loggable()
964 ms  | | __android_log_get_minimum_priority()
964 ms  | | __android_log_write_log_message()
964 ms  | | __android_log_logd_logger()
964 ms  | | | __android_log_is_debuggable()
965 ms  android_dlopen_ext()
965 ms  dlsym(handle 0xf4f687c6329daa95, symbol="HMI")
966 ms  open(path "/data/vendor/gpu/esx_config_com.example.displaydemo.txt", oflag=0
x0)
966 ms  open(path "/data/vendor/gpu/esx_config.txt", oflag=0x0)
966 ms  open(path "/data/misc/gpu/esx_config_com.example.displaydemo.txt", oflag=0x0)

966 ms  open(path "/data/misc/gpu/esx_config.txt", oflag=0x0)
966 ms  open(path "./adreno_config.txt", oflag=0x0)
966 ms  open(path "/data/vendor/gpu//adreno_config.txt", oflag=0x0)
966 ms  open(path "/data/misc/gpu//adreno_config.txt", oflag=0x0)
966 ms  open(path "./yamato_panel.txt", oflag=0x0)
966 ms  open(path "/data/vendor/gpu//yamato_panel.txt", oflag=0x0)
966 ms  open(path "/data/misc/gpu//yamato_panel.txt", oflag=0x0)
966 ms  open(path "/data/vendor/gpu/esx_config_com.example.displaydemo.txt", oflag=0
x0)
966 ms  open(path "/data/vendor/gpu/esx_config.txt", oflag=0x0)
966 ms  open(path "/data/misc/gpu/esx_config_com.example.displaydemo.txt", oflag=0x0)

967 ms  open(path "/data/misc/gpu/esx_config.txt", oflag=0x0)
967 ms  __android_log_print()
967 ms  | __android_log_is_loggable()
967 ms  | | __android_log_get_minimum_priority()
967 ms  | | __android_log_write_log_message()
967 ms  | | __android_log_logd_logger()
967 ms  | | | __android_log_is_debuggable()
967 ms  open(path "/data/vendor/gpu/esx_config_com.example.displaydemo.txt", oflag=0
x0)
967 ms  open(path "/data/vendor/gpu/esx_config.txt", oflag=0x0)
967 ms  open(path "/data/misc/gpu/esx_config_com.example.displaydemo.txt", oflag=0x0)

```

```

967 ms open(path="/data/misc/gpu/esx_config.txt", oflag=0x0)
968 ms open(path="/sys/devices/system/cpu/present", oflag=0x0)
968 ms open(path="/sys/devices/system/cpu/cpu0/cpu_capacity", oflag=0x0)
968 ms open(path="/sys/devices/system/cpu/cpu0/cpufreq/cpuinfo_max_freq", oflag=0x0)

968 ms open(path="/sys/devices/system/cpu/cpu1/cpufreq/cpuinfo_max_freq", oflag=0x0)
968 ms open(path="/sys/devices/system/cpu/cpu2/cpufreq/cpuinfo_max_freq", oflag=0x0)
968 ms open(path="/sys/devices/system/cpu/cpu3/cpufreq/cpuinfo_max_freq", oflag=0x0)
968 ms open(path="/sys/devices/system/cpu/cpu4/cpufreq/cpuinfo_max_freq", oflag=0x0)
968 ms open(path="/sys/devices/system/cpu/cpu5/cpufreq/cpuinfo_max_freq", oflag=0x0)
968 ms open(path="/sys/devices/system/cpu/cpu6/cpufreq/cpuinfo_max_freq", oflag=0x0)
968 ms open(path="/sys/devices/system/cpu/cpu7/cpufreq/cpuinfo_max_freq", oflag=0x0)

969 ms open(path="/sys/class/kgsl/kgsl-3d0/gpu_model", oflag=0x0)
969 ms __android_log_print()
969 ms     __android_log_is_loggable()
969 ms         __android_log_get_minimum_priority()
969 ms         __android_log_write_log_message()
969 ms             __android_log_logd_logger()
969 ms                 __android_log_is_debuggable()
969 ms __android_log_print()
969 ms     __android_log_is_loggable()
969 ms         __android_log_get_minimum_priority()
969 ms         __android_log_write_log_message()
969 ms             __android_log_logd_logger()
969 ms                 __android_log_is_debuggable()
969 ms dlopen(path="libEGL_adreno.so", mode=0x2)
970 ms dlsym(handle=0xf9e57fda79bd3c09, symbol="eglSetBlobCacheFuncsANDROID")
971 ms dlsym(handle=0x5dae32eb4dcc0329, symbol="glGetStringi")
971 ms dlsym(handle=0x231259e63d1aef61, symbol="glGetStringi")
971 ms dlsym(handle=0x5dae32eb4dcc0329, symbol="glGetStringi")
972 ms dlsym(handle=0x231259e63d1aef61, symbol="glGetStringi")
972 ms dlsym(handle=0x5dae32eb4dcc0329, symbol="glMemoryBarrier")
972 ms dlsym(handle=0x231259e63d1aef61, symbol="glMemoryBarrier")
972 ms dlsym(handle=0x5dae32eb4dcc0329, symbol="glBindVertexArray")
972 ms dlsym(handle=0x231259e63d1aef61, symbol="glBindVertexArray")
972 ms dlsym(handle=0x5dae32eb4dcc0329, symbol="glDeleteVertexArrays")
972 ms dlsym(handle=0x231259e63d1aef61, symbol="glDeleteVertexArrays")
972 ms dlsym(handle=0x5dae32eb4dcc0329, symbol="glGenVertexArrays")
972 ms dlsym(handle=0x231259e63d1aef61, symbol="glGenVertexArrays")
972 ms dlsym(handle=0x5dae32eb4dcc0329, symbol="glPatchParameteri")
972 ms dlsym(handle=0x231259e63d1aef61, symbol="glPatchParameteri")
972 ms dlsym(handle=0x5dae32eb4dcc0329, symbol="glBindFragDataLocationEXT")
972 ms dlsym(handle=0x231259e63d1aef61, symbol="glBindFragDataLocationEXT")
972 ms dlsym(handle=0x5dae32eb4dcc0329, symbol="glBindFragDataLocationIndexedEXT")
972 ms dlsym(handle=0x231259e63d1aef61, symbol="glBindFragDataLocationIndexedEXT")
972 ms dlsym(handle=0x5dae32eb4dcc0329, symbol="glBlendBarrierKHR")
972 ms dlsym(handle=0x231259e63d1aef61, symbol="glBlendBarrierKHR")
972 ms dlsym(handle=0x5dae32eb4dcc0329, symbol="glDrawArraysInstanced")

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972 ms dlsym(handle 0x231259e63d1aef61, symbol="glDrawArraysInstanced")
972 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glDrawElementsInstanced")
972 ms dlsym(handle 0x231259e63d1aef61, symbol="glDrawElementsInstanced")
972 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glDrawBuffers")
972 ms dlsym(handle 0x231259e63d1aef61, symbol="glDrawBuffers")
973 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glReadBuffer")
973 ms dlsym(handle 0x231259e63d1aef61, symbol="glReadBuffer")
973 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glDrawArraysIndirect")
973 ms dlsym(handle 0x231259e63d1aef61, symbol="glDrawArraysIndirect")
973 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glDrawElementsIndirect")
973 ms dlsym(handle 0x231259e63d1aef61, symbol="glDrawElementsIndirect")
973 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glDrawRangeElements")
973 ms dlsym(handle 0x231259e63d1aef61, symbol="glDrawRangeElements")
973 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glGetMultisamplefv")
973 ms dlsym(handle 0x231259e63d1aef61, symbol="glGetMultisamplefv")
973 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glGetTexLevelParameteriv")
973 ms dlsym(handle 0x231259e63d1aef61, symbol="glGetTexLevelParameteriv")
973 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glTexBuffer")
973 ms dlsym(handle 0x231259e63d1aef61, symbol="glTexBuffer")
973 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glTexBufferSize")
973 ms dlsym(handle 0x231259e63d1aef61, symbol="glTexBufferSize")
973 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glTexStorage2D")
973 ms dlsym(handle 0x231259e63d1aef61, symbol="glTexStorage2D")
973 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glDiscardFramebufferEXT")
973 ms dlsym(handle 0x231259e63d1aef61, symbol="glDiscardFramebufferEXT")
973 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glEndTilingQCOM")
973 ms dlsym(handle 0x231259e63d1aef61, symbol="glEndTilingQCOM")
973 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glStartTilingQCOM")
974 ms dlsym(handle 0x231259e63d1aef61, symbol="glStartTilingQCOM")
974 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glVertexAttribDivisor")
974 ms dlsym(handle 0x231259e63d1aef61, symbol="glVertexAttribDivisor")
974 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glVertexAttribIPointer")
974 ms dlsym(handle 0x231259e63d1aef61, symbol="glVertexAttribIPointer")
974 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glBlitFramebuffer")
974 ms dlsym(handle 0x231259e63d1aef61, symbol="glBlitFramebuffer")
974 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glRenderbufferStorageMultisample")
974 ms dlsym(handle 0x231259e63d1aef61, symbol="glRenderbufferStorageMultisample")
974 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glFramebufferTexture2DMultisampleEXT")
)
974 ms dlsym(handle 0x231259e63d1aef61, symbol="glFramebufferTexture2DMultisampleEXT")
)
974 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glRenderbufferStorageMultisampleEXT")
)
974 ms dlsym(handle 0x231259e63d1aef61, symbol="glRenderbufferStorageMultisampleEXT")
)
974 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glUnmapBuffer")
974 ms dlsym(handle 0x231259e63d1aef61, symbol="glUnmapBuffer")
974 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glFlushMappedBufferRange")
974 ms dlsym(handle 0x231259e63d1aef61, symbol="glFlushMappedBufferRange")
974 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glMapBufferRange")
974 ms dlsym(handle 0x231259e63d1aef61, symbol="glMapBufferRange")
974 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glInsertEventMarkerEXT")
974 ms dlsym(handle 0x231259e63d1aef61, symbol="glInsertEventMarkerEXT")
974 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glPopGroupMarkerEXT")
974 ms dlsym(handle 0x231259e63d1aef61, symbol="glPopGroupMarkerEXT")
974 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glPushGroupMarkerEXT")

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975 ms dlsym(handle 0x231259e63d1aef61, symbol="glPushGroupMarkerEXT")
975 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glGetProgramResourceLocation")
975 ms dlsym(handle 0x231259e63d1aef61, symbol="glGetProgramResourceLocation")
975 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glDebugMessageCallbackKHR")
975 ms dlsym(handle 0x231259e63d1aef61, symbol="glDebugMessageCallbackKHR")
975 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glDebugMessageControlKHR")
975 ms dlsym(handle 0x231259e63d1aef61, symbol="glDebugMessageControlKHR")
975 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glDebugMessageInsertKHR")
975 ms dlsym(handle 0x231259e63d1aef61, symbol="glDebugMessageInsertKHR")
975 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glGetDebugMessageLogKHR")
975 ms dlsym(handle 0x231259e63d1aef61, symbol="glGetDebugMessageLogKHR")
975 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glObjectLabelKHR")
975 ms dlsym(handle 0x231259e63d1aef61, symbol="glObjectLabelKHR")
975 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glPopDebugGroupKHR")
975 ms dlsym(handle 0x231259e63d1aef61, symbol="glPopDebugGroupKHR")
975 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glPushDebugGroupKHR")
975 ms dlsym(handle 0x231259e63d1aef61, symbol="glPushDebugGroupKHR")
975 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glClientWaitSync")
975 ms dlsym(handle 0x231259e63d1aef61, symbol="glClientWaitSync")
975 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glDeleteSync")
975 ms dlsym(handle 0x231259e63d1aef61, symbol="glDeleteSync")
975 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glFenceSync")
975 ms dlsym(handle 0x231259e63d1aef61, symbol="glFenceSync")
975 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glIsSync")
975 ms dlsym(handle 0x231259e63d1aef61, symbol="glIsSync")
976 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glWaitSync")
976 ms dlsym(handle 0x231259e63d1aef61, symbol="glWaitSync")
976 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glGetInternalformativ")
976 ms dlsym(handle 0x231259e63d1aef61, symbol="glGetInternalformativ")
976 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glGetProgramBinary")
976 ms dlsym(handle 0x231259e63d1aef61, symbol="glGetProgramBinary")
976 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glProgramBinary")
976 ms dlsym(handle 0x231259e63d1aef61, symbol="glProgramBinary")
976 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glProgramParameteri")
976 ms dlsym(handle 0x231259e63d1aef61, symbol="glProgramParameteri")
976 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glBindSampler")
976 ms dlsym(handle 0x231259e63d1aef61, symbol="glBindSampler")
976 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glDeleteSamplers")
976 ms dlsym(handle 0x231259e63d1aef61, symbol="glDeleteSamplers")
976 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glGenSamplers")
976 ms dlsym(handle 0x231259e63d1aef61, symbol="glGenSamplers")
976 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glSamplerParameteri")
976 ms dlsym(handle 0x231259e63d1aef61, symbol="glSamplerParameteri")
976 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glSamplerParameteriv")
976 ms dlsym(handle 0x231259e63d1aef61, symbol="glSamplerParameteriv")
976 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glBeginQuery")
976 ms dlsym(handle 0x231259e63d1aef61, symbol="glBeginQuery")
976 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glDeleteQueries")
976 ms dlsym(handle 0x231259e63d1aef61, symbol="glDeleteQueries")
976 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glEndQuery")
977 ms dlsym(handle 0x231259e63d1aef61, symbol="glEndQuery")
977 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glGenQueries")
977 ms dlsym(handle 0x231259e63d1aef61, symbol="glGenQueries")
977 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glGetQueryObjectuiv")
977 ms dlsym(handle 0x231259e63d1aef61, symbol="glGetQueryObjectuiv")
977 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glGetQueryiv")

```

```

977 ms dlsym(handle 0x231259e63d1aef61, symbol="glGetQueryiv")
977 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glInvalidateFramebuffer")
977 ms dlsym(handle 0x231259e63d1aef61, symbol="glInvalidateFramebuffer")
977 ms dlsym(handle 0x5dae32eb4dcc0329, symbol="glInvalidateSubFramebuffer")
977 ms dlsym(handle 0x231259e63d1aef61, symbol="glInvalidateSubFramebuffer")
977 ms open(path "/data/user_de/0/com.example.displaydemo/code_cache/com.android.sk
ia.shaders_cache", oflag 0x0)
990 ms __android_log_print()
990 ms | __android_log_is_loggable()
990 ms | | __android_log_get_minimum_priority()
990 ms | | __android_log_write_log_message()
990 ms | | __android_log_logd_logger()
990 ms | | | __android_log_is_debuggable()
990 ms | __android_log_print()
990 ms | | __android_log_is_loggable()
990 ms | | | __android_log_get_minimum_priority()
990 ms | | | __android_log_write_log_message()
990 ms | | | __android_log_logd_logger()
990 ms | | | | __android_log_is_debuggable()
990 ms dlerror()
990 ms android_dlopen_ext()
991 ms dlsym(handle 0x32a24e38d5386b55, symbol="HIDL_FETCH_IMapper")
991 ms __android_log_is_loggable()
991 ms | __android_log_get_minimum_priority()
991 ms dlopen(path "libadreno_utils.so", mode=0x2)
992 ms dlsym(handle 0xf1188f74383613ef, symbol="compute_aligned_width_and_height")
992 ms dlsym(handle 0xf1188f74383613ef, symbol="compute_fmt_aligned_width_and_heigh
t")
992 ms dlsym(handle 0xf1188f74383613ef, symbol="compute_surface_padding")
992 ms dlsym(handle 0xf1188f74383613ef, symbol="compute_compressedfmt_aligned_width
_and_height")
992 ms dlsym(handle 0xf1188f74383613ef, symbol="isUBWCSupportedByGpu")
992 ms dlsym(handle 0xf1188f74383613ef, symbol="get_gpu_pixel_alignment")
992 ms dlsym(handle 0xf1188f74383613ef, symbol="adreno_get_metadata_blob_size")
992 ms dlsym(handle 0xf1188f74383613ef, symbol="adreno_init_memory_layout")
992 ms dlsym(handle 0xf1188f74383613ef, symbol="adreno_get_aligned_gpu_buffer_size")

992 ms __cfi_slowpath()
/* TID 0x73cc */
1406 ms __cfi_slowpath()
1407 ms __cfi_slowpath()
1407 ms __cfi_slowpath()
1407 ms __cfi_slowpath()
1407 ms __cfi_slowpath()

        ...
/* TID 0x73a5 */
35028 ms __cfi_slowpath()
35028 ms __cfi_slowpath()
35035 ms __android_log_buf_write()
35036 ms | __android_log_is_loggable()

        ...
/* TID 0x73c9 */
35113 ms open(path "/data/user_de/0/com.example.displaydemo/code_cache/com.android.op
engl.shaders_cache", oflag 0x0)

```

```

36036 ms open(path="/proc/self/cmdline", oflag=0x80000)
36037 ms open(path="/proc/self/cmdline", oflag=0x80000)
36037 ms open(path="/proc/self/cmdline", oflag=0x80000)
/* TID 0x73a5 */

. . .
36345 ms __cfi_slowpath()
37083 ms open(path="/data/app/~OyO-UMCLSaECmfJvvRSy1w==/com.example.displaydemo-EXz8
U1Y8uB9h_Modc1C__Q==/lib/arm64/libtacker.so", oflag=0x0)
37085 ms open(path="/data/app/~OyO-UMCLSaECmfJvvRSy1w==/com.example.displaydemo-EXz8
U1Y8uB9h_Modc1C__Q==/base.apk", oflag=0x80000)
37086 ms android_dlopen_ext()
37094 ms dlsym(handle 0x2bb94aab7ee5d9eb, symbol="JNI_OnLoad")
37097 ms __android_log_print()
37097 ms | __android_log_is_loggable()
37097 ms | | __android_log_get_minimum_priority()
37097 ms | | __android_log_write_log_message()
37097 ms | | __android_log_logd_logger()
37097 ms | | | __android_log_is_debuggable()
37099 ms dlerror()
37100 ms android_dlopen_ext()
37111 ms | dlsym(handle 0x0, symbol="android_get_exported_namespace")
37111 ms | dlopen(path "libRS_internal.so", mode=0x1)
37141 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsAllocation1DData")
37141 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsAllocation1DRead")
37141 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsAllocation2DData")
37141 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsAllocation2DRead")
37141 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsAllocation3DData")
37141 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsAllocation3DRead")
37141 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsAllocationAdapterCreate")
37141 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsAllocationAdapterOffset")
37141 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsAllocationCopy2DRange")
37141 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsAllocationCopy3DRange")
37141 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsAllocationCopyToBitmap")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsAllocationCreateFromBitmap")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsAllocationCreateStrided")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsAllocationCreateTyped")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsAllocationCubeCreateFromBitm
ap")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsAllocationElementData")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsAllocationElementRead")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsAllocationGenerateMipmaps")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsAllocationGetPointer")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsAllocationGetSurface")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsaAllocationGetType")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsAllocationIoReceive")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsAllocationIoSend")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsAllocationRead")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsAllocationResize1D")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsAllocationSetSurface")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsAllocationSyncAll")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsAllocationSetupBufferQueue")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsAllocationShareBufferQueue")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsAssignName")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsClosureCreate")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsClosureSetArg")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsClosureSetGlobal")

```

```

37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsContextCreateVendor")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsContextDeinitToClient")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsContextDestroy")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsContextDump")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsContextFinish")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsContextGetMessage")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsContextInitToClient")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsContextPeekMessage")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsContextSendMessage")
37142 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsContextSetPriority")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsContextSetCacheDir")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsElementCreate2")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsElementCreate")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsaElementGetNativeData")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsaElementGetSubElements")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsaGetName")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsInvokeClosureCreate")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsObjDestroy")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsSamplerCreate")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsScriptBindAllocation")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsScriptCCreate")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsScriptFieldIDCreate")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsScriptForEachMulti")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsScriptGetVarV")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsScriptGroup2Create")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsScriptGroupCreate")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsScriptGroupExecute")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsScriptGroupSetInput")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsScriptGroupSetOutput")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsScriptIntrinsicCreate")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsScriptInvoke")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsScriptInvokeIDCreate")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsScriptInvokeV")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsScriptKernelIDCreate")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsScriptReduce")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsScriptSetTimeZone")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsScriptSetVarD")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsScriptSetVarF")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsScriptSetVarI")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsScriptSetVarJ")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsScriptSetVarObj")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsScriptSetVarVE")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsScriptSetVarV")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsTypeCreate")
37143 ms | dlsym(handle 0xb510c3446c65bd65, symbol="rsaTypeGetNativeData")
37144 ms | dlsym(handle 0xdd4f837609790777, symbol="HIDL_FETCH_IDevice")

...
/* TID 0x748b */
37148 ms | dlopen(path="libRSDriver_adreno.so", mode=0x1)
37169 ms | dlerror()
37169 ms | dlsym(handle 0xd30b16fb5b2b6c41, symbol="rsdHalQueryVersion")
37169 ms | dlsym(handle 0xd30b16fb5b2b6c41, symbol="rsdHalQueryHal")
37169 ms | dlsym(handle 0xd30b16fb5b2b6c41, symbol="rsdHalInit")
37169 ms | dlsym(handle 0xd30b16fb5b2b6c41, symbol="rsdHalAbort")
37169 ms | open(path="/proc/cpuinfo", oflag=0x80000)
37170 ms | open(path=".//adreno_config.txt", oflag=0x0)

```

```

37170 ms open(path="/data/vendor/gpu//adreno_config.txt", oflag=0x0)
37170 ms open(path="/data/misc/gpu//adreno_config.txt", oflag=0x0)
37170 ms open(path "./yamato_panel.txt", oflag=0x0)
37171 ms open(path="/data/vendor/gpu//yamato_panel.txt", oflag=0x0)
37171 ms open(path="/data/misc/gpu//yamato_panel.txt", oflag=0x0)
37172 ms __cfi_slowpath()
37180 ms dlopen(path "libllvm-qcom.so", mode=0x2)
37256 ms dlsym(handle 0x2dd005fbeae03129, symbol="cl_compiler_create_llvm_instance")
37256 ms dlsym(handle 0x2dd005fbeae03129, symbol="cl_compiler_destroy_llvm_instance")
37256 ms dlsym(handle 0x2dd005fbeae03129, symbol="cl_compiler_compile_source")
37256 ms dlsym(handle 0x2dd005fbeae03129, symbol="cl_compiler_link_program")
37256 ms dlsym(handle 0x2dd005fbeae03129, symbol="cl_compiler_get_error_code")
37256 ms dlsym(handle 0x2dd005fbeae03129, symbol="cl_compiler_get_build_log")
37256 ms dlsym(handle 0x2dd005fbeae03129, symbol="cl_compiler_query_handle_type")
37256 ms dlsym(handle 0x2dd005fbeae03129, symbol="cl_compiler_handle_to_executable")
37256 ms dlsym(handle 0x2dd005fbeae03129, symbol="cl_compiler_free_handle")
37256 ms dlsym(handle 0x2dd005fbeae03129, symbol="cl_compiler_disassemble")
37256 ms dlsym(handle 0x2dd005fbeae03129, symbol="cl_compiler_free_assembly")
37256 ms dlsym(handle 0x2dd005fbeae03129, symbol="cl_compiler_program_get_ddl_data")
37256 ms dlsym(handle 0x2dd005fbeae03129, symbol="cl_compiler_handle_from_binary")
37257 ms dlsym(handle 0x2dd005fbeae03129, symbol="cl_compiler_handle_create_binary")
37257 ms dlsym(handle 0x2dd005fbeae03129, symbol="cl_compiler_program_free_binary")
37257 ms dlsym(handle 0x2dd005fbeae03129, symbol="cl_compiler_interpret_printf_buffer"
)
37257 ms dlsym(handle 0x2dd005fbeae03129, symbol="cl_compiler_query_version_string")
37264 ms __cfi_slowpath()
37265 ms __cfi_slowpath()
37265 ms __cfi_slowpath()
37265 ms __cfi_slowpath()
37265 ms dlopen(path "libqti-perfd-client.so", mode=0x2)
...
37266 ms __cfi_slowpath()
37266 ms dlopen(path "librs_adreno_sha1.so", mode=0x2)
37269 ms dlsym(handle 0xe42754d5434639f, symbol="libllvm_qcom_so_SHA1")
37269 ms dlsym(handle 0xe42754d5434639f, symbol="libCB_so_SHA1")
37269 ms dlsym(handle 0xe42754d5434639f, symbol="libgsl_so_SHA1")
37269 ms dlsym(handle 0xe42754d5434639f, symbol="librs_adreno_so_SHA1")
37269 ms dlsym(handle 0xe42754d5434639f, symbol="libRSDriver_adreno_so_SHA1")
37269 ms dlclose(handle 0xe42754d5434639f)
37269 ms __cfi_slowpath()
37270 ms __android_log_print()
37270 ms   __android_log_is_loggable()
37270 ms     __android_log_get_minimum_priority()
37270 ms   __android_log_write_log_message()
37270 ms     __android_log_logd_logger()
37270 ms   __android_log_is_debuggable()
/* TID 0x73a5 */
37270 ms dlopen(path "libRSCacheDir.so", mode=0x1)
37272 ms dlsym(handle 0xaaa10682b389f92b, symbol="rsQueryCacheDir")
...
37339 ms __cfi_slowpath()
/* TID 0x73e8 */
39181 ms open(path "/data/user_de/0/com.example.displaydemo/code_cache/com.android.opengl.shaders_cache", oflag=0xc2)
39196 ms open(path "/data/user_de/0/com.example.displaydemo/code_cache/com.android.opengl.shaders_cache", oflag=0xc2)

```

```
/* TID 0x73e9 */
39255 ms  open(path="/data/user_de/0/com.example.displaydemo/code_cache/com.android.sk
ia.shaders_cache", oflag 0xc2)
39257 ms  open(path="/data/user_de/0/com.example.displaydemo/code_cache/com.android.sk
ia.shaders_cache", oflag 0xc2)
```

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常见问题

Failed to spawn timeout was reached

- 现象

```
→ frida frida-trace -U -f com.example.displaydemo -i JIN_OnLoad -i RegisterNatives
Spawning `com.example.displaydemo`...
Failed to spawn: timeout was reached
```

- 原因：偶发的bug
- 解决办法
 - 多试试几次
 - 重启安卓手机
 - 杀掉frida-server后，手动重启几次
 - 注：此处由于之前是Magisk安装的插件MagiskFrida，好像是：
 - 发现frida-server被杀掉后，会自动重启frida-server

心得

Frida的js脚本中过滤字符串参数

- 背景

想要在 `Interceptor.attach` 的 `onEnter` 中，实现参数的过滤=判断，去实现，当满足某些条件，才打印（或不打印）某些日志之类的需求

- 核心逻辑：用 `someJsStrList.includes(inputParaStr)` 去判断即可
- 示例代码

```
const KnownStrList = [
    "CurrencyMap/US/0/",
    "CurrencyMap/CN/0/",
    "CurrencyMap/CN/",
    "CurrencyMap/",
    "CurrencyMap",
    "CN",
    "US",
    "/",
    "@",
    "id",
    "zh_CN_#HANS",
    "zh_Hans_CN",
    "zh",
    "Hans",
    "HANS",
]

// char *strcpy(char *restrict dst, const char *restrict src);
Interceptor.attach(Module.findExportByName(null, "strcpy"), {
    onEnter: function (args) {
        var dst = Memory.readCString(args[0]);
        var src = Memory.readCString(args[1]);
        if (KnownStrList.includes(src)) {
            console.log("strcpy: dst=" + dst + ", src=" + src);
        }
    },
    onLeave: function (args) {
    }
});
```

Frida去hook安卓JNI函数JIN_OnLoad却hook不到无输出

- 现象

此处，要调试的安卓app：

- DisplayDemo

- 内部的so库: libtacker.so
 - 加载方式: System.loadLibrary("tacker");

-》可能是此处特殊的加载方式，导致了：

frida-trace无法去hook到，libtacker.so的加载，也就无法找到其内部的函数JNI_OnLoad了
所以frida-trace无法hook此处的JNI_OnLoad，无输出。

- 解决办法

手动写frida的js脚本，去

```
const funcSym = "JNI_OnLoad";
const funcPtr = Module.findExportByName(libraryName, "libtacker.so");
...
```

- 完整代码：

- hook_libtacker_JNI_Onload.js

```
/**
 * frida -U -f com.example.displaydemo -l hook_libtacker_JNI_Onload.js
 */

function processJniOnLoad(libraryName) {
  const funcSym = "JNI_OnLoad";
  const funcPtr = Module.findExportByName(libraryName, funcSym);

  console.log("[+] Hooking " + funcSym + "() @ " + funcPtr + "...");
  // jint JNI_OnLoad(JavaVM *vm, void *reserved);
  var funcHook = Interceptor.attach(funcPtr, {
    onEnter: function (args) {
      const vm = args[0];
      const reserved = args[1];
      console.log("[+] " + funcSym + "(" + vm + ", " + reserved + ") called");
    },
    onLeave: function (retval) {
      console.log("[+]\t= " + retval);
    }
  });
}

function waitForLibLoading(libraryName) {
  var isLibLoaded = false;

  Interceptor.attach(Module.findExportByName(null, "android_dlopen_ext"), {
    onEnter: function (args) {
      var libraryPath = Memory.readCString(args[0]);
      if (libraryPath.includes(libraryName)) {
        console.log("[+] Loading library " + libraryPath + "...");
        isLibLoaded = true;
      }
    },
    onLeave: function (args) {
      if (isLibLoaded) {
        ...
      }
    }
  });
}
```

```
processJniOnLoad(libraryName);
isLibLoaded = false;
}
});
}
});

Java.perform(function() {
const libraryName = "libtacker.so";
waitForLibLoading(libraryName);
});
```

(此处点击Jump跳转页面后) 即可hook到JNI_OnLoad函数的执行:

=> 输出:

- 截图

◦
◦



- log日志

```
→ frida frida -U -f com.example.displaydemo -l hook_libtacker_JNI_Onload.js
/ _| Frida 16.1.3 - A world-class dynamic instrumentation toolkit
| ( )|
> _| Commands:
/_/ |     help      -> Displays the help system
+ + + |     object?   -> Display information about 'object'
+ + + |     exit/quit -> Exit
+ + + |
+ + + More info at https://frida.re/docs/home/
+ + + |
+ + + Connected to Pixel 3 (id 91BX1VSA3)
Spawned `com.example.displaydemo` Resuming main thread
[Pixel 3::com.example.displaydemo ]-> %resume
[Pixel 3::com.example.displaydemo ]-> [+] Loading library /data/app/~~0y0-UMCLSaECm
fJvvRSy1w==/com.example.displaydemo-EXz8U1Y8uB9h_Modc1C__Q=/base.apk /lib/arm64-v8a/libtacker.so...
[+] Hooking JNI_OnLoad() @ 0x6dd0349438...
[+] JNI_OnLoad(0x6eaf3380d0, 0x0) called
[+] = 0x10006
```

模拟代码运行

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Unidbg

- Unidbg
 - Github
 - <https://github.com/zhl0228/unidbg>
 - Allows you to emulate an Android native library, and an experimental iOS emulation
 - 概述
 - unidbg是unicorn的一个实现，它可以在电脑上跑arm的可执行文件或共享库文件
 - unidbg是一个基于 unicorn 的逆向工具，可以在PC端直接调用Android（的apk中）和iOS（的ipa中）的 so 动态库文件（中的native函数方法）
 - 背景
 - 目前很多 App 的加密签名算法都在so文件中，强行逆向so的话可能会消耗大量时间和资源
 - 规避方式
 - 用 xposed 采用 hook 的方法从程序计算签名
 - 缺点：需要模拟器或者真机运行这个应用，使用效率不高
 - 用过 jtype 启动JVM，然后通过 native 对so文件进行调用
 - 缺点：因为每次都需要启动JVM，所以效率也不高
 - unidbg
 - 原理：通过在 app 中找到对应的 JNI 接口，然后用 unicorn 引擎直接调用 so 文件
 - 优点：不需要运行 app，也无需逆向 so 文件，所以效率相对要高不少
 - 底层依赖于：Unicorn
 - 详见
 - [CPU模拟利器：Unicorn](#)

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安卓的Hook框架

TODO:

- hook框架
 - 【整理】安卓hook框架: Sandhook
-

- 安卓的Hook框架
 - Xposed (系列)
 - Cydia Substrate

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Xposed框架

- 概述
 - Xposed/EdXposed/LSPosed系列框架
 - 可以安装插件实现各种功能
 - 也可以自己写Xposed插件，实现特定功能
 - 理论上也可以动态调试Xposed插件
- 详解：[安卓逆向调试：XPosed框架](#)

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CydiaSubstrate

- 主页
 - [CydiaSubstrate](#)
- 下载
 - [com.saurik.substrate.apk](#)
- 功能
 - 和 Xposed 类似的框架，用来安装各种插件，实现各种功能。
 - 比如可以：
 - 安装绕过 SSL 检测的插件，用来破解 SSL pinning
 - 关于安卓的app中的https：
 - app内部启用了：
 - `SSL Pinning = ssl certificate pinning = certificate pinning`
 - = SSL证书绑定 =证书绑定`
 - 此处也可以用来安装相关插件，导出安卓的dex文件
 - 特点
 - Hook底层方法非常方便
 - 对so中的方法hook操作非常便捷
 - 截图
 -

Android-OpenDebug

- 主页
 - [iSECPartners/Android-OpenDebug: Make any application debuggable](#)
- 功能
 - 是一个 Cydia Substrate 的插件
 - 所以前提是要先安装 Cydia Substrate
 - 可以使得任何一个安卓程序可以被调试
 - 就有了分析和破解的可能
- 下载
 - [Android-OpenDebug APK下载](#)
- 安装
 - `adb install Android-OpenDebug.apk`
 - 或直接安装apk

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Introspy-Android

- 主页
 - GitHub
 - [iSECPartners/Introspy-Android: Security profiling for blackbox Android](#)
 - 网站
 - [Introspy-Android](#)
- 功能
 - 帮助分析安卓app运行期间的行为
 - 以便于找到可能存在的安全问题
- 提示
 - 是个 Cydia Substrate 插件
 - 所以前提是先安装 Cydia Substrate

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adb辅助调试

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adb查看进程内存映射

- 查看进程的内存映射 real layout of process segment

```
/proc/ pid /maps
```

举例：

查看安卓app: AIO File Manager =包名: com.manager.files.super.cleaner 的进程的内存映射

```
adb shell
```

后：

查看确认进程PID：

```
blueeline:/storage/emulated/0/dev # ps -A | grep clean
u0_a256      14868  1025 2051980  61568 SyS_epoll_wait      0 S com.manager.files.super.cleaner
```

查看到AIO File Manager的PID是：14868

再去切换到root权限：

```
SU
```

然后才能看到maps映射：

```
cat /proc/14868/maps
```

输出结果：

```
blueeline:/sdcard/dev $ cat /proc/14868/map
map_files/ maps
```

详细结果：

```
blueeline:/storage/emulated/0/dev # cat /proc/14868/maps
12c00000-52c00000 rw-p 00000000 00:00 0 [anon:dalvik-m
ain space (region space)]
6faeb000-6fcc8000 rw-p 00000000 00:00 0 [anon:dalvik-/ap
ex/com.android.art/javalib/boot.art]
6fcc8000-6fd0b000 rw-p 00000000 00:00 0 [anon:dalvik-/ap
ex/com.android.art/javalib/boot-core-libart.art]
6fd0b000-6fda9000 rw-p 00000000 00:00 0 [anon:dalvik-/ap
ex/com.android.art/javalib/boot-core-icu4j.art]
6fda9000-6fdd2000 rw-p 00000000 00:00 0 [anon:dalvik-/ap
ex/com.android.art/javalib/boot-okhttp.art]
```

6ffd2000-6fe08000 rw-p 00000000 00:00 0	[anon:dalvik-/
apex/com.android.art/javalib/boot-bouncycastle.art]	
6fe08000-6fe13000 rw-p 00000000 00:00 0	[anon:dalvik-/
apex/com.android.art/javalib/boot-apache-xml.art]	
6fe13000-6fe90000 r--p 00000000 07:78 44	/apex/com.andr
oid.art/javalib/arm/boot.oat	
6fe90000-70094000 r-xp 0007d000 07:78 44	/apex/com.andr
oid.art/javalib/arm/boot.oat	
70094000-70095000 rw-p 00000000 00:00 0	[anon:.bss]
70095000-70097000 r--p 00000000 07:78 45	/apex/com.andr
oid.art/javalib/arm/boot.vdex	
70097000-70098000 r--p 00281000 07:78 44	/apex/com.andr
oid.art/javalib/arm/boot.oat	
70098000-70099000 rw-p 00282000 07:78 44	/apex/com.andr
oid.art/javalib/arm/boot.oat	
70099000-700a8000 r--p 00000000 07:78 38	/apex/com.andr
oid.art/javalib/arm/boot-core-libart.oat	
700a8000-700e7000 r-xp 0000f000 07:78 38	/apex/com.andr
oid.art/javalib/arm/boot-core-libart.oat	
700e7000-700e8000 rw-p 00000000 00:00 0	[anon:.bss]
700e8000-700e9000 r--p 00000000 07:78 39	/apex/com.andr
oid.art/javalib/arm/boot-core-libart.vdex	
700e9000-700ea000 r--p 0004e000 07:78 38	/apex/com.andr
oid.art/javalib/arm/boot-core-libart.oat	
700ea000-700eb000 rw-p 0004f000 07:78 38	/apex/com.andr
oid.art/javalib/arm/boot-core-libart.oat	
700eb000-70114000 r--p 00000000 07:78 35	/apex/com.andr
oid.art/javalib/arm/boot-core-icu4j.oat	
70114000-701ad000 r-xp 00029000 07:78 35	/apex/com.andr
oid.art/javalib/arm/boot-core-icu4j.oat	
701ad000-701ae000 rw-p 00000000 00:00 0	[anon:.bss]
701ae000-701af000 r--p 00000000 07:78 36	/apex/com.andr
oid.art/javalib/arm/boot-core-icu4j.vdex	
701af000-701b0000 r--p 000c2000 07:78 35	/apex/com.andr
oid.art/javalib/arm/boot-core-icu4j.oat	
701b0000-701b1000 rw-p 000c3000 07:78 35	/apex/com.andr
oid.art/javalib/arm/boot-core-icu4j.oat	
701b1000-701bc000 r--p 00000000 07:78 41	/apex/com.andr
oid.art/javalib/arm/boot-okhttp.oat	
701bc000-701e2000 r-xp 0000b000 07:78 41	/apex/com.andr
oid.art/javalib/arm/boot-okhttp.oat	
701e2000-701e3000 rw-p 00000000 00:00 0	[anon:.bss]
701e3000-701e4000 r--p 00000000 07:78 42	/apex/com.andr
oid.art/javalib/arm/boot-okhttp.vdex	
701e4000-701e5000 r--p 00031000 07:78 41	/apex/com.andr
oid.art/javalib/arm/boot-okhttp.oat	
701e5000-701e6000 rw-p 00032000 07:78 41	/apex/com.andr
oid.art/javalib/arm/boot-okhttp.oat	
701e6000-701f1000 r--p 00000000 07:78 32	/apex/com.andr
oid.art/javalib/arm/boot-bouncycastle.oat	
701f1000-70200000 r-xp 0000b000 07:78 32	/apex/com.andr
oid.art/javalib/arm/boot-bouncycastle.oat	
70200000-70201000 rw-p 00000000 00:00 0	[anon:.bss]
70201000-70202000 r--p 00000000 07:78 33	/apex/com.andr
oid.art/javalib/arm/boot-bouncycastle.vdex	
70202000-70203000 r--p 0001a000 07:78 32	/apex/com.andr

```

oid.art/javalib/arm/boot-bouncycastle.oat          /apex/com.andr
70203000-70204000 rw-p 0001b000 07:78 32
oid.art/javalib/arm/boot-bouncycastle.oat          /apex/com.andr
70204000-70209000 r--p 00000000 07:78 29
oid.art/javalib/arm/boot-apache-xml.oat           /apex/com.andr
70209000-7020a000 r--p 00000000 07:78 30
oid.art/javalib/arm/boot-apache-xml.vdex          /apex/com.andr
7020a000-7020b000 r--p 00005000 07:78 29
oid.art/javalib/arm/boot-apache-xml.oat           /apex/com.andr
7020b000-7020c000 rw-p 00006000 07:78 29
oid.art/javalib/arm/boot-apache-xml.oat           /apex/com.andr
7020c000-70b13000 rw-p 00000000 00:00 0
[anon:dalvik-/
system/framework/boot-framework.art]
70b13000-70b44000 rw-p 00000000 00:00 0
[anon:dalvik-/
system/framework/boot-ext.art]
70b44000-70c6f000 rw-p 00000000 00:00 0
[anon:dalvik-/
system/framework/boot-telephony-common.art]
70c6f000-70cf2000 rw-p 00000000 00:00 0
[anon:dalvik-/
system/framework/boot-voip-common.art]
70cf2000-70d0f000 rw-p 00000000 00:00 0
[anon:dalvik-/
system/framework/boot-ims-common.art]
70d0f000-70d12000 rw-p 00000000 00:00 0
[anon:dalvik-/
system/framework/boot-framework-atb-backward-compatibility.art]
70d12000-70f01000 r--p 00000000 fd:04 1225
ork/arm/boot-framework.oat
70f01000-71613000 r-xp 001ef000 fd:04 1225
ork/arm/boot-framework.oat
71613000-71615000 r--p 00901000 fd:04 1225
ork/arm/boot-framework.oat
71615000-71616000 rw-p 00000000 00:00 0
[anon:.bss]
71616000-71620000 r--p 00000000 fd:04 1258
ork/boot-framework.vdex
71620000-71621000 r--p 00903000 fd:04 1225
ork/arm/boot-framework.oat
71621000-71622000 rw-p 00904000 fd:04 1225
ork/arm/boot-framework.oat
71622000-71627000 r--p 00000000 fd:04 1219
ork/arm/boot-ext.oat
71627000-71638000 r-xp 00005000 fd:04 1219
ork/arm/boot-ext.oat
71638000-71639000 r--p 00016000 fd:04 1219
ork/arm/boot-ext.oat
71639000-7163a000 r--p 00000000 fd:04 1256
ork/boot-ext.vdex
7163a000-7163b000 r--p 00017000 fd:04 1219
ork/arm/boot-ext.oat
7163b000-7163c000 rw-p 00018000 fd:04 1219
ork/arm/boot-ext.oat
7163c000-71644000 r--p 00000000 fd:04 1231
ork/arm/boot-telephony-common.oat
71644000-71645000 r--p 00000000 fd:04 1260
ork/boot-telephony-common.vdex
71645000-71646000 r--p 00008000 fd:04 1231
ork/arm/boot-telephony-common.oat
71646000-71647000 rw-p 00009000 fd:04 1231
ork/arm/boot-telephony-common.oat

```

```

71647000-7164c000 r--p 00000000 fd:04 1234 /system/framework
ork/arm/boot-voip-common.oat
7164c000-7164d000 r-xp 00005000 fd:04 1234 /system/framework
ork/arm/boot-voip-common.oat
7164d000-7164e000 r--p 00000000 fd:04 1261 /system/framework
ork/boot-voip-common.vdex
7164e000-7164f000 r--p 00006000 fd:04 1234 /system/framework
ork/arm/boot-voip-common.oat
7164f000-71650000 rw-p 00007000 fd:04 1234 /system/framework
ork/arm/boot-voip-common.oat
71650000-71652000 r--p 00000000 fd:04 1228 /system/framework
ork/arm/boot-ims-common.oat
71652000-71653000 r--p 00000000 fd:04 1259 /system/framework
ork/boot-ims-common.vdex
71653000-71654000 r--p 00002000 fd:04 1228 /system/framework
ork/arm/boot-ims-common.oat
71654000-71655000 rw-p 00003000 fd:04 1228 /system/framework
ork/arm/boot-ims-common.oat
71655000-71657000 r--p 00000000 fd:04 1222 /system/framework
ork/arm/boot-framework-atb-backward-compatibility.oat
71657000-71658000 r--p 00000000 fd:04 1257 /system/framework
ork/boot-framework-atb-backward-compatibility.vdex
71658000-71659000 r--p 00002000 fd:04 1222 /system/framework
ork/arm/boot-framework-atb-backward-compatibility.oat
71659000-7165a000 rw-p 00003000 fd:04 1222 /system/framework
ork/arm/boot-framework-atb-backward-compatibility.oat
7165a000-719bd000 rw-p 00000000 00:00 0 [anon:dalvik-z
ygote space]
719bd000-719bf000 rw-p 00000000 00:00 0 [anon:dalvik-n
on moving space]
719bf000-719cc000 rw-p 00000000 00:00 0 [anon:dalvik-n
on moving space]
719cc000-74e5b000 ---p 00000000 00:00 0 [anon:dalvik-n
on moving space]
74e5b000-7565a000 rw-p 00000000 00:00 0 [anon:dalvik-n
on moving space]
b1562000-b1564000 r--p 00000000 fd:04 176 /system/bin/ap
p_process32
b1564000-b1568000 r-xp 00001000 fd:04 176 /system/bin/ap
p_process32
...
...
...
f4226000-f4246000 r--s 00000000 00:11 23653 /dev/__property
ies__/_u:object_r:vendor_socket_hook_prop:s0
f4246000-f4266000 r--s 00000000 00:11 23566 /dev/__property
ies__/_u:object_r:heapprofd_prop:s0
f4266000-f4286000 r--s 00000000 00:11 23535 /dev/__property
ies__/_u:object_r:exported2_default_prop:s0
f4286000-f434e000 r--p 00000000 00:00 0 [anon:linker_a
lloc]
f434e000-f436e000 r--s 00000000 00:11 23665 /dev/__property
ies__/_u:object_r:vndk_prop:s0
f436e000-f436f000 rw-p 00000000 00:00 0 [anon:bionic_a

```

```

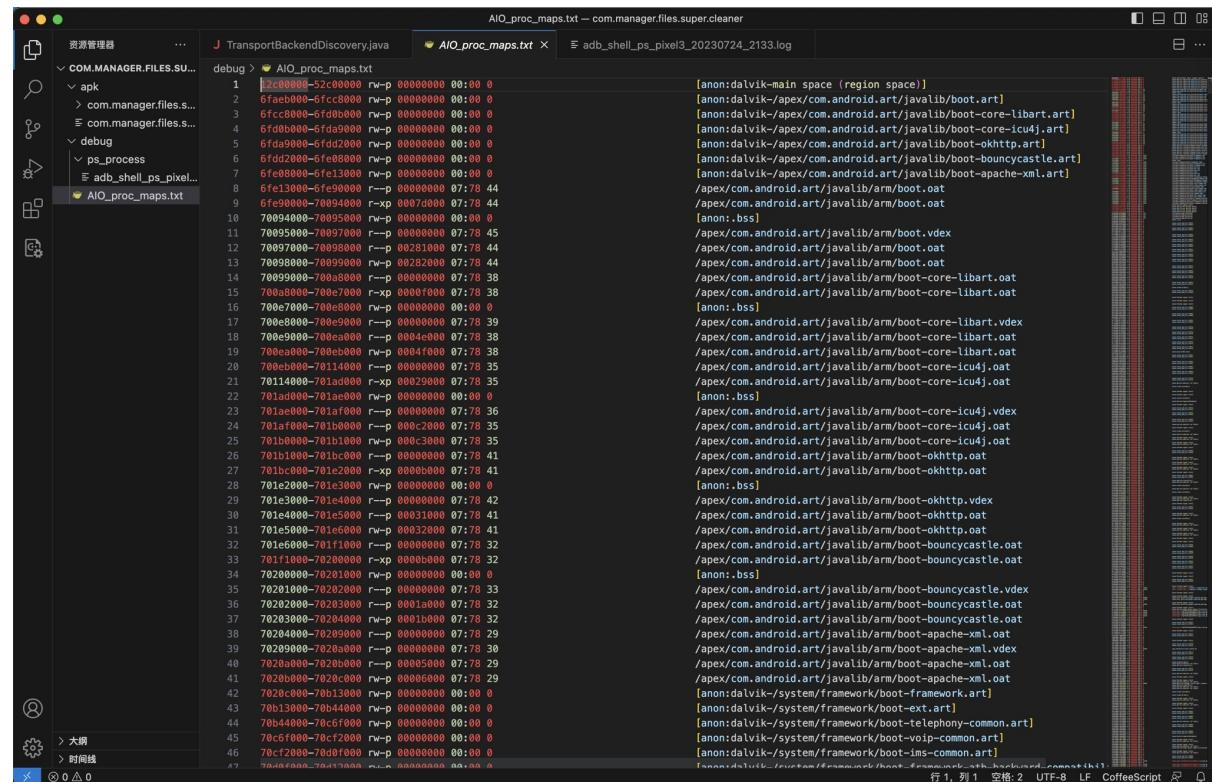
lloc_small_objects]
f436f000-f4370000 r--p 00002000 07:78 28                               /apex/com.andr
oid.art/javalib/arm/boot-apache-xml.art
f4370000-f4371000 rw-p 00000000 00:00 0                                [anon:bionic_a
lloc_small_objects]
f4371000-f4372000 r--p 00015000 07:78 31                               /apex/com.andr
oid.art/javalib/arm/boot-bouncycastle.art
f4372000-f4377000 rw-p 00000000 00:00 0                                [anon:bionic_a
lloc_small_objects]
f4377000-f4378000 r--p 00011000 07:78 40                               /apex/com.andr
oid.art/javalib/arm/boot-okhttp.art
f4378000-f4379000 r--p 0001b000 07:78 37                               /apex/com.andr
oid.art/javalib/arm/boot-core-libart.art
f4379000-f437d000 r--p 000b7000 07:78 43                               /apex/com.andr
oid.art/javalib/arm/boot.art
f437d000-f437e000 ---p 00000000 00:00 0
f437e000-f4381000 rw-p 00000000 00:00 0                                [anon:stack_an
d_tls:main]
f4381000-f4382000 ---p 00000000 00:00 0
f4382000-f438a000 rw-p 00000000 00:00 0                                [anon:bionic_a
lloc_small_objects]
f438a000-f43ee000 r--p 00000000 00:00 0                                [anon:linker_a
lloc]
f43ee000-f43ef000 rw-p 00000000 00:00 0                                [anon:bionic_a
lloc_small_objects]
f43ef000-f440f000 r--s 00000000 00:11 23514                           /dev/__propert
ies__/_u:object_r:debug_prop:s0
f440f000-f442f000 r--s 00000000 00:11 23535                           /dev/__propert
ies__/_u:object_r:exported2_default_prop:s0
f442f000-f4430000 ---p 00000000 00:00 0
f4430000-f4438000 rw-p 00000000 00:00 0
f4438000-f4439000 ---p 00000000 00:00 0
f4439000-f4459000 r--s 00000000 00:11 23669                           /dev/__propert
ies__/_properties_serial
f4459000-f445b000 rw-p 00000000 00:00 0                                [anon:System p
roperty context nodes]
f445b000-f446a000 r--s 00000000 00:11 23470                           /dev/__propert
ies__/_property_info
f446a000-f44ce000 r--p 00000000 00:00 0                                [anon:linker_a
lloc]
f44ce000-f44cf000 rw-p 00000000 00:00 0                                [anon:bionic_a
lloc_small_objects]
f44cf000-f44d0000 r--p 00000000 00:00 0                                [anon:atexit_h
andlers]
f44d0000-f44d1000 ---p 00000000 00:00 0
f44d1000-f44d5000 rw-p 00000000 00:00 0                                [anon:thread s
ignal stack]
f44d5000-f44d6000 rw-p 00000000 00:00 0                                [anon:arc4rand
om data]
f44d6000-f44d8000 rw-p 00000000 00:00 0                                [anon:System p
roperty context nodes]
f44d8000-f44d9000 rw-p 00000000 00:00 0                                [anon:arc4rand
om data]
f44d9000-f44da000 r--p 00000000 00:00 0
f44da000-f44dc000 r-xp 00000000 00:00 0
f44dc000-f44f5000 r--p 00000000 07:b8 13                                [vvar]
[vdso]
/apex/com.andr

```

```

oid.runtime/bin/linker
f44f5000-f457c000 r-xp 00018000 07:b8 13 /apex/com.andr
oid.runtime/bin/linker
f457c000-f4580000 r--p 0009e000 07:b8 13 /apex/com.andr
oid.runtime/bin/linker
f4580000-f4582000 rw-p 000a1000 07:b8 13 /apex/com.andr
oid.runtime/bin/linker
f4582000-f4585000 rw-p 00000000 00:00 0 [anon:.bss]
f4585000-f4586000 r--p 00000000 00:00 0 [anon:.bss]
f4586000-f458c000 rw-p 00000000 00:00 0 [anon:.bss]
ff77f000-ff780000 ---p 00000000 00:00 0
ff780000-ffff7f000 rw-p 00000000 00:00 0 [stack]
fffff0000-fffff1000 r-xp 00000000 00:00 0 [kuserhelpers]

```



The screenshot shows the Android Studio Memory Profiler interface. On the left, there's a file tree with entries like 'apk', 'com.manager.files.s...', 'debug', 'adb_shell_ps_pixel3_20230724_2133.log', and 'AIO_proc_maps.txt'. The main area displays memory dump details for 'AIO_proc_maps.txt'. It lists memory regions with addresses, permissions (rwx), offsets, sizes, and source code annotations from 'TransportBackendDiscovery.java' and 'adb_shell_ps_pixel3_20230724_2133.log'. The right side has a vertical scroll bar and some status text at the bottom.

内存映射信息的解读

想要搞懂：

- 内存对齐
- 哪个是stack

等具体含义。

[Understanding ELF using readelf and objdump \(studylib.net\)](#)

```
[1] 0039d000-003b2000 r-xp 00000000 16:41 1080084 /lib/ld-2.3.3.so
[2] 003b2000-003b3000 r--p 00014000 16:41 1080084 /lib/ld-2.3.3.so
[3] 003b3000-003b4000 rw-p 00015000 16:41 1080084 /lib/ld-2.3.3.so
[4] 003b6000-004cb000 r-xp 00000000 16:41 1080085 /lib/tls/libc-2.3.3.so
[5] 004cb000-004cd000 r--p 00115000 16:41 1080085 /lib/tls/libc-2.3.3.so
[6] 004cd000-004cf000 rw-p 00117000 16:41 1080085 /lib/tls/libc-2.3.3.so
[7] 004cf000-004d1000 rw-p 004cf000 00:00 0
[8] 08048000-08049000 r-xp 00000000 16:06 66970 /tmp/test
[9] 08049000-0804a000 rw-p 00000000 16:06 66970 /tmp/test
[10] b7fec000-b7fed000 rw-p b7fec000 00:00 0
[11] bfffeb000-c0000000 rw-p bfffeb000 00:00 0
[12] fffffe000-fffff000 ---p 00000000 00:00 0
```

其中：

- VMA# 11
 - [11] bfffeb000-c0000000 rw-p bfffeb000 00:00 0

是：

- stack
 - usually, the kernel allocate several pages dynamically and map to the highest virtual address possible in user space to form stack area.

-> 此处去搜stack, 还真有多个stack这样的:

```
e6ded000-e6df1000 rw-p 00000000 00:00 0 [anon:thread signal stack]  
e84d3000-e86d3000 rw-p 00000000 00:00 0 [anon:dalvik-r  
b copying gc mark stack]  
e86d3000-e96d3000 rw-p 00000000 00:00 0 [anon:dalvik-c  
oncurrent copying gc mark stack]  
e96d3000-e9ed4000 rw-p 00000000 00:00 0 [anon:dalvik-l  
ive stack]  
e9ed4000-ea6d5000 rw-p 00000000 00:00 0 [anon:dalvik-a  
llocation stack]  
  
ebbc0000-ebdc0000 rw-p 00000000 00:00 0 [anon:dalvik-r  
b copying gc mark stack]  
  
f2282000-f228e000 rw-p 00000000 00:00 0 [anon:dalvik-t  
hread local mark stack]  
...  

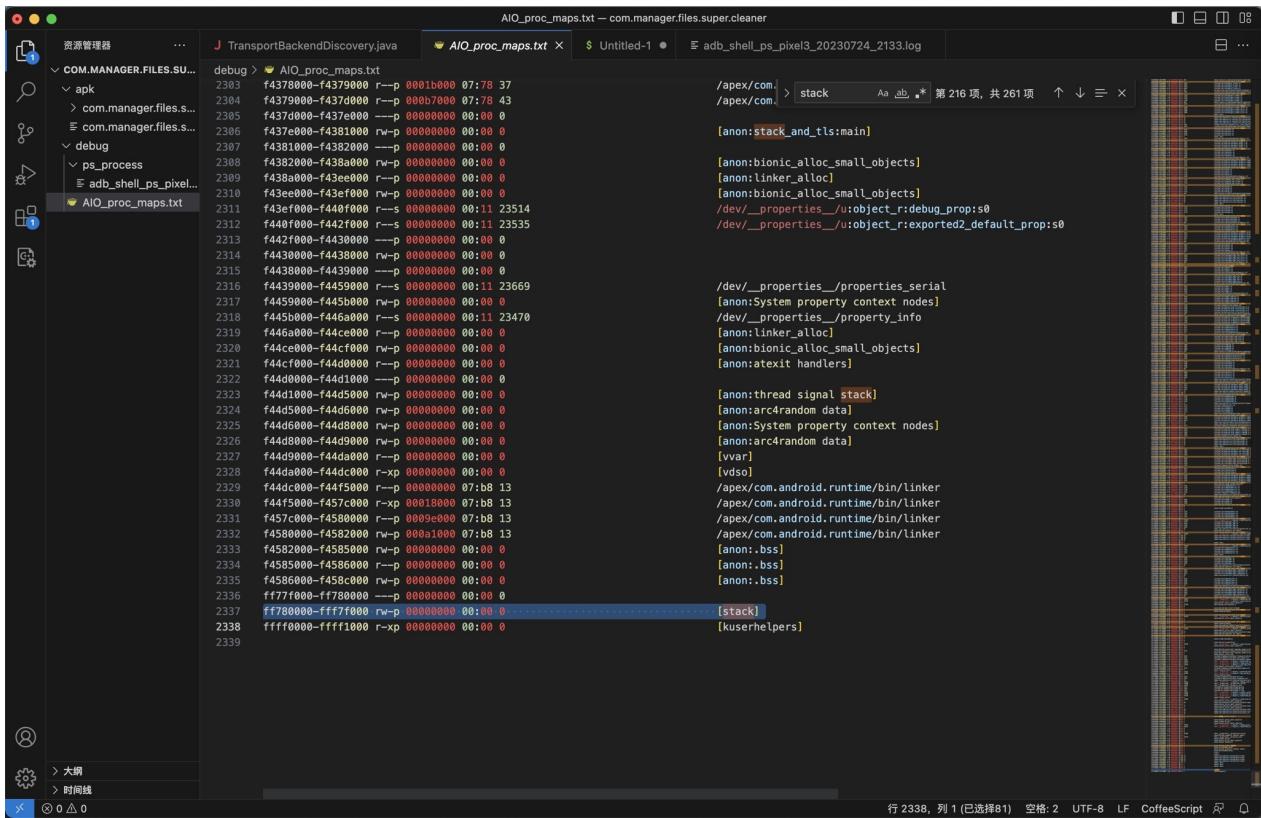
```

倒数最后一个:

```
ff780000-ffff7f000 rw-p 00000000 00:00 0 [stack]  

```

整个名字就是Stack:



是我们希望的，要找的

- Simply speaking, each process address space is divided into two parts (this assume Intel compatible 32 bit processor): user space and kernel space. User space is in 0x00000000-0xc0000000 range, while kernel space starts on 0xc0000000 onward

->

- 每个进程的 (Intel 的32位处理器的) 地址空间都被分为2部分
 - 用户空间
 - 范围: 0x00000000-0xc0000000
 - 所以上述test的地址空间的，最高位置(地址范围 bffeb000-c0000000)，分配给了stack
 - [11] bffeb000-c0000000 rw-p bffeb000 00:00 0
 - 内核空间
 - 范围: 0xc0000000-...

其他相关解释：

[Executable and Linkable Format \(ELF\) \(netmeister.org\)](http://netmeister.org/)

```

00000000000400000 8K r-x-- a.out
00000000000601000 4K rw--- a.out
0000003433e000000 112K r-x-- /lib64/ld-2.5.so
000000343401b0000 4K r---- /lib64/ld-2.5.so
000000343401c0000 4K rw--- /lib64/ld-2.5.so
00000034342000000 1336K r-x-- /lib64/libc-2.5.so    -- The first "LOAD" segment, which contains .text and .rodata sections
000000343434e0000 2044K ----- /lib64/libc-2.5.so    -- "Hole"
000000343454d0000 16K r----- /lib64/libc-2.5.so    -- Relocation (GNU_RELRO) info
+-+---- The second "LOAD" segment

```

```
0000003434551000    4K rw--- /lib64/libc-2.5.so    <-- .got.plt .data sections
-+
0000003434552000    20K rw--- [ anon ]           <-- The remaining zero-filled sections (e.g. .bss)
0000003434e00000    88K r-x-- /lib64/libpthread-2.5.so   <-- The first "LOAD" segment, which contains .text and .rodata sections
0000003434e16000    2044K ----- /lib64/libpthread-2.5.so  <-- "Hole"
0000003435015000    4K r---- /lib64/libpthread-2.5.so   <-- Relocation (GNU_RELRO) info -+-- The second "LOAD" segment
0000003435016000    4K rw--- /lib64/libpthread-2.5.so   <-- .got.plt .data sections
-+
0000003435017000    16K rw--- [ anon ]           <-- The remaining zero-filled sections (e.g. .bss)
00002aaaaaaaaab000    4K rw--- [ anon ]
00002aaaaaaaaac6000    12K rw--- [ anon ]
00007ffffffffea000    84K rw--- [ stack ]
ffffffffffff600000    8192K ----- [ anon ]
total                 14000K
```

供参考。

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其他工具

此处整理和安卓逆向的动态调试有关的，其他的分析和调试方面的工具。

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AndBug

- 主页
 - [swdunlop/AndBug: Android Debugging Library](#)
- 作用
 - 在没有源代码的情况下，调试android上的java程序
- 功能
 - 支持断点、call stack查看、查看class、method等信息
- 截图

◦

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redexer

- 主页
 - [plum-umd/redexer: The Redexer binary instrumentation framework for Dalvik bytecode](#)
 - [The Redexer Dalvik bytecode instrumentation platform](#)
- 文档
 - [Tutorial: using redexer to implement logging in Android apps](#)
- 功能
 - Dalvik 字节码（用于安卓APP）分析框架
 - 它是一套基于OCaml的实用工具
 - 帮助程序员解析、操作Dalvik虚拟机
- 作者
 - Redexer由来自马里兰大学帕克分校的PLUM组织开发完成
 - 主要作者是： Jinseong Jeon, Kristopher Micinski以及Jeff Foster

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Fino

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 - [sysdream/fino: Android small footprint inspection tool](#)
- 功能
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- 特点
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附录

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参考资料

- 【未解决】Mac中用LLDB调试DisplayDemo安卓app中的libtacker.so
- 【已解决】安卓逆向：lldb调试安卓app
- 【已解决】Mac中下载和安装lldb-server到安卓手机Pixel3
- 【已解决】已root的Android13的Pixel5中：用lldb调试安卓
- 【已解决】Mac中lldb连接安卓中lldb-server报错：error Connection shut down by remote side while waiting for reply to initial handshake packet
- 【记录】用lldb去调试安卓app：LiftFileManager
- 【已解决】Mac中给安卓手机Pixel3中初始化Frida调试环境
- 【已解决】安卓手机Pixel3中运行frida-server
- 【已解决】安卓手机Pixel3中adb shell中chmod无效
- 【部分解决】Mac中运行adb root卡死restarting adbd as root
- 【已解决】Mac中调试Pixel3中frida报错：Failed to enumerate processes connection closed
- 【已解决】Mac中用frida去调试安卓手机Pixel3中的安卓app
- 【已解决】尝试解决Android的frida不可用问题：MagiskFrida
- 【已解决】安卓逆向：Pixel3中初始化frida调试安卓apk的环境
- 【未解决】安卓逆向：用frida去hook调试JNI_OnLoad
- 【记录】用frida-trace调试DisplayDemo中更多的函数调用
- 【已解决】frida-trace去hook安卓应用报错：Failed to spawn timeout was reached
- 【已解决】安卓逆向DisplayDemo：用Frida去hook调试dlopen
- 【未解决】安卓逆向DisplayDemo：用Frida去hook调试android_dlopen_ext
- 【未解决】安卓逆向LiftFileManager：用frida去hook调试
- 【未解决】安卓逆向：用frida去hook调试RegisterNatives
- 【已解决】安卓逆向LiftFileManager：用frida调试lcodecortex/KeepAlive相关底层C函数
- 【记录】安卓逆向LiftFileManager：分析frida调试lcodecortex/KeepAlive的结果
- 【已解决】安卓逆向LiftFileManager：用frida调试flock及结果分析
- 【未解决】安卓逆向LiftFileManager：用frida调试pthread_create并分析结果
- 【未解决】安卓逆向LiftFileManager：用frida调试创建进程的Linux的C函数
- 【未解决】Mac中安装frida
- 【已解决】Frida去hook安卓JNI函数JIN_OnLoad却hook不到无输出
- 【已解决】安卓逆向DisplayDemo：用frida+js脚本去hook函数JIN_OnLoad
- 【已解决】Frida调试安卓进程：字符串参数判断过滤
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- [crifan/AndroidYouTubeDynamicDebug: 安卓逆向动态调试YouTube \(github.com\)](#)
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- [Xposed插件开发 · 安卓逆向调试：XPosed框架](#)
- [CPU模拟利器：Unicorn](#)
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- [lldb-server – Server for LLDB Debugging Sessions — The LLDB Debugger](#)

- [Android SDK Offline: Android NDK LLDB Direct Download](#)
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 - [安卓逆向13 --- AndroidStudio + Smalidea 动态调试 smali 代码 【APK可调试】、gradle 配置擒贼先擒王的博客-CSDN博客_smalidea](#)
- DDMS adb 调试 端口 映射 关系
 - [Android调试系列—使用android studio调试smali代码 - Gordon0918 - 博客园 \(cnblogs.com\)](#)
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- [\[免费专栏\] Android安全之Android Studion 动态调试APK的两种方法菠萝橙留香的博客-CSDN博客_安卓apk调试](#)
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- [unidbg调用so生成xgorgon - SegmentFault 思否](#)
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- [菜鸡诈尸水贴之unidbg学习笔记 - 『移动安全区』 - 吾爱破解 - LCG - LSG |安卓破解|病毒分析|www.52pojie.cn](#)
- [Android逆向之旅---Hook神器家族的Frida工具使用详解 - Android应用安全防护和逆向分析----作者 - CSDN博客](#)
- [浅谈 android hook 技术 - Android - 掘金](#)
- [使用Frida框架进行hook | LaOs](#)
- [Android逆向之旅-Hook神器家族的Frida工具使用详解 - 云+社区 - 腾讯云](#)
- [hookmaster/frida-all-in-one: 《FRIDA操作手册》 by @hluwa @r0ysue](#)
- [详解Hook框架frida，让你在逆向工作中效率成倍提升 - 知乎](#)
- [Android Hook工具之Frida 基础使用 - 简书](#)
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