环境

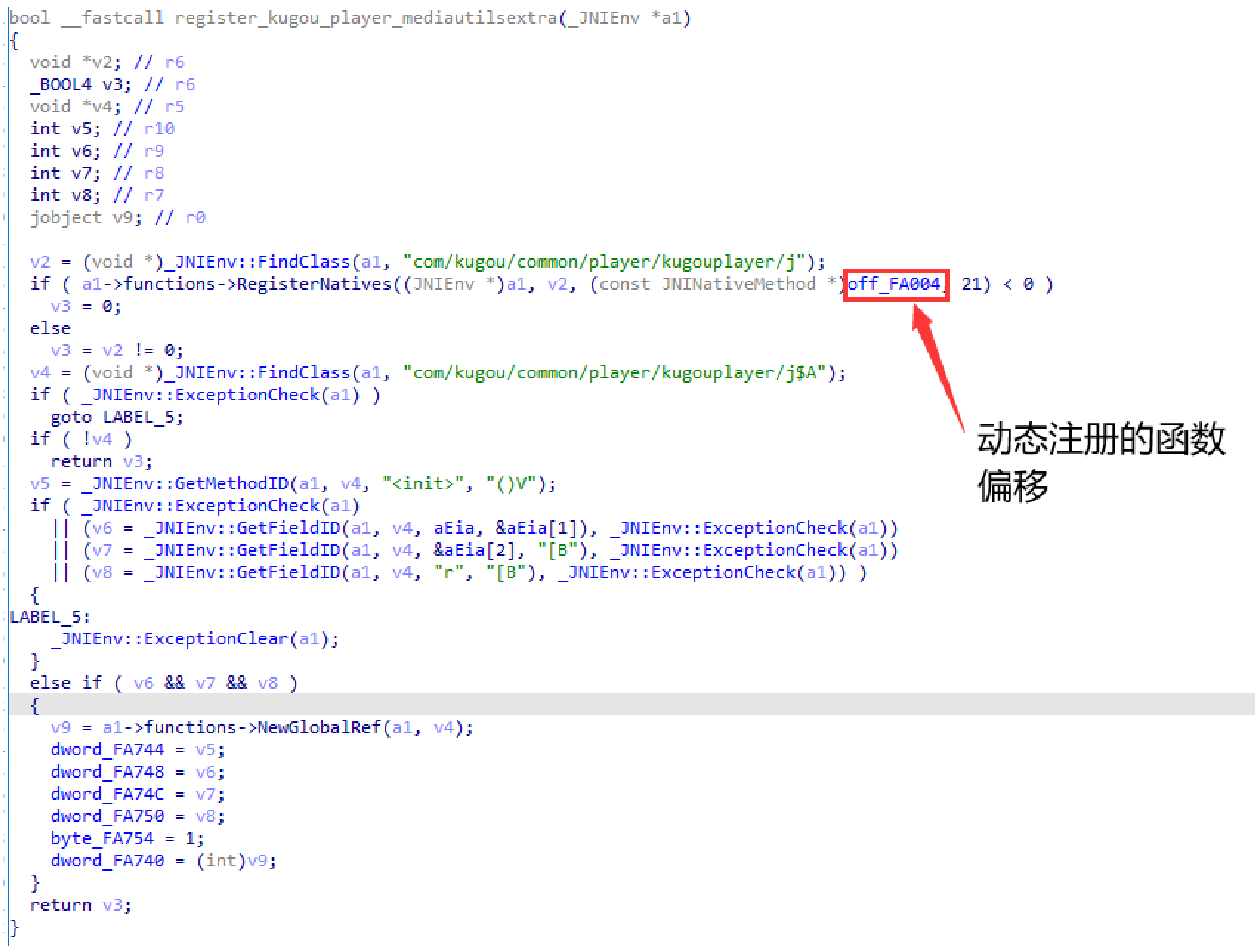
1. 主机：win10
2. 手机：Pixel 4， Android 10
3. APP版本：V5.54.0

工具

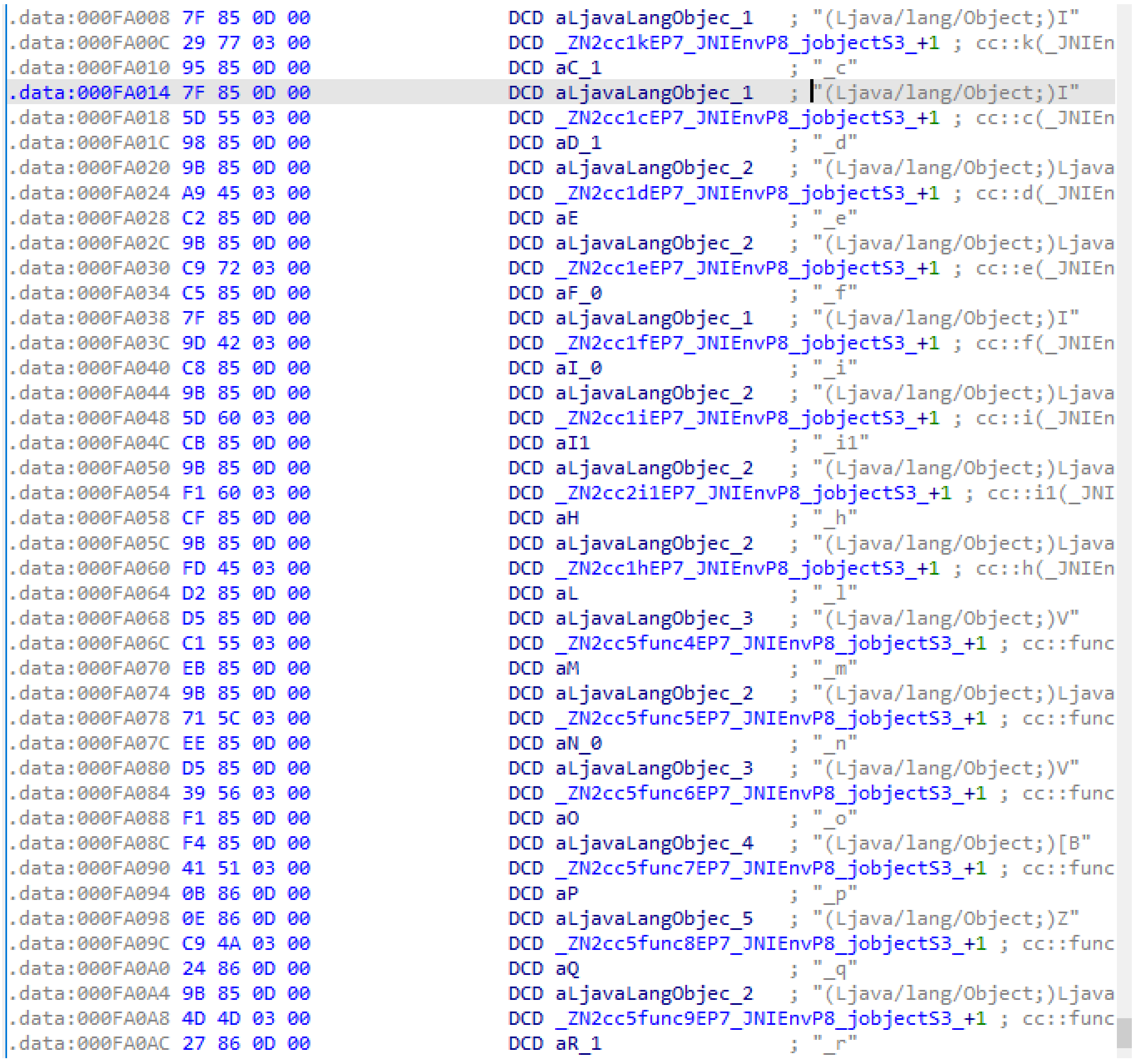
IDA、JADX、Frida、Charles

登录逆向分析

RegisterNatives



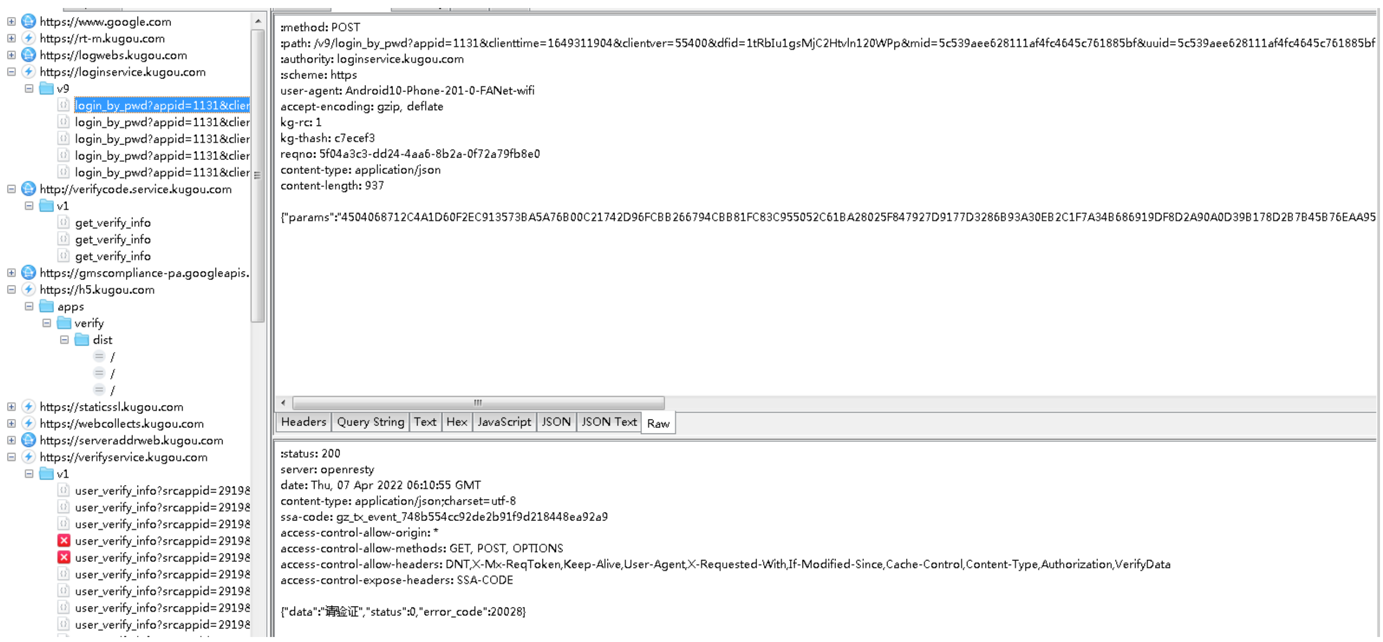
```
bool __fastcall register_kugou_player_mediautilsextra(_JNIEnv *a1)
{
  void *v2; // r6
  _BOOL4 v3; // r6
  void *v4; // r5
  int v5; // r10
  int v6; // r9
  int v7; // r8
  int v8; // r7
  jobject v9; // r0

  v2 = (void *)_JNIEnv::FindClass(a1, "com/kugou/common/player/kugouplayer/j");
  if ( a1->functions->RegisterNatives((JNIEnv *)a1, v2, (const JNINativeMethod *)off_FA004, 21) < 0 )
    v3 = 0;
  else
    v3 = v2 != 0;
  v4 = (void *)_JNIEnv::FindClass(a1, "com/kugou/common/player/kugouplayer/j$A");
  if ( _JNIEnv::ExceptionCheck(a1) )
    goto LABEL_5;
  if ( !v4 )
    return v3;
  v5 = _JNIEnv::GetMethodID(a1, v4, "<init>", "()V");
  if ( _JNIEnv::ExceptionCheck(a1)
    || (v6 = _JNIEnv::GetFieldID(a1, v4, aEia, &aEia[1]), _JNIEnv::ExceptionCheck(a1))
    || (v7 = _JNIEnv::GetFieldID(a1, v4, &aEia[2], "[B"), _JNIEnv::ExceptionCheck(a1))
    || (v8 = _JNIEnv::GetFieldID(a1, v4, "r", "[B"), _JNIEnv::ExceptionCheck(a1)) )
  {
LABEL_5:
    _JNIEnv::ExceptionClear(a1);
  }
  else if ( v6 && v7 && v8 )
  {
    v9 = a1->functions->NewGlobalRef(a1, v4);
    dword_FA744 = v5;
    dword_FA748 = v6;
    dword_FA74C = v7;
    dword_FA750 = v8;
    byte_FA754 = 1;
    dword_FA740 = (int)v9;
  }
  return v3;
}
```



```
.data:000FA008 7F 85 0D 00                DCD aLjavaLangObjec_1    ; "(Ljava/lang/Object;)I"
.data:000FA00C 29 77 03 00                DCD _ZN2cc1kEP7_JNIEnvP8_jobjectS3_+1 ; cc::k(_JNIEn
.data:000FA010 95 85 0D 00                DCD aC_1                 ; "_c"
.data:000FA014 7F 85 0D 00                DCD aLjavaLangObjec_1    ; "(Ljava/lang/Object;)I"
.data:000FA018 5D 55 03 00                DCD _ZN2cc1cEP7_JNIEnvP8_jobjectS3_+1 ; cc::c(_JNIEn
.data:000FA01C 98 85 0D 00                DCD aD_1                 ; "_d"
.data:000FA020 9B 85 0D 00                DCD aLjavaLangObjec_2    ; "(Ljava/lang/Object;)Ljava
.data:000FA024 A9 45 03 00                DCD _ZN2cc1dEP7_JNIEnvP8_jobjectS3_+1 ; cc::d(_JNIEn
.data:000FA028 C2 85 0D 00                DCD aE                   ; "_e"
.data:000FA02C 9B 85 0D 00                DCD aLjavaLangObjec_2    ; "(Ljava/lang/Object;)Ljava
.data:000FA030 C9 72 03 00                DCD _ZN2cc1eEP7_JNIEnvP8_jobjectS3_+1 ; cc::e(_JNIEn
.data:000FA034 C5 85 0D 00                DCD aF_0                 ; "_f"
.data:000FA038 7F 85 0D 00                DCD aLjavaLangObjec_1    ; "(Ljava/lang/Object;)I"
.data:000FA03C 9D 42 03 00                DCD _ZN2cc1fEP7_JNIEnvP8_jobjectS3_+1 ; cc::f(_JNIEn
.data:000FA040 C8 85 0D 00                DCD aI_0                 ; "_i"
.data:000FA044 9B 85 0D 00                DCD aLjavaLangObjec_2    ; "(Ljava/lang/Object;)Ljava
.data:000FA048 5D 60 03 00                DCD _ZN2cc1iEP7_JNIEnvP8_jobjectS3_+1 ; cc::i(_JNIEn
.data:000FA04C CB 85 0D 00                DCD aI1                  ; "_i1"
.data:000FA050 9B 85 0D 00                DCD aLjavaLangObjec_2    ; "(Ljava/lang/Object;)Ljava
.data:000FA054 F1 60 03 00                DCD _ZN2cc2i1EP7_JNIEnvP8_jobjectS3_+1 ; cc::i1(_JNI
.data:000FA058 CF 85 0D 00                DCD aH                   ; "_h"
.data:000FA05C 9B 85 0D 00                DCD aLjavaLangObjec_2    ; "(Ljava/lang/Object;)Ljava
.data:000FA060 FD 45 03 00                DCD _ZN2cc1hEP7_JNIEnvP8_jobjectS3_+1 ; cc::h(_JNIEn
.data:000FA064 D2 85 0D 00                DCD aL                   ; "_l"
.data:000FA068 D5 85 0D 00                DCD aLjavaLangObjec_3    ; "(Ljava/lang/Object;)V"
.data:000FA06C C1 55 03 00                DCD _ZN2cc5func4EP7_JNIEnvP8_jobjectS3_+1 ; cc::func
.data:000FA070 EB 85 0D 00                DCD aM                   ; "_m"
.data:000FA074 9B 85 0D 00                DCD aLjavaLangObjec_2    ; "(Ljava/lang/Object;)Ljava
.data:000FA078 71 5C 03 00                DCD _ZN2cc5func5EP7_JNIEnvP8_jobjectS3_+1 ; cc::func
.data:000FA07C EE 85 0D 00                DCD aN_0                 ; "_n"
.data:000FA080 D5 85 0D 00                DCD aLjavaLangObjec_3    ; "(Ljava/lang/Object;)V"
.data:000FA084 39 56 03 00                DCD _ZN2cc5func6EP7_JNIEnvP8_jobjectS3_+1 ; cc::func
.data:000FA088 F1 85 0D 00                DCD aO                   ; "_o"
.data:000FA08C F4 85 0D 00                DCD aLjavaLangObjec_4    ; "(Ljava/lang/Object;)[B"
.data:000FA090 41 51 03 00                DCD _ZN2cc5func7EP7_JNIEnvP8_jobjectS3_+1 ; cc::func
.data:000FA094 0B 86 0D 00                DCD aP                   ; "_p"
.data:000FA098 0E 86 0D 00                DCD aLjavaLangObjec_5    ; "(Ljava/lang/Object;)Z"
.data:000FA09C C9 4A 03 00                DCD _ZN2cc5func8EP7_JNIEnvP8_jobjectS3_+1 ; cc::func
.data:000FA0A0 24 86 0D 00                DCD aQ                   ; "_q"
.data:000FA0A4 9B 85 0D 00                DCD aLjavaLangObjec_2    ; "(Ljava/lang/Object;)Ljava
.data:000FA0A8 4D 4D 03 00                DCD _ZN2cc5func9EP7_JNIEnvP8_jobjectS3_+1 ; cc::func
.data:000FA0AC 27 86 0D 00                DCD aR_1                 ; "_r"
```

Request Params

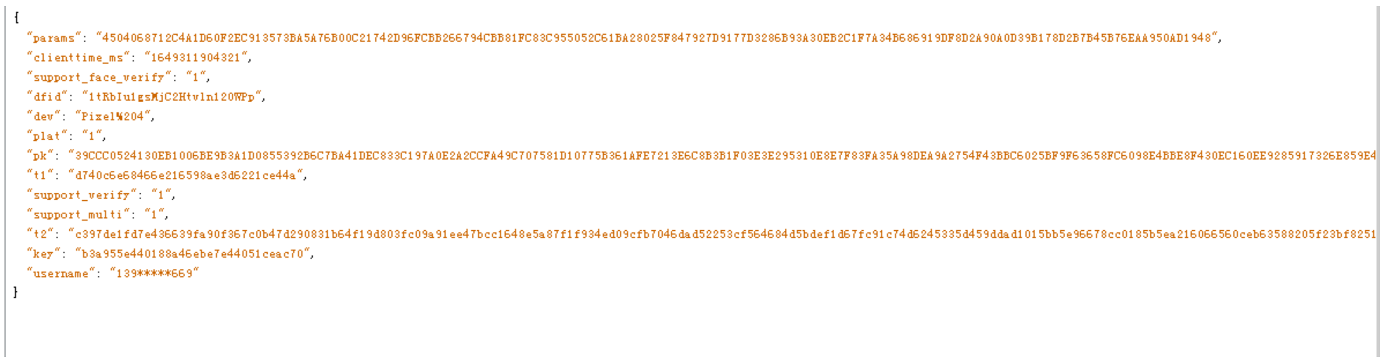
首先抓包看一下登录包：



```
https://www.google.com
https://rt-m.kugou.com
https://logwebs.kugou.com
https://loginservice.kugou.com
  v9
    login_by_pwd?appid=1131&clier
    login_by_pwd?appid=1131&clier
    login_by_pwd?appid=1131&clier
    login_by_pwd?appid=1131&clier
    login_by_pwd?appid=1131&clier
http://verifycode.service.kugou.com
  v1
    get_verify_info
    get_verify_info
    get_verify_info
https://gmscompliance-pa.googleapis.
https://h5.kugou.com
  apps
    verify
      dist
        /
        /
        /
https://staticssl.kugou.com
https://webcollects.kugou.com
https://serveraddrweb.kugou.com
https://verifyservice.kugou.com
  v1
    user_verify_info?srcappid=2919
    user_verify_info?srcappid=2919
    user_verify_info?srcappid=2919
    user_verify_info?srcappid=2919
    user_verify_info?srcappid=2919
    user_verify_info?srcappid=2919
    user_verify_info?srcappid=2919
    user_verify_info?srcappid=2919
    user_verify_info?srcappid=2919
```

```
:method: POST
:path: /v9/login_by_pwd?appid=1131&clienttime=1649311904&clientver=55400&dfid=1tRbIu1gsMjC2Htvln120WPp&mid=5c539aee628111af4fc4645c761885bf&uuid=5c539aee628111af4fc4645c761885bf
:authority: loginservice.kugou.com
:scheme: https
user-agent: Android10-Phone-201-0-FANet-wifi
accept-encoding: gzip, deflate
kg-rc: 1
kg-thash: c7ecef3
reqno: 5f04a3c3-dd24-4aa6-8b2a-0f72a79fb8e0
content-type: application/json
content-length: 937

{"params":"4504068712C4A1D60F2EC913573BA5A76B00C21742D96FCBB266794CBB81FC83C955052C61BA28025F847927D9177D3286B93A30EB2C1F7A34B686919DF8D2A90A0D39B178D2B7B45B76EAA95
```

```
:status: 200
server: openresty
date: Thu, 07 Apr 2022 06:10:55 GMT
content-type: application/json;charset=utf-8
ssa-code: gz_tx_event_748b554cc92de2b91f9d218448ea92a9
access-control-allow-origin: *
access-control-allow-methods: GET, POST, OPTIONS
access-control-allow-headers: DNT,X-Mx-ReqToken,Keep-Alive,User-Agent,X-Requested-With,If-Modified-Since,Cache-Control,Content-Type,Authorization,VerifyData
access-control-expose-headers: SSA-CODE

{"data":"请验证","status":0,"error_code":20028}
```



```
{
  "params": "4504068712C4A1D60F2EC913573BA5A76B00C21742D96FCBB266794CBB81FC83C955052C61BA28025F847927D9177D3286B93A30EB2C1F7A34B686919DF8D2A90A0D39B178D2B7B45B76EAA950AD1948",
  "clienttime_ms": "1649311904321",
  "support_face_verify": "1",
  "dfid": "1tRbIu1gsMjC2Htvln120WPp",
  "dev": "Pixel%204",
  "plat": "1",
  "pk": "39CCC0524130EB1006BE9B3A1D0855392B6C7BA41DEC833C197A0E2A2CCFA49C707581D10775B361AFE7213E6C8B3B1F03E3E295310E8E7F83FA35A98DEA9A2754F43BBC6025BF9F63658FC6098E4BBE8F430EC160EE9285917326E859E4
  "t1": "d740c6e68466e216598ae3d6221ce44a",
  "support_verify": "1",
  "support_multi": "1",
  "t2": "c397de1fd7e436639fa90f367c0b47d290831b64f19d803fc09a91ee47bcc1648e5a87f1f934ed09cfb7046dad52253cf564684d5bdef1d67fc91c74d6245335d459ddad1015bb5e96678cc0185b5ea216066560ceb63588205f23bf8251
  "key": "b3a955e440188a46ebe7e44051ceac70",
  "username": "139*****669"
}
```

verifydata

> { "params": "5F1D4B282F5E89548F98FC30853F4F9289D874AA82EDB0ED82330B07CF5D208ECAAF446BAEA4D4848BB7515573123514EFDEA8E6C1000FEF8F30A9901382B7119822C74B9C91394F9DDFF8B239E241F9", "clienttime_ms": "1647312358378", "support_face_verify": "1", "dfid": "-", "dev": "Pixel%204", "plat": "1", "pk": "7C9E722B7BCCE5B56BAB9D42902B2A4F238BAA40EACCCEECACE72C3EE46A85B1B833F7800E6D2B968EE809303485376180BD8494EBA84F006DBD050E1F876B3713DE64AFADDA4F51FCC522C6DAC0AFFC8A04AABAF47F95FE6D3F2FB6726A16FC4664AB66CE065E3FCFD7D0FACD3DCA05AA96D74DD96EC74DBF54CA72D088E42C", "t1": "bfaf46951c6a5c58d4bf618c517354de", "support_verify": "1", "support_multi": "1", "t2": "c397de1fd7e436639fa90f367c0b47d290831b64f19d803fc09a91ee47bcc1648e5a87f1f934ed09cfb7046dad52253cf564684d5bdef1d67fc91c74d6245335237a78074f157641a1ddfb5ca4a66c5d72855feae18282b981d896c6f170cb54ca7c21aad3811d69c80a73ad3482c340", "key": "8d73d8b5da06bad3b466d864812d488b", "username": "130*****696" }

params参数解析

通过JADX搜索"params"字符串定位到位置：

```
this.j.put("params", a.c(jSONObject.toString(), this.g));

进入c方法内可以看到：
```

```
public static String c(String str, String str2) throws Exception {
        return a(str, "utf-8", ao.a(str2).substring(0, 32), ao.a(str2).substring(16,
32));
    }
```

通过objection hook该方法内的a方法，得到如下结果：

(agent) [302556] Called com.kugou.fanxing.allinone.common.utils.a.a(java.lang.String, java.lang.String, java.lang.String, java.lang.String)

(agent) [302556] Arguments com.kugou.fanxing.allinone.common.utils.a.a({"username":"13062581696","clienttime_ms":"1647313862199","pwd":"557998555"}, utf-8, 0dd6da40aea47d05b5f6612596fd2e7f, b5f6612596fd2e7f)

(agent) [793424] Backtrace: com.kugou.fanxing.allinone.common.utils.a.a(Native Method) com.kugou.fanxing.allinone.common.utils.a.a(SourceFile:117) com.kugou.fanxing.allinone.common.utils.a.a(Native Method) com.kugou.fanxing.allinone.common.utils.a.c(SourceFile:106) com.kugou.fanxing.core.protocol.g.e.c(SourceFile:85) com.kugou.fanxing.core.protocol.g.e.c(Native Method) com.kugou.fanxing.core.protocol.g.a.d(SourceFile:76) com.kugou.fanxing.core.modul.user.login.c.a(SourceFile:50) com.kugou.fanxing.core.modul.user.login.f.a(SourceFile:228) com.kugou.fanxing.core.modul.user.ui.a.a(SourceFile:577) com.kugou.fanxing.core.modul.user.ui.a.j(SourceFile:554) com.kugou.fanxing.core.modul.user.ui.a.i(SourceFile:520) com.kugou.fanxing.core.modul.user.ui.a.onClick(SourceFile:417) android.view.View.performClick(View.java:7259) android.view.View.performClickInternal(View.java:7236) android.view.View.access $3600(View.java:801)android.view.View$PerformClick.run(View.java:27892) android.os.Handler.handleCallback(Handler.java:883)

android.os.Handler.dispatchMessage(Handler.java:100)
android.os.Looper.loop(Looper.java:214)
android.app.ActivityThread.main(ActivityThread.java:7356)
java.lang.reflect.Method.invoke(Native Method)
com.android.internal.os.RuntimeInit$MethodAndArgsCaller.run(RuntimeInit.java:492)
com.android.internal.os.ZygoteInit.main(ZygoteInit.java:930)

这样我们可以得到a.c(jSONObject.toString(), this.g)中两个参数的来源，其中第一个参数为JSON结构：{"username":"13062581696","clienttime_ms":"1647313862199","pwd":"557998555"}，第二个参数为AES的KEY，最终将KEY拆分为(0,32)和(16,32)具体生成方式如下：

```
this.g =
com.kugou.fanxing.allinone.common.utils.a.a(com.kugou.fanxing.allinone.common.constant.c.h
 ? 128 : 64);
```

a方法如下：

```
public static String a(int i) {
        try {
            KeyGenerator instance = KeyGenerator.getInstance("AES");
            instance.init(i);
            return a(instance.generateKey().getEncoded());
        } catch (Exception e) {
            e.printStackTrace();
            return null;
        }
    }

public static String a(byte[] bArr) {
        StringBuffer stringBuffer = new StringBuffer();
        for (byte b : bArr) {
            String hexString = Integer.toHexString(b & 255);
            if (hexString.length() == 1) {
                hexString = '0' + hexString;
            }
            stringBuffer.append(hexString.toUpperCase());
        }
        return stringBuffer.toString();
    }


public static String c(String str, String str2) throws Exception {
        return a(str, "utf-8", ao.a(str2).substring(0, 32),
ao.a(str2).substring(16, 32));
    }
```

```
public static String a(String str, String str2, String str3, String str4) throws
Exception {
        SecretKeySpec secretKeySpec = new SecretKeySpec(str3.getBytes(str2),
"AES");
        Cipher instance = Cipher.getInstance("AES/CBC/PKCS5Padding");
        instance.init(1, secretKeySpec, new IvParameterSpec(str4.getBytes()));
        return a(instance.doFinal(str.getBytes(str2)));
    }
```

dfid参数解析

通过搜索字符串即可定位到如下函数:

```
public String e() {
        String a2 = com.kugou.fanxing.core.common.fingerprint.a.a();
        return TextUtils.isEmpty(a2) ? "-" : a2;
    }

a2 -> share_data -> device_fingerprint
通过sharedPreferences读取了文件名为share_data里的device_fingerprint字段
```

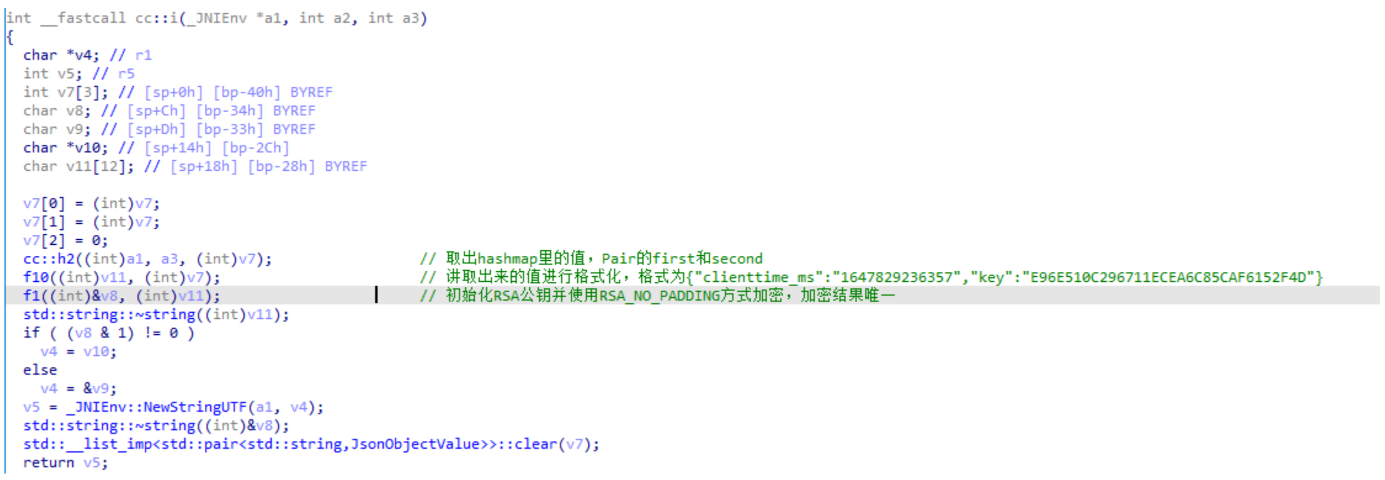
pk参数解析

```
hashMap.put("pk",
com.kugou.fanxing.core.protocol.g.a.a(String.valueOf(currentTimeMillis), a2));

public static String a(String str, String str2) throws Exception {
        HashMap hashMap = new HashMap();
        hashMap.put("clienttime_ms", str);
        hashMap.put(ao.M, str2);
        return com.kugou.common.player.kugouplayer.a.d(hashMap);
    }
```

```
str为时间戳, str2为AES随机密钥
组成形式如下:
```

> {"clienttime_ms":"1647829236357","key":"E96E510C296711ECEA6C85CAF6152F4D"}

最终调用native层的cc::i加密方法


```
int __fastcall cc::i(_JNIEnv *a1, int a2, int a3)
{
  char *v4; // r1
  int v5; // r5
  int v7[3]; // [sp+0h] [bp-40h] BYREF
  char v8; // [sp+Ch] [bp-34h] BYREF
  char v9; // [sp+Dh] [bp-33h] BYREF
  char *v10; // [sp+14h] [bp-2Ch]
  char v11[12]; // [sp+18h] [bp-28h] BYREF

  v7[0] = (int)v7;
  v7[1] = (int)v7;
  v7[2] = 0;
  cc::h2((int)a1, a3, (int)v7);                 // 取出hashmap里的值，Pair的first和second
  f10((int)v11, (int)v7);                       // 讲取出来的值进行格式化，格式为{"clienttime_ms":"1647829236357","key":"E96E510C296711ECEA6C85CAF6152F4D"}
  f1((int)&v8, (int)v11);                       // 初始化RSA公钥并使用RSA_NO_PADDING方式加密，加密结果唯一
  std::string::~string((int)v11);
  if ( (v8 & 1) != 0 )
    v4 = v10;
  else
    v4 = &v9;
  v5 = _JNIEnv::NewStringUTF(a1, v4);
  std::string::~string((int)&v8);
  std::__list_imp<std::pair<std::string,JsonObjectValue>>::clear(v7);
  return v5;
```

PUBKEY：

> MIGfMA0GCSqGSIb3DQEBAQUAA4GNADCBiQKBgQD2DT4odzkDd7hMlZ7djdZQH1
> 2j38nKxriINW1MGjMry3tXheya113xwmbBOwN0GA4zTwKFauFJRzcsD0nDFq1eaatcFK
> eDF25R4dnQRX+4BdTwFVS8lIb8nJMluSBwK+i4Z3VF+gfZ0AqQOXda6lJ4jPBt9Ep7VX
> EAHXUDn9JM8wIDAQAB

Python版RSA_NOPADDING加密方法实现：

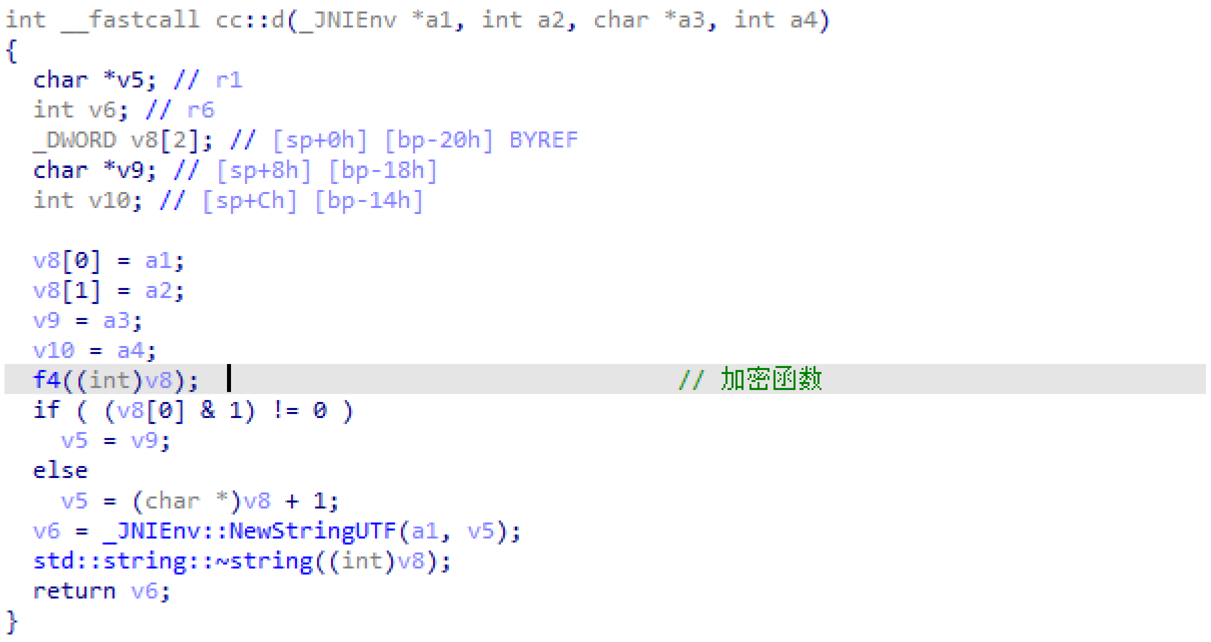
```python
import rsa
import base64
from Crypto.PublicKey import RSA


def zfillStrToBin(s):
    b = bytes(s.encode())
    for i in range(128 - len(b)):
        b += b'\0'
    print(len(b))
    return b


class RsaNopadding:

    def __init__(self, key):
        self.pubkey = RSA.importKey(base64.b64decode(key))

    def encrypt(self, message):
        kLen = rsa.common.byte_size(self.pubkey.n)
        msg = zfillStrToBin(message)
        _b = rsa.transform.bytes2int(msg)
        _i = rsa.core.encrypt_int(_b, self.pubkey.e, self.pubkey.n)
        result = rsa.transform.int2bytes(_i, kLen)
        return result.hex().upper()


message = '{"clienttime_ms":"1647829236357","key":"E96E510C296711ECEA6C85CAF6152F4D"}'
```

```
msg = RsaNopadding(

"MIGfMA0GCSqGSIb3DQEBAQUAA4GNADCBiQKBgQD2DT4odzkDd7hMlZ7djdZQH12j38nKxriINW1MGjMry3tXheya1

print(msg.encrypt(message))
```

t1参数解析

```
String t1 = com.kugou.common.player.kugouplayer.a.b(null);
```

最终调用native层的cc::d方法



```
int __fastcall cc::d(_JNIEnv *a1, int a2, char *a3, int a4)
{
  char *v5; // r1
  int v6; // r6
  _DWORD v8[2]; // [sp+0h] [bp-20h] BYREF
  char *v9; // [sp+8h] [bp-18h]
  int v10; // [sp+Ch] [bp-14h]

  v8[0] = a1;
  v8[1] = a2;
  v9 = a3;
  v10 = a4;
  f4((int)v8);                                  // 加密函数
  if ( (v8[0] & 1) != 0 )
    v5 = v9;
  else
    v5 = (char *)v8 + 1;
  v6 = _JNIEnv::NewStringUTF(a1, v5);
  std::string::~string((int)v8);
  return v6;
}
```

这里只分析f4函数内关键步骤部分：

```
int __fastcall f4(int a1)
{
LABEL_44:                                   // 走这
  v76[0] = (int)v76;
  v76[1] = (int)v76;
  v76[2] = 0;
  v77 = 0;
  v78 = 0;
  v79 = 0;
  std::string::__init((int)&v77, (int)&aEia[2], 1);
  v34 = v77;
  v35 = v78;
  v77 = 0;
  v78 = 0;
  v103 = v34;
  v104 = v35;
  v105 = v79;
  v79 = 0;
  std::string::basic_string((int)v106, (int)&v66);
  std::list<std::pair<std::string,std::string>>::push_back((int)v76, (int)&v103);
  std::string::~string((int)v106);
  std::string::~string((int)&v103);
  std::string::~string((int)&v77);
  v80 = 0;
  v81 = 0;
  v82 = 0;
  std::string::__init((int)&v80, (int)"b", 1);
  f5(&v83);                                      // daytime
  v36 = v80;
  v37 = v81;
  v38 = v82;
  v80 = 0;
  v81 = 0;
  v82 = 0;
  v103 = v36;
  v104 = v37;
  v105 = v38;
  v39 = v83;
  v40 = v84;
  v41 = v85;
  v83 = 0;
  v84 = 0;
  v85 = 0;
  v106[0] = v39;
  v106[1] = v40;
  v106[2] = v41;
  std::list<std::pair<std::string,std::string>>::push_back((int)v76, (int)&v103);
  std::string::~string((int)v106);
  std::string::~string((int)&v103);
  std::string::~string((int)&v83);
  std::string::~string((int)&v80);
  f9((int)v86, (int)v76);
  v87 = 0;
  v42 = v107;
  v88 = 0;
  v89 = 0;
  v95[0] = 0;
  v95[1] = 0;
  v95[2] = 0;
  v43 = aBdeaed243193ce;                         // v42=bdeaed243193ce1i#~DC<M[g
  do
  {
    v44 = *(_DWORD *)v43;
    v43 += 8;
    v45 = *((_DWORD *)v43 - 1);
    *(_DWORD *)v42 = v44;                        // 整个循环将bdeaed243193ce1i#~DC<M[g扩
展到bdeaed243193ce1i#~DC<M[g..=2..~4
    *((_DWORD *)v42 + 1) = v45;
    v42 += 8;
  }
  while ( v43 != (const char *)&unk_D90E4 );
  v103 = 0;
  v104 = 0;
  v105 = 0;
  std::string::__init((int)&v103, (int)v107, 32);//
v105=v109=bdeaed243193ce1i#~DC<M[g..=2..~4
                                                // 62 64 65 61 65 64 32 34 33 31 39 33
63 65 31 69
                                                // 23 7E 44 43 3C 4D 5B 67 7F 0E 3D 32
01 2E 7E 34
  v46 = (unsigned __int8)v103;
  if ( (v103 & 1) == 0 )
    v46 = (int)(unsigned __int8)v103 >> 1;
  if ( (v103 & 1) != 0 )
    v46 = v104;
  v47 = v46 - 2;
  do
  {
    if ( v47 < 0 )
      break;
    v48 = (v103 & 1) != 0 ? v105 : (int *)((char *)&v103 + 1);
    v49 = (char *)v48 + v47;                    // 转换v105为
bdeaed243193ce11ac913bbd48d340a4
    v50 = (v103 & 1) != 0 ? v105 : (int *)((char *)&v103 + 1);
    v51 = *((_BYTE *)v50 + v47);
    v52 = (char *)&unk_D90E4 + v47 - v46;
    --v47;
    *v49 = v51 ^ v52[17];
  }
  while ( v47 != v46 - 18 );
  std::string::basic_string((int)&v100, (int)&v103);
  std::string::~string((int)&v103);
  v53 = v107;
  v54 = aAc913bbd48d340;                        // v54 =
ac913bbd48d340a41234567890qwertyuiopasdfghjklzxcvbnm.
  do
  {
    v55 = *(_DWORD *)v54;
    v54 += 8;
    v56 = *((_DWORD *)v54 - 1);
    *(_DWORD *)v53 = v55;                       // 整个循环将
ac913bbd48d340a41234567890qwertyuiopasdfghjklzxcvbnm.转换为ac913bbd48d340a4
    *((_DWORD *)v53 + 1) = v56;
    v53 += 8;
  }
  while ( v54 != &aAc913bbd48d340[16] );
  v103 = 0;
  v104 = 0;
  v105 = 0;
  std::string::__init((int)&v103, (int)v107, 16);// v103=v107=ac913bbd48d340a4
  std::string::basic_string((int)v99, (int)&v103);
  std::string::~string((int)&v103);
  sub_394FC(1, v86, v95, (unsigned __int8 *)&v100, v99);// AES加密
  std::string::~string((int)v99);
  std::string::~string((int)&v100);
  f11((int)&v96, (int)v95);                     // HEX格式化
  v58 = v87 & 1;
  if ( (v87 & 1) != 0 )
  {
    v57 = v89;
    v58 = 0;
  }
  else
  {
    BYTE1(v87) = v87 & 1;
  }
  if ( (v87 & 1) != 0 )
  {
    *v57 = v58;
    v88 = v58;
  }
  else
  {
    LOBYTE(v87) = v58;
  }
  std::string::reserve((int)&v87, 0);
  v59 = v96;
  v60 = v97;
  v61 = v98;
  v96 = 0;
  v97 = 0;
  v98 = 0;
  v87 = v59;
  v88 = v60;
  v89 = (_BYTE *)v61;
  std::string::~string((int)&v96);
  std::string::~string((int)v95);
  if ( (*(_BYTE *)a1 & 1) != 0 )
  {
    **(_BYTE **)(a1 + 8) = 0;
    *(_DWORD *)(a1 + 4) = 0;
  }
  else
  {
    *(_BYTE *)(a1 + 1) = 0;
    *(_BYTE *)a1 = 0;
  }
  std::string::reserve(a1, 0);
  v62 = v87;
  v63 = v88;
  v64 = (int)v89;
  v87 = 0;
  v88 = 0;
  v89 = 0;
  *(_DWORD *)a1 = v62;
  *(_DWORD *)(a1 + 4) = v63;
  *(_DWORD *)(a1 + 8) = v64;
  std::string::~string((int)&v87);
  std::string::~string((int)v86);
  std::__list_imp<std::pair<std::string,std::string>>::clear(v76);
  std::string::~string((int)&v66);
  return a1;
}
```

cc::d方法里为AES_256_CBC_ENCRYPT

encData: |1649905000102

key:bdeaed243193ce11ac913bbd48d340a4

iv:ac913bbd48d340a4

---

t2参数解析

```
String t2 = com.kugou.common.player.kugouplayer.a.c(null);
```

最终调用native层的cc::e方法

```
int __fastcall cc::e(_JNIEnv *a1)
{
  sub_346F4(&v33);
  v34[2] = 0;
  v34[0] = (int)v34;
  v34[1] = (int)v34;
  v35 = 0;
  v36 = 0;
  v37 = 0;
  std::string::__init((int)&v35, (int)&aEia[2], 1);
  cc::h4((int)&v38, a1);                          // 获取ANDROID_ID
  v2 = v35;
  v3 = v36;
  v35 = 0;
  v36 = 0;
  v66 = v2;
  v67 = v3;
  v68 = v37;
  v4 = v38;
  v5 = v39;
  v37 = 0;
  v38 = 0;
```

```
    v39 = 0;
    v69 = v4;
    v70 = v5;
    v71 = v40;
    v40 = 0;
    std::list<std::pair<std::string,std::string>>::push_back(v34, &v66);
    std::pair<std::string,std::string>::~pair(&v66);
    std::string::~string((int)&v38);
    std::string::~string((int)&v35);
    v41 = 0;
    v42 = 0;
    v43 = 0;
    std::string::__init((int)&v41, (int)"b", 1);
    cc::h5((int)&v44, a1);                          // 获取DeviceId
    v6 = v41;
    v7 = v42;
    v8 = v43;
    v41 = 0;
    v42 = 0;
    v43 = 0;
    v66 = v6;
    v67 = v7;
    v68 = v8;
    v9 = v44;
    v10 = v45;
    v11 = v46;
    v44 = 0;
    v45 = 0;
    v46 = 0;
    v69 = v9;
    v70 = v10;
    v71 = v11;
    std::list<std::pair<std::string,std::string>>::push_back(v34, &v66);
    std::pair<std::string,std::string>::~pair(&v66);
    std::string::~string((int)&v44);
    std::string::~string((int)&v41);
    v47 = 0;
    v48 = 0;
    v49 = 0;
    std::string::__init((int)&v47, (int)"c", 1);
    cc::h6((cc *)&v50, a1);                         // 获取network HardwareAddress
    v12 = v47;
    v13 = v48;
    v14 = v49;
    v47 = 0;
    v48 = 0;
    v49 = 0;
    v66 = v12;
    v67 = v13;
    v68 = v14;
    v15 = v50;
    v16 = v51;
    v17 = v52;
    v50 = 0;
    v51 = 0;
    v52 = 0;
    v69 = v15;
    v70 = v16;
    v71 = v17;
    std::list<std::pair<std::string,std::string>>::push_back(v34, &v66);
    std::pair<std::string,std::string>::~pair(&v66);
    std::string::~string((int)&v50);
    std::string::~string((int)&v47);
    v53 = 0;
    v54 = 0;
    v55 = 0;
    std::string::__init((int)&v53, (int)"d", 1);
    cc::h8((cc *)&v56, a1);                           // 获取手机的型号设备名称
    v18 = v53;
    v19 = v54;
    v20 = v55;
    v53 = 0;
    v54 = 0;
    v55 = 0;
    v66 = v18;
    v67 = v19;
    v68 = v20;
    v21 = v56;
    v22 = v57;
    v23 = v58;
    v56 = 0;
    v57 = 0;
    v58 = 0;
    v69 = v21;
    v70 = v22;
    v71 = v23;
    std::list<std::pair<std::string,std::string>>::push_back(v34, &v66);
    std::pair<std::string,std::string>::~pair(&v66);
    std::string::~string((int)&v56);
    std::string::~string((int)&v53);
    v59 = 0;
    v60 = 0;
    v61 = 0;
    std::string::__init((int)&v59, (int)aEia, 1);
    f5();                                             // daytime
    v24 = v59;
    v25 = v60;
    v26 = v61;
    v59 = 0;
    v60 = 0;
    v61 = 0;
    v66 = v24;
    v67 = v25;
    v68 = v26;
    v27 = v62;
    v28 = v63;
```

```
  v29 = v64;
  v62 = 0;
  v63 = 0;
  v64 = 0;
  v69 = v27;
  v70 = v28;
  v71 = v29;
  std::list<std::pair<std::string,std::string>>::push_back(v34, &v66);
  std::pair<std::string,std::string>::~pair(&v66);
  std::string::~string((int)&v62);
  std::string::~string((int)&v59);
  f9(v65, v34);                              // 合并string
  f6(&v66, v65);                             // aes
  if ( (v66 & 1) != 0 )
    v30 = v68;
  else
    v30 = (char *)&v66 + 1;
  v31 = _JNIEnv::NewStringUTF(a1, v30);
  std::string::~string((int)&v66);
  std::string::~string((int)v65);
  std::__list_imp<std::pair<std::string,std::string>>::clear(v34);
  cc::sp<cc::RefJObject>::~sp(&v33);
  return v31;
}
```

f6函数内部逻辑与t1的f4函数一致

cc::e方法里为AES_256_CBC_ENCRYPT

encData: ||9eea2d301e53|Pixel 4|1649905000118

cc::d方法里为AES_256_CBC_ENCRYPT

key:dc8e123f07636a41361b62235fc313ac

iv:361b62235fc313ac

key参数解析

> com.kugou.fanxing.core.protocol.g.e.c

```
map.put(ao.M, com.kugou.fanxing.allinone.common.utils.ao.a("" + this.b + this.e +
getVersion() + String.valueOf(this.h).toLowerCase()));
```

ao.m = key

this.b = AppId

this.e = AppKey

this.h = clienttime_ms

key = MD5("" + AppId + AppKey + APPVersion + String.valueOf(this.h).toLowerCase())