Mobile Application Development

(Publish to Play Store)

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S^{3}Lab

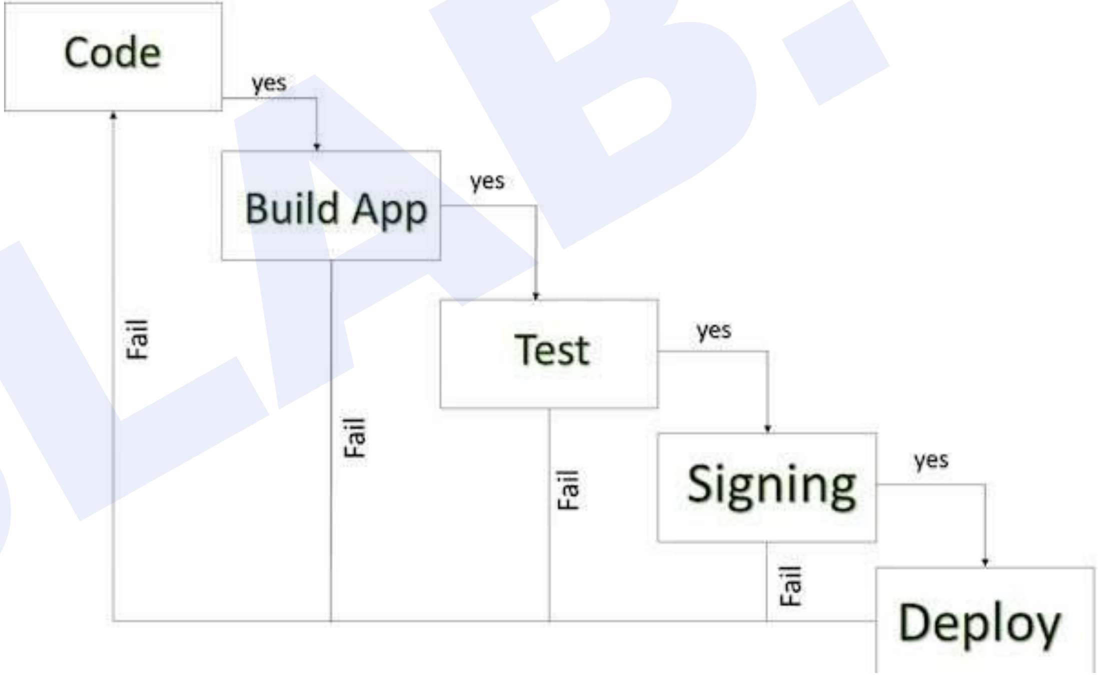
Smart Software System Laboratory

> “The future of mobile is the future of online. It is how people access online content now.”
>
> – David Murphy, Founder and Editor of Mobile Marketing Daily

Publishing

Overview

- a process that makes your Android applications available to users. Infect, publishing is the last phase of the Android application development process.



Publishing

Where to Publish?

- Slideme.org
- Amazon Store
- 1Mobile
- Samsung
- Mobile9
- Opera Mobile Store
- Mobango
- F-droid
- GetJar
- Google Play

Publishing

Tips

- #1. Take a Look at App Store Policies
- #2. Take High-Quality Screenshots of Your App
- #3. Create a Policy Page for Your App
- #4. Test Your App to Eliminate Errors
- #5. Get In Touch with App Review Sites
- #6. Be Clear About the Support Available with Your App
- #7. Give Your App a Version Number
- #8. Consider Getting Android Market Licensing
- #9. Optimize App for Different Platforms
- #10. Clean Up the App

Prerequisites

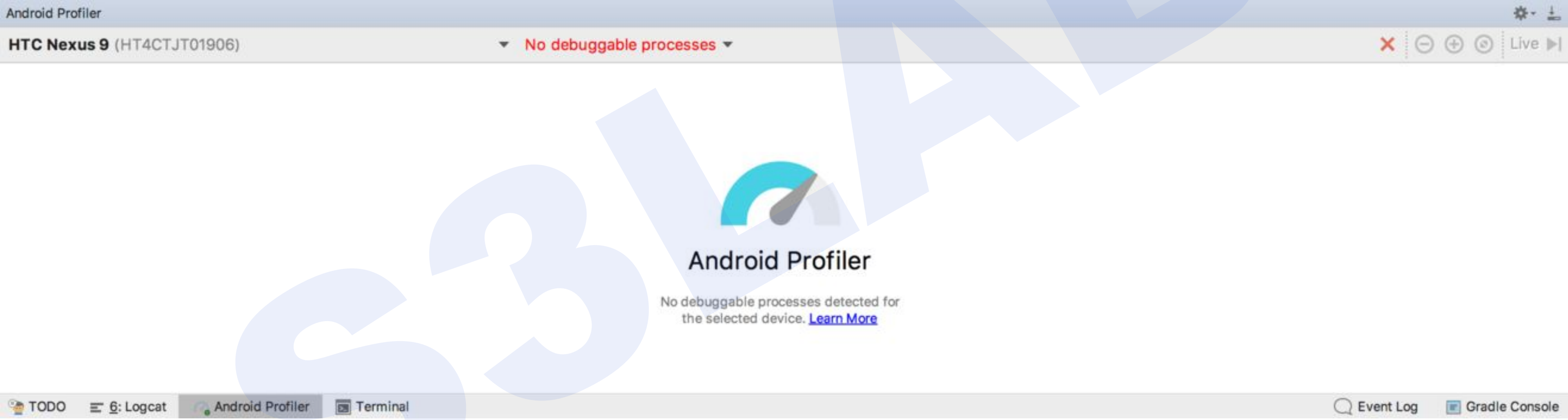
- Regression Testing - > for all target devices
- Application Rating
- Targeted Regions -> Time, Localize
- Application Size -> **150MB** as default limit in Google Play
- SDK and Screen Compatibility
- Application Pricing -> Free or Specific Price
- Promotional Content -> for marketing
- Build and Upload release-ready APK
- Finalize Application Detail

Android Profiling

- Provides a way to monitor CPU, networking and memory metrics of an app in real-time as it is running on a device or emulator. This serves as an invaluable tool for performing tasks such as identifying performance bottlenecks in an app, checking that the app makes appropriate use of memory resources and ensuring that the app does not use excessive networking data bandwidth.

Android Profiling

View -> Tool Windows -> Android Profiler

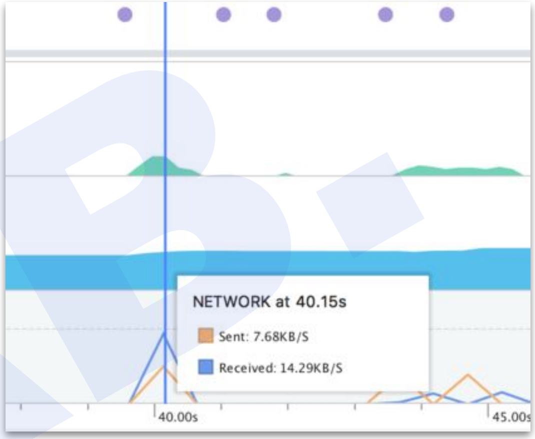


Android Profiler

No debuggable processes detected for the selected device. Learn More

Android Profiling

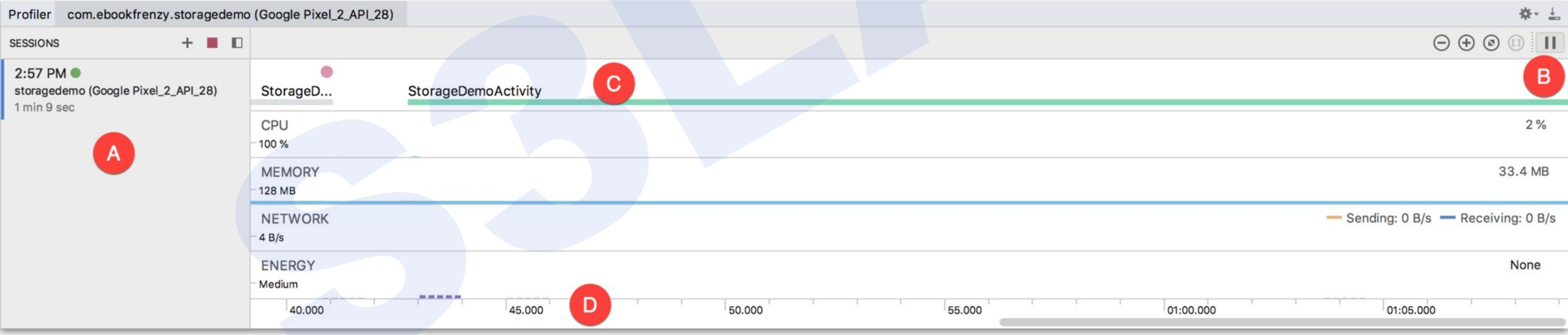
View -> Tool Windows -> Android Profiler



NETWORK at 40.15s

🟧 Sent: 7.68KB/S

🟦 Received: 14.29KB/S



Profiler | com.ebookfrenzy.storagedemo (Google Pixel_2_API_28)

SESSIONS

2:57 PM ●
storagedemo (Google Pixel_2_API_28)
1 min 9 sec

StorageD... StorageDemoActivity

CPU 100 % — 2 %

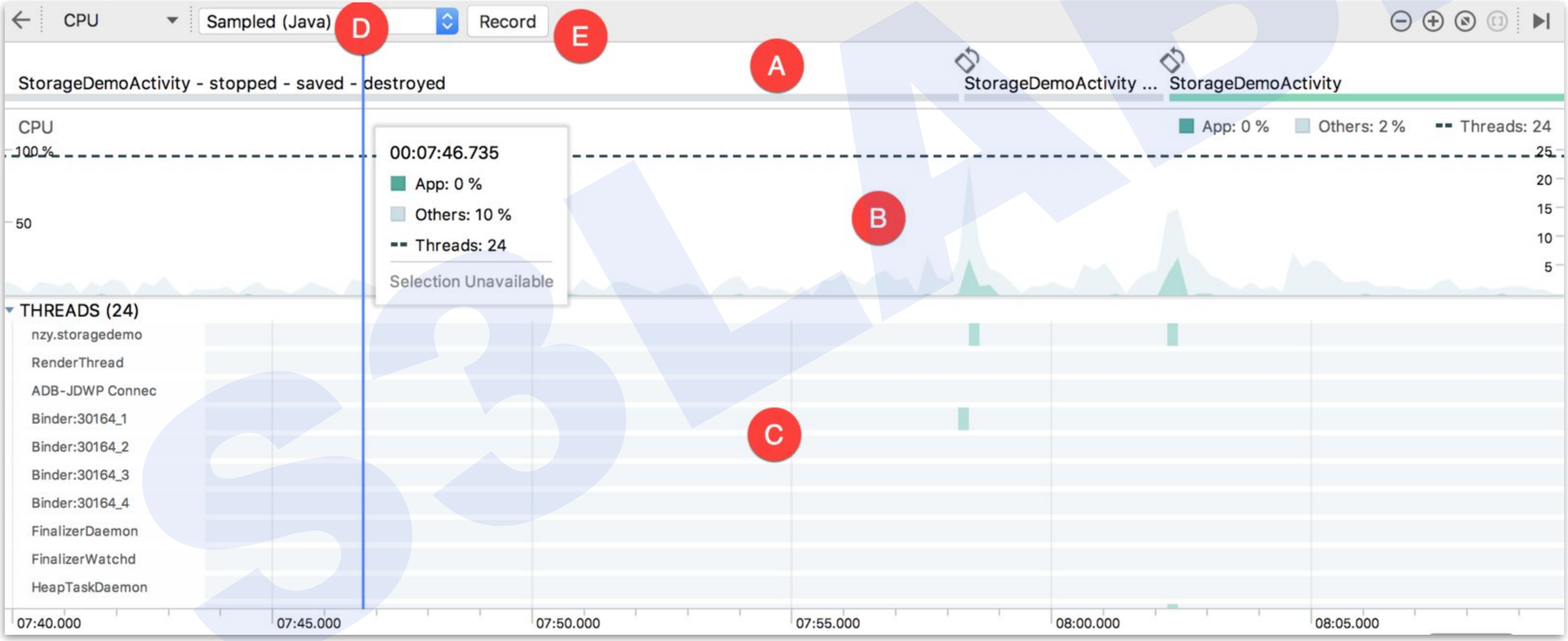
MEMORY 128 MB — 33.4 MB

NETWORK 4 B/s — Sending: 0 B/s — Receiving: 0 B/s

ENERGY Medium — None

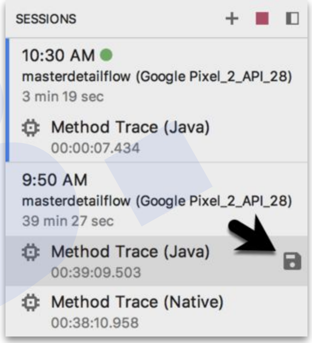
Android Profiling

CPU Profiler



Android Profiling

CPU Profiler - trace



SESSIONS

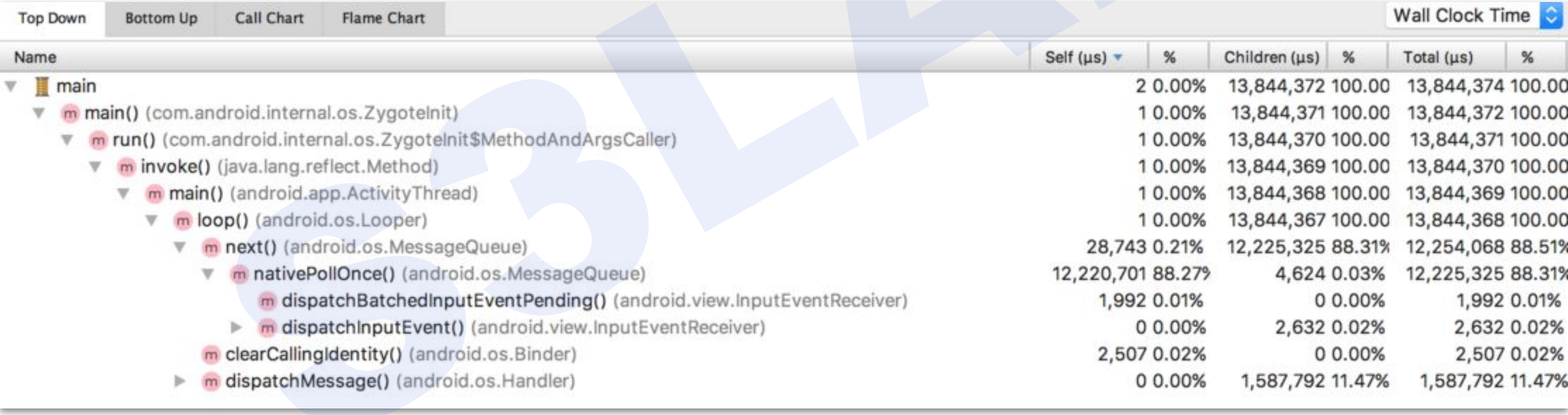
10:30 AM
masterdetailflow (Google Pixel_2_API_28)
3 min 19 sec

Method Trace (Java)
00:00:07.434

9:50 AM
masterdetailflow (Google Pixel_2_API_28)
39 min 27 sec

Method Trace (Java)
00:39:09.503

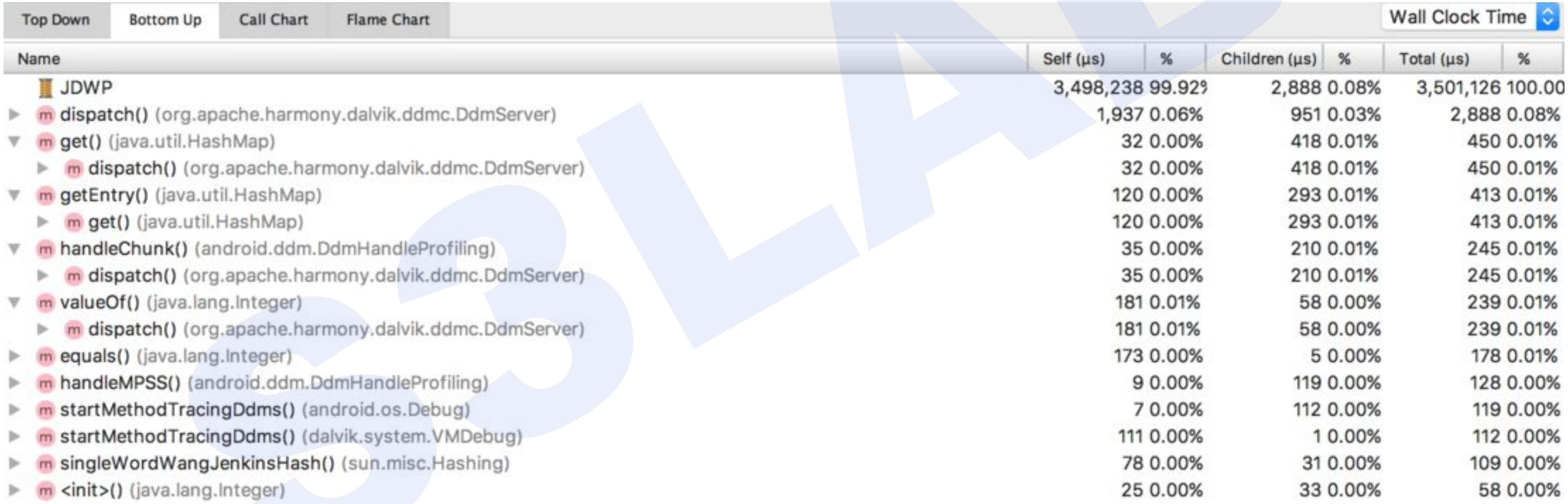
Method Trace (Native)
00:38:10.958



Name	Self (µs) ▾	%	Children (µs)	%	Total (µs)	%
▼ main	2	0.00%	13,844,372	100.00	13,844,374	100.00
▼ main() (com.android.internal.os.ZygoteInit)	1	0.00%	13,844,371	100.00	13,844,372	100.00
▼ run() (com.android.internal.os.ZygoteInit$MethodAndArgsCaller)	1	0.00%	13,844,370	100.00	13,844,371	100.00
▼ invoke() (java.lang.reflect.Method)	1	0.00%	13,844,369	100.00	13,844,370	100.00
▼ main() (android.app.ActivityThread)	1	0.00%	13,844,368	100.00	13,844,369	100.00
▼ loop() (android.os.Looper)	1	0.00%	13,844,367	100.00	13,844,368	100.00
▼ next() (android.os.MessageQueue)	28,743	0.21%	12,225,325	88.31%	12,254,068	88.51%
▼ nativePollOnce() (android.os.MessageQueue)	12,220,701	88.27%	4,624	0.03%	12,225,325	88.31%
dispatchBatchedInputEventPending() (android.view.InputEventReceiver)	1,992	0.01%	0	0.00%	1,992	0.01%
▶ dispatchInputEvent() (android.view.InputEventReceiver)	0	0.00%	2,632	0.02%	2,632	0.02%
clearCallingIdentity() (android.os.Binder)	2,507	0.02%	0	0.00%	2,507	0.02%
▶ dispatchMessage() (android.os.Handler)	0	0.00%	1,587,792	11.47%	1,587,792	11.47%

Android Profiling

CPU Profiler - trace

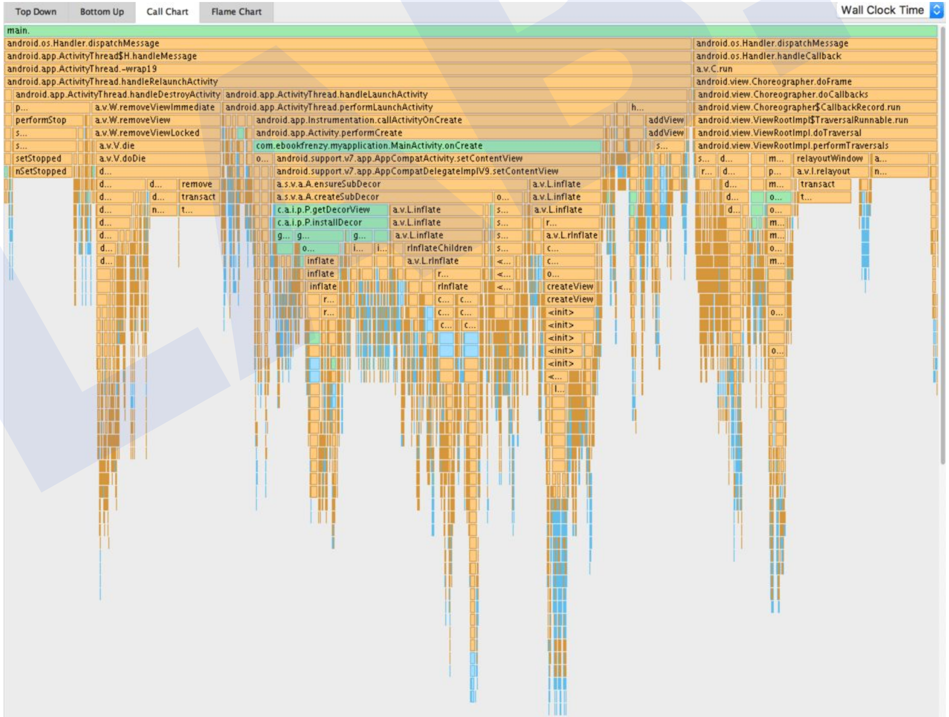


Name	Self (µs)	%	Children (µs)	%	Total (µs)	%
JDWP	3,498,238	99.92	2,888	0.08%	3,501,126	100.00
▶ m dispatch() (org.apache.harmony.dalvik.ddmc.DdmServer)	1,937	0.06%	951	0.03%	2,888	0.08%
▼ m get() (java.util.HashMap)	32	0.00%	418	0.01%	450	0.01%
▶ m dispatch() (org.apache.harmony.dalvik.ddmc.DdmServer)	32	0.00%	418	0.01%	450	0.01%
▼ m getEntry() (java.util.HashMap)	120	0.00%	293	0.01%	413	0.01%
▶ m get() (java.util.HashMap)	120	0.00%	293	0.01%	413	0.01%
▼ m handleChunk() (android.ddm.DdmHandleProfiling)	35	0.00%	210	0.01%	245	0.01%
▶ m dispatch() (org.apache.harmony.dalvik.ddmc.DdmServer)	35	0.00%	210	0.01%	245	0.01%
▼ m valueOf() (java.lang.Integer)	181	0.01%	58	0.00%	239	0.01%
▶ m dispatch() (org.apache.harmony.dalvik.ddmc.DdmServer)	181	0.01%	58	0.00%	239	0.01%
▶ m equals() (java.lang.Integer)	173	0.00%	5	0.00%	178	0.01%
▶ m handleMPSS() (android.ddm.DdmHandleProfiling)	9	0.00%	119	0.00%	128	0.00%
▶ m startMethodTracingDdms() (android.os.Debug)	7	0.00%	112	0.00%	119	0.00%
▶ m startMethodTracingDdms() (dalvik.system.VMDebug)	111	0.00%	1	0.00%	112	0.00%
▶ m singleWordWangJenkinsHash() (sun.misc.Hashing)	78	0.00%	31	0.00%	109	0.00%
▶ m <init>() (java.lang.Integer)	25	0.00%	33	0.00%	58	0.00%

Android Profiling

CPU Profiler - trace

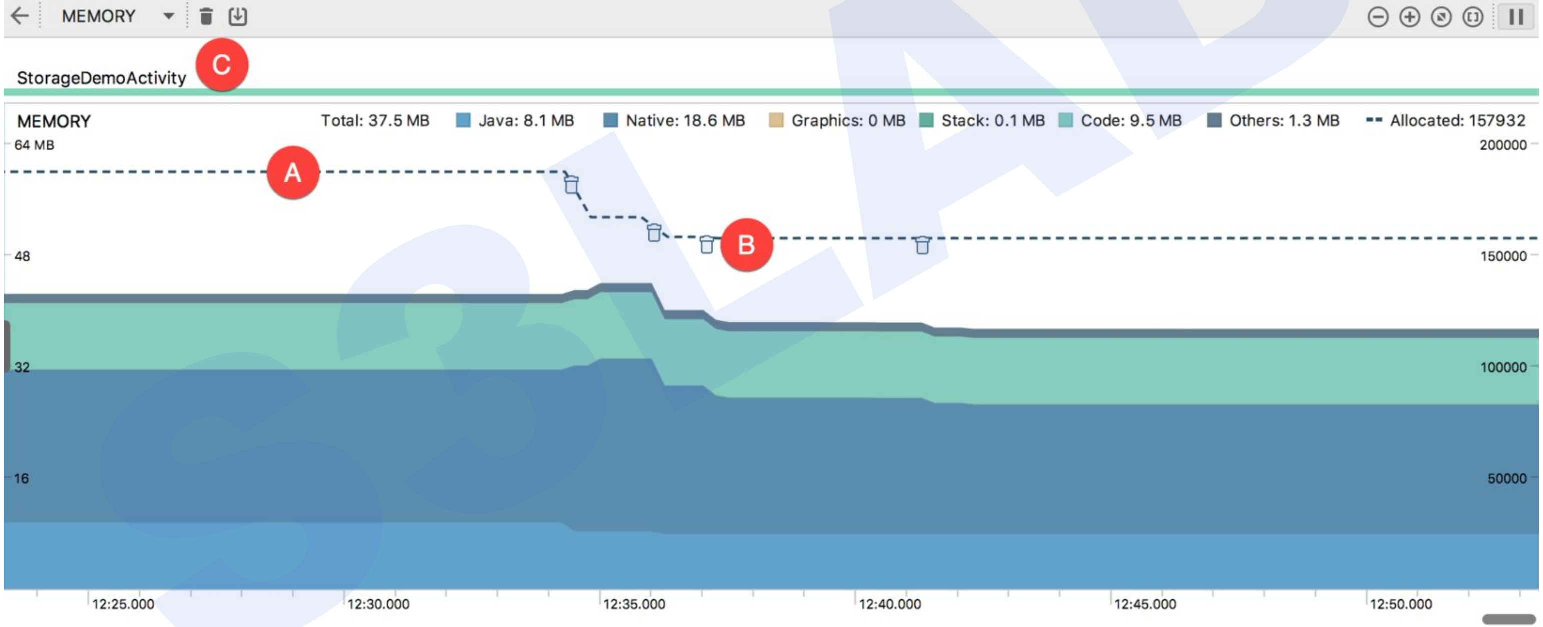
- In app method: Green
- API: Orange
- Third-party: Blue



Top Down
Bottom Up
Call Chart
Flame Chart
Wall Clock Time
main.
android.os.Handler.dispatchMessage
android.app.ActivityThread$H.handleMessage
android.app.ActivityThread.-wrap19
android.app.ActivityThread.handleRelaunchActivity
android.app.ActivityThread.handleDestroyActivity
android.app.ActivityThread.handleLaunchActivity
android.app.ActivityThread.performLaunchActivity
a.v.W.removeViewImmediate
a.v.W.removeView
a.v.W.removeViewLocked
a.v.V.die
a.v.V.doDie
performStop
setStopped
nSetStopped
remove
transact
android.app.Instrumentation.callActivityOnCreate
android.app.Activity.performCreate
com.ebookfrenzy.myapplication.MainActivity.onCreate
android.support.v7.app.AppCompatActivity.setContentView
android.support.v7.app.AppCompatDelegateImplV9.setContentView
a.s.v.a.A.ensureSubDecor
a.s.v.a.A.createSubDecor
c.a.i.p.P.getDecorView
c.a.i.p.P.installDecor
a.v.L.inflate
a.v.L.rInflate
rInflateChildren
inflate
rInflate
createView
<init>
addView
android.os.Handler.dispatchMessage
android.os.Handler.handleCallback
a.v.C.run
android.view.Choreographer.doFrame
android.view.Choreographer.doCallbacks
android.view.Choreographer$CallbackRecord.run
android.view.ViewRootImpl$TraversalRunnable.run
android.view.ViewRootImpl.doTraversal
android.view.ViewRootImpl.performTraversals
relayoutWindow
a.v.I.relayout
transact

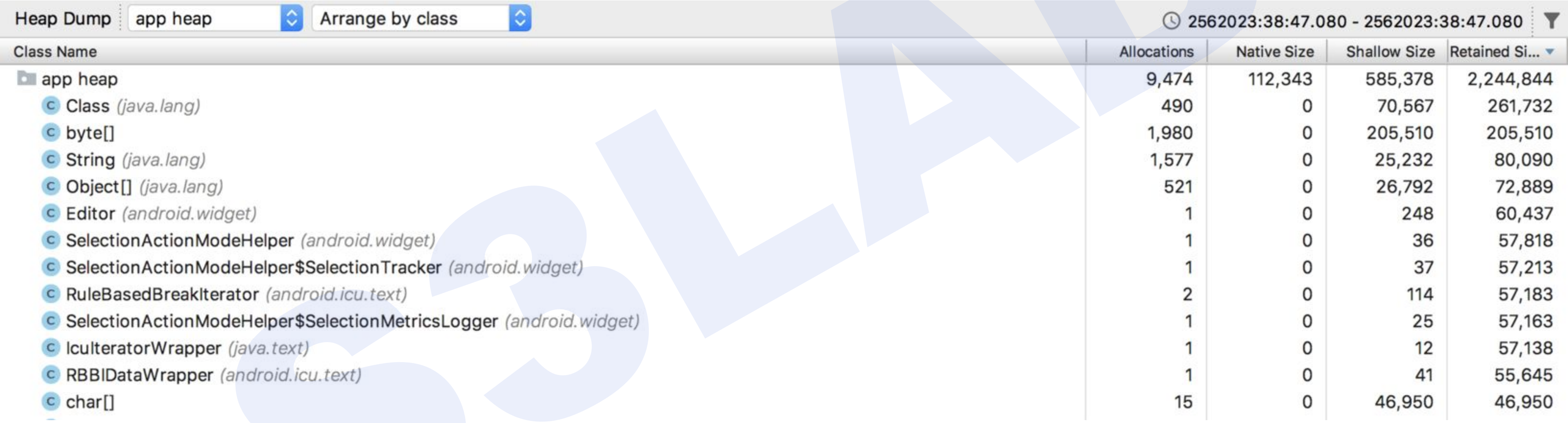
Android Profiling

Memory Profiler



Android Profiling

Memory Profiler - heap dump

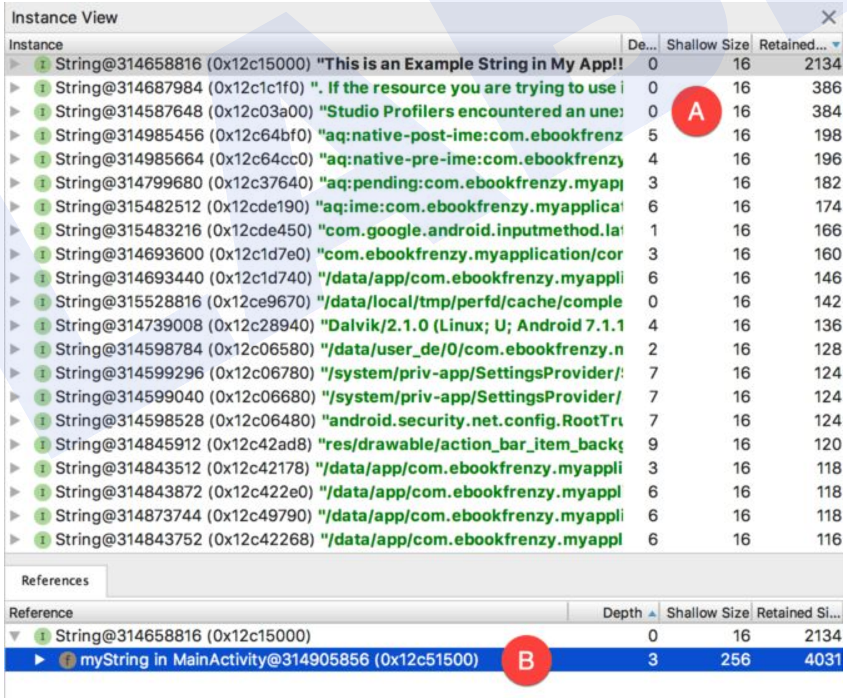


Heap Dump | app heap | Arrange by class | 2562023:38:47.080 - 2562023:38:47.080

Class Name	Allocations	Native Size	Shallow Size	Retained Si...
app heap	9,474	112,343	585,378	2,244,844
Class *(java.lang)*	490	0	70,567	261,732
byte[]	1,980	0	205,510	205,510
String *(java.lang)*	1,577	0	25,232	80,090
Object[] *(java.lang)*	521	0	26,792	72,889
Editor *(android.widget)*	1	0	248	60,437
SelectionActionModeHelper *(android.widget)*	1	0	36	57,818
SelectionActionModeHelper$SelectionTracker *(android.widget)*	1	0	37	57,213
RuleBasedBreakIterator *(android.icu.text)*	2	0	114	57,183
SelectionActionModeHelper$SelectionMetricsLogger *(android.widget)*	1	0	25	57,163
IculteratorWrapper *(java.text)*	1	0	12	57,138
RBBIDataWrapper *(android.icu.text)*	1	0	41	55,645
char[]	15	0	46,950	46,950

Android Profiling

Memory Profiler - heap dump



Instance View

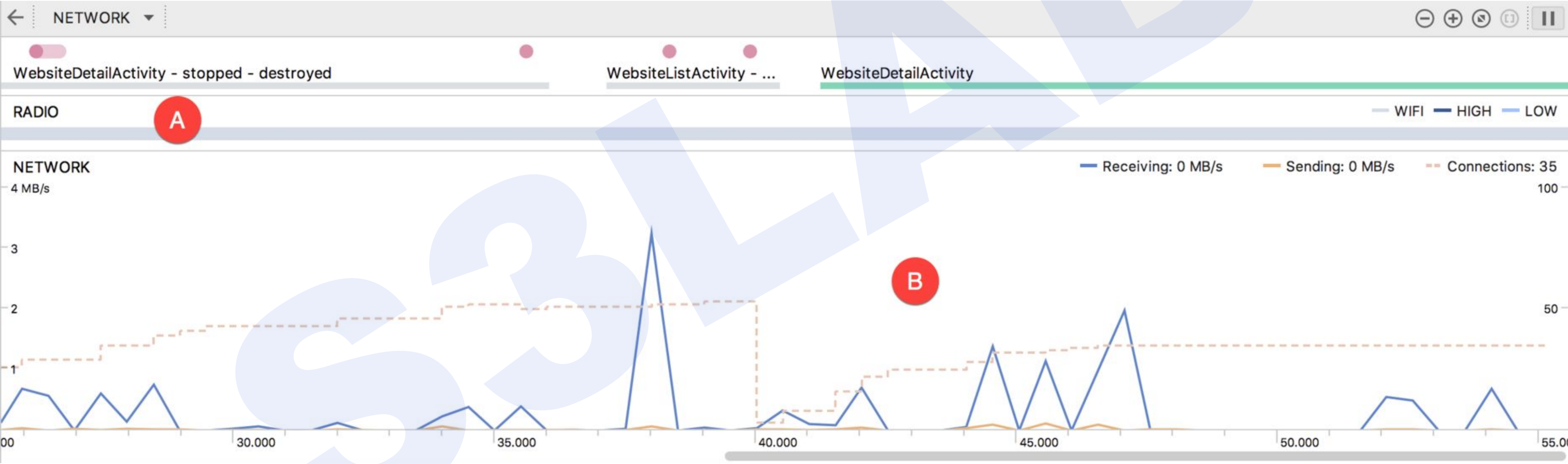
Instance	De...	Shallow Size	Retained...
String@314658816 (0x12c15000) "This is an Example String in My App!!	0	16	2134
String@314687984 (0x12c1c1f0) ". If the resource you are trying to use i	0	16	386
String@314587648 (0x12c03a00) "Studio Profilers encountered an une	0	16	384
String@314985456 (0x12c64bf0) "aq:native-post-ime:com.ebookfrenz	5	16	198
String@314985664 (0x12c64cc0) "aq:native-pre-ime:com.ebookfrenzy	4	16	196
String@314799680 (0x12c37640) "aq:pending:com.ebookfrenzy.myap	3	16	182
String@315482512 (0x12cde190) "aq:ime:com.ebookfrenzy.myapplica	6	16	174
String@315483216 (0x12cde450) "com.google.android.inputmethod.la	1	16	166
String@314693600 (0x12c1d7e0) "com.ebookfrenzy.myapplication/cor	3	16	160
String@314693440 (0x12c1d740) "/data/app/com.ebookfrenzy.myappli	6	16	146
String@315528816 (0x12ce9670) "/data/local/tmp/perfd/cache/comple	0	16	142
String@314739008 (0x12c28940) "Dalvik/2.1.0 (Linux; U; Android 7.1.1	4	16	136
String@314598784 (0x12c06580) "/data/user_de/0/com.ebookfrenzy.n	2	16	128
String@314599296 (0x12c06780) "/system/priv-app/SettingsProvider/	7	16	124
String@314599040 (0x12c06680) "/system/priv-app/SettingsProvider/	7	16	124
String@314598528 (0x12c06480) "android.security.net.config.RootTru	7	16	124
String@314845912 (0x12c42ad8) "res/drawable/action_bar_item_back	9	16	120
String@314843512 (0x12c42178) "/data/app/com.ebookfrenzy.myappli	3	16	118
String@314843872 (0x12c422e0) "/data/app/com.ebookfrenzy.myappl	6	16	118
String@314873744 (0x12c49790) "/data/app/com.ebookfrenzy.myappli	6	16	118
String@314843752 (0x12c42268) "/data/app/com.ebookfrenzy.myappl	6	16	116

References

Reference	Depth	Shallow Size	Retained Si...
String@314658816 (0x12c15000)	0	16	2134
myString in MainActivity@314905856 (0x12c51500)	3	256	4031

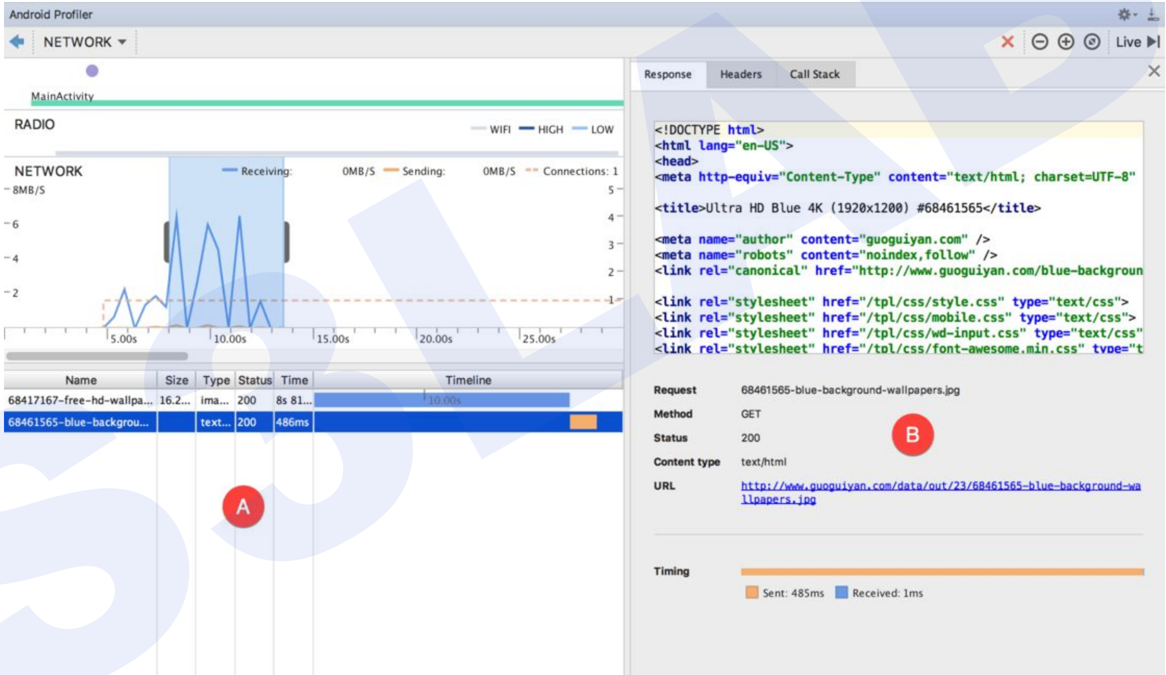
Android Profiling

Network Profiler



Android Profiling

Network Profiler



Name	Size	Type	Status	Time	Timeline
68417167-free-hd-wallpa...	16.2...	ima...	200	8s 81...	10.00s
68461565-blue-backgrou...		text...	200	486ms	

```
<!DOCTYPE html>
<html lang="en-US">
<head>
<meta http-equiv="Content-Type" content="text/html; charset=UTF-8"

<title>Ultra HD Blue 4K (1920x1200) #68461565</title>

<meta name="author" content="guoguiyan.com" />
<meta name="robots" content="noindex,follow" />
<link rel="canonical" href="http://www.guoguiyan.com/blue-backgroun

<link rel="stylesheet" href="/tpl/css/style.css" type="text/css">
<link rel="stylesheet" href="/tpl/css/mobile.css" type="text/css">
<link rel="stylesheet" href="/tpl/css/wd-input.css" type="text/css"
<link rel="stylesheet" href="/tpl/css/font-awesome.min.css" type="t
```

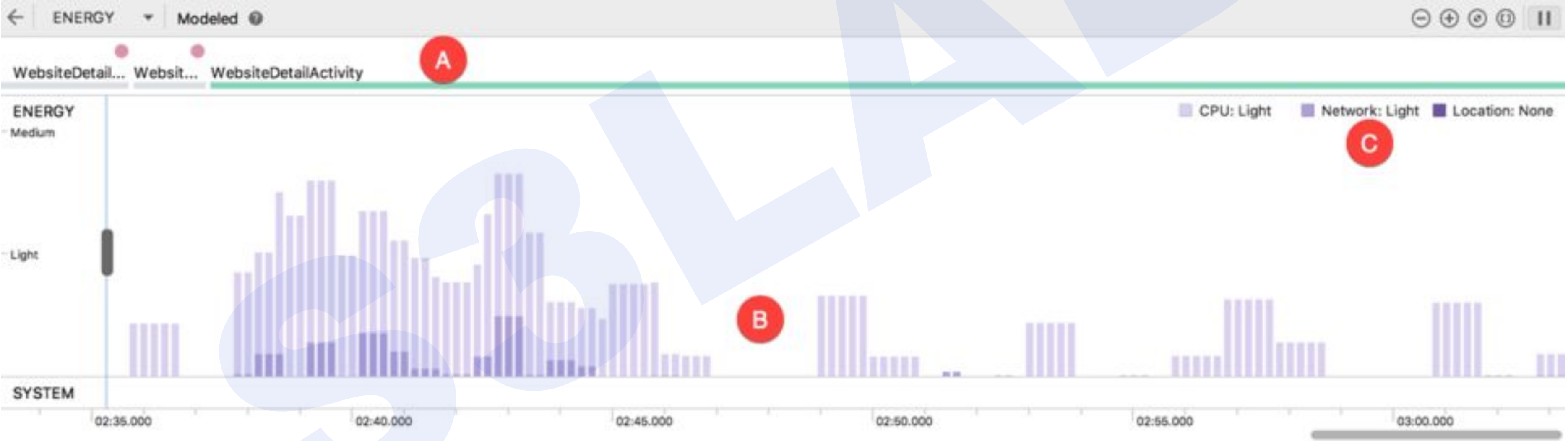
Request	68461565-blue-background-wallpapers.jpg
Method	GET
Status	200
Content type	text/html
URL	http://www.guoguiyan.com/data/out/23/68461565-blue-background-wallpapers.jpg

Timing

🟧 Sent: 485ms 🟦 Received: 1ms

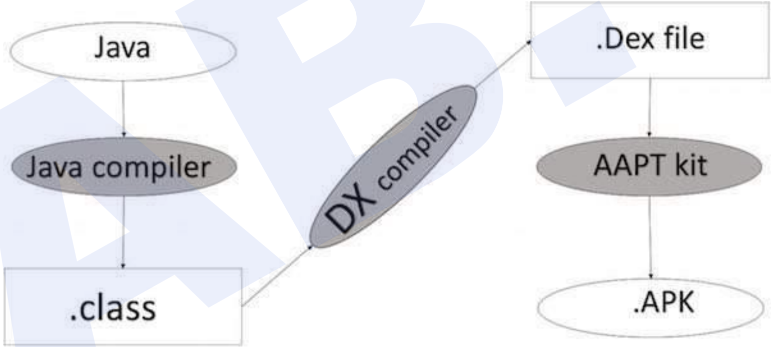
Android Profiling

Energy Profiler



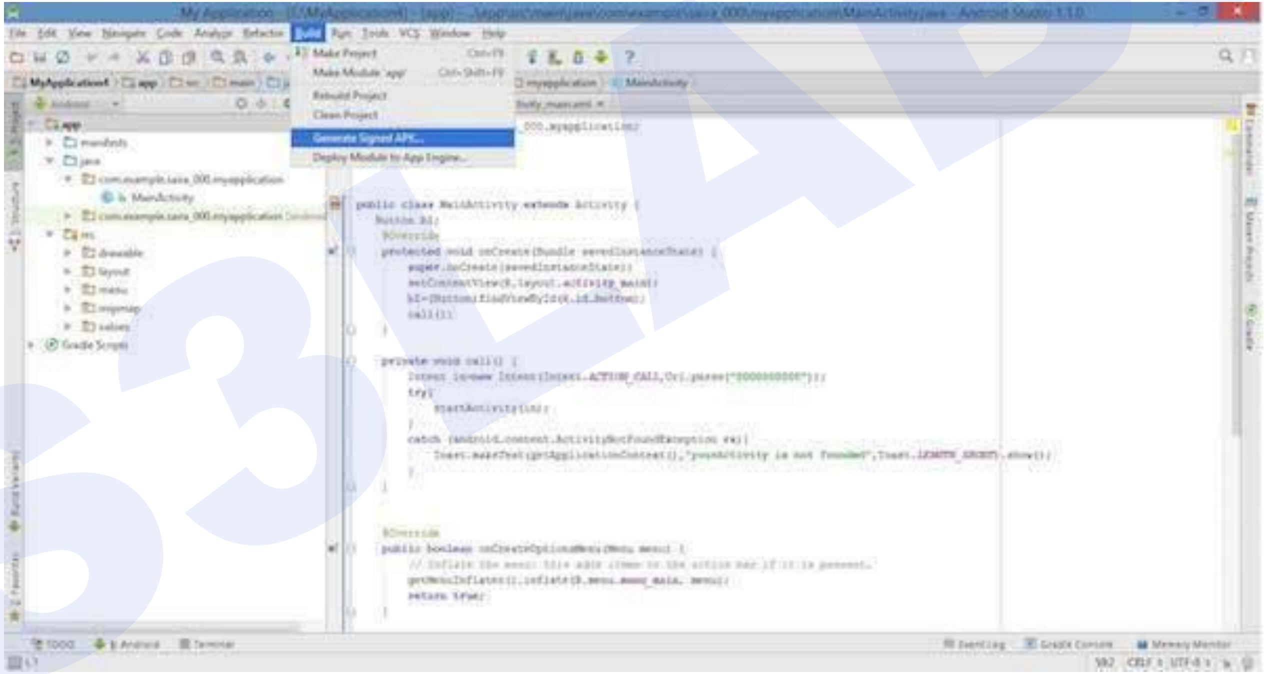
Android Export Process

- **Dx tools**(Dalvik executable tools): convert **.class** file to **.dex** file, memory optimization and reduce the boot-up speed time.
- **AAPT**(Android assistance packaging tool):convert **.Dex** file to **.Apk**
- **APK**(Android packaging kit): The final stage of deployment process is called as **.apk**.



Export Signed APK

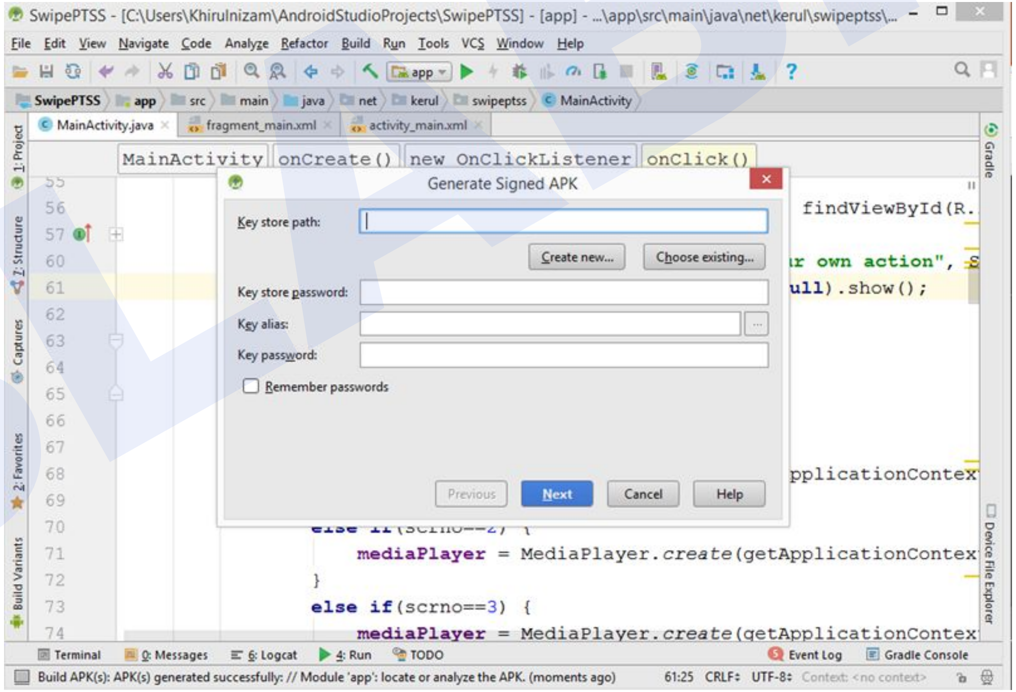
Build -> Generate Signed APK


My Application - [...\MyApplication4] - [app] - ...\app\src\main\java\com\example\saia_000\myapplication\MainActivity.java - Android Studio 1.1.0
File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help
Make Project Ctrl+F9
Make Module 'app' Ctrl+Shift+F9
Rebuild Project
Clean Project
Generate Signed APK...
Deploy Module to App Engine...
MyApplication4
app
src
main
myapplication
MainActivity
activity_main.xml
Android
app
manifests
java
com.example.saia_000.myapplication
MainActivity
com.example.saia_000.myapplication (androidTest)
res
drawable
layout
menu
mipmap
values
Gradle Scripts
TODO
6: Android
Terminal
Event Log
Gradle Console
Memory Monitor

```
000.myapplication;

public class MainActivity extends Activity {
    Button b1;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        b1=(Button)findViewById(R.id.button);
        call();
    }

    private void call() {
        Intent in=new Intent(Intent.ACTION_CALL,Uri.parse("0000000000"));
        try{
            startActivity(in);
        }
        catch (android.content.ActivityNotFoundException ex){
            Toast.makeText(getApplicationContext(),"yourActivity is not founded",Toast.LENGTH_SHORT).show();
        }
    }

    @Override
    public boolean onCreateOptionsMenu(Menu menu) {
        // Inflate the menu; this adds items to the action bar if it is present.
        getMenuInflater().inflate(R.menu.menu_main, menu);
        return true;
    }
```

Export Signed APK

Create new keystore



SwipePTSS - [C:\Users\Khirulnizam\AndroidStudioProjects\SwipePTSS] - [app] - ...\app\src\main\java\net\kerul\swipeptss\...

File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help
app
SwipePTSS app src main java net kerul swipeptss MainActivity
MainActivity.java fragment_main.xml activity_main.xml
MainActivity onCreate() new OnClickListener onClick()
1: Project
7: Structure
Captures
2: Favorites
Build Variants
Gradle
Device File Explorer

Generate Signed APK

Key store path:

Create new... Choose existing...

Key store password:

Key alias:

Key password:

□ Remember passwords

Previous Next Cancel Help

```
findViewById(R.
ır own action", S
ull).show();
pplicationContex
else if(scrno==2) {
    mediaPlayer = MediaPlayer.create(getApplicationContex
}
else if(scrno==3) {
    mediaPlayer = MediaPlayer.create(getApplicationContex
```

Terminal 0: Messages 6: Logcat 4: Run TODO Event Log Gradle Console

Build APK(s): APK(s) generated successfully: // Module 'app': locate or analyze the APK. (moments ago) 61:25 CRLF: UTF-8: Context: <no context>

Export Signed APK

Manually

- Generate a private key using keytool
  ```
  $ keytool -genkey -v -keystore my-release-key.keystore -alias alias_name -keyalg RSA -keysize 2048 -validity 10000
  ```
- Compile your app in release mode to obtain an unsigned APK
- Sign your app with your private key using jarsigner
  ```
  $ jarsigner -verbose -sigalg SHA1withRSA -digestalg SHA1 -keystore my-release-key.keystore my_application.apk alias_name
  ```
- Verify that your APK is signed. For example −
  ```
  $ jarsigner -verify -verbose -certs my_application.apk
  ```
- Align the final APK package using zipalign.
  ```
  $ zipalign -v 4 your_project_name-unaligned.apk your_project_name.apk
  ```

Export Signed APK

Manifest

- Remove **Log** calls and remove the **android:debuggable** attribute
- android:versionCode -> should be increase for every updated release
- android:versionName -> usually follow the version code

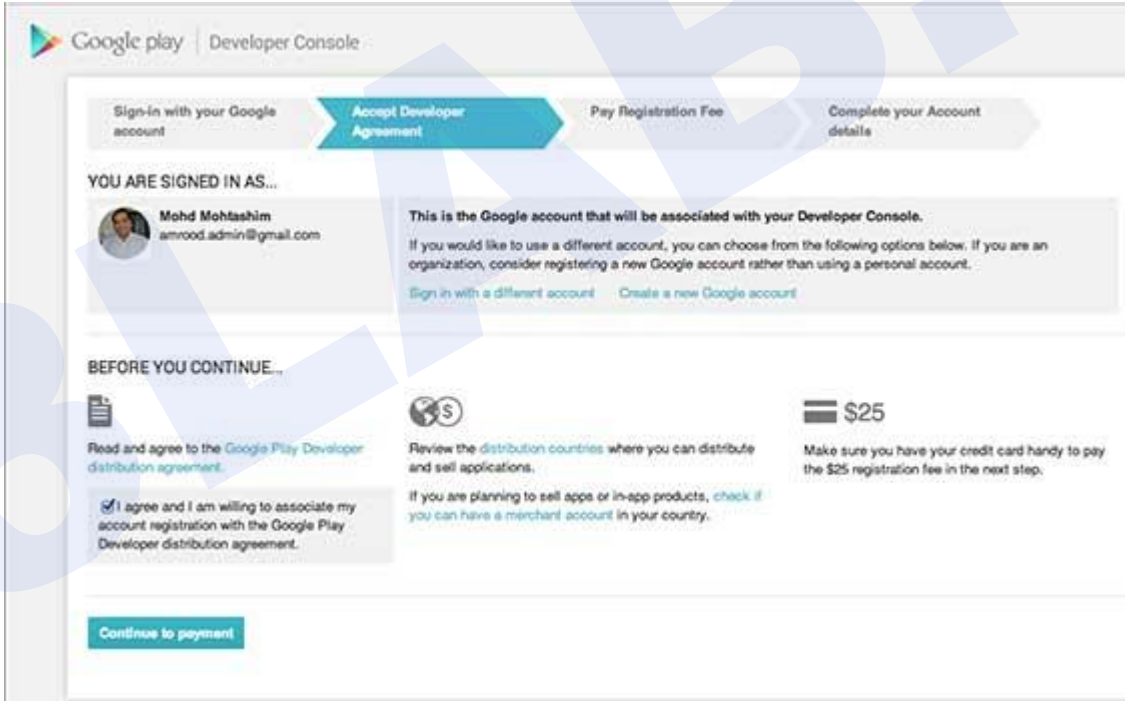
Play Store Account

Register

- Register for a developer ID
- $25 for life.
- Another consideration: you need to pay through Google Wallet, using a credit card.
- https://play.google.com/apps/publish/

Play Store Account

Using Google ID
Register
MarketPlace


Google play | Developer Console
Sign-in with your Google account
Accept Developer Agreement
Pay Registration Fee
Complete your Account details
Sign in with a different account
Create a new Google account
$25
Continue to payment

YOU ARE SIGNED IN AS...

Mohd Mohtashim
amrood.admin@gmail.com

This is the Google account that will be associated with your Developer Console.

If you would like to use a different account, you can choose from the following options below. If you are an organization, consider registering a new Google account rather than using a personal account.

BEFORE YOU CONTINUE...

Read and agree to the Google Play Developer distribution agreement.

☑ I agree and I am willing to associate my account registration with the Google Play Developer distribution agreement.

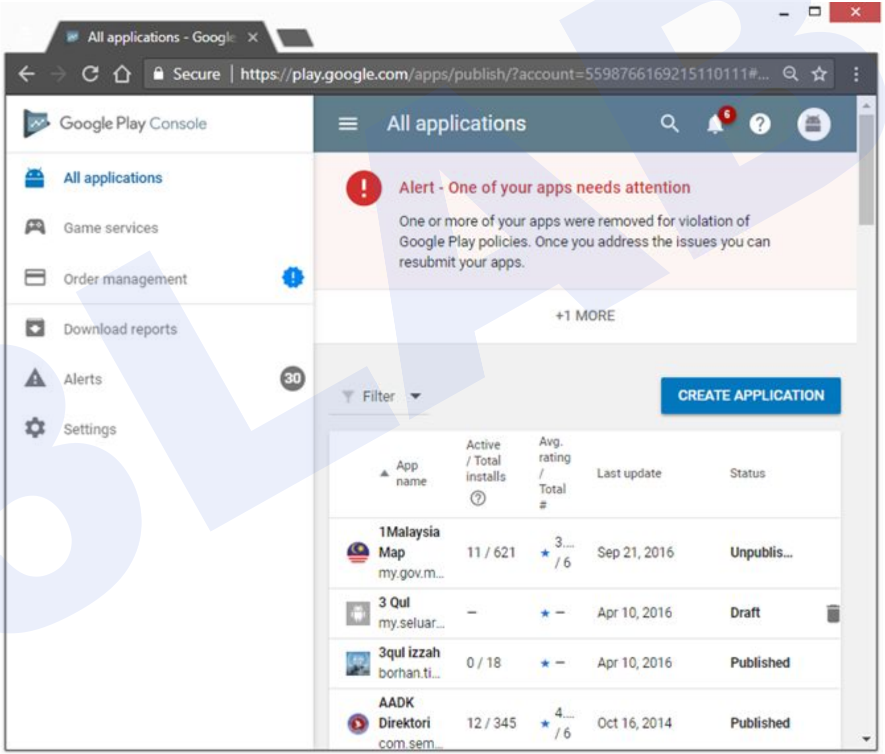
Review the distribution countries where you can distribute and sell applications.

If you are planning to sell apps or in-app products, check if you can have a merchant account in your country.

Make sure you have your credit card handy to pay the $25 registration fee in the next step.

Play Store Account

Create Application



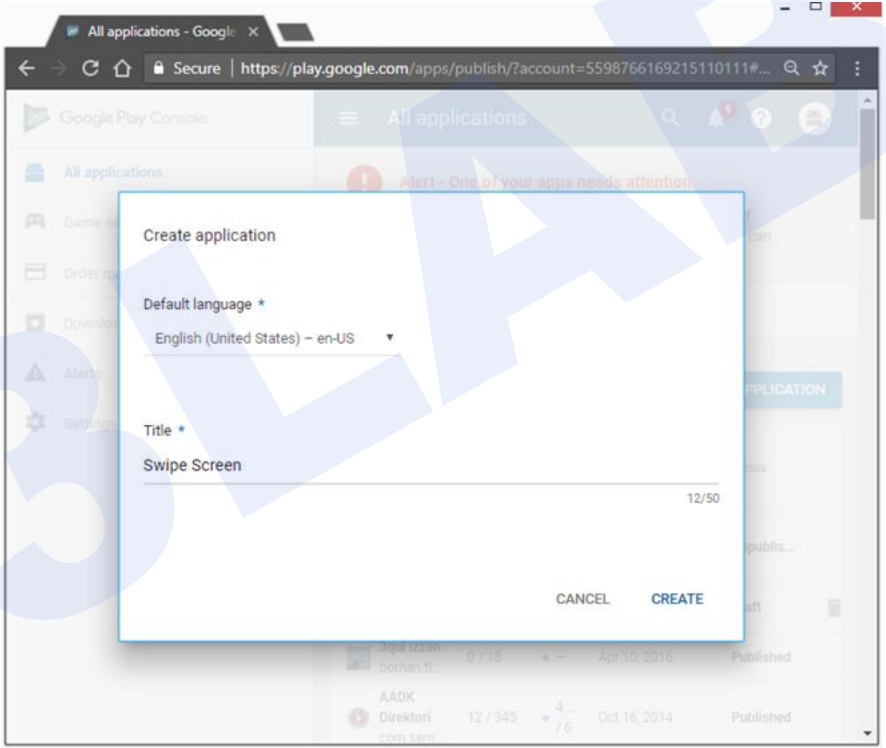
Alert - One of your apps needs attention

One or more of your apps were removed for violation of Google Play policies. Once you address the issues you can resubmit your apps.

App name	Active / Total installs	Avg. rating / Total #	Last update	Status
1Malaysia Map my.gov.m...	11 / 621	★ 3.... / 6	Sep 21, 2016	Unpublis...
3 Qul my.seluar...	–	★ –	Apr 10, 2016	Draft
3qul izzah borhan.ti...	0 / 18	★ –	Apr 10, 2016	Published
AADK Direktori com.sem...	12 / 345	★ 4.... / 6	Oct 16, 2014	Published

Play Store Account

Create Application



Create application

Default language *

English (United States) – en-US

Title *

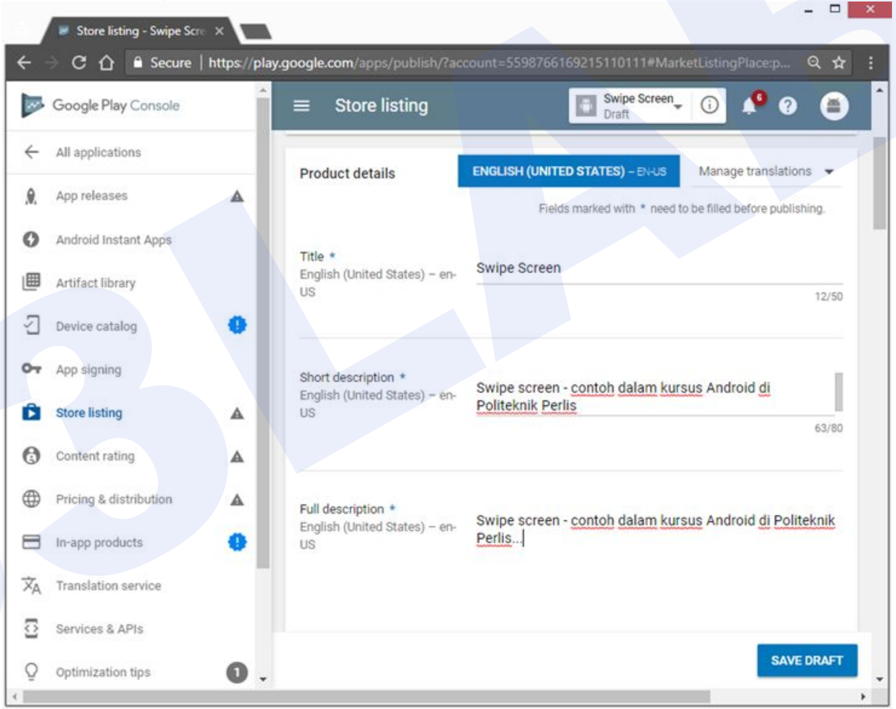
Swipe Screen

12/50

All applications - Google
Secure
https://play.google.com/apps/publish/?account=5598766169215110111#...
Google Play Console
All applications
CANCEL
CREATE

Play Store Account

Configure Application - Description



Fields marked with * need to be filled before publishing.

Title *
English (United States) – en-US
Swipe Screen
12/50

Short description *
English (United States) – en-US
Swipe screen - contoh dalam kursus Android di Politeknik Perlis
63/80

Full description *
English (United States) – en-US
Swipe screen - contoh dalam kursus Android di Politeknik Perlis...

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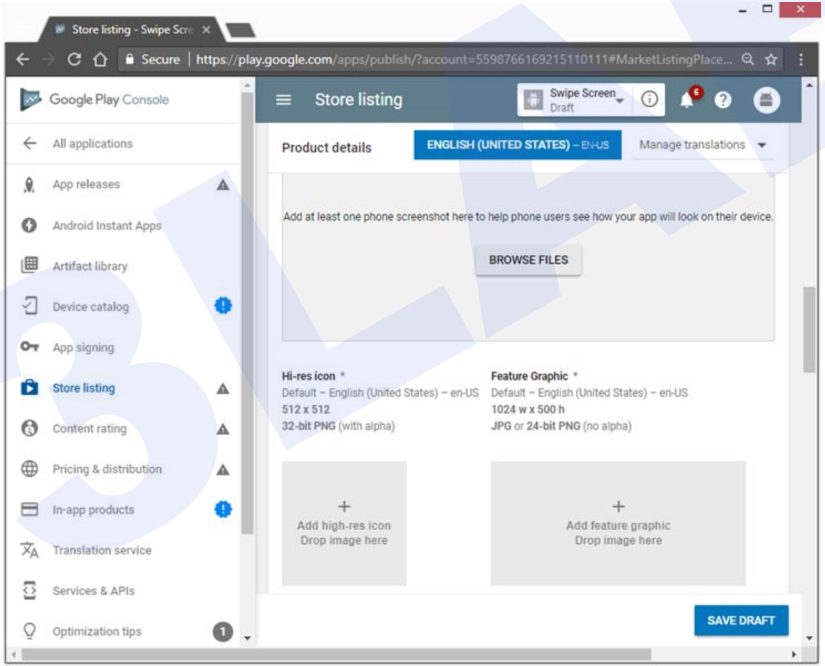
Configure Application - Upload graphic Assets



Add at least one phone screenshot here to help phone users see how your app will look on their device.

Hi-res icon *
Default – English (United States) – en-US
512 x 512
32-bit PNG (with alpha)

Feature Graphic *
Default – English (United States) – en-US
1024 w x 500 h
JPG or 24-bit PNG (no alpha)

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Graphic Materials

- High-res icon. (size 512px x 512px)
- Featured graphic. (size 1024px x 500px)
- At least 2 non-Android TV screenshots. (2 screenshot images. Min length for any side: 320px)

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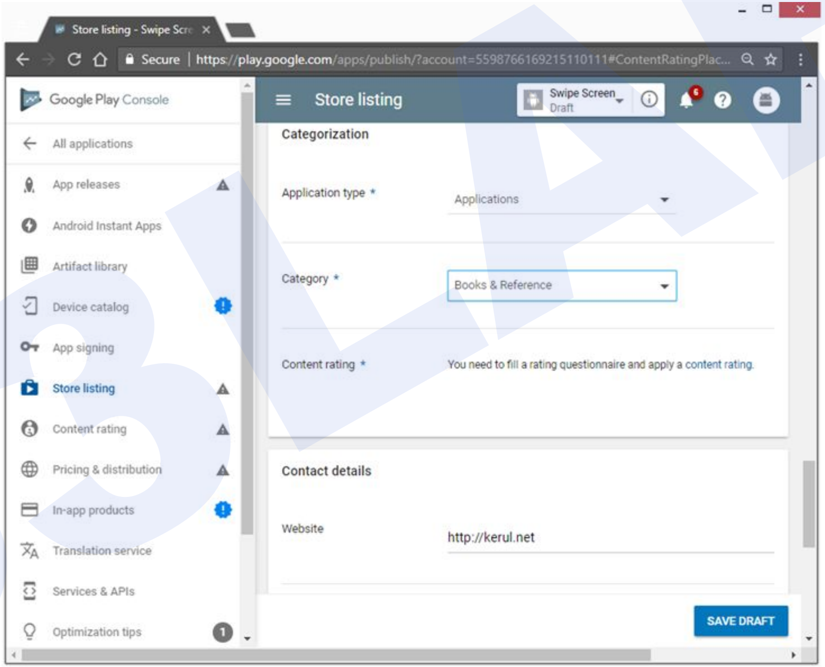
Configure Application - App Category



Categorization

Application type * Applications

Category * Books & Reference

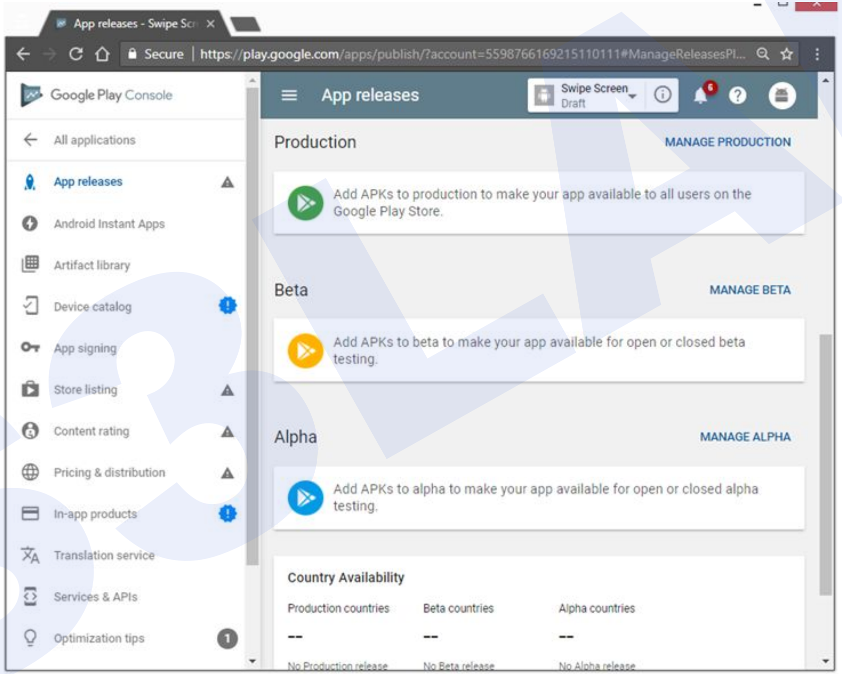
Content rating * You need to fill a rating questionnaire and apply a content rating.

Contact details

Website http://kerul.net

Play Store Account

Configure Application - Upload APK



Production

Add APKs to production to make your app available to all users on the Google Play Store.

Beta

Add APKs to beta to make your app available for open or closed beta testing.

Alpha

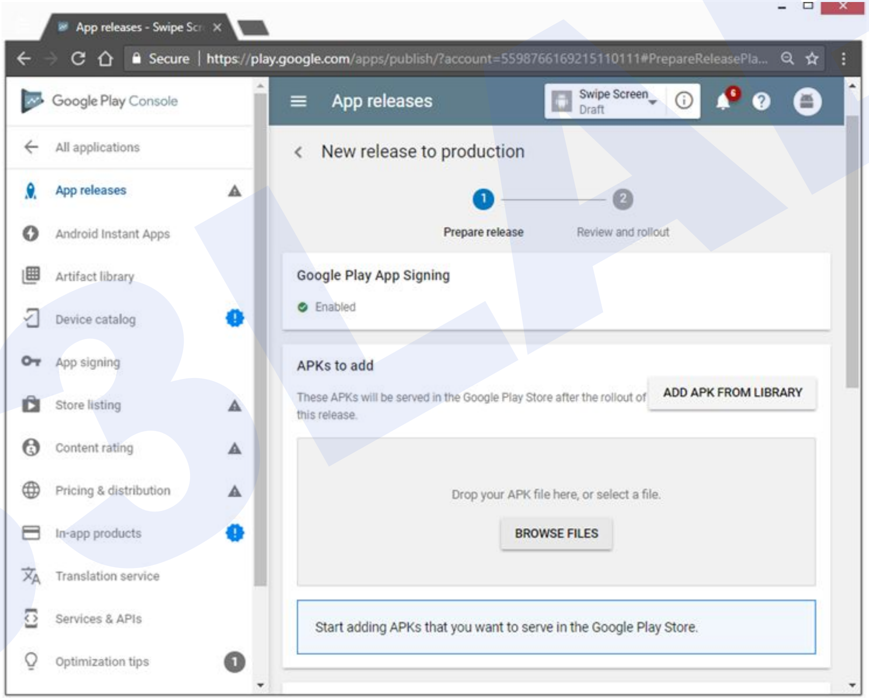
Add APKs to alpha to make your app available for open or closed alpha testing.

Country Availability

Production countries	Beta countries	Alpha countries
--	--	--
No Production release	No Beta release	No Alpha release

Play Store Account

Configure Application - Upload APK



Google Play App Signing

Enabled

APKs to add

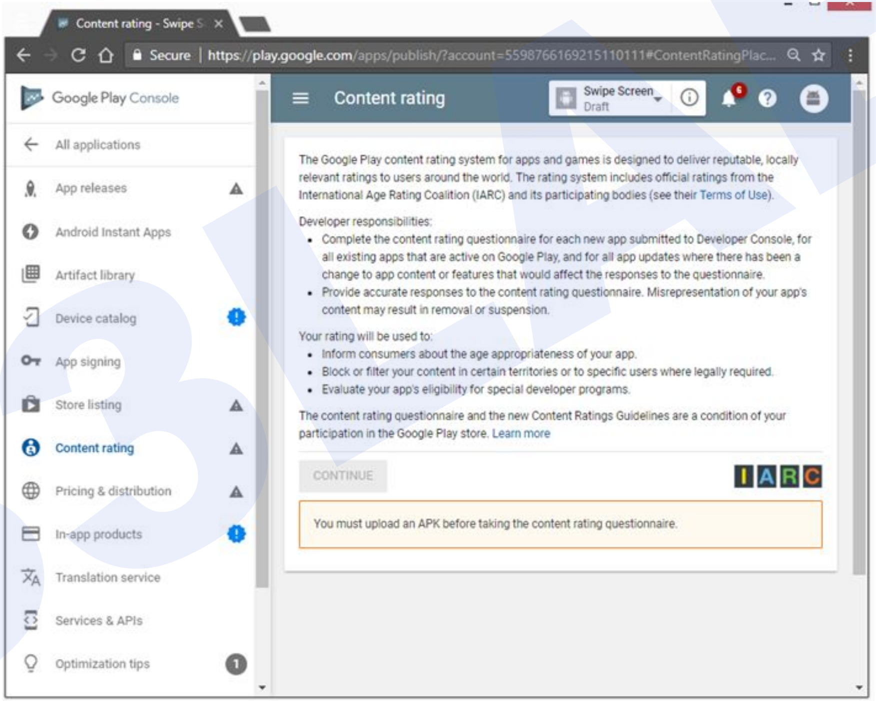
These APKs will be served in the Google Play Store after the rollout of this release.

Drop your APK file here, or select a file.

Start adding APKs that you want to serve in the Google Play Store.

Play Store Account

Configure Application - Content Rating



The Google Play content rating system for apps and games is designed to deliver reputable, locally relevant ratings to users around the world. The rating system includes official ratings from the International Age Rating Coalition (IARC) and its participating bodies (see their Terms of Use).

Developer responsibilities:

- Complete the content rating questionnaire for each new app submitted to Developer Console, for all existing apps that are active on Google Play, and for all app updates where there has been a change to app content or features that would affect the responses to the questionnaire.
- Provide accurate responses to the content rating questionnaire. Misrepresentation of your app's content may result in removal or suspension.

Your rating will be used to:

- Inform consumers about the age appropriateness of your app.
- Block or filter your content in certain territories or to specific users where legally required.
- Evaluate your app's eligibility for special developer programs.

The content rating questionnaire and the new Content Ratings Guidelines are a condition of your participation in the Google Play store. Learn more

You must upload an APK before taking the content rating questionnaire.

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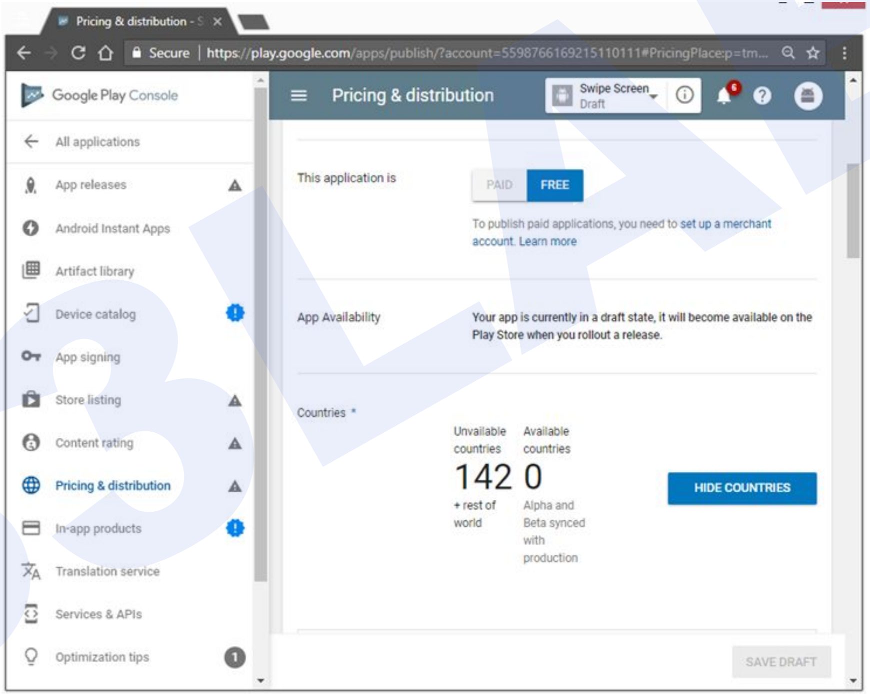
Configure Application - Pricing



This application is PAID [✓ FREE]

To publish paid applications, you need to set up a merchant account. Learn more

App Availability

Your app is currently in a draft state, it will become available on the Play Store when you rollout a release.

Countries *

Unavailable countries	Available countries
142	0
+ rest of world	Alpha and Beta synced with production

Q & A

Thank you for listening

“Coming together is a beginning;
Keeping together is progress;
Working together is success.”
- HENRY FORD