

Android Developer Options

A deep dive

{ } Developer options

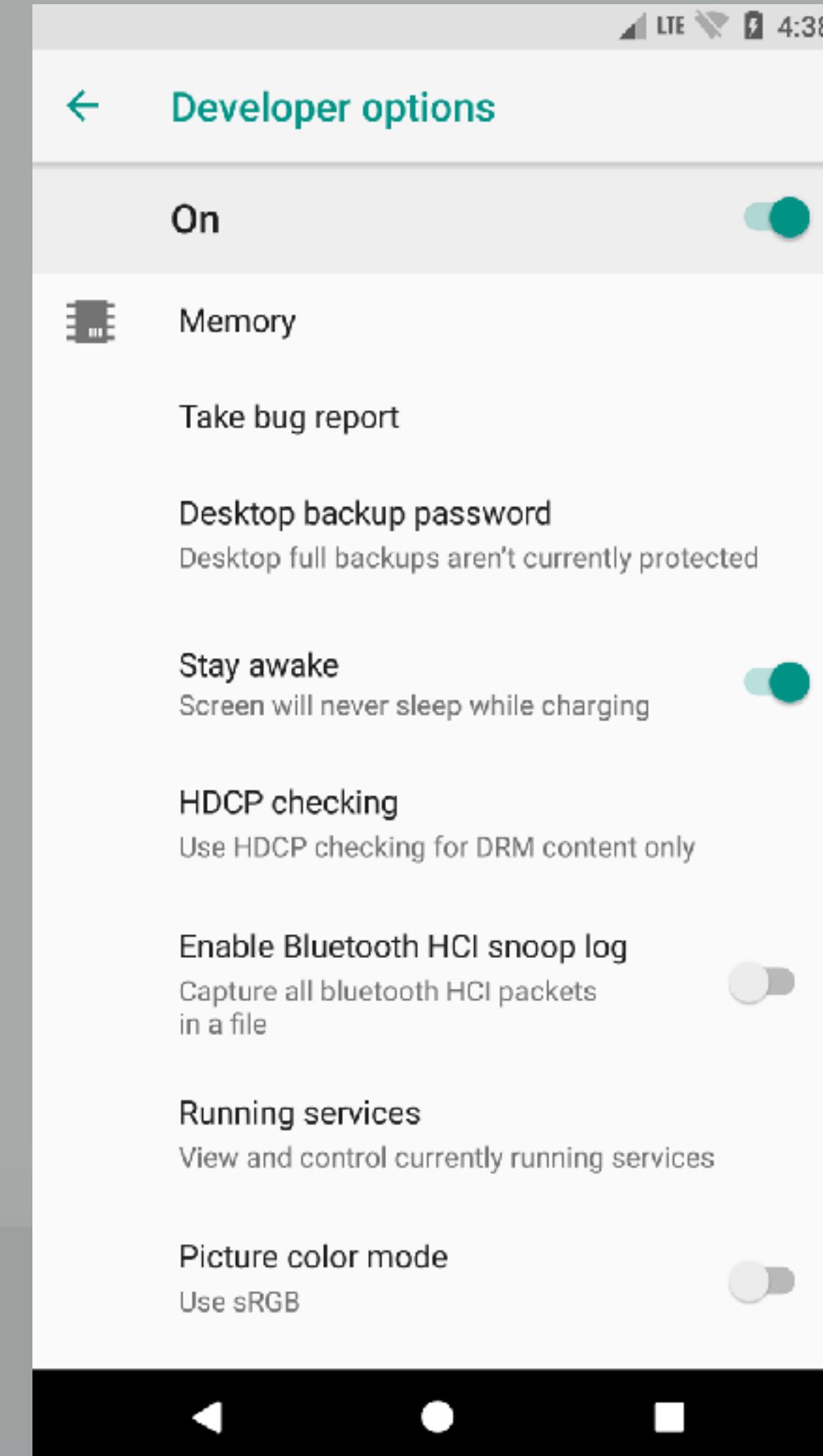
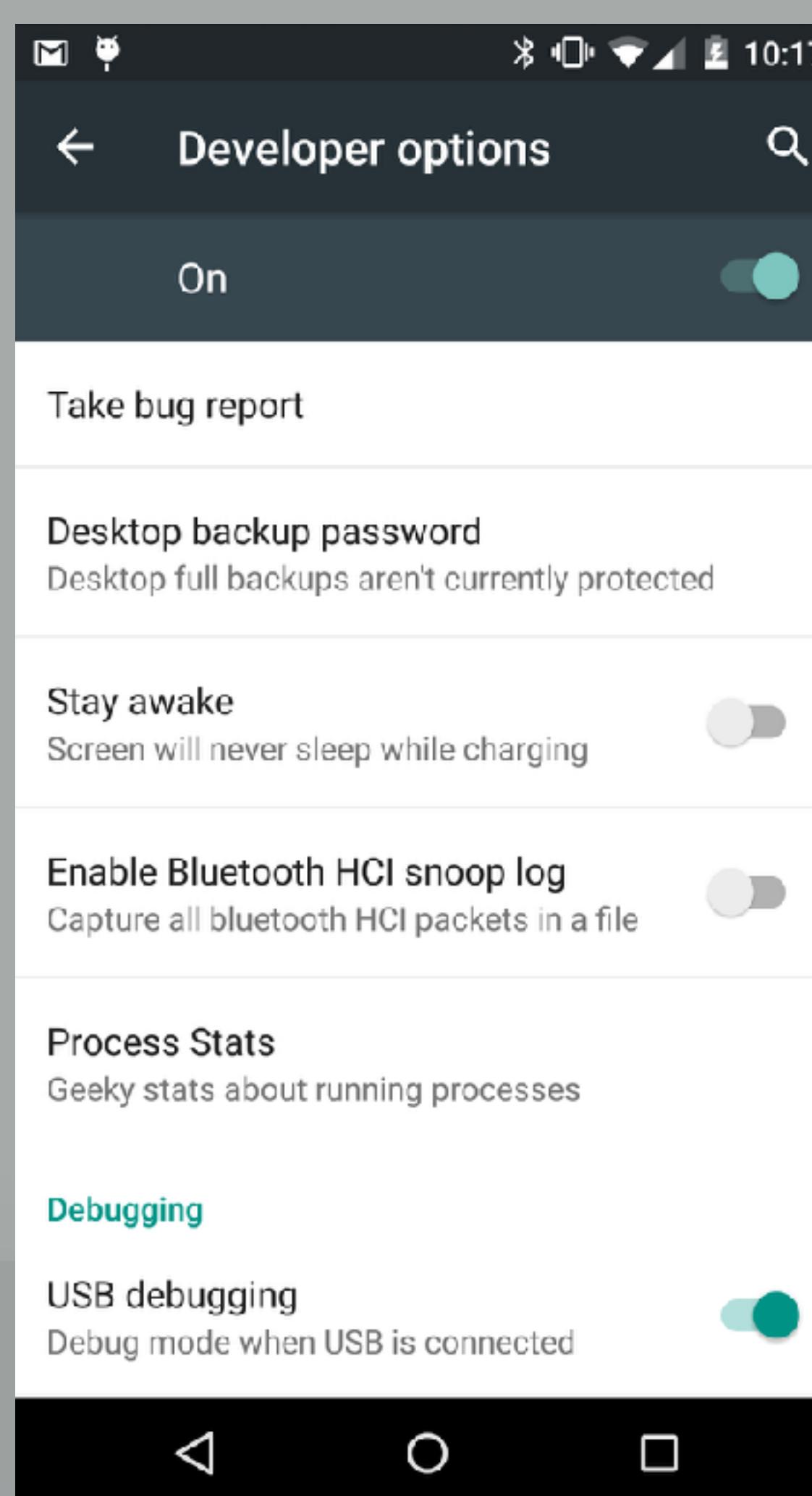
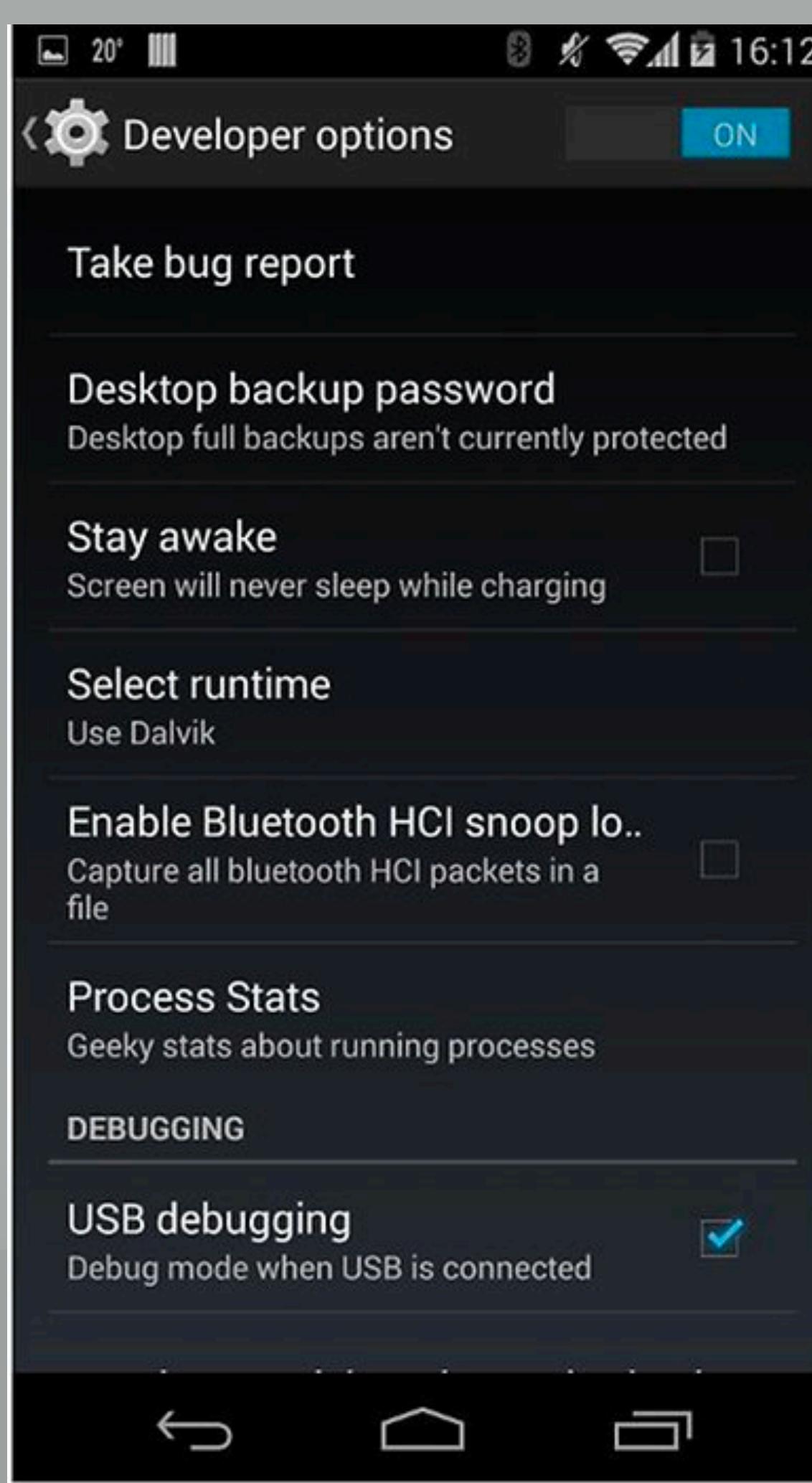
Andrea Falcone

Senior Software Engineer, Google

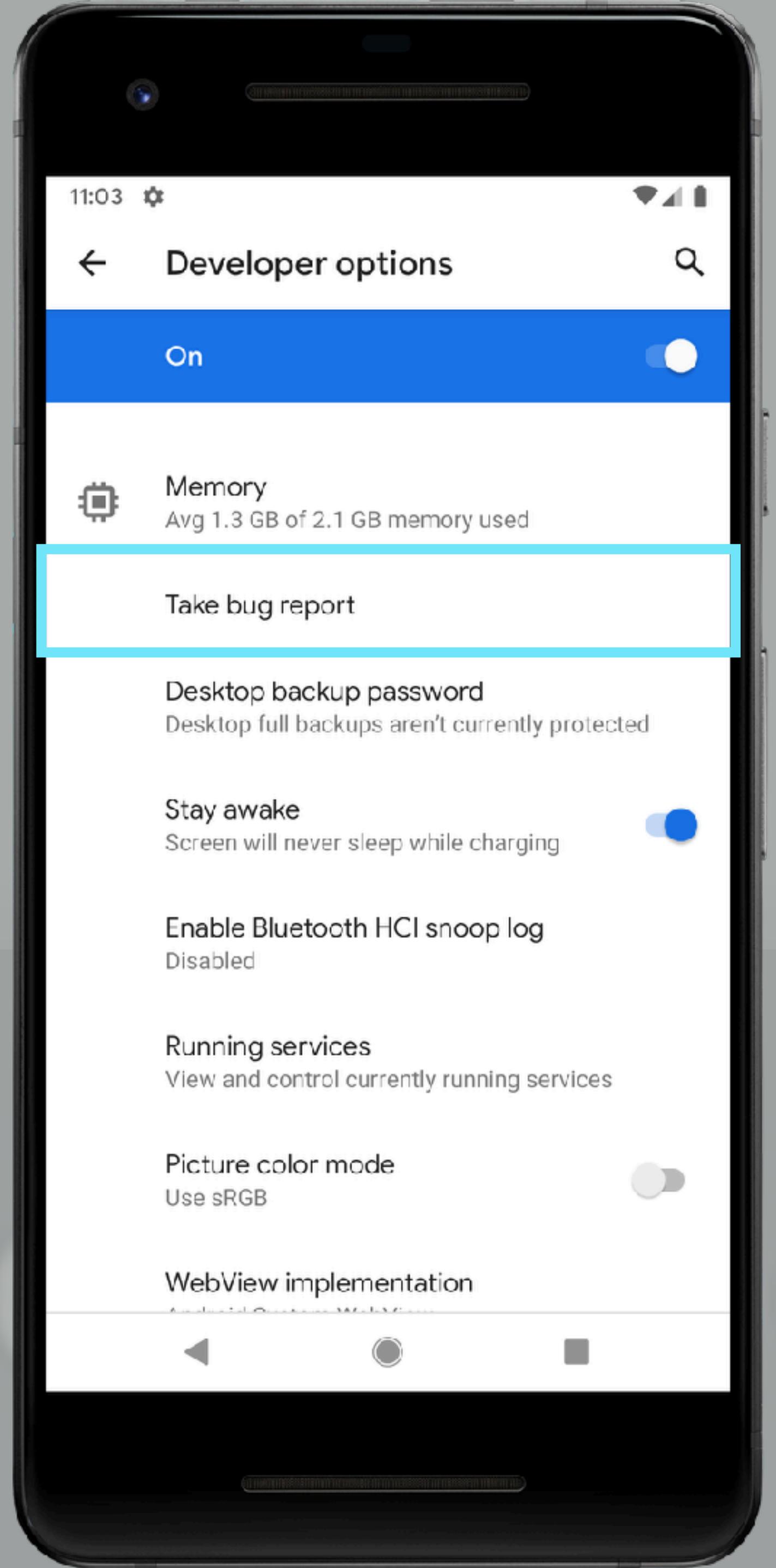
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You are now a developer!

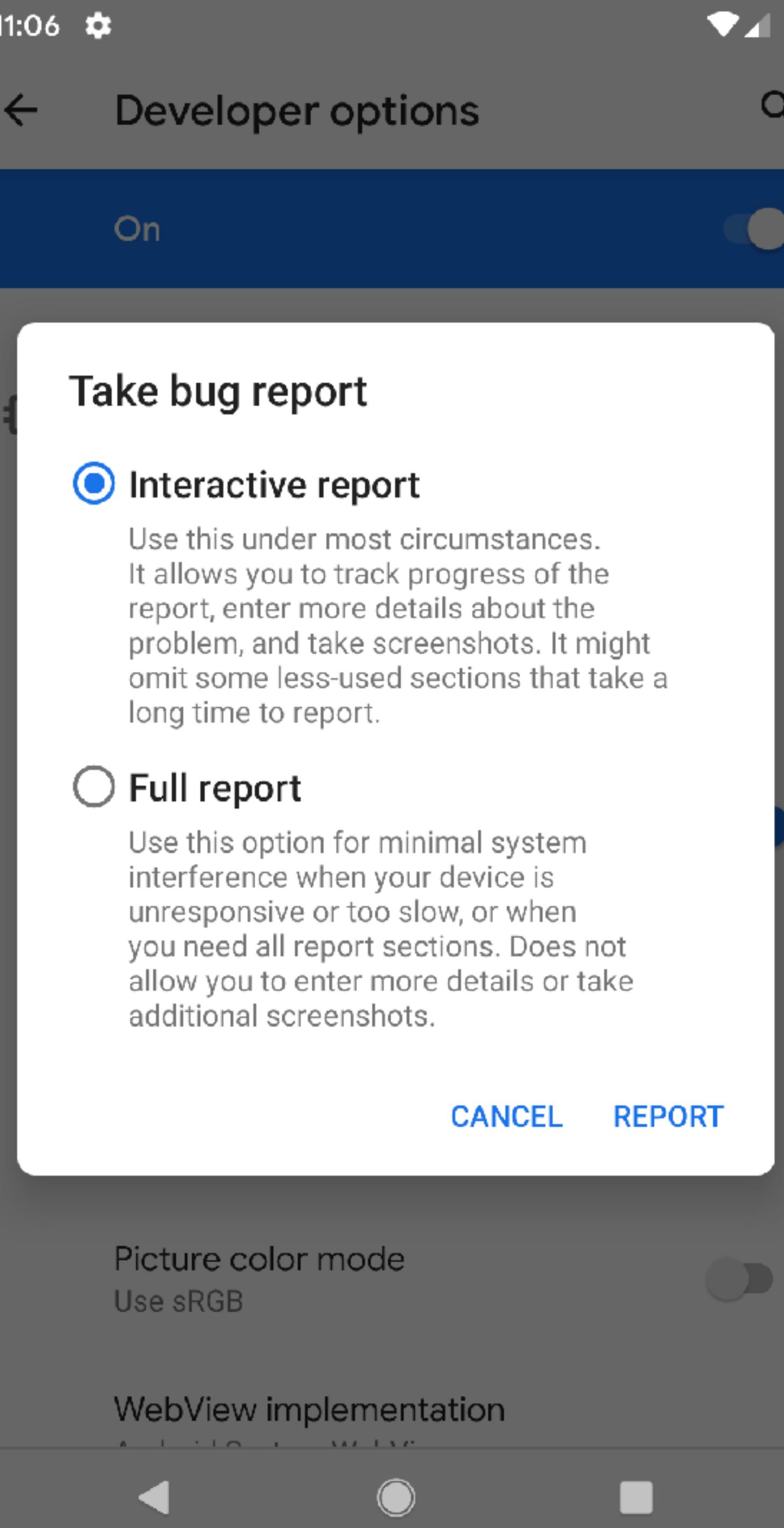
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11:06

Mon, May 6

100%



Android System

Bug report #1 is being generated 2019-05-06-11-06-30

Details Screenshot Cancel

Desktop full backups aren't currently protected

Manage

Stay awake

Screen will never sleep while charging

Enable Bluetooth HCI snoop log

Disabled

Running services

View and control currently running services

Picture color mode

Use sRGB

WebView implementation

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```

1 =====
2 == dumpstate: 2017-07-05 10:59:35
3 =====
4
5 Build: N2G47Z
6 Build fingerprint: 'google/bullhead/bullhead:7.1.2/N2G47Z/4045513:user/release-keys'
7 Bootloader: BHZ11m
8 Radio: M8994F-2.6.37.2.21
9 Network: AT&T
10 Kernel: Linux version 3.10.73-g038989083d85 (android-build@wphr11.hot.corp.google.com) (gcc version 4.8 (GCC)
11 ) #1 SMP PREEMPT Fri May 19 22:59:35 UTC 2017
11 Command line: sched_enable_hmp=1 sched_enable_power_aware=1 console=ttyHSL0,115200,n8 androidboot.
hardware=bullhead boot_cpus=0-5 lpm_levels.sleep_disabled=1 msm_poweroff.download_mode=0 buildvariant=user
androidboot.bootreason=reboot kswitch androidboot.dlcomplete=0 slub_debug=FZP gpt model.name=BULLHEAD
androidboot.revision=rev_1.0 bootcable.type=400MA fakebattery=disable androidboot.verifiedbootstate=green
androidboot.veritymode=enforcing androidboot.emmc=true androidboot.serialno=025c54daa79ebfaa androidboot.
bootloader=BHZ11m lge-handle-panic.use_hardreset=1 androidboot.authorized_kernel=true androidboot.
baseband=msm androidboot.hardware.sku=LGH790 mdss_mdp.panel=1:dsi:0:qcom,mdss_dsi_jd35695b_1080p_cmd:1:none
12 Bugreport format version: 1.0
13 Dumpstate info: id=1 pid=5325
14
15 ----- DUMPSYS MEMINFO (dumpsys -t 30 meminfo -a) -----
16 Applications Memory Usage (in Kilobytes):
17 Uptime: 3490256 Realtime: 8566418
18
19 ** MEMINFO in pid 4825 [com.android.settings] **
20          Pss      Pss      Shared   Private   Shared   Private   SwapPss   Heap     Heap     Heap
21          Total     Clean    Dirty     Dirty    Clean     Clean    Dirty     Size     Alloc     Free
22          -----  -----  -----  -----  -----  -----  -----  -----
23  Native Heap  15487       0     516    15460       0       0    1876   22528   18773    3754
24  Dalvik Heap  9776       0    1272    9740       0       0   3744   14640   8784    5856
25  Dalvik Other  1689       0     100    1688       0       0       0
26  Stack        356       0       4     356       0       0       0
27  Ashmem        2       0       4       0      12       0       0
28  Gfx dev      1814       0    2204     712       0       0       0
29  Other dev      4       0      60       0       0       4       0
30  .so mmap     4522    1224    1224     188   14892   1224      42
31

```

UPTIME (`uptime`)

MMC PERF (`/sys/block/mmcblk0/stat`)

MEMORY INFO (`/proc/meminfo`)

CPU INFO (`top -n 1 -d 1 -m 30 -t`)

PROCESSES (`ps -P`)

PROCESSES AND THREADS (`ps -t -p -P`)

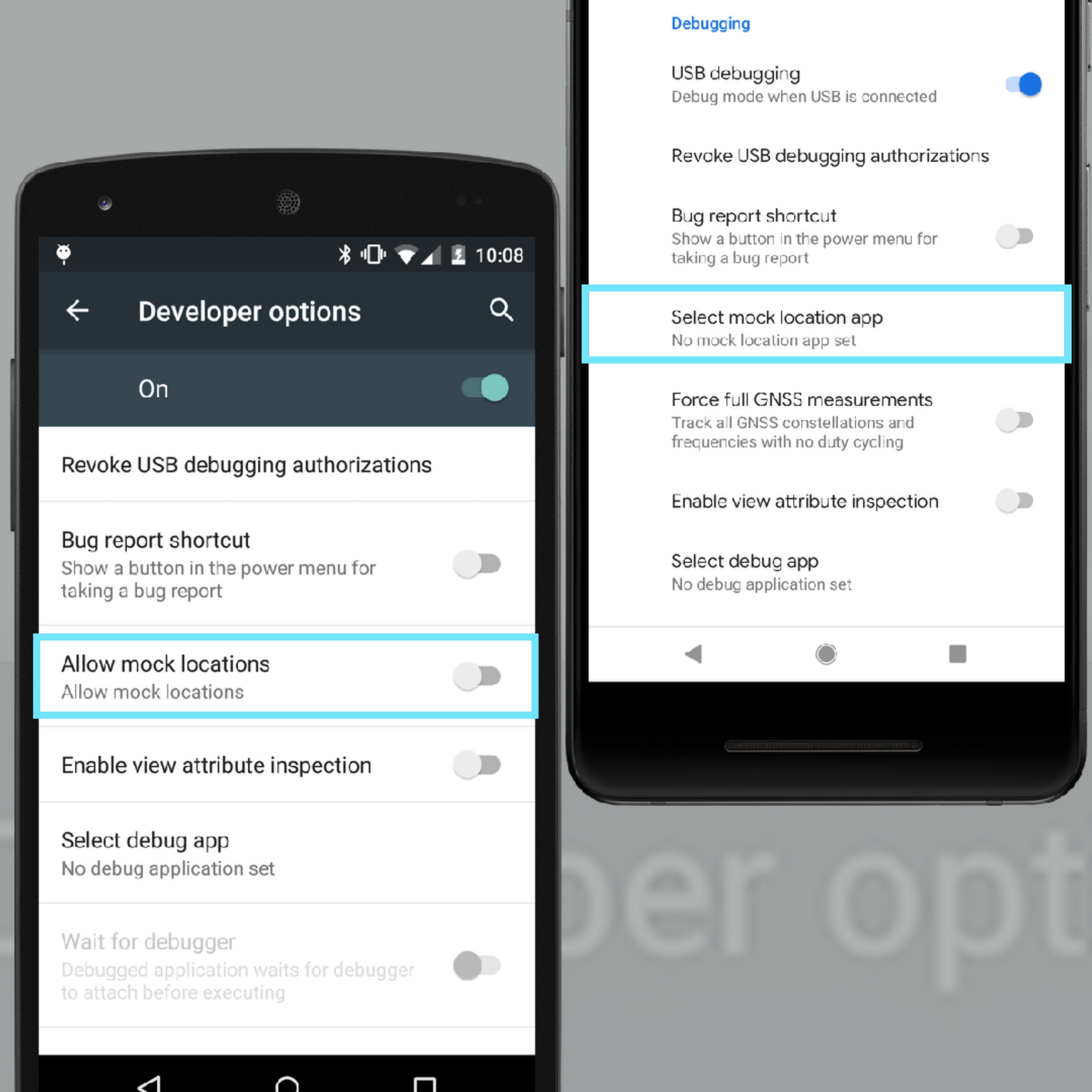
APP ACTIVITIES (`dumpsys activity all`)

APP SERVICES (`dumpsys activity service all`)

APP PROVIDERS (`dumpsys activity provider all`)

SYSTEM LOG (`logcat -v threadtime -d *:v`)

VM TRACES JUST NOW (`/data/anr/traces.txt.bugreport`)



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Developer options

On



Debugging

USB debugging



Debug mode when USB is connected

Select application

Nothing



Fake GPS

com.lexa.fakegps



Select debug app

No debug application set

Wait for debugger

Debugged application waits for
debugger to attach before executing



Verify apps over USB

Check apps installed via ADB/ADT for
harmful behavior.



LocationManager

```
public void setTestProviderLocation (String provider, Location loc)
```

Added in API level 3

Sets a mock location for the given provider.

This location will be used in place of any actual location from the provider. The location object must have a minimum number of fields set to be considered a valid LocationProvider Location, as per documentation on [Location](#) class.

Parameters

provider the provider name

loc the mock location

Throws

[SecurityException](#) if the ACCESS_MOCK_LOCATION permission is not present or the
[Settings.Secure.ALLOW_MOCK_LOCATION](#) } system setting is not enabled

[IllegalArgumentException](#) if no provider with the given name exists

[IllegalArgumentException](#) if the location is incomplete

Extended controls - Pixel_3_API_Q:5554

- Location
- Cellular
- Battery
- Camera
- Phone
- Directional pad
- Microphone
- Fingerprint
- Virtual sensors
- Bug report
- Snapshots
- Record and Playback
- Settings
- Help

GPS data point

Coordinate system Decimal Latitude 37.422 Longitude -122.084

Currently reported location

Latitude: 37.4220
Longitude: -122.0840
Altitude: 5.0
Speed: 0.0
Headings: 0.0

Altitude (meters) 5.0 Speed (knots) 0.0

SEND

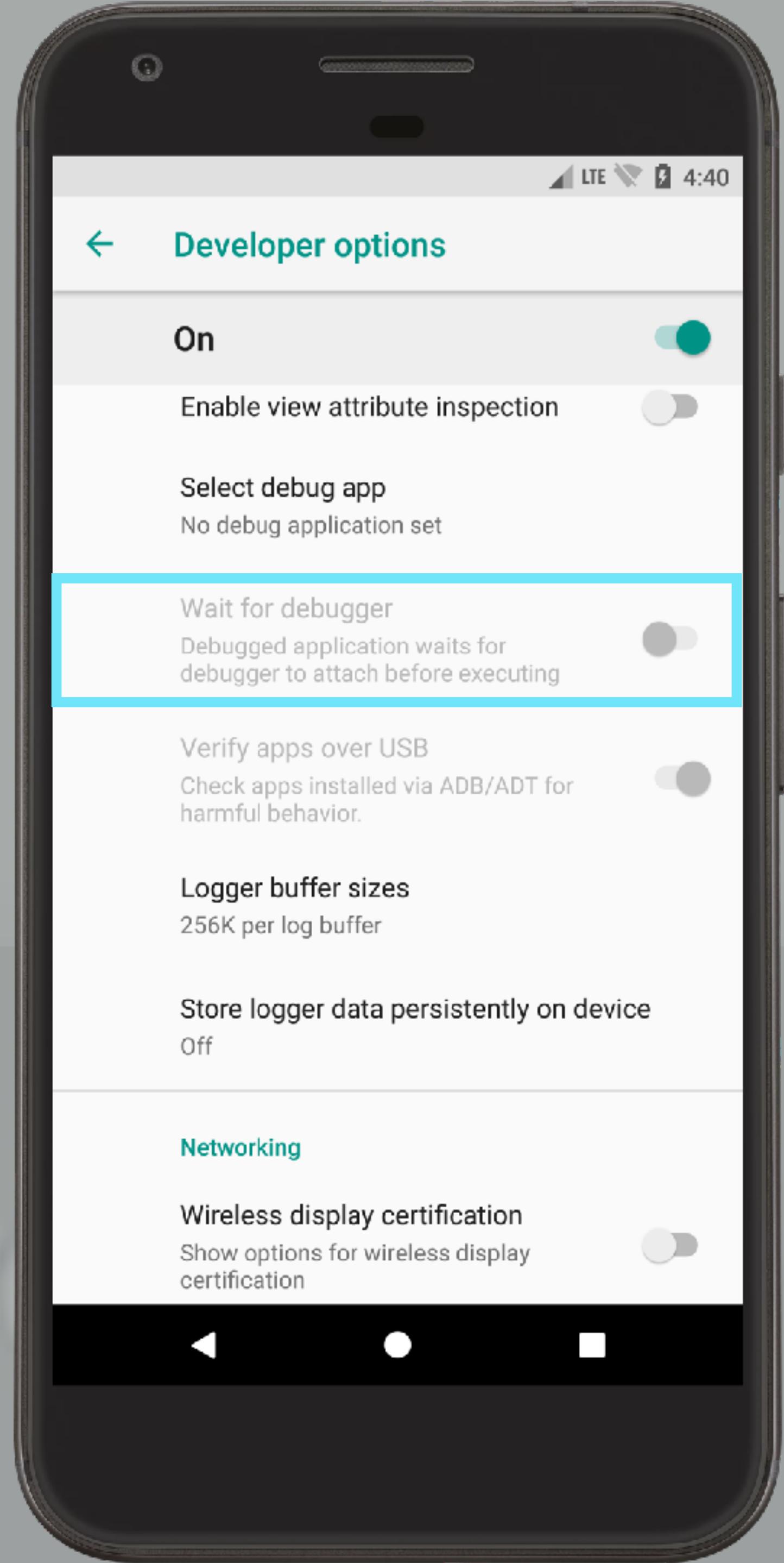
GPS data playback

Delay (sec)	Latitude	Longitude	Elevation	Name	Description

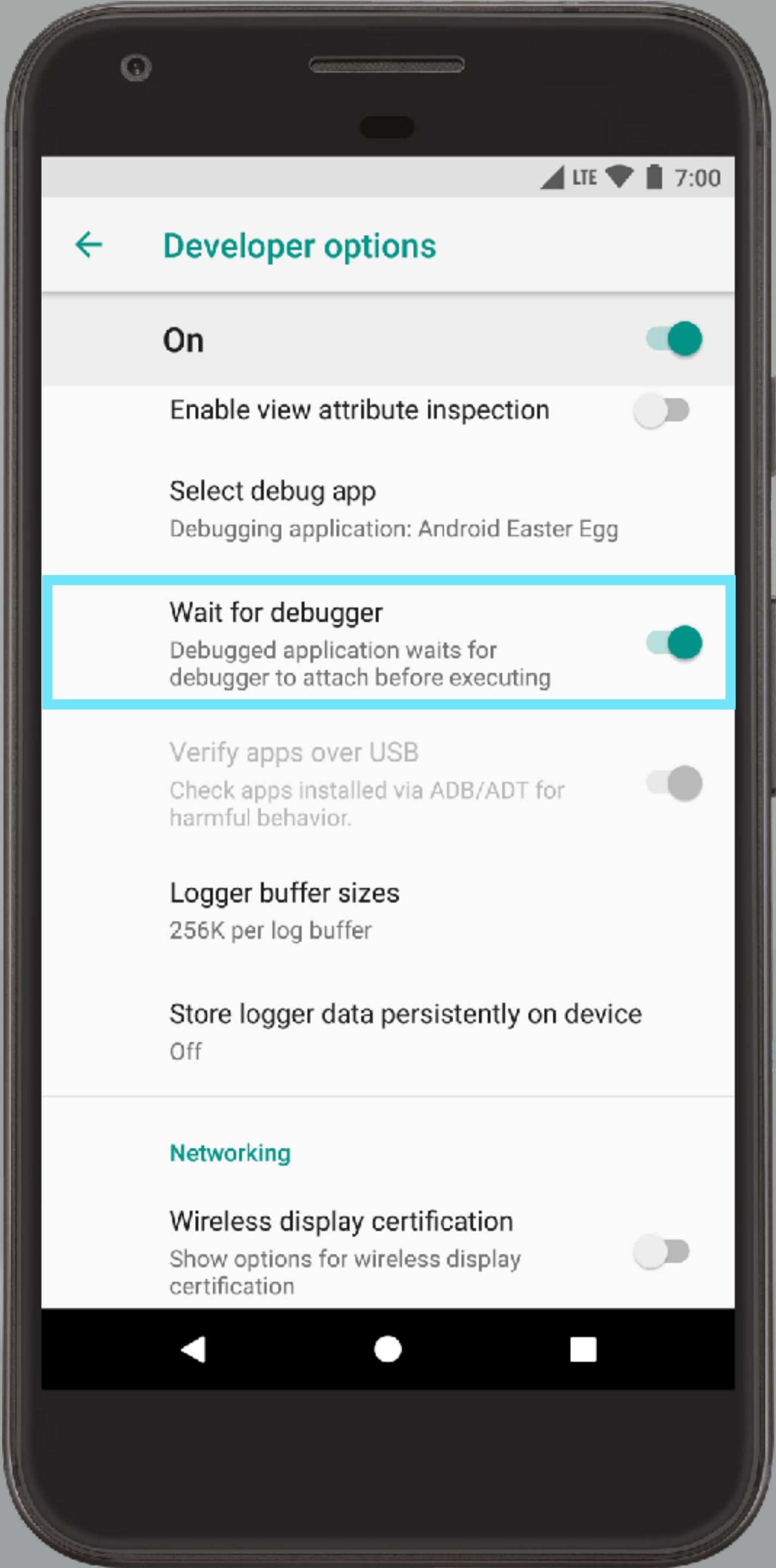
▶ Speed 1X ▾ LOAD GPX/KML

emulator
only





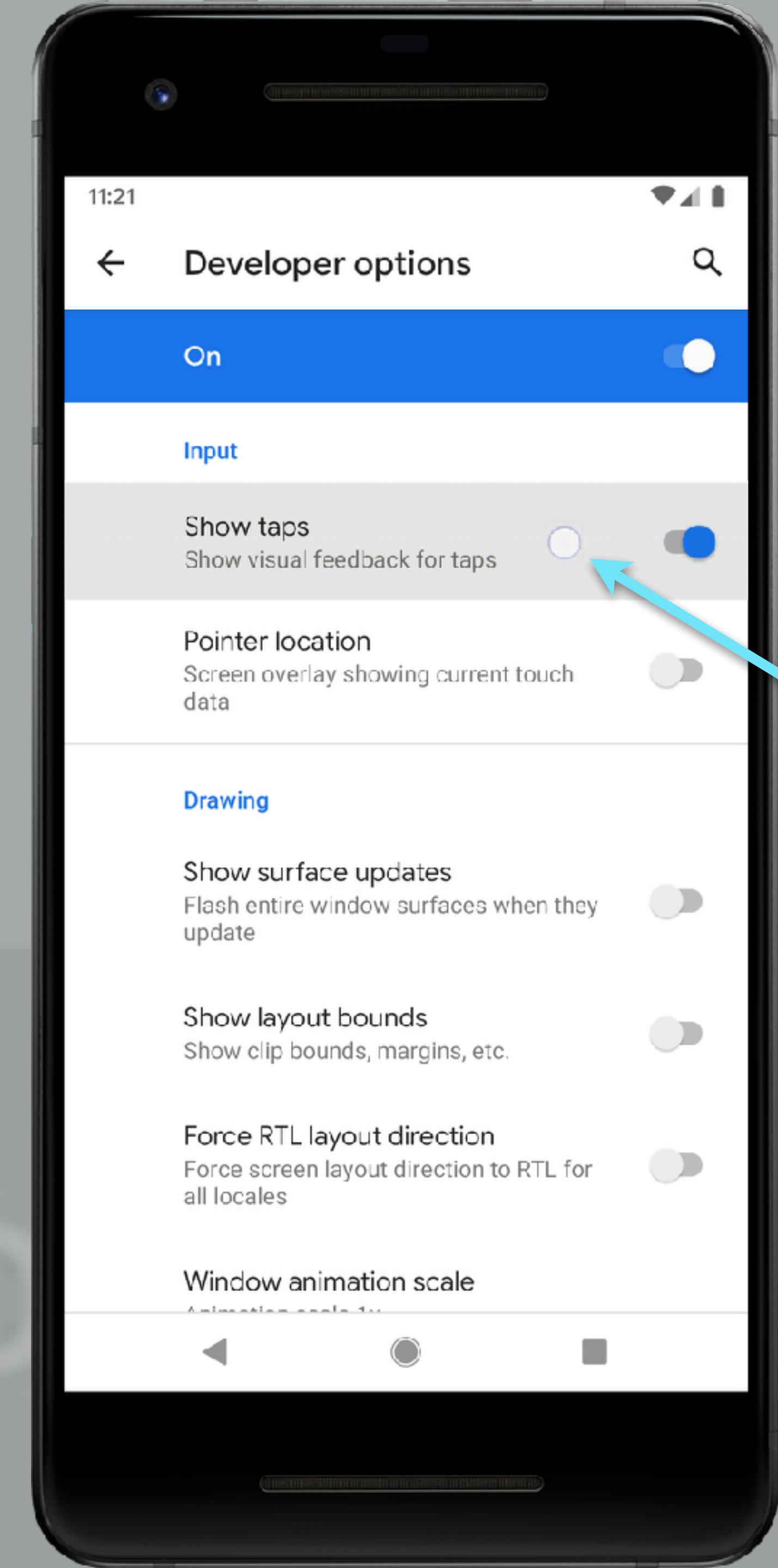
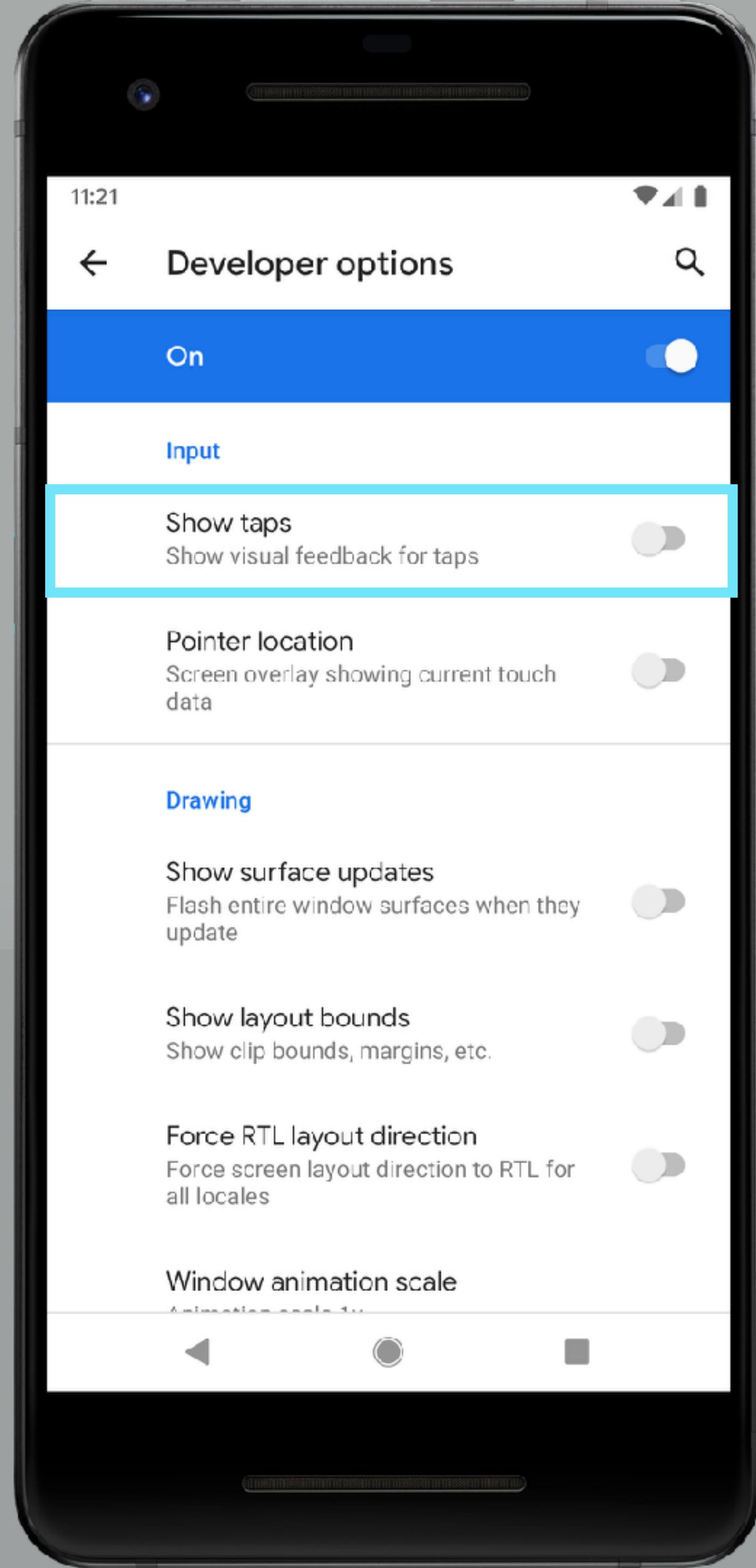
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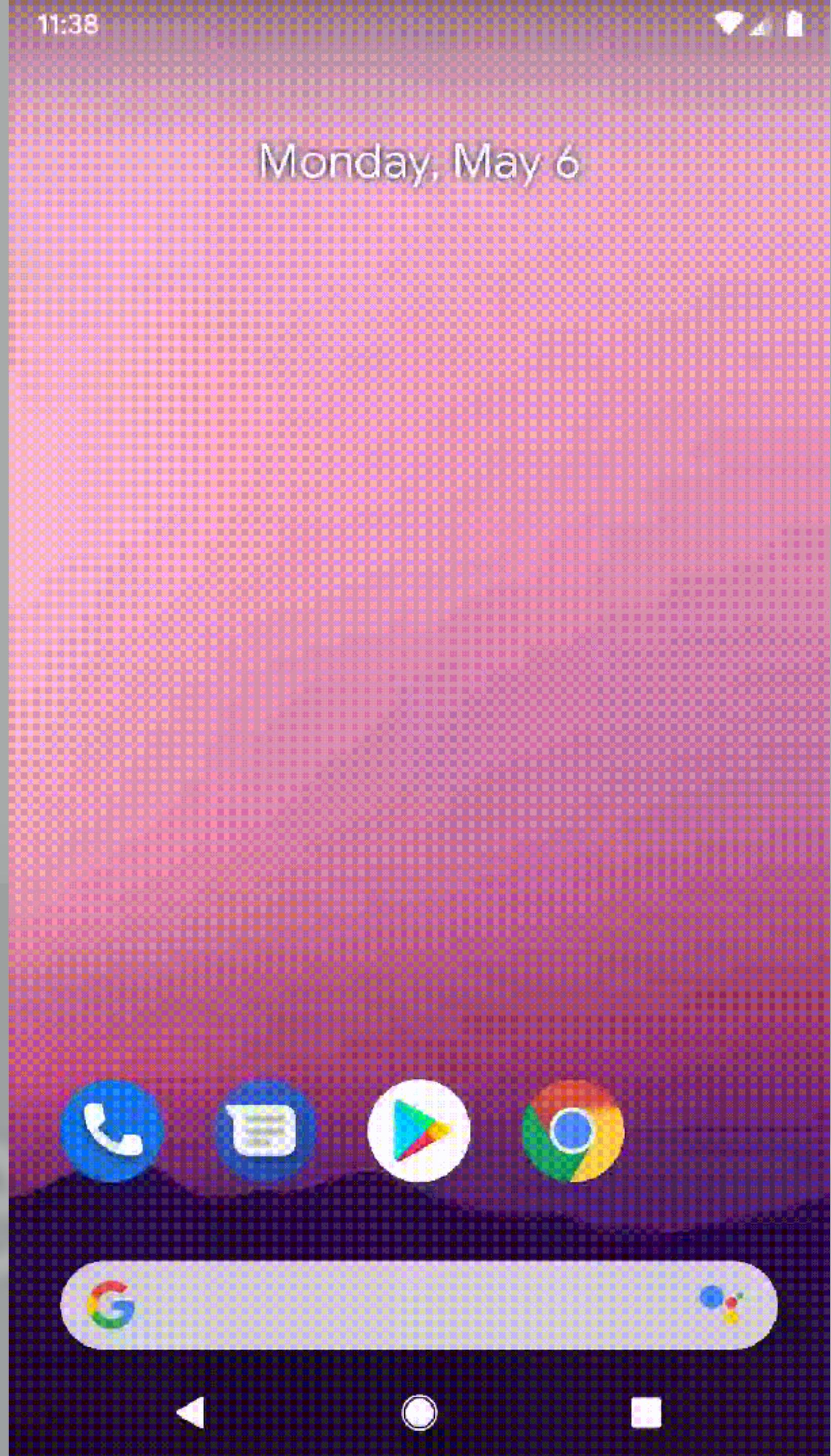
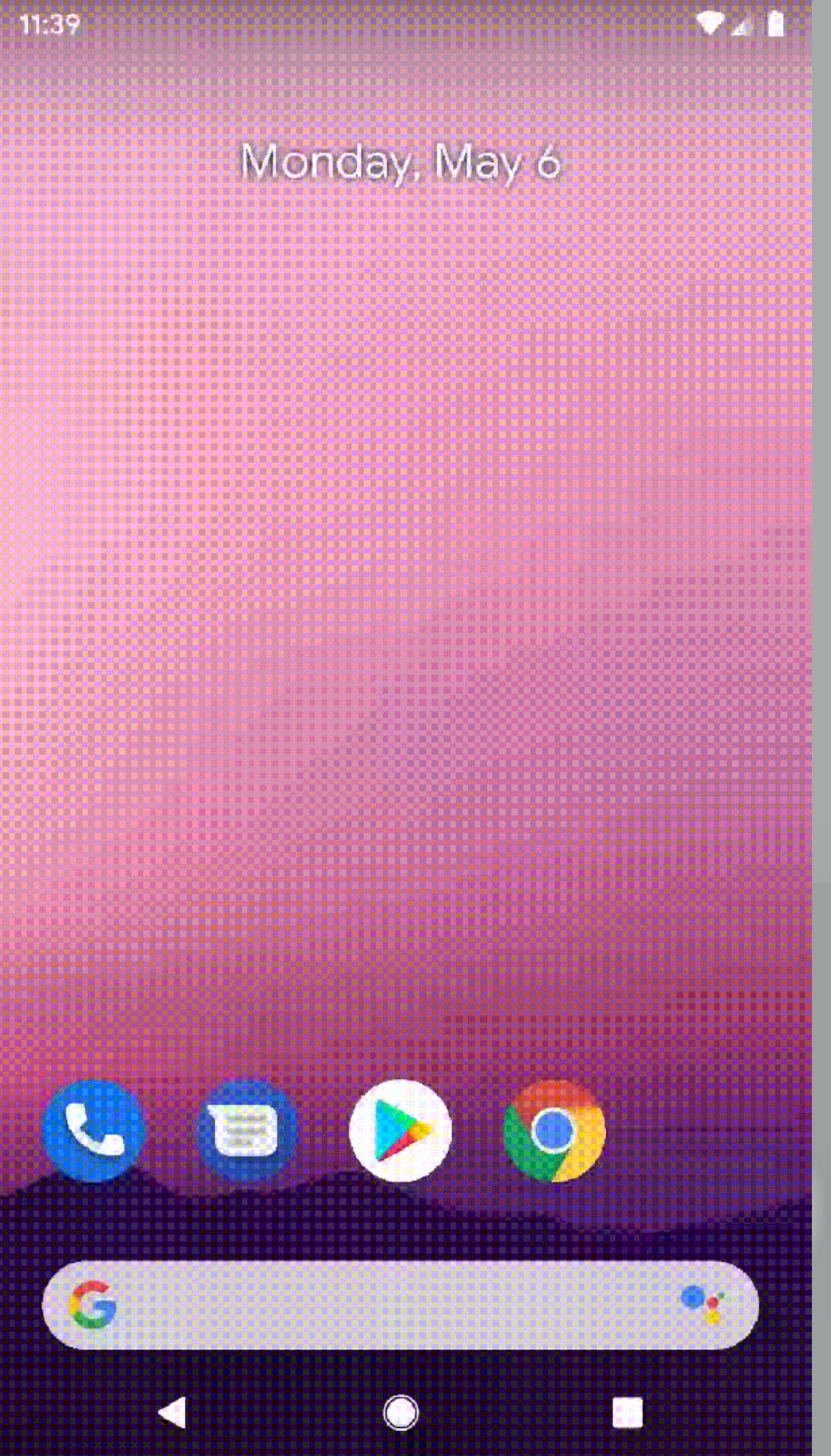


```
protected void onCreate(Bundle savedInstanceState) {  
    super.onCreate(savedInstanceState);  
  
    android.os.Debug.waitForDebugger();  
    int breakpoint = 1;  
}
```

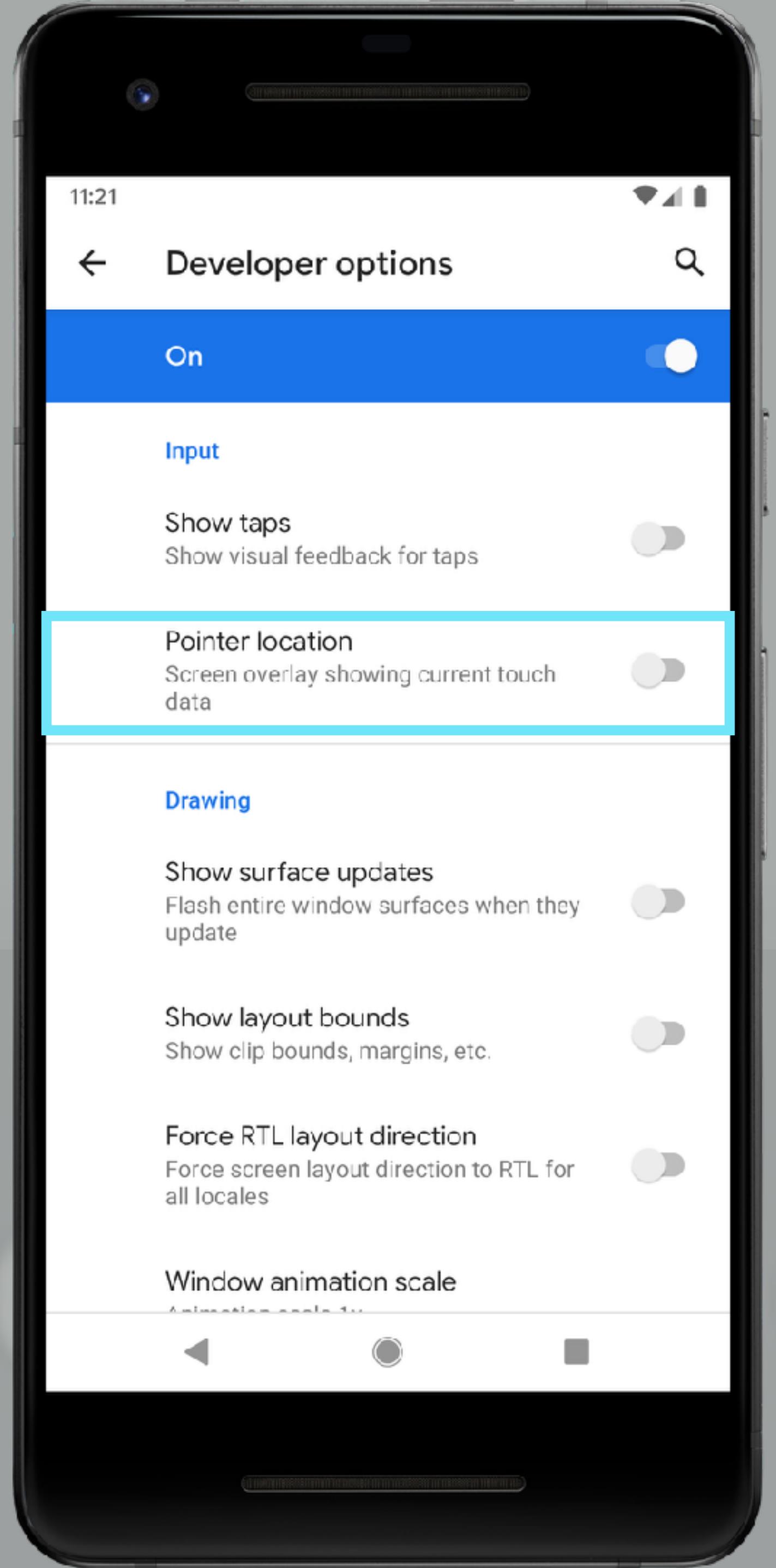
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On



Input

Show taps



Show visual feedback for taps

Pointer location



Screen overlay showing current touch data

Drawing

Show surface updates



Flash entire window surfaces when they update

Show layout bounds



Show clip bounds, margins, etc.

Force RTL layout direction



Force screen layout direction to RTL for all locales

Window animation scale

← Developer options



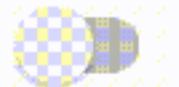
On



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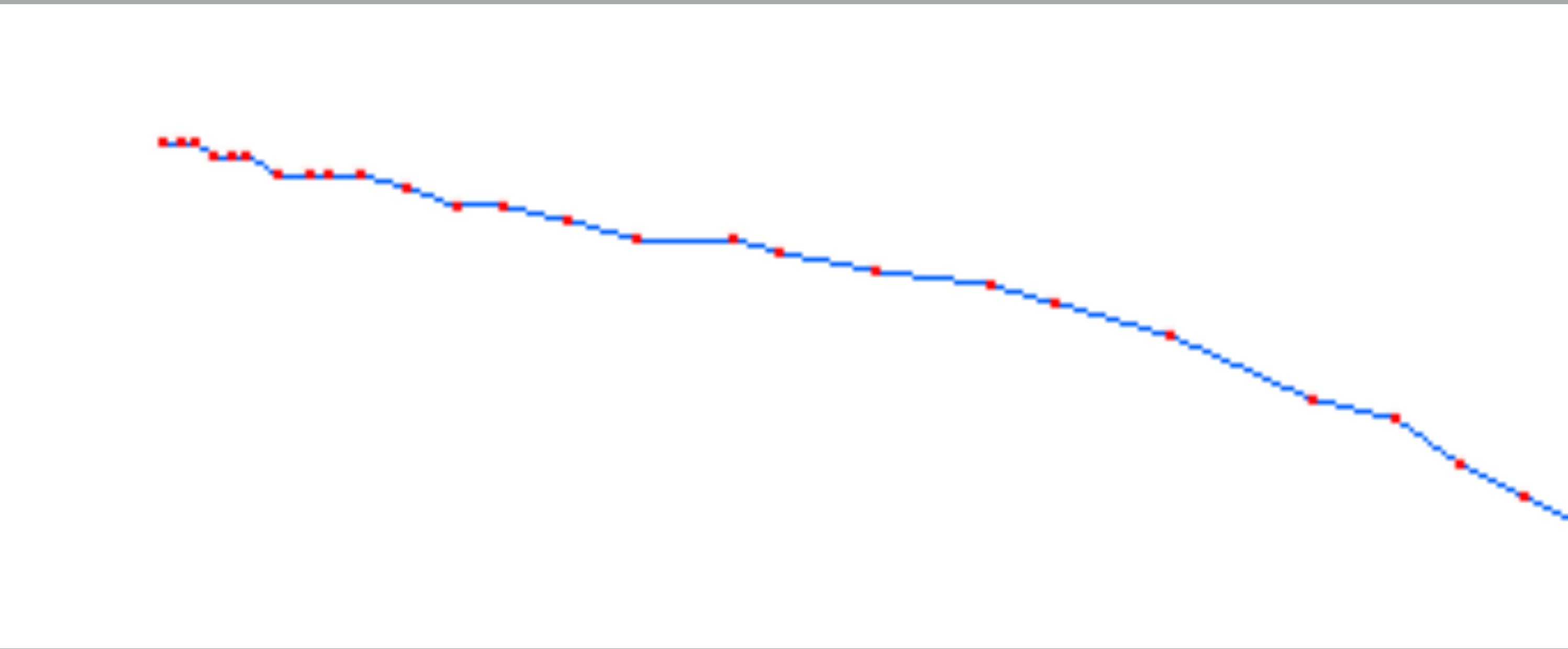
Force RTL layout direction

Force screen layout direction to RTL for all locales



Window animation scale

Animation scale 1x



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P: 0 / 1
12:59

dX: -486.0

dY: -169.0

Xv: 0.0

Yv: 0.0

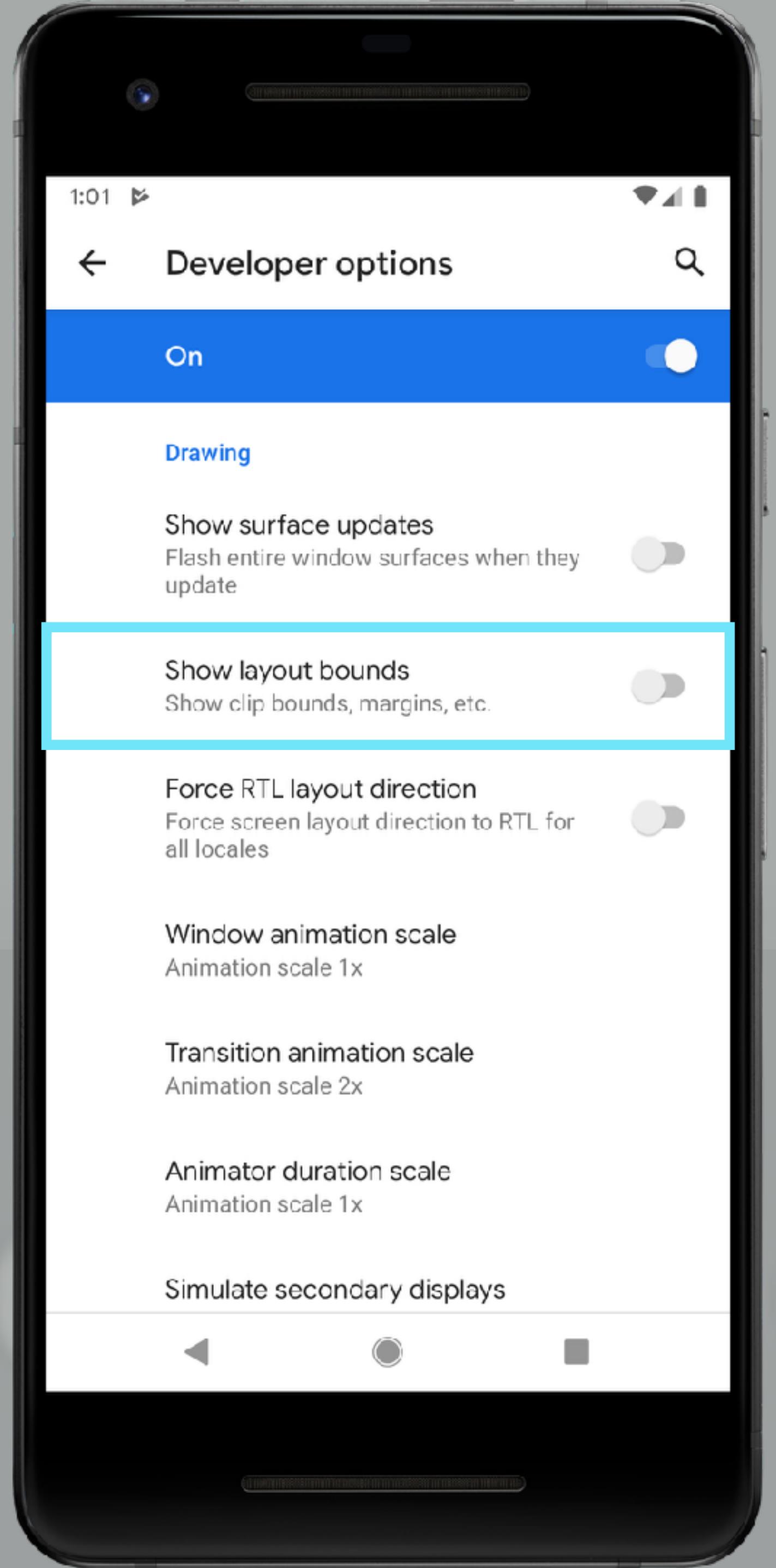
Prs: 0.50

Size: 0.0

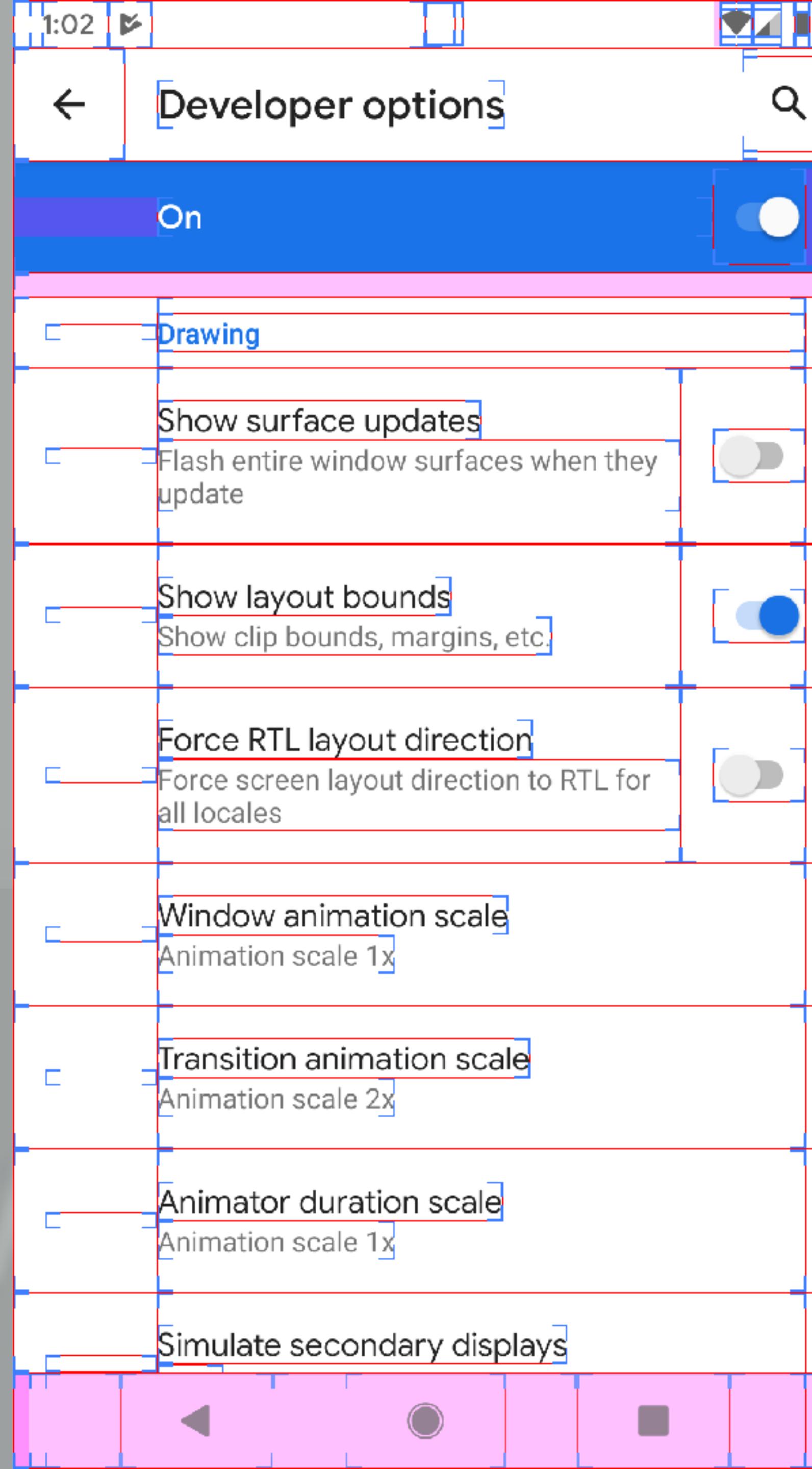


Developer options



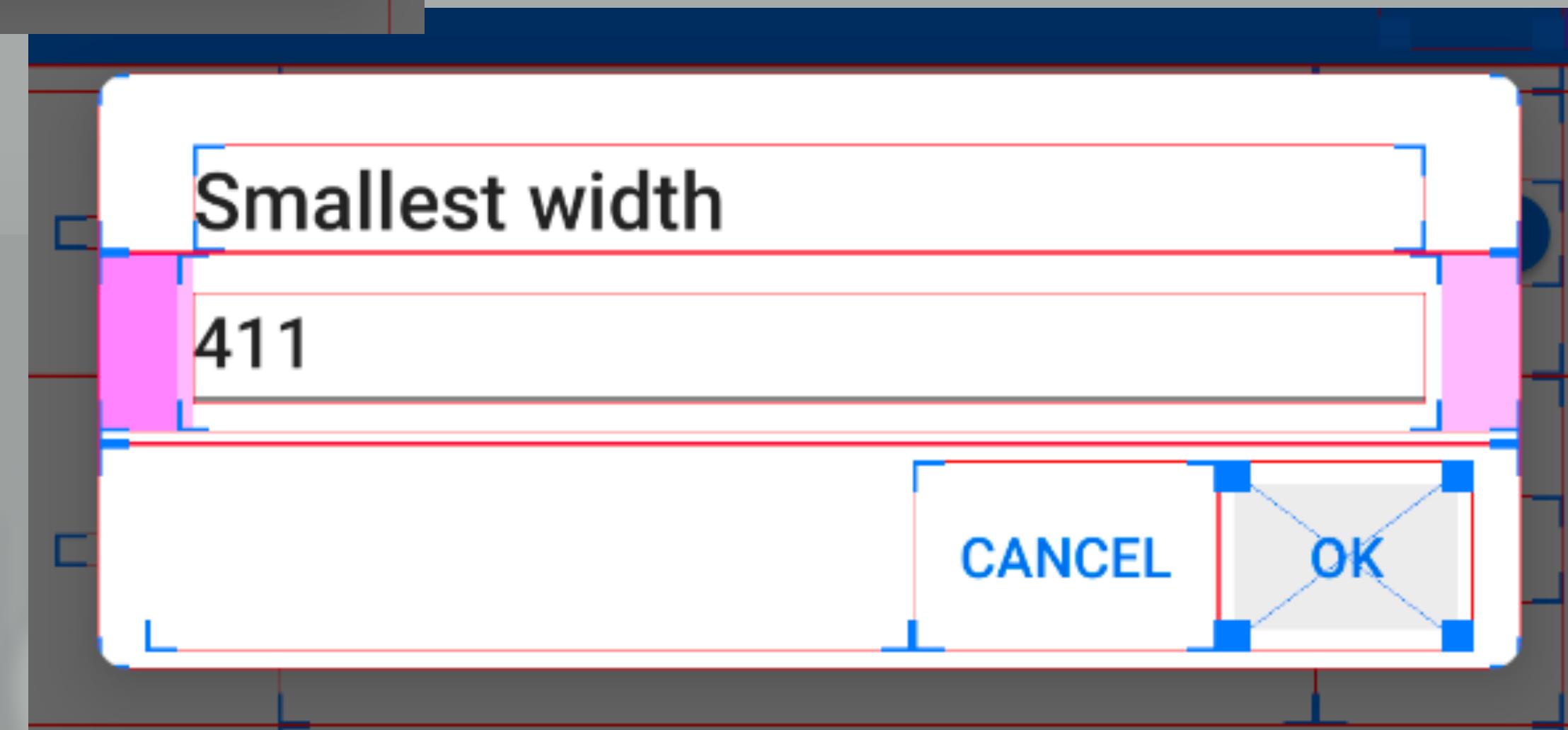
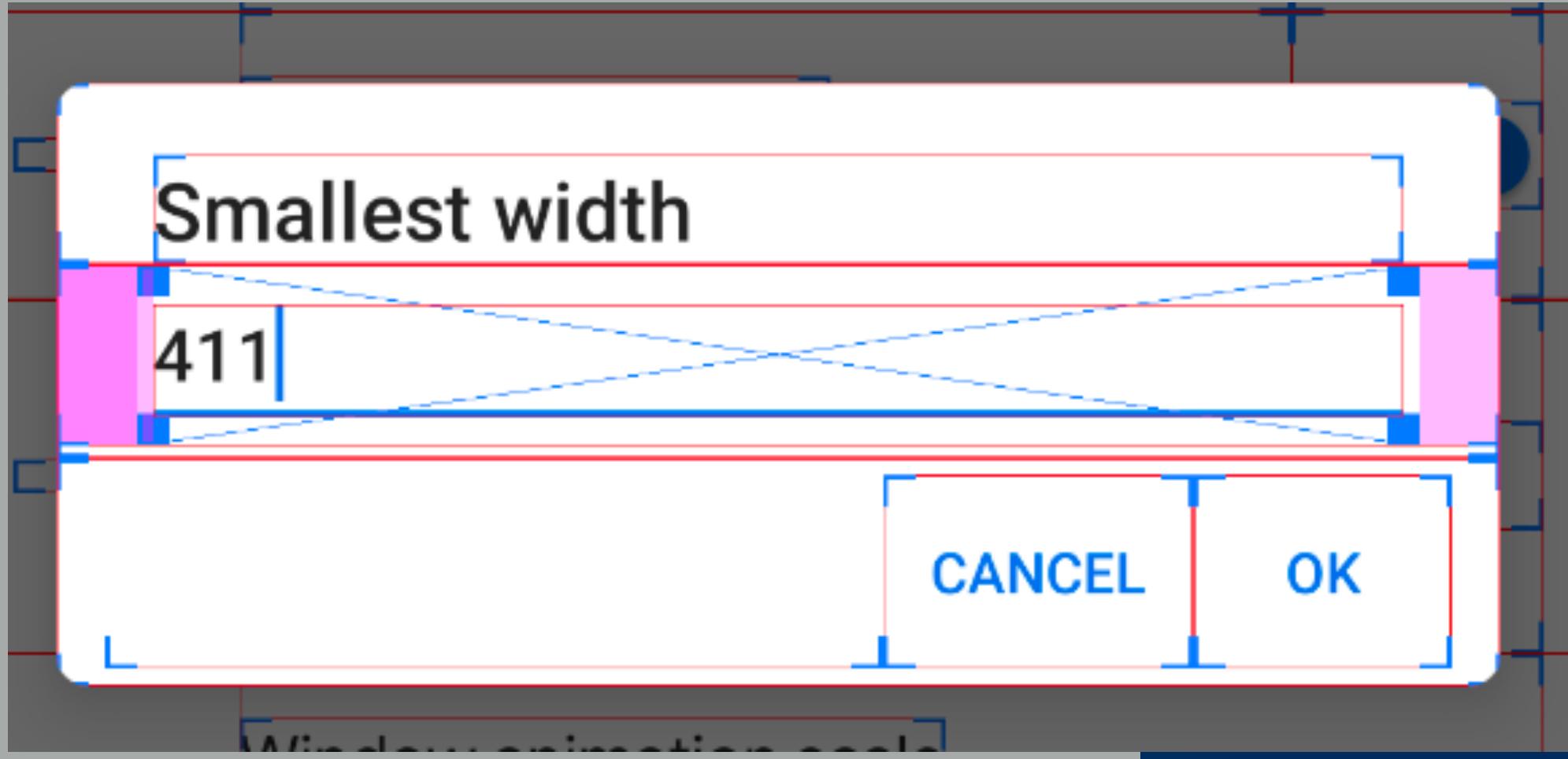


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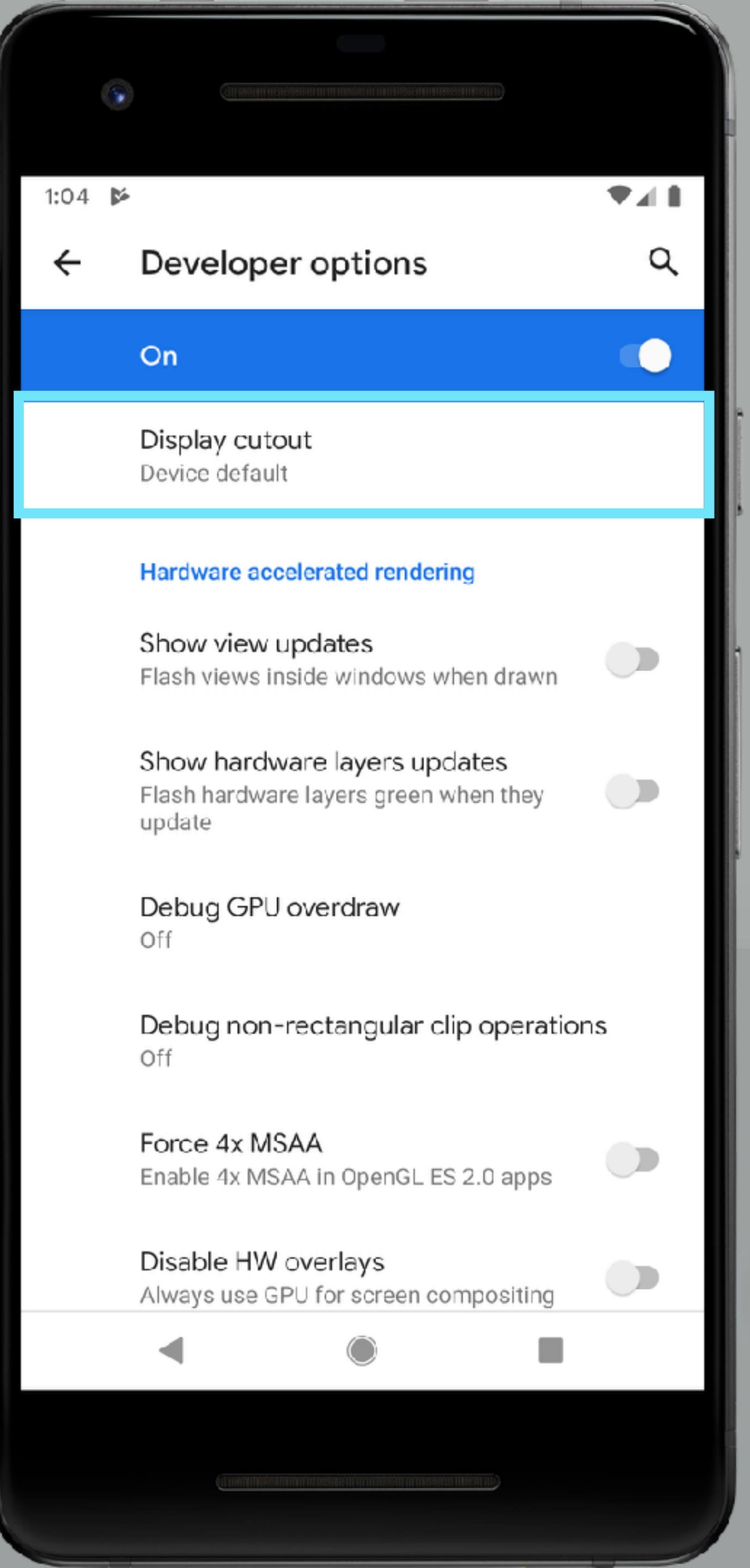
Margins
Optical bounds
Clip bounds

New in O



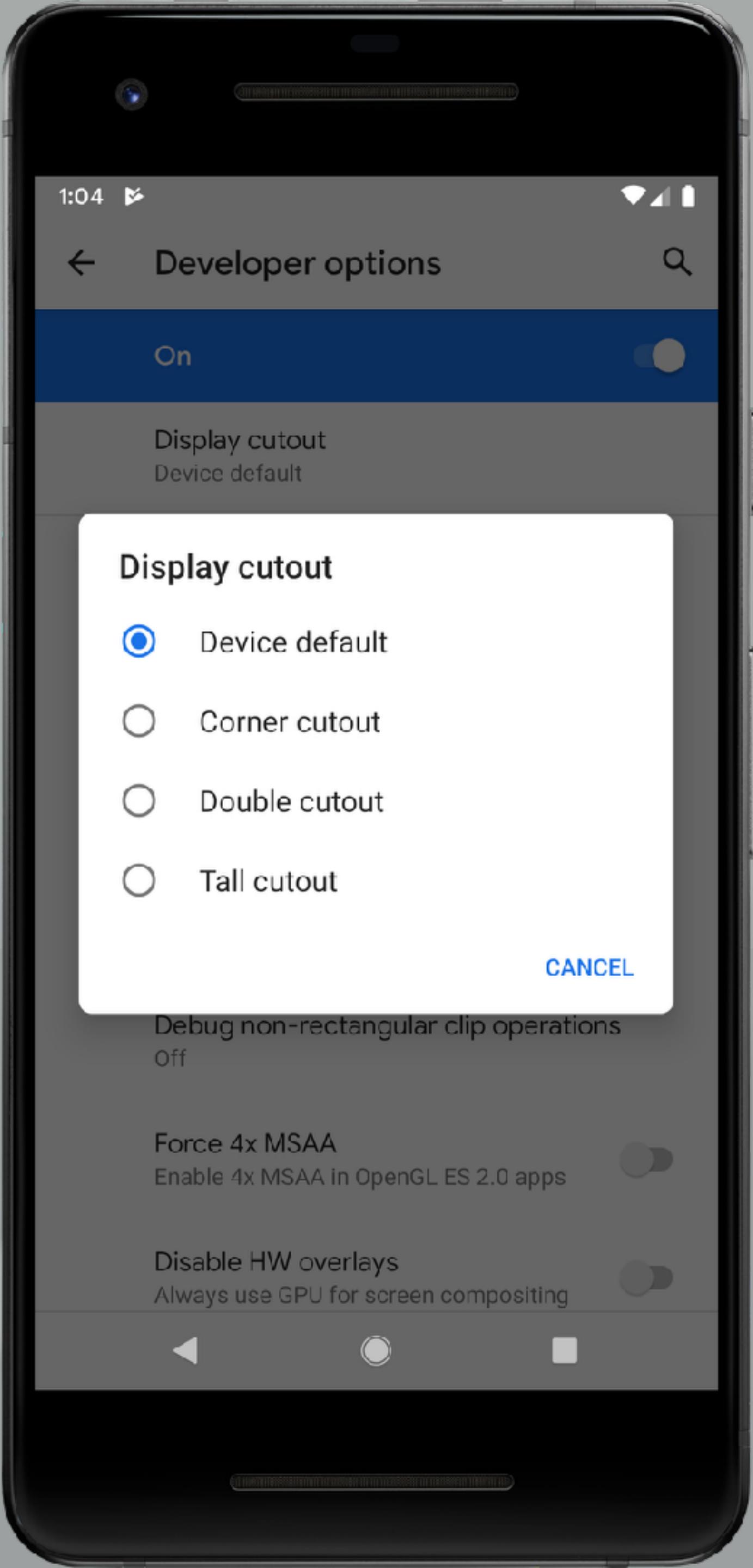
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New in P



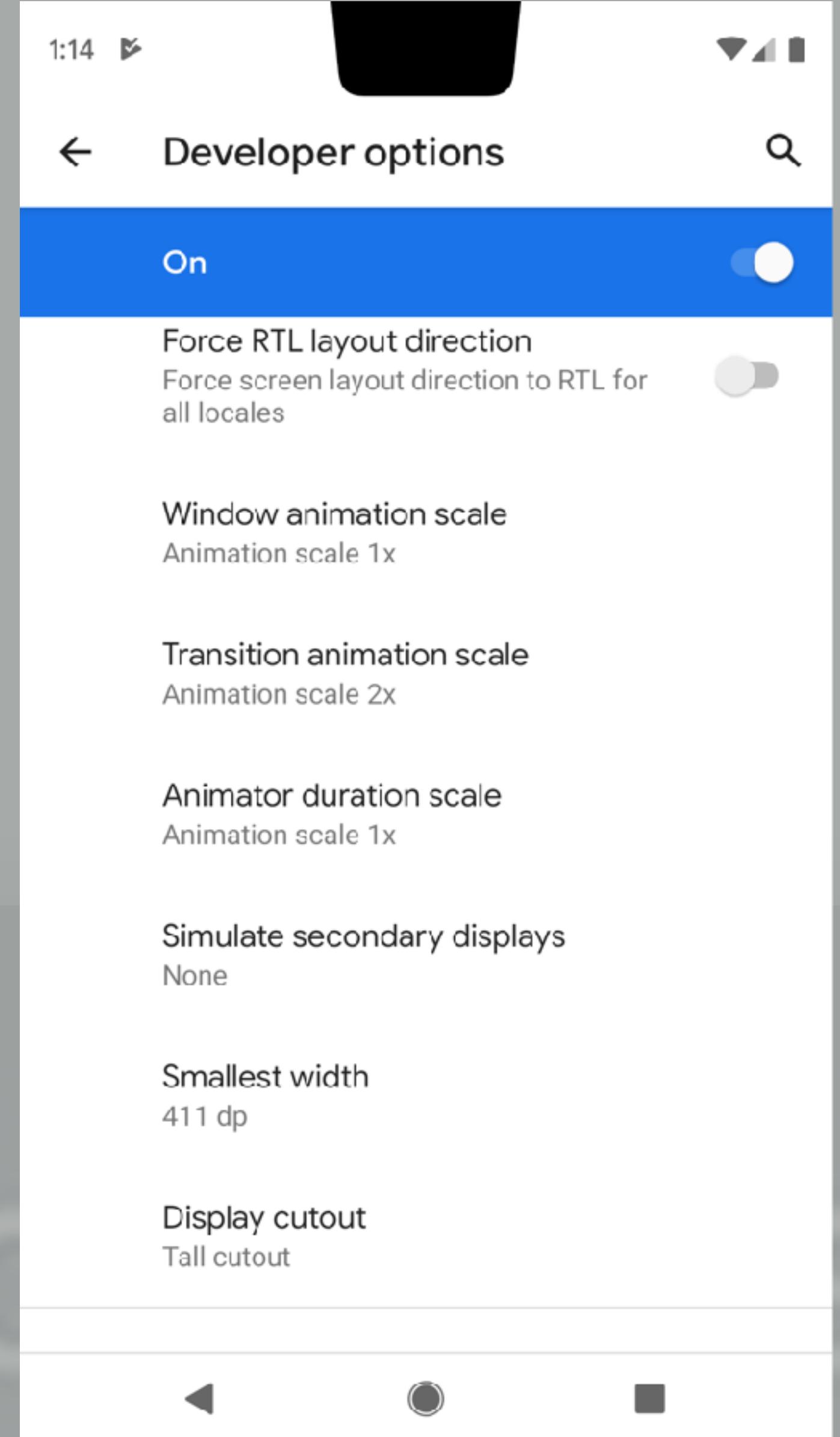
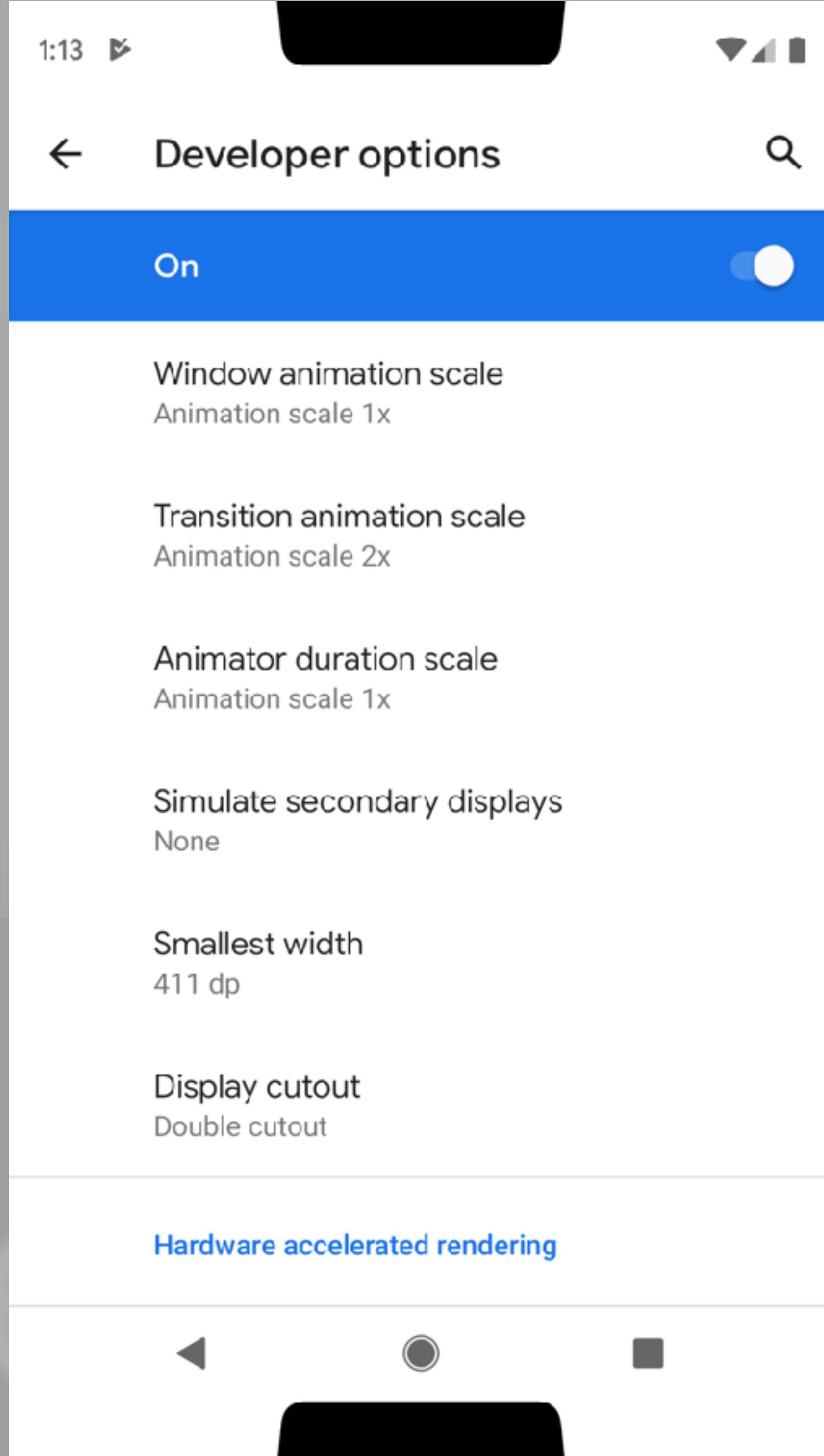
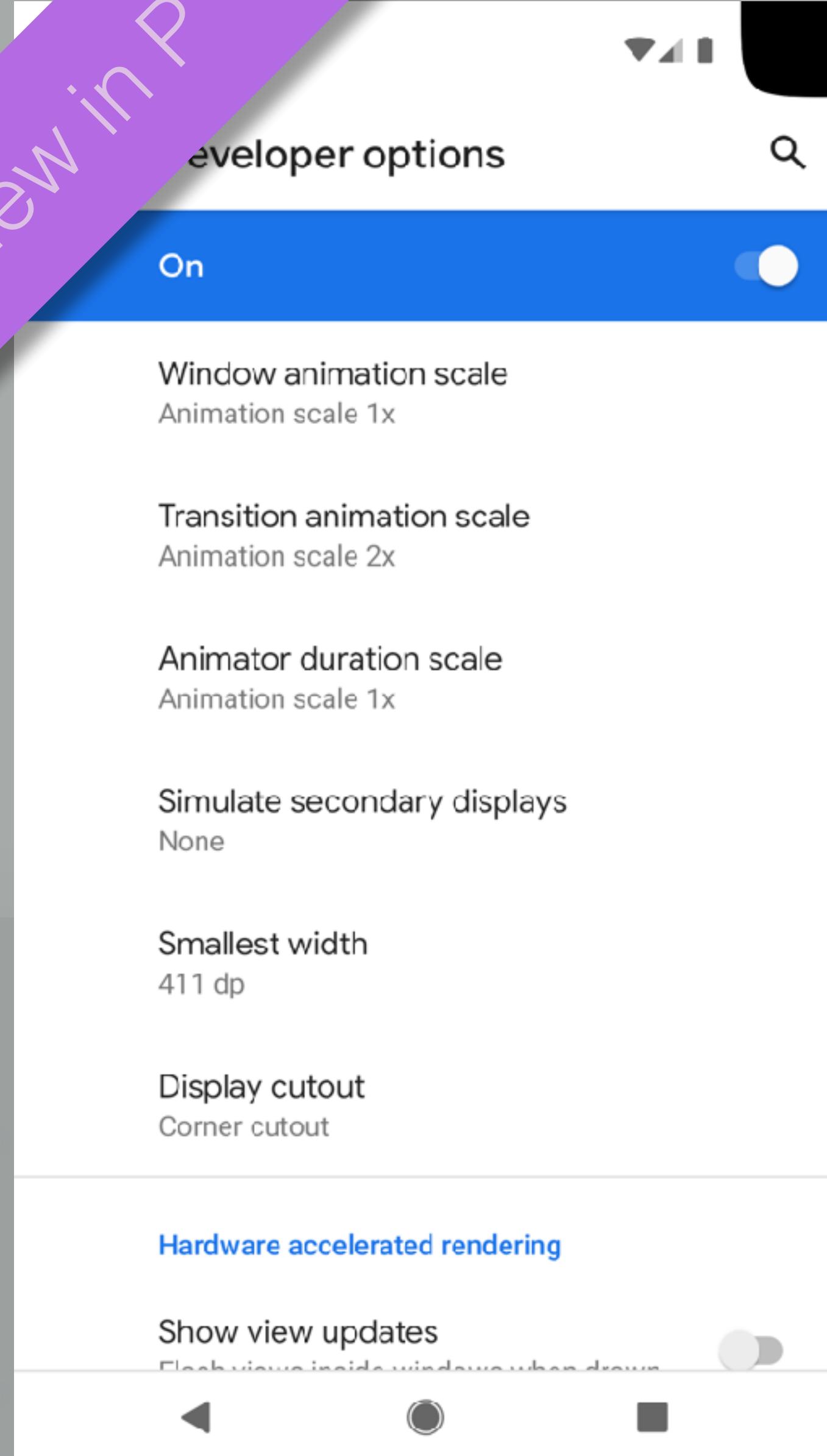
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New in P

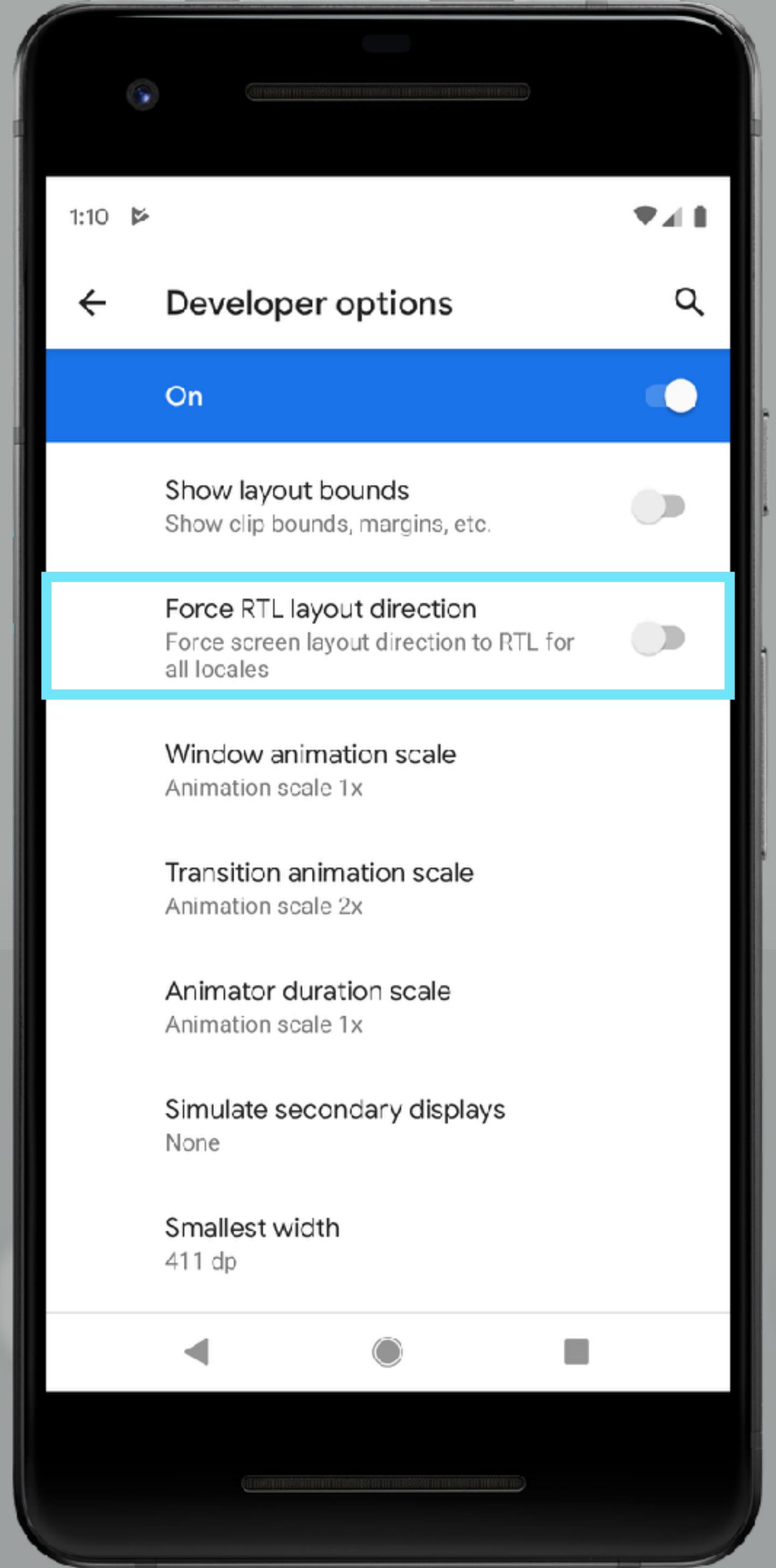


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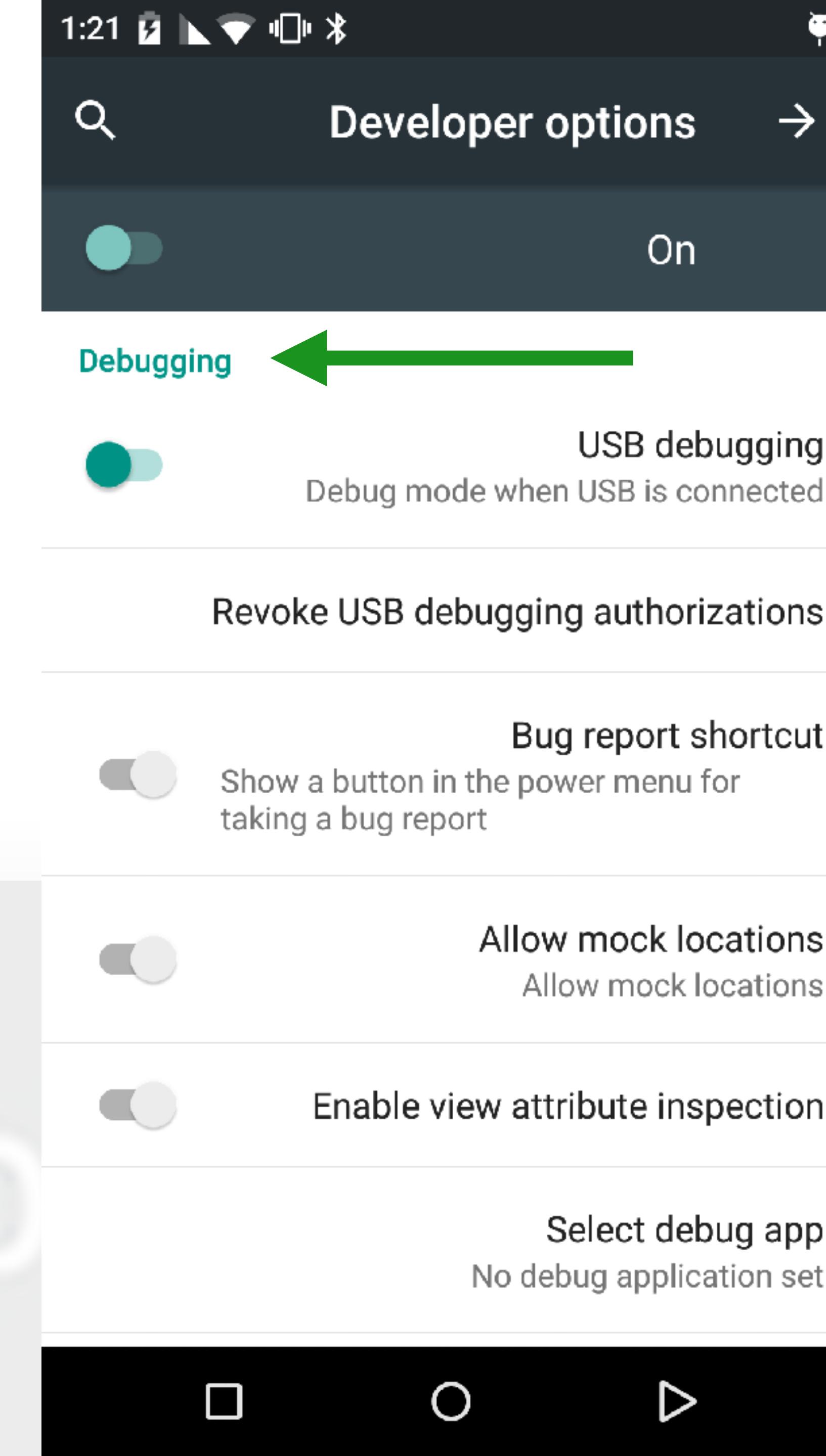
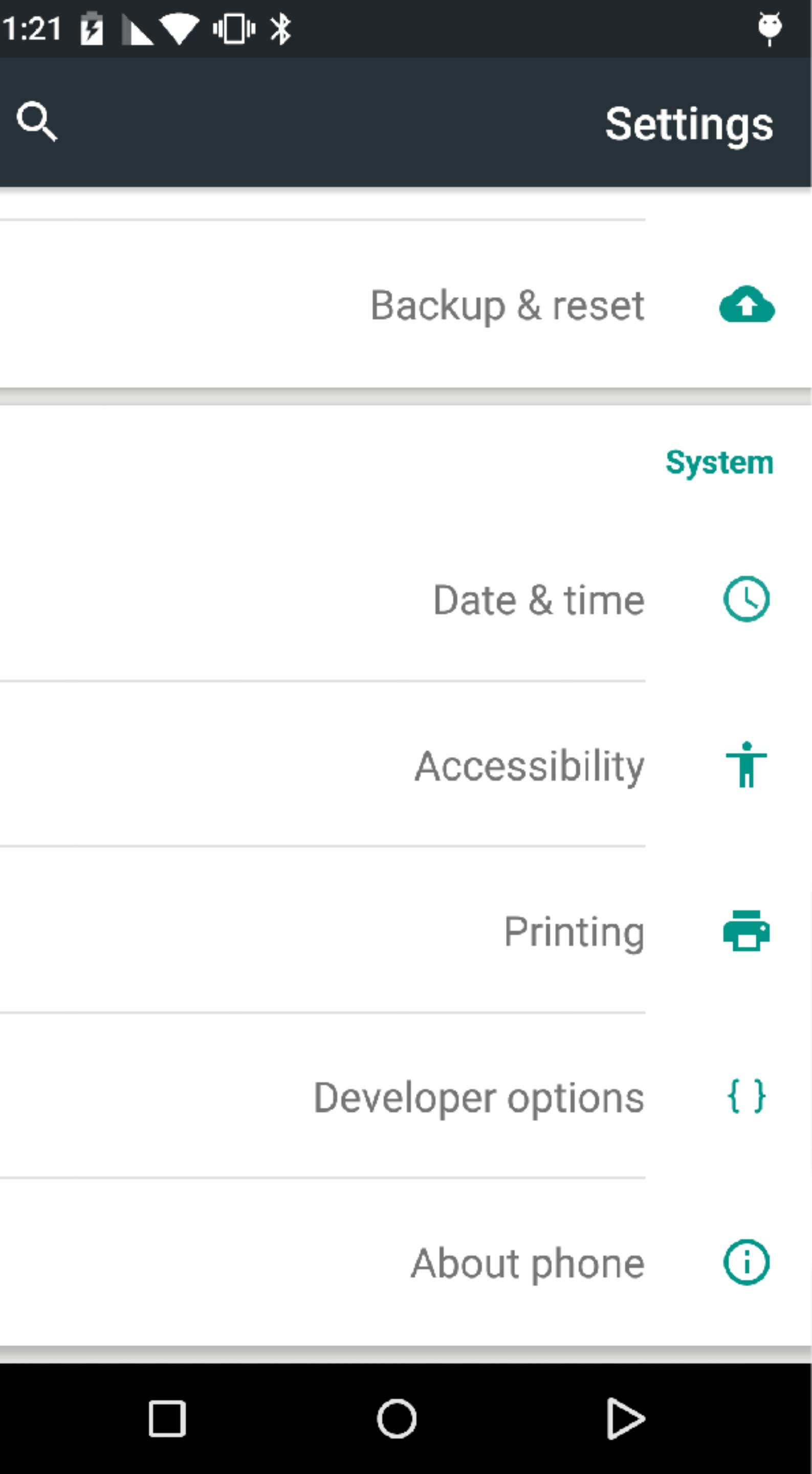
New in P

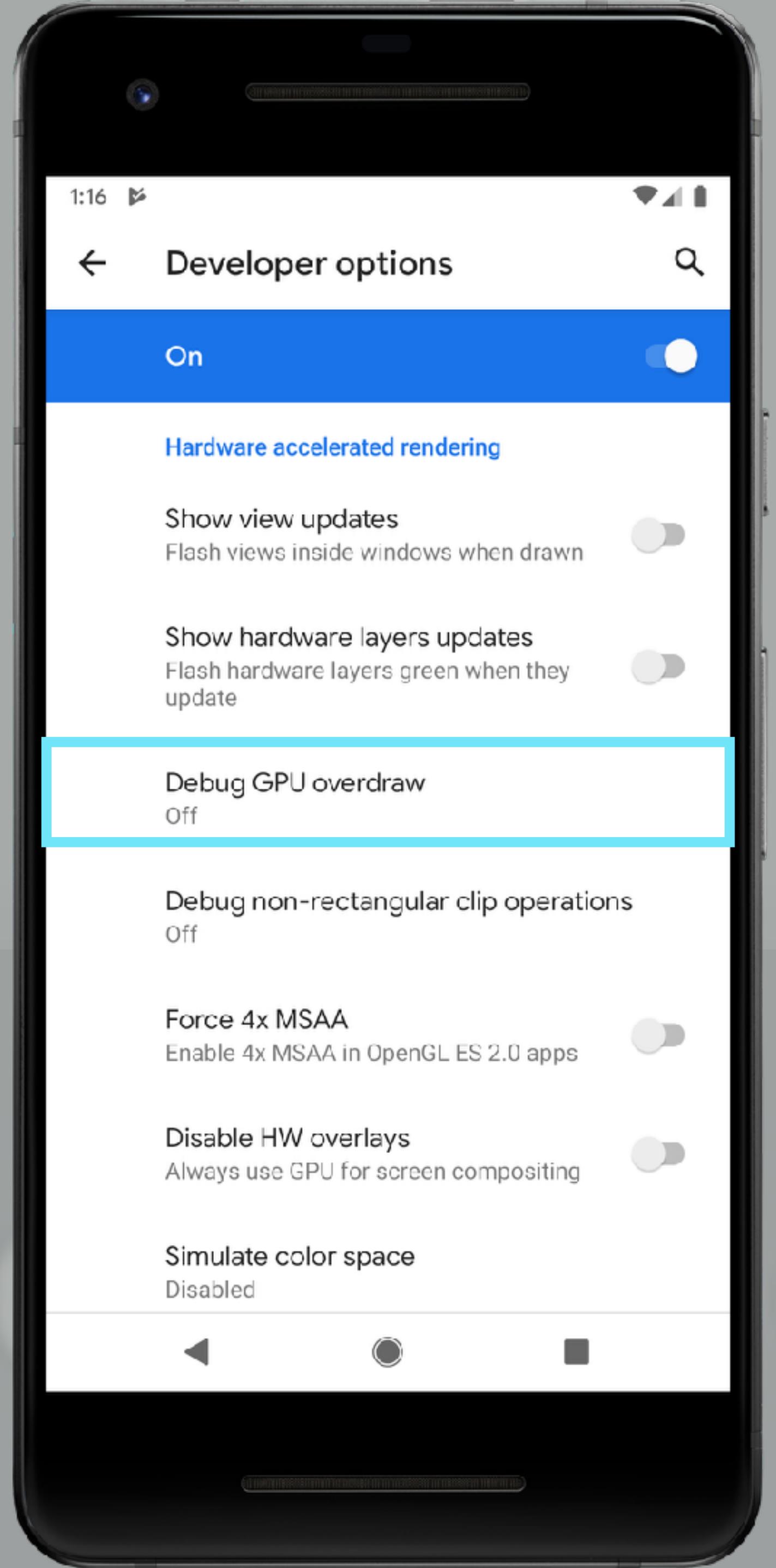


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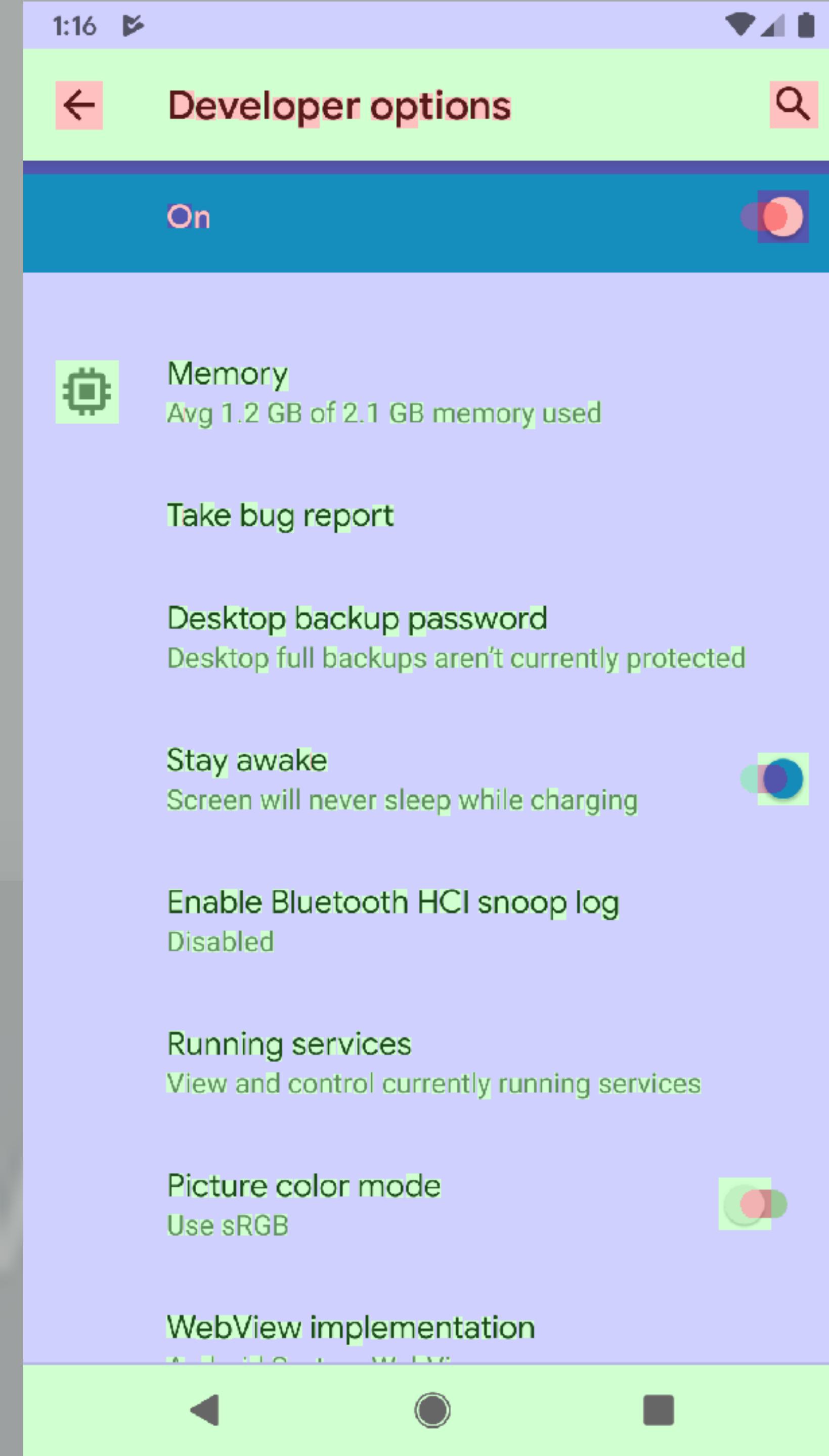
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[https://
developer.android.com/
topic/performance/
rendering/overdraw.html](https://developer.android.com/topic/performance/rendering/overdraw.html)



No overdraw

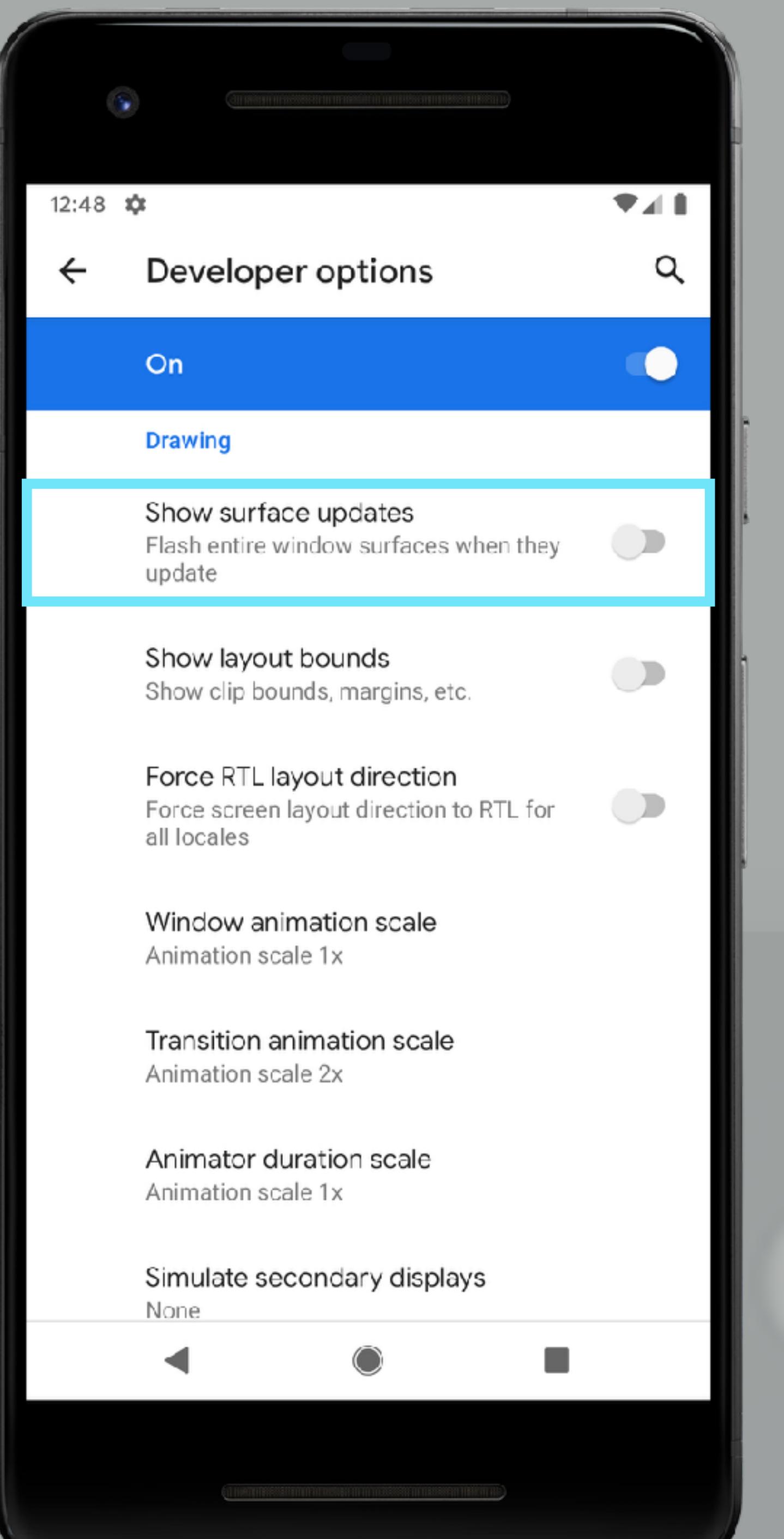
1x overdraw

2x overdraw

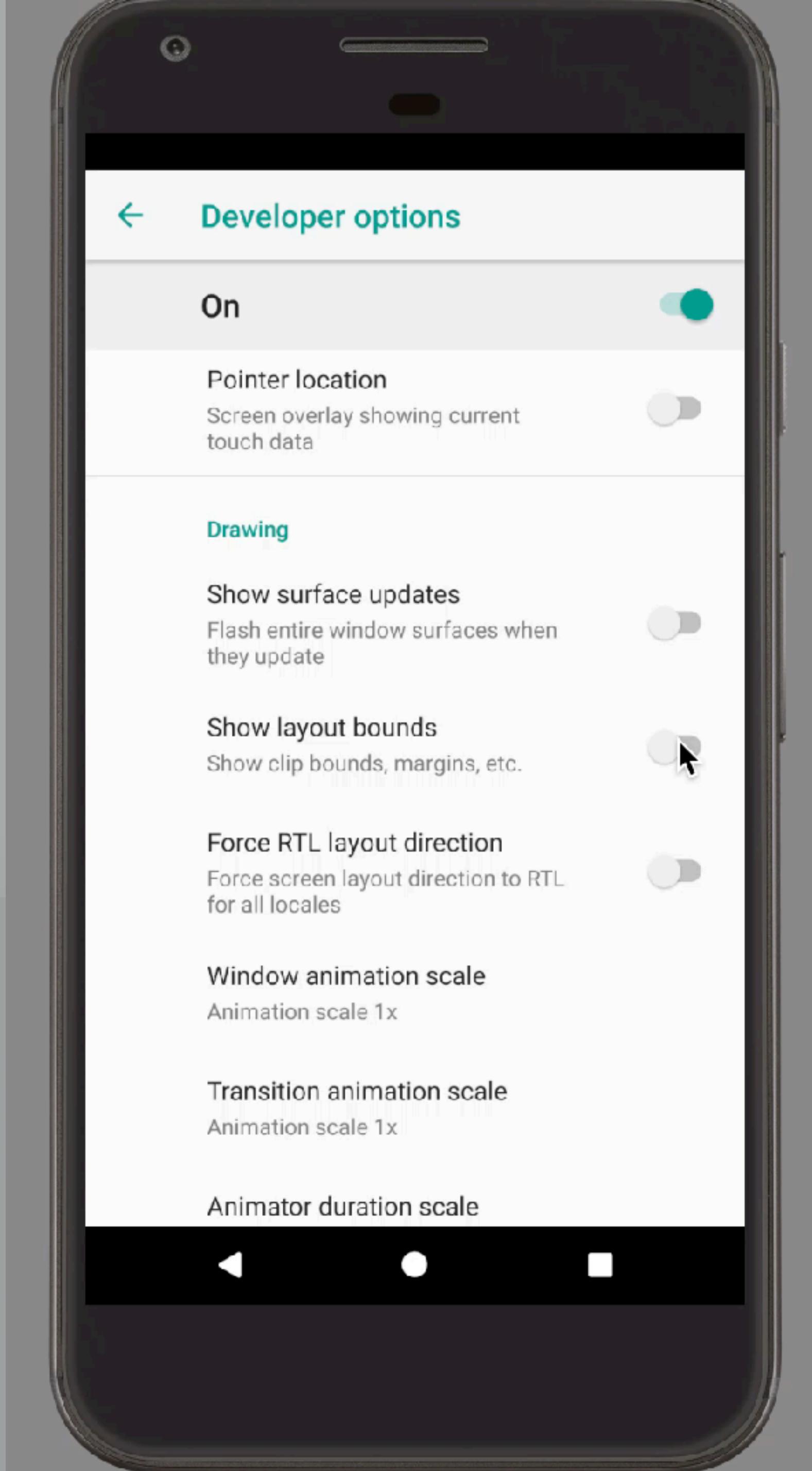
3x overdraw

4+x overdraw

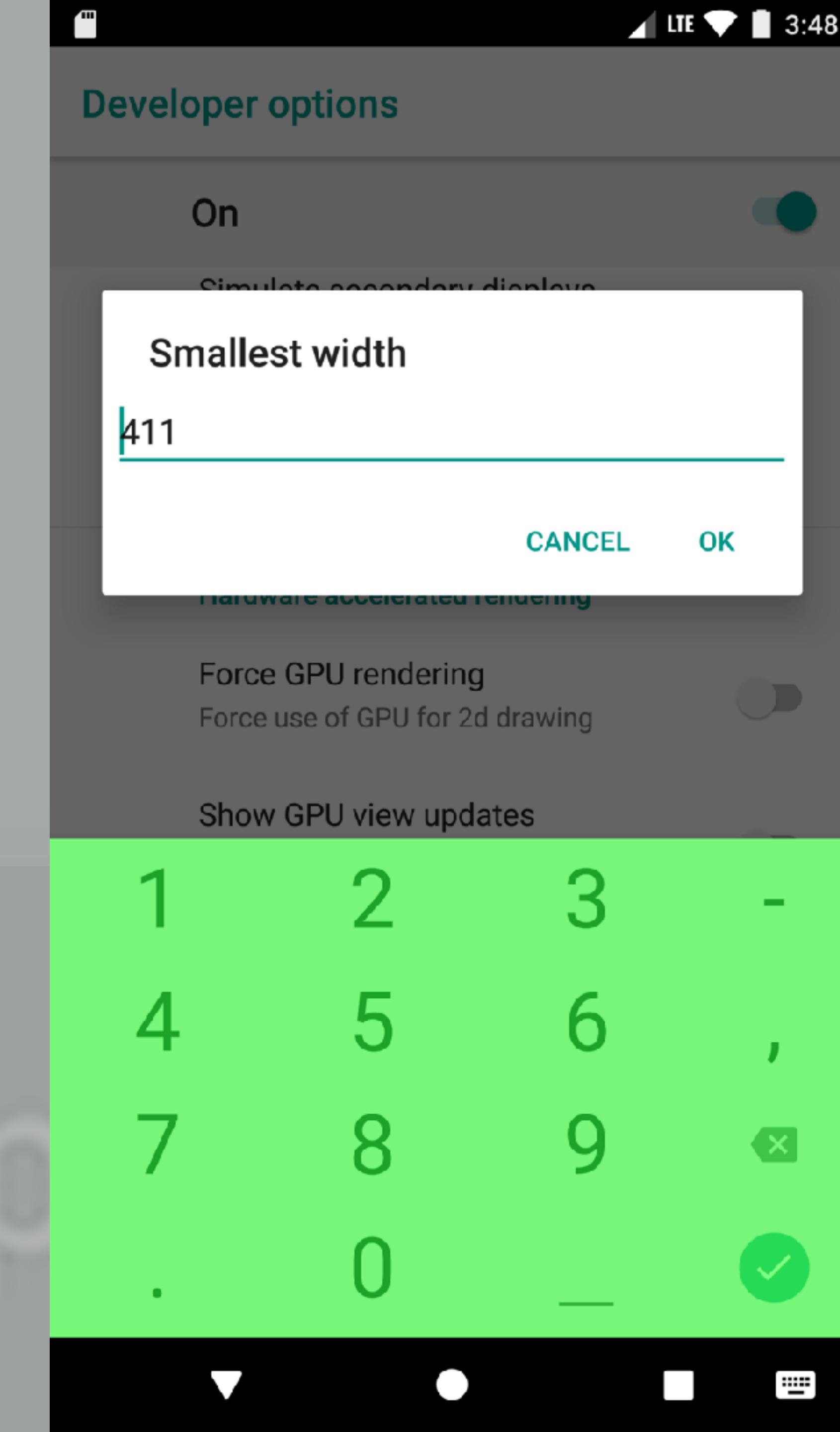
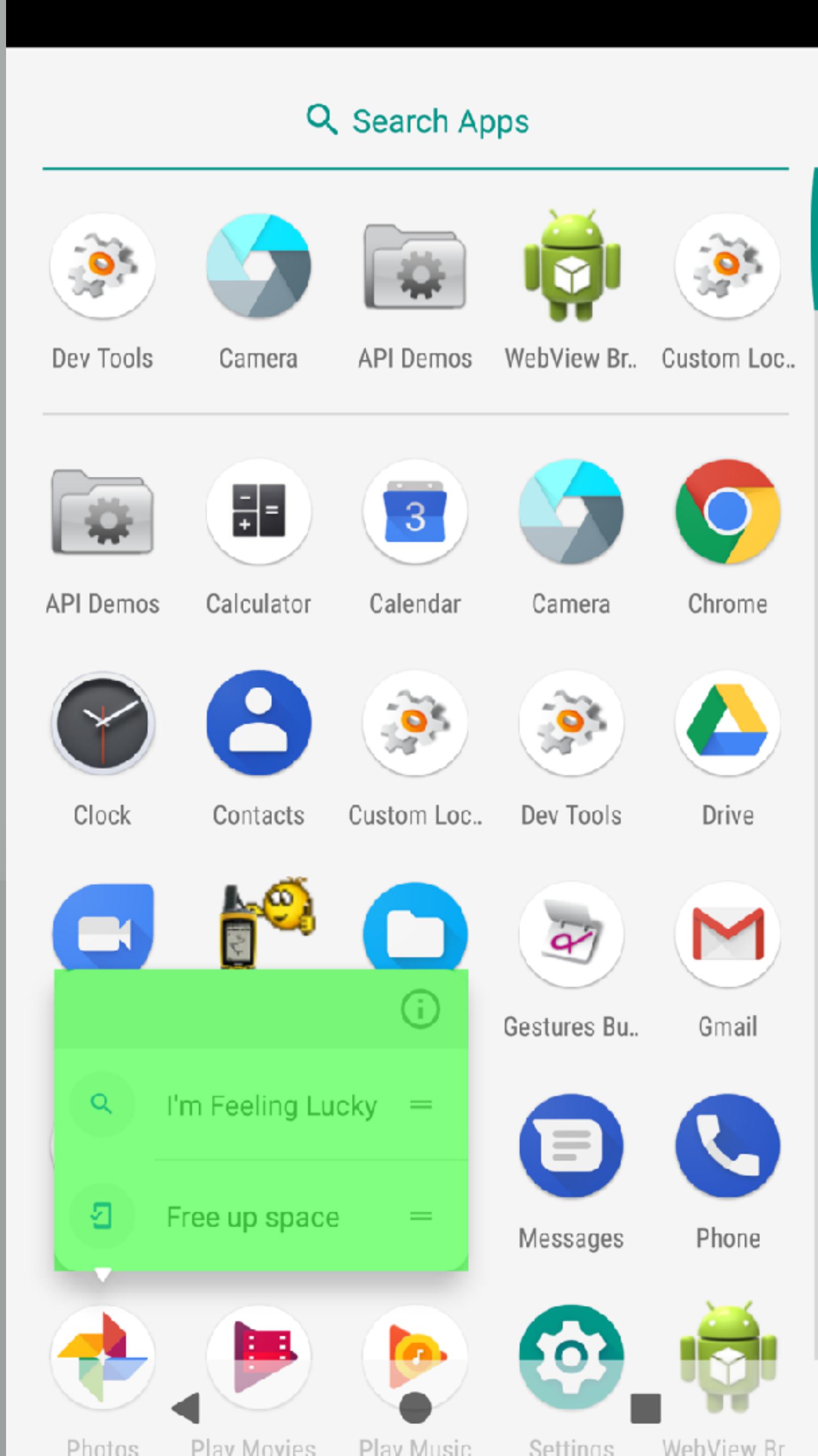
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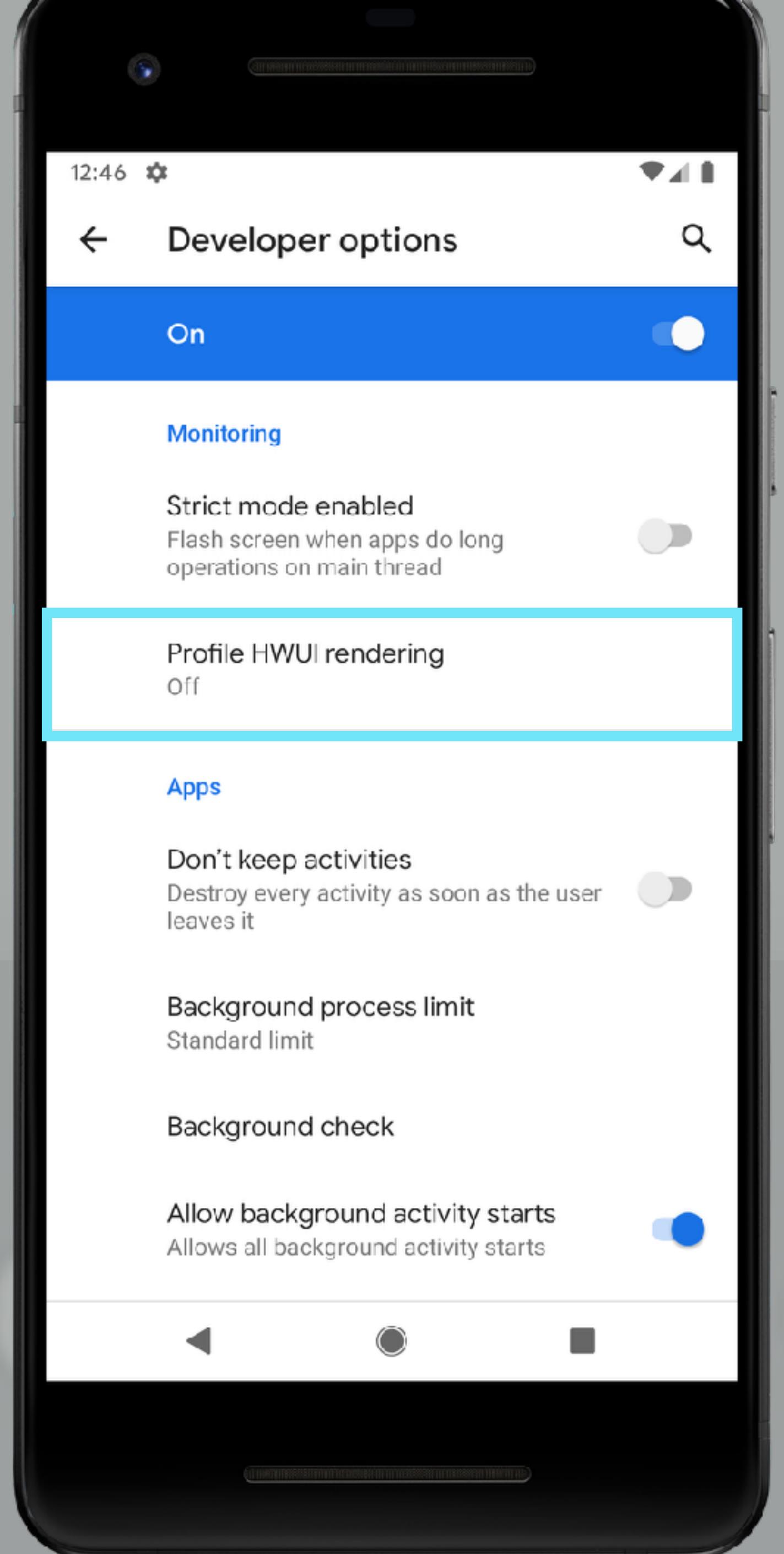
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← Developer options



On



Monitoring

Strict mode enabled

Profile HWUI rendering

- Off
- On screen as bars
- In adb shell dumpsys gfxinfo

CANCEL

Background process limit

Standard limit

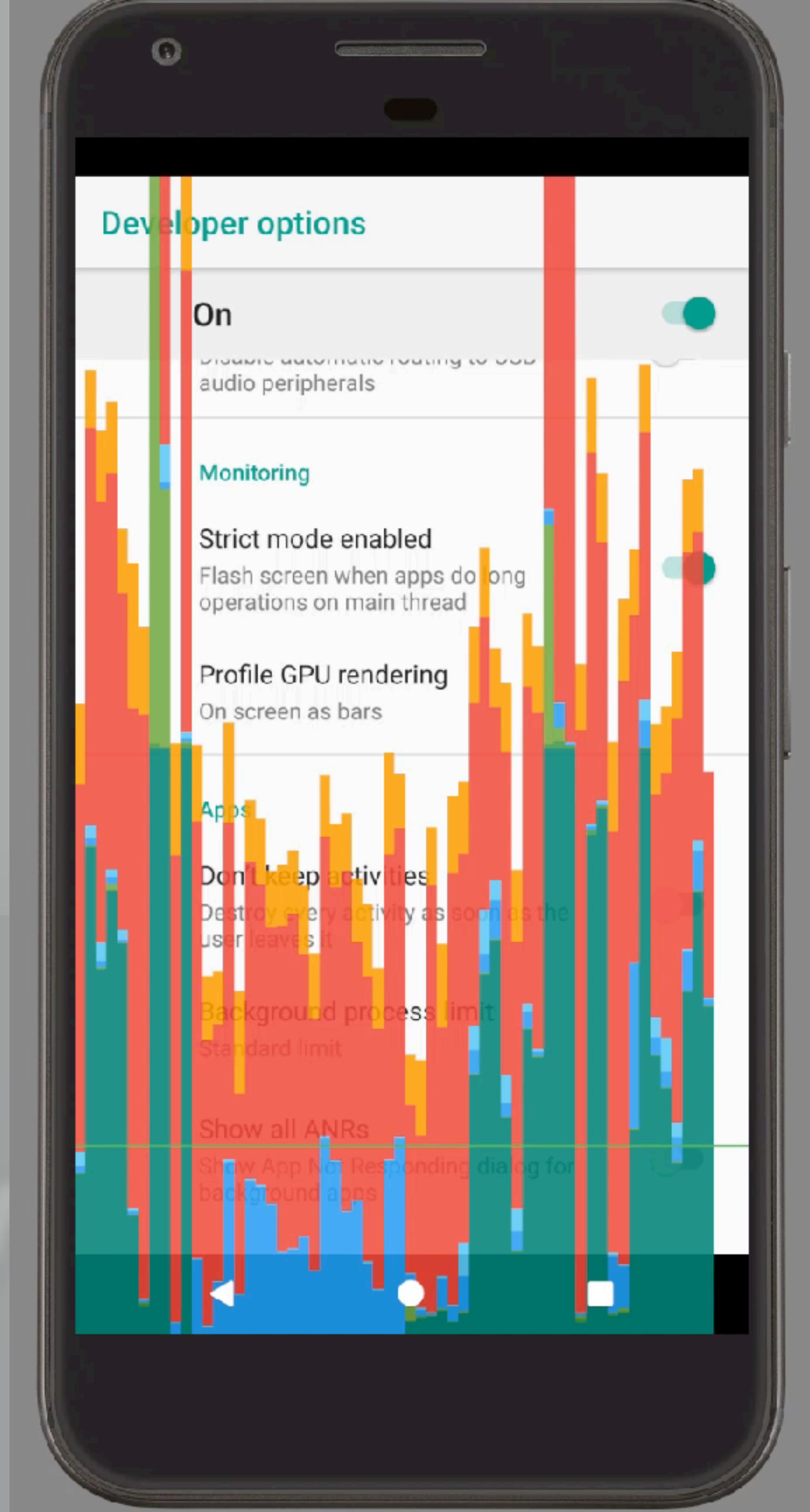
Background check

Allow background activity starts

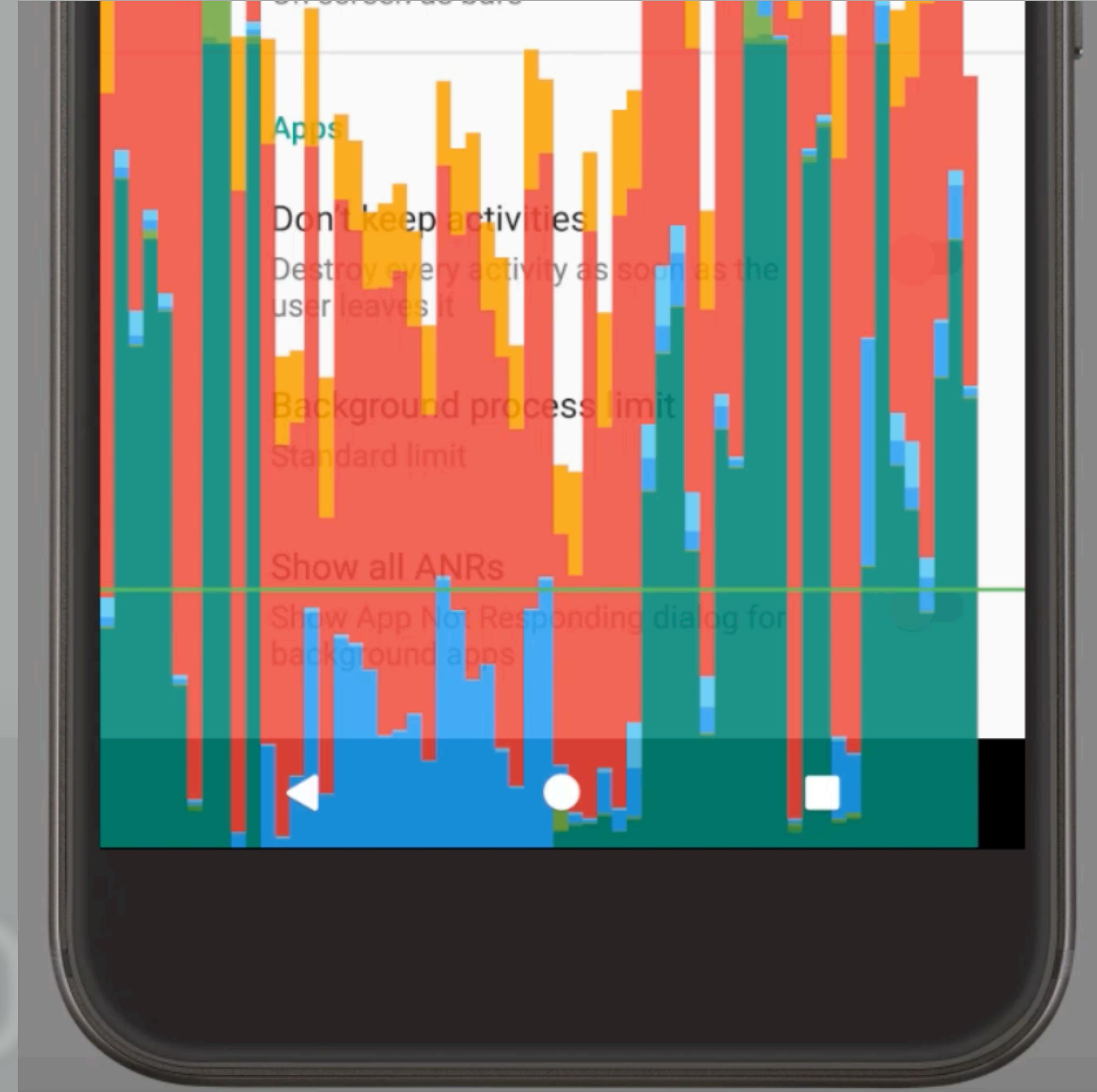
Allows all background activity starts



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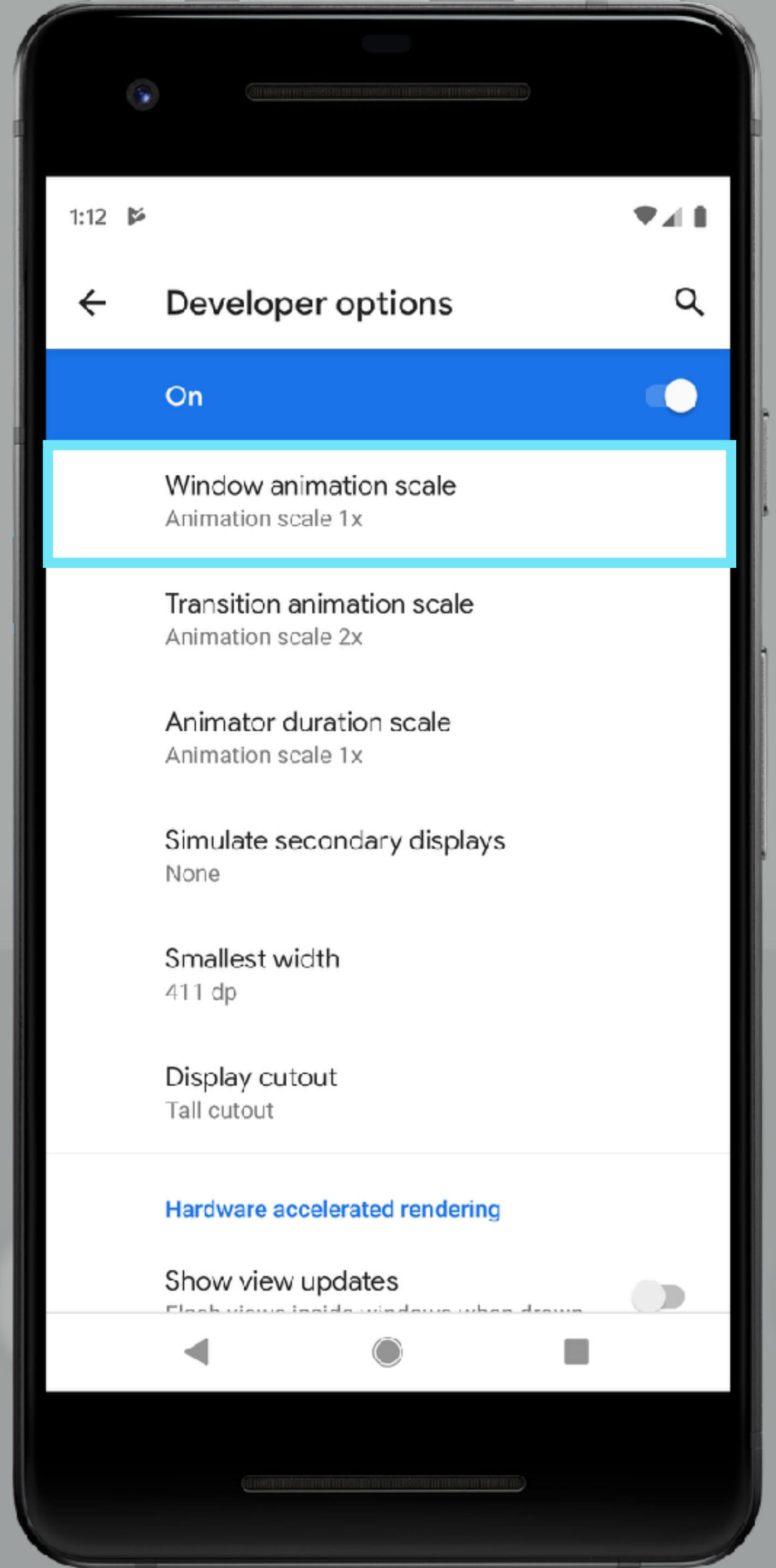


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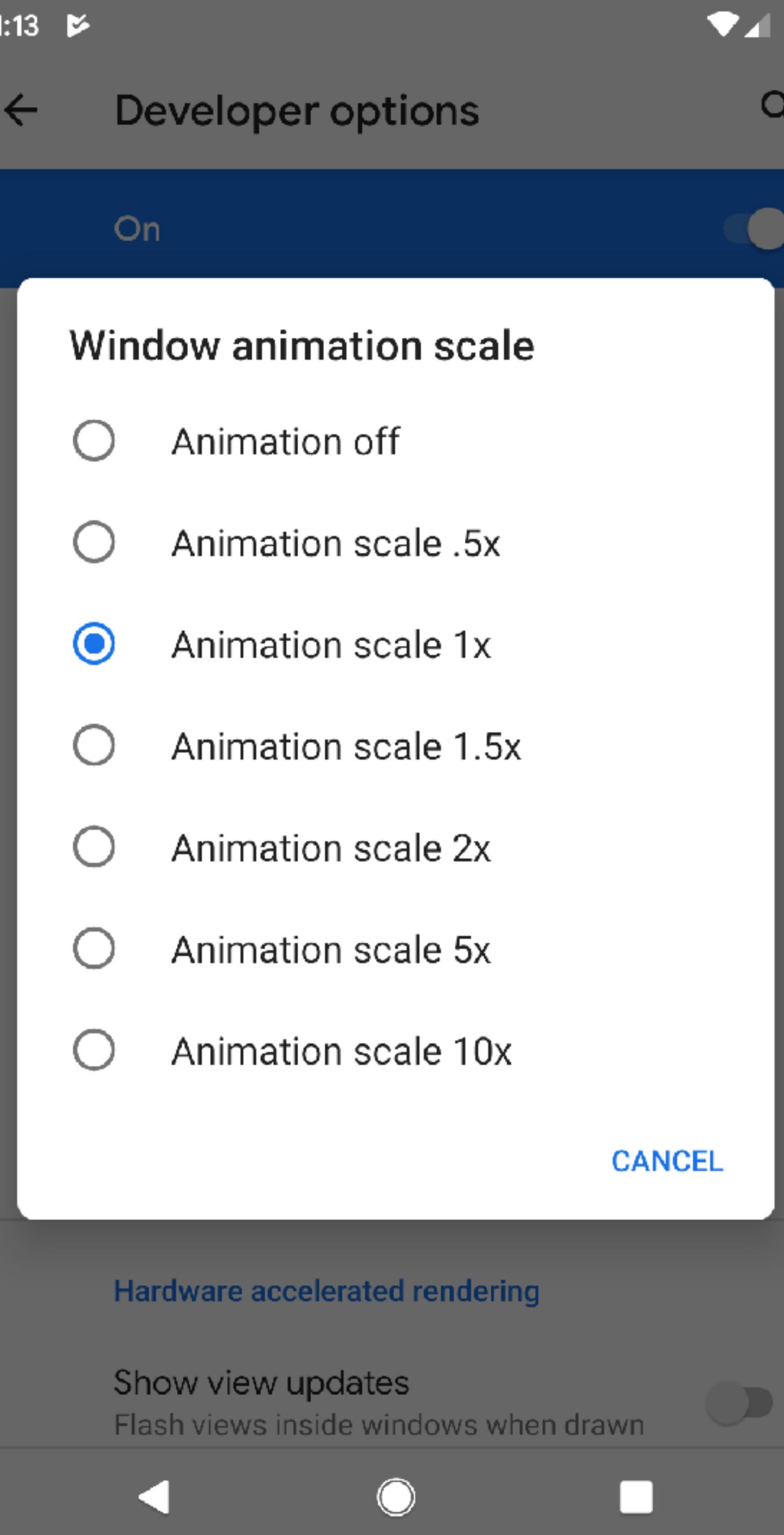


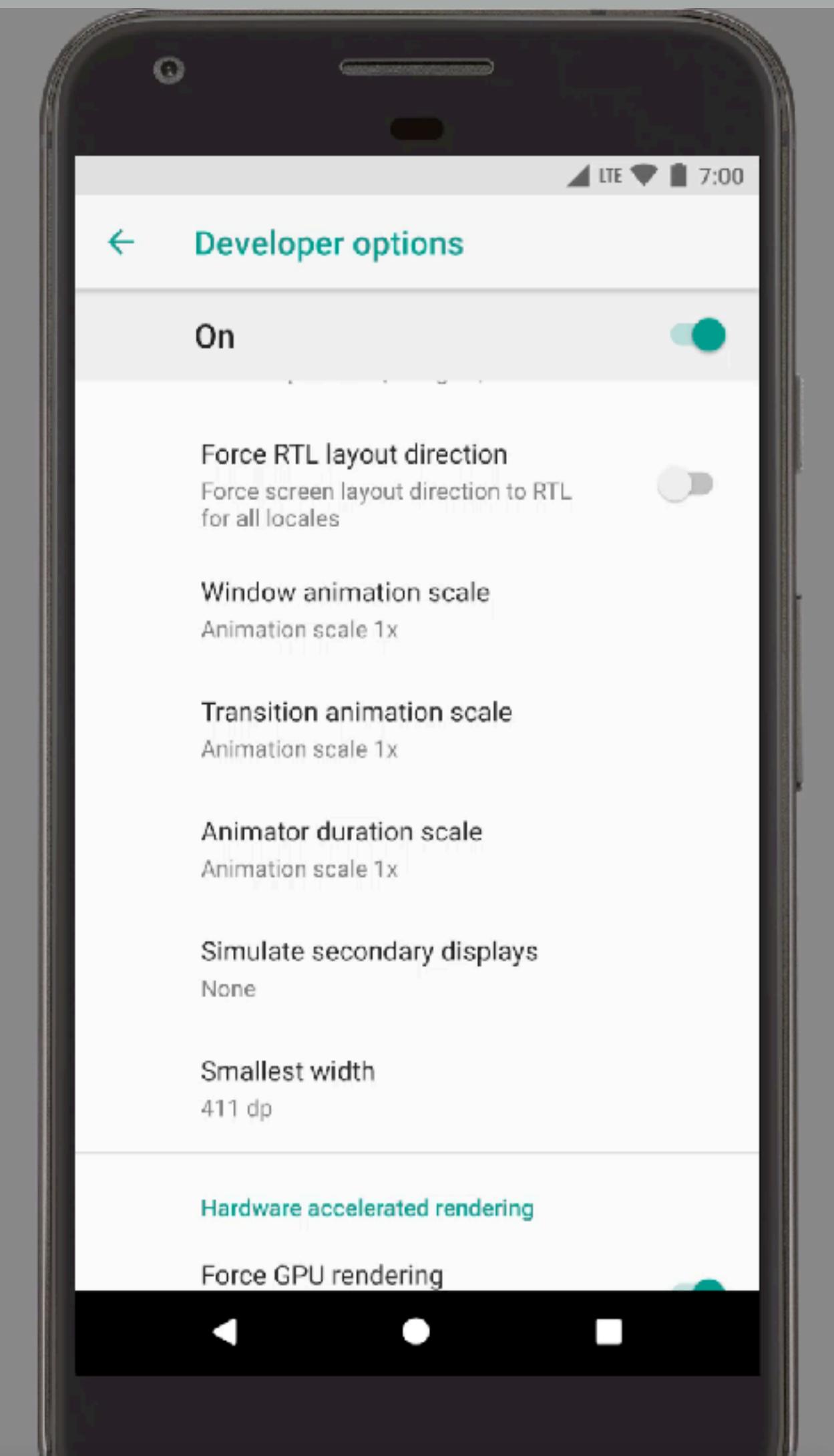
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Component of Bar	Rendering Stage	Description
	Swap Buffers	Represents the time the CPU is waiting for the GPU to finish its work. If this bar gets tall, it means the app is doing too much work on the GPU.
	Command Issue	Represents the time spent by Android's 2D renderer issuing commands to OpenGL to draw and redraw display lists. The height of this bar is directly proportional to the sum of the time it takes each display list to execute—more display lists equals a taller red bar.
	Sync & Upload	Represents the time it take to upload bitmap information to the GPU. A large segment indicates that the app is taking considerable time loading large amounts of graphics.
	Draw	Represents the time used to create and update the view's display lists. If this part of the bar is tall, there may be a lot of custom view drawing, or a lot of work in onDraw methods.
	Measure / Layout	Represents the amount of time spent on onLayout and onMeasure callbacks in the view hierarchy. A large segment indicates that the view hierarchy is taking a long time to process.
	Animation	Represents the time it took to evaluate all the animators that were running that frame. If this segment is large, your app could be using a custom animator that is not performing well or some unintended work is happening as a result of properties being updated.
	Input Handling	Represents the time that the app spent executing code inside of an input event callback. If this segment is large it indicates that the app is spending too much time processing the user input. Consider offloading such processing to a different thread.
	Misc Time/VSync Delay	Represents the time that the app spends executing operations in between two consecutive frames. It might be an indicator of too much processing happening in the UI thread that could be offloaded to a different thread.

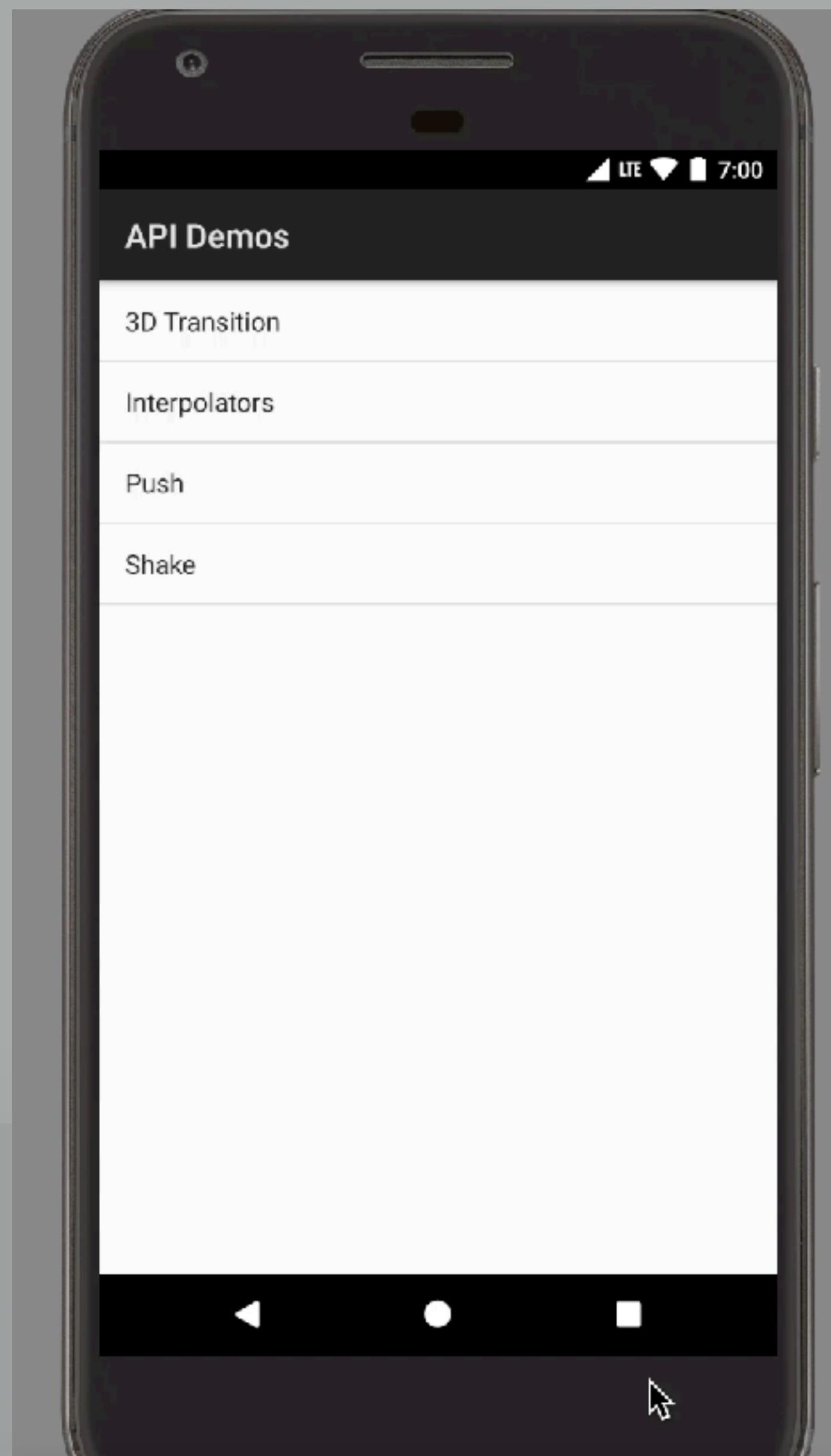


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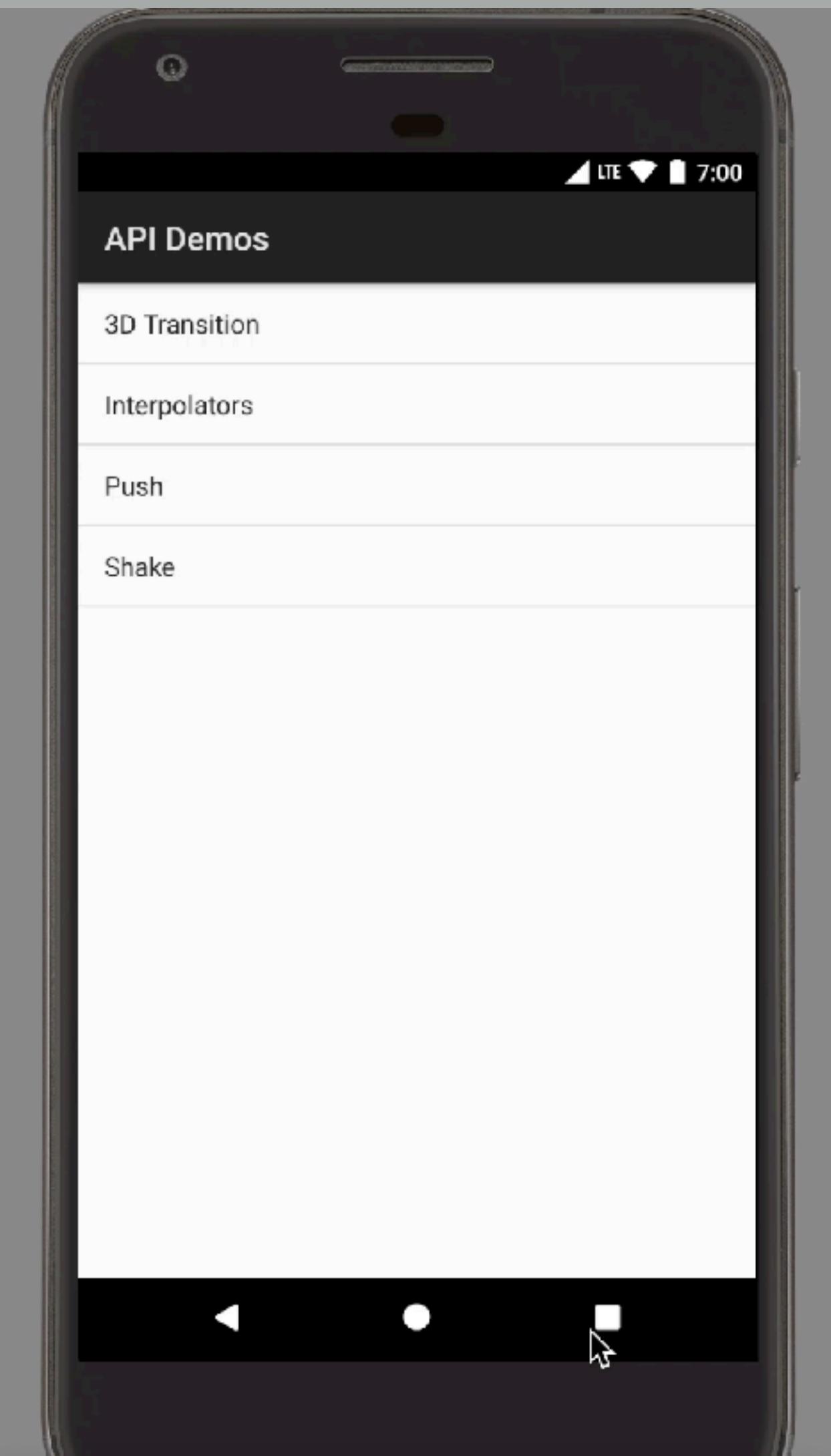




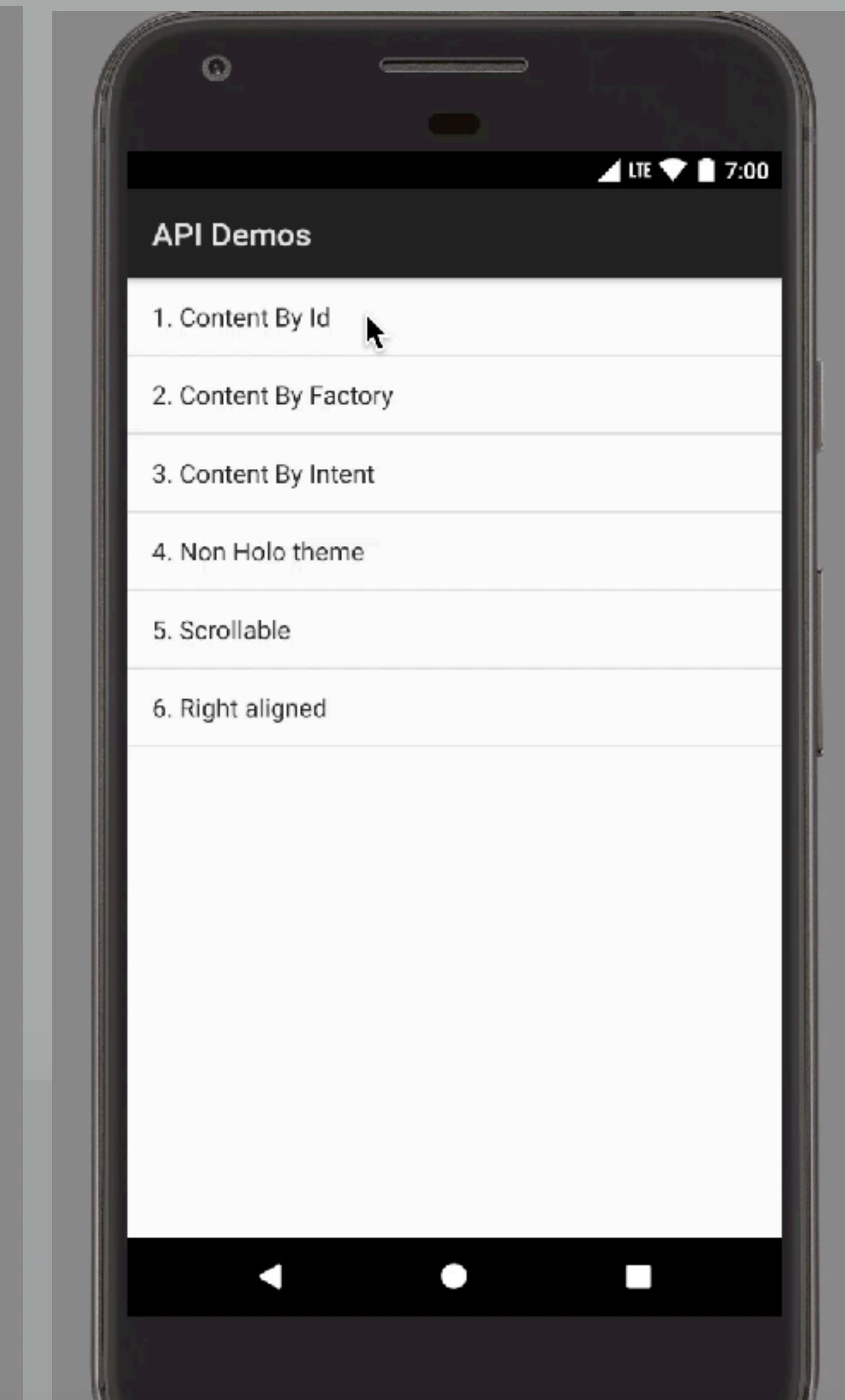
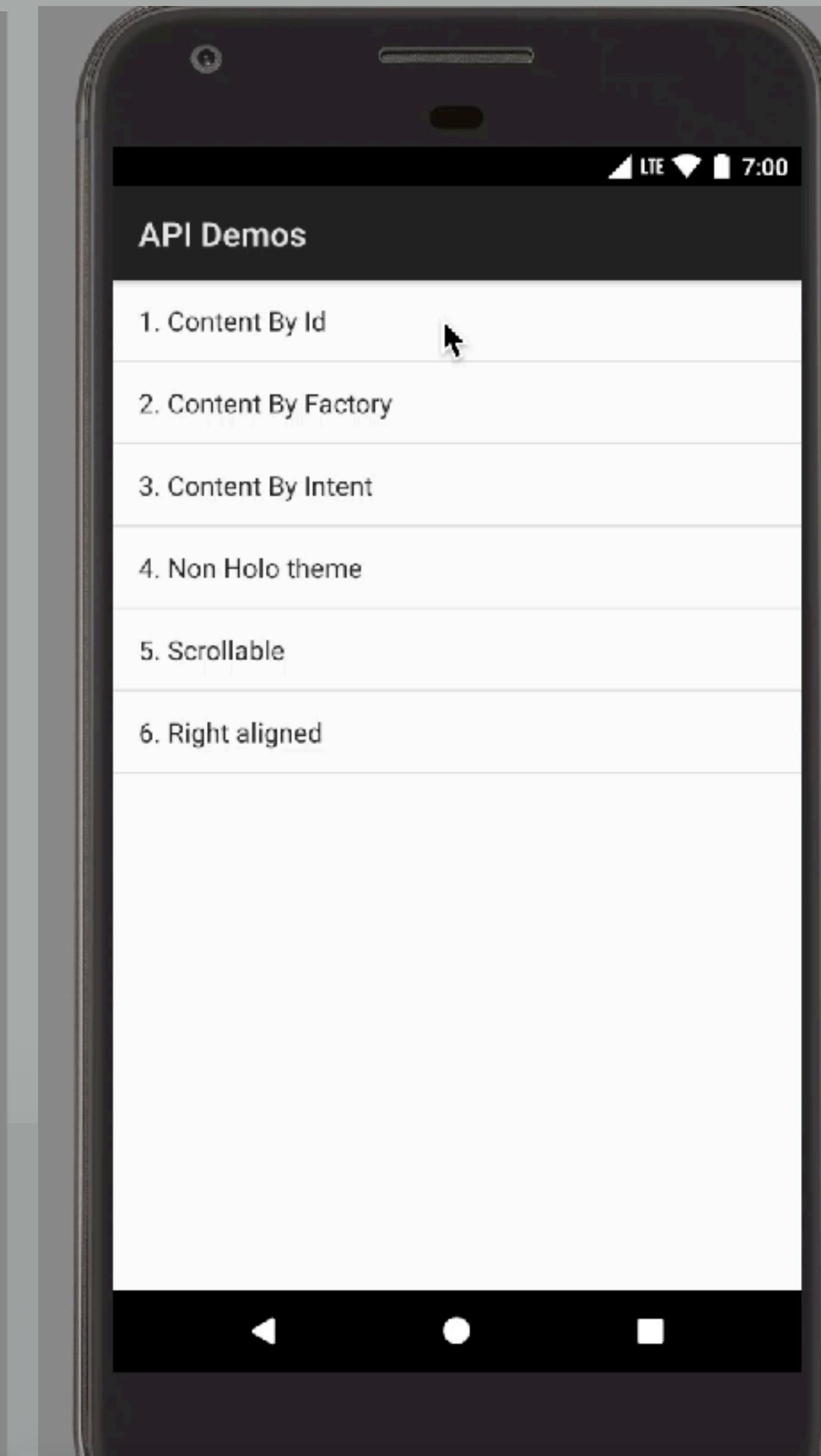
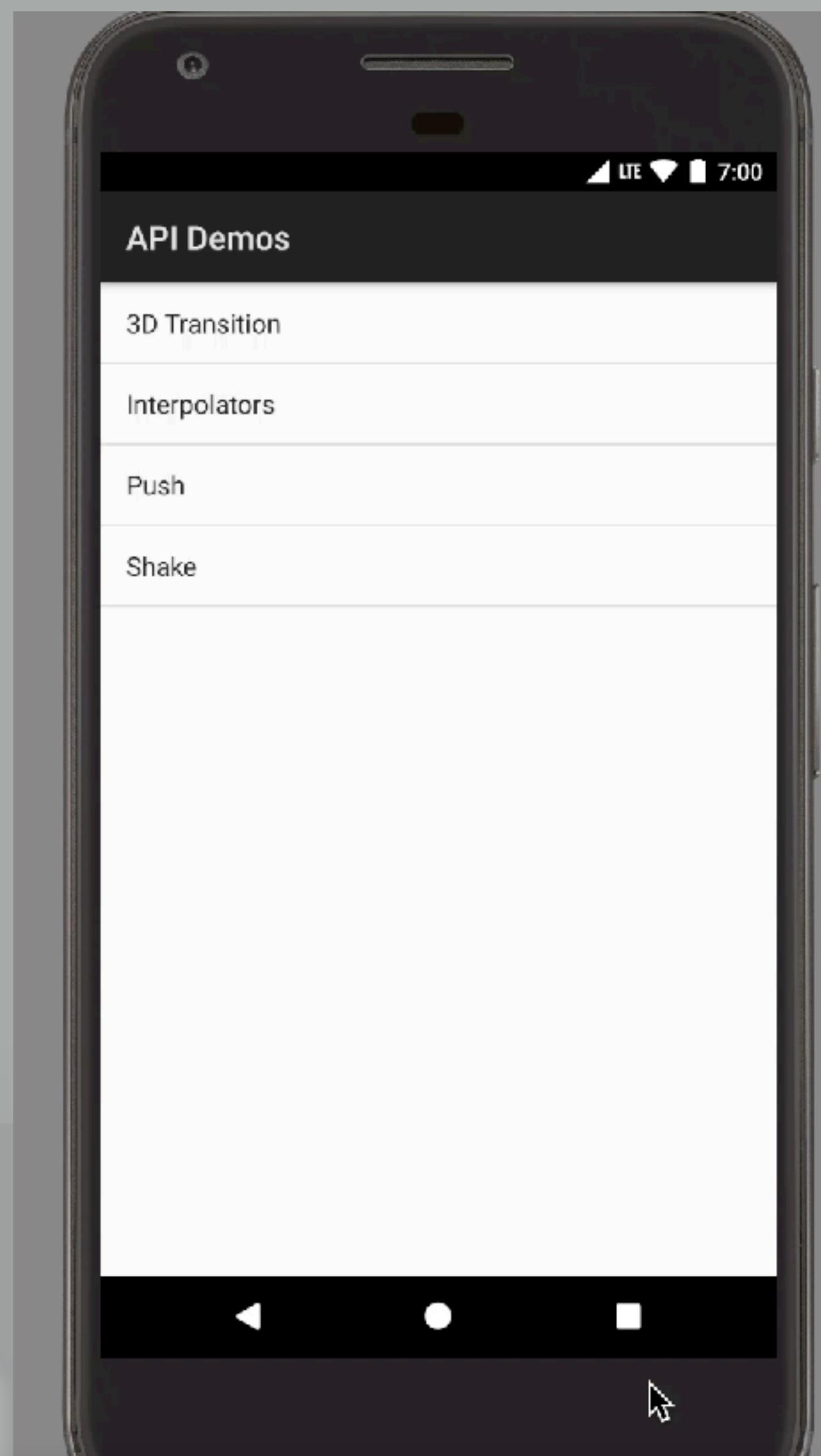
Normal



10x



Off

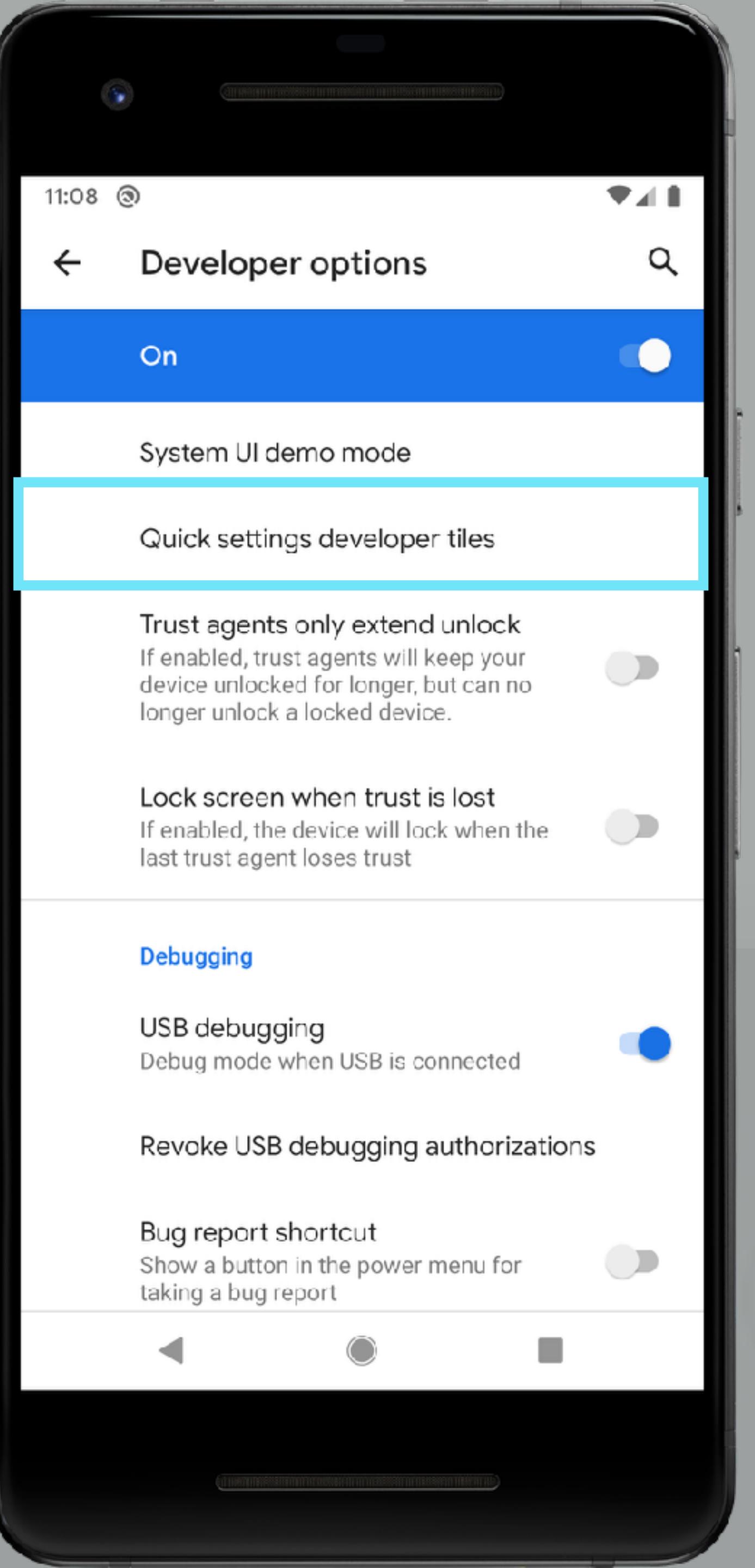


Window

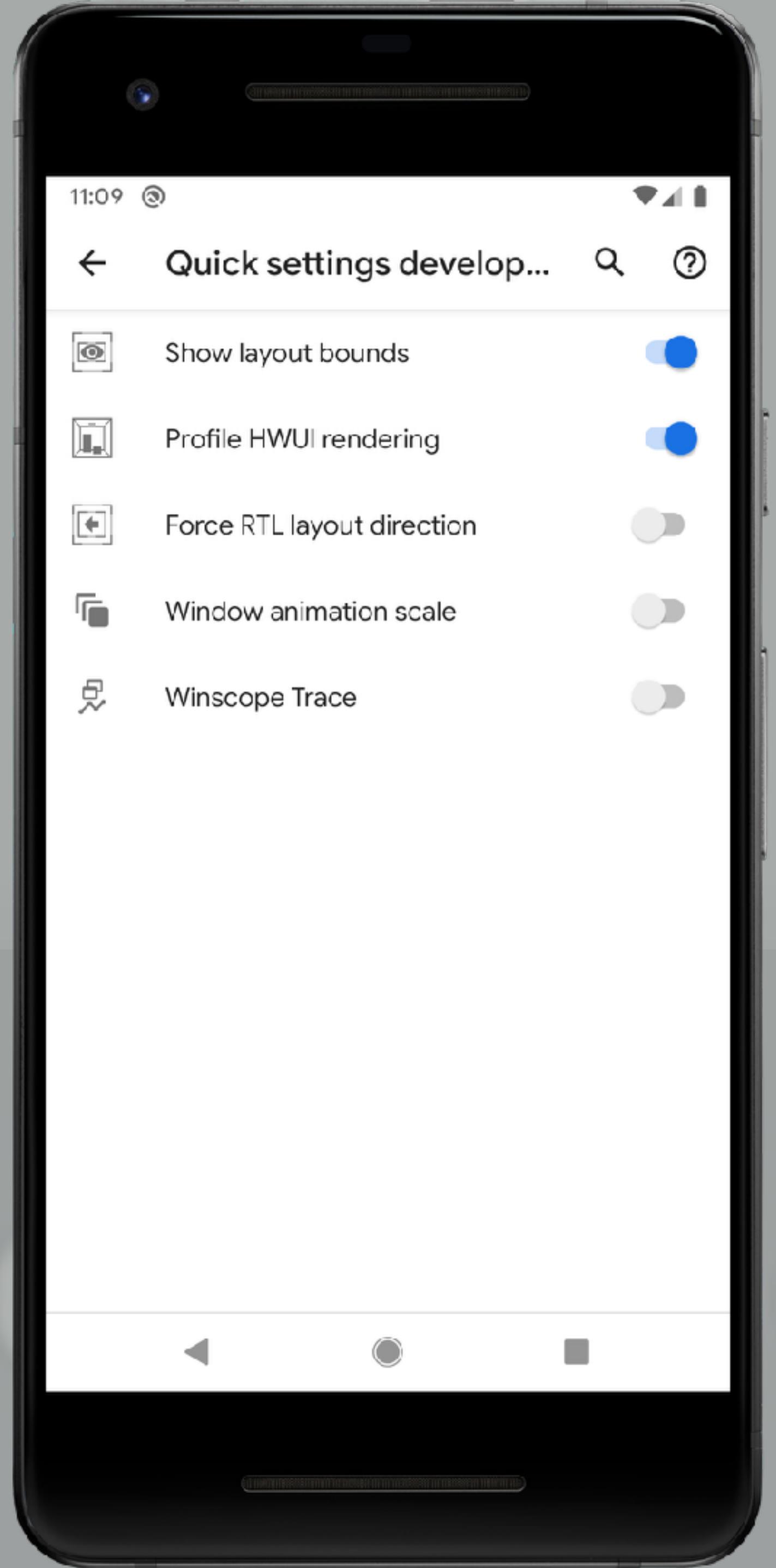
Transition

Duration

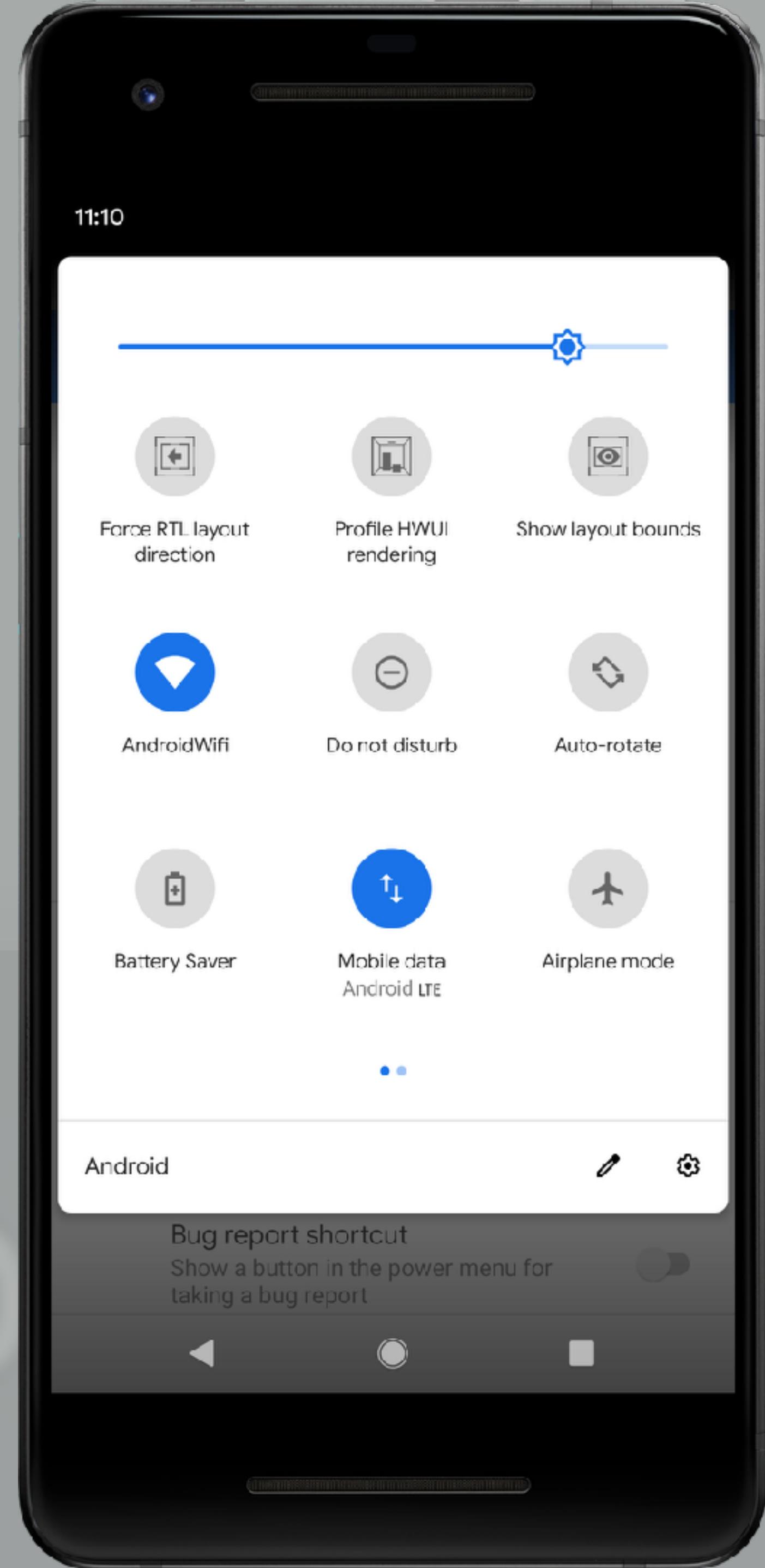
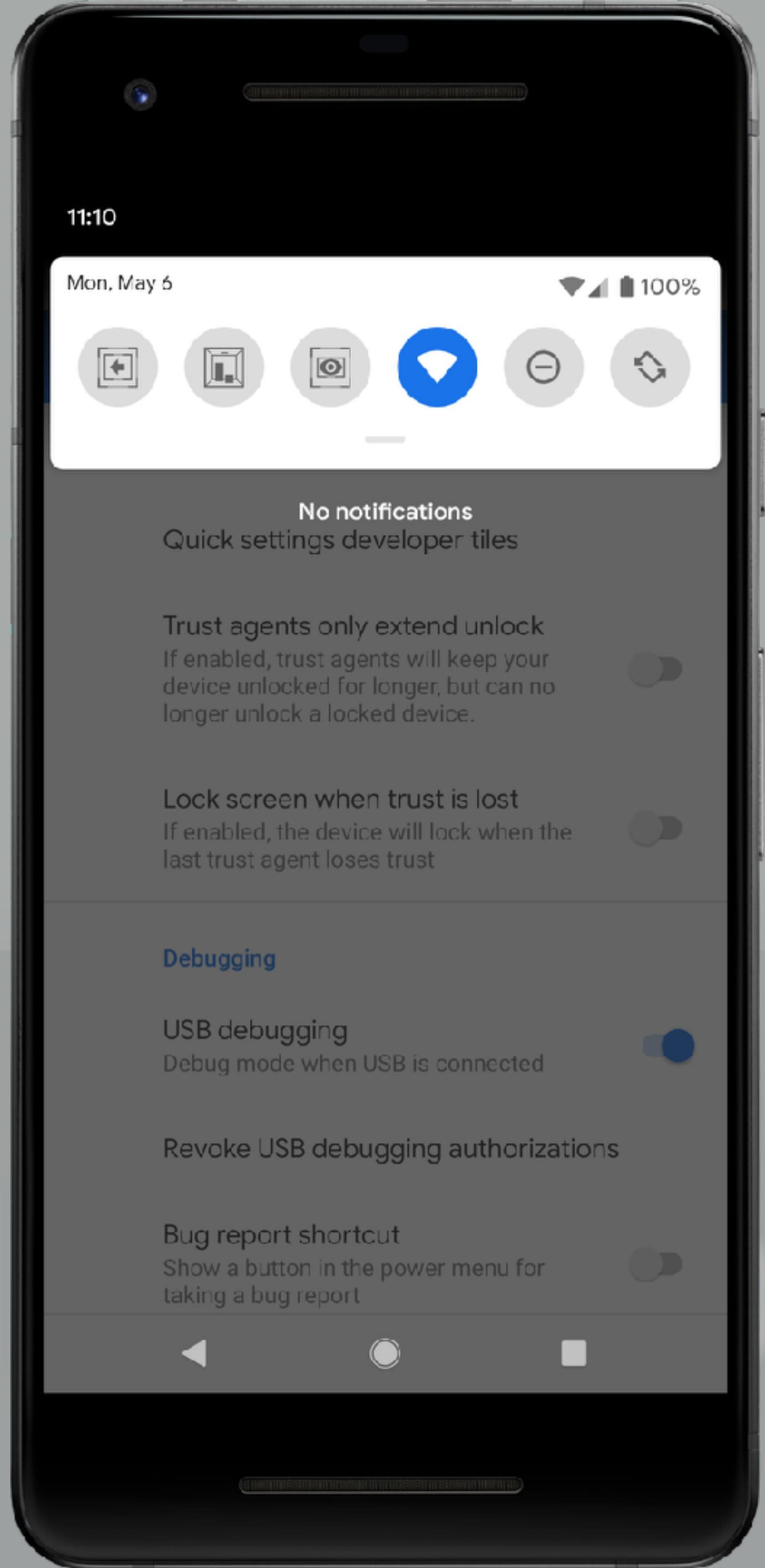
New in O



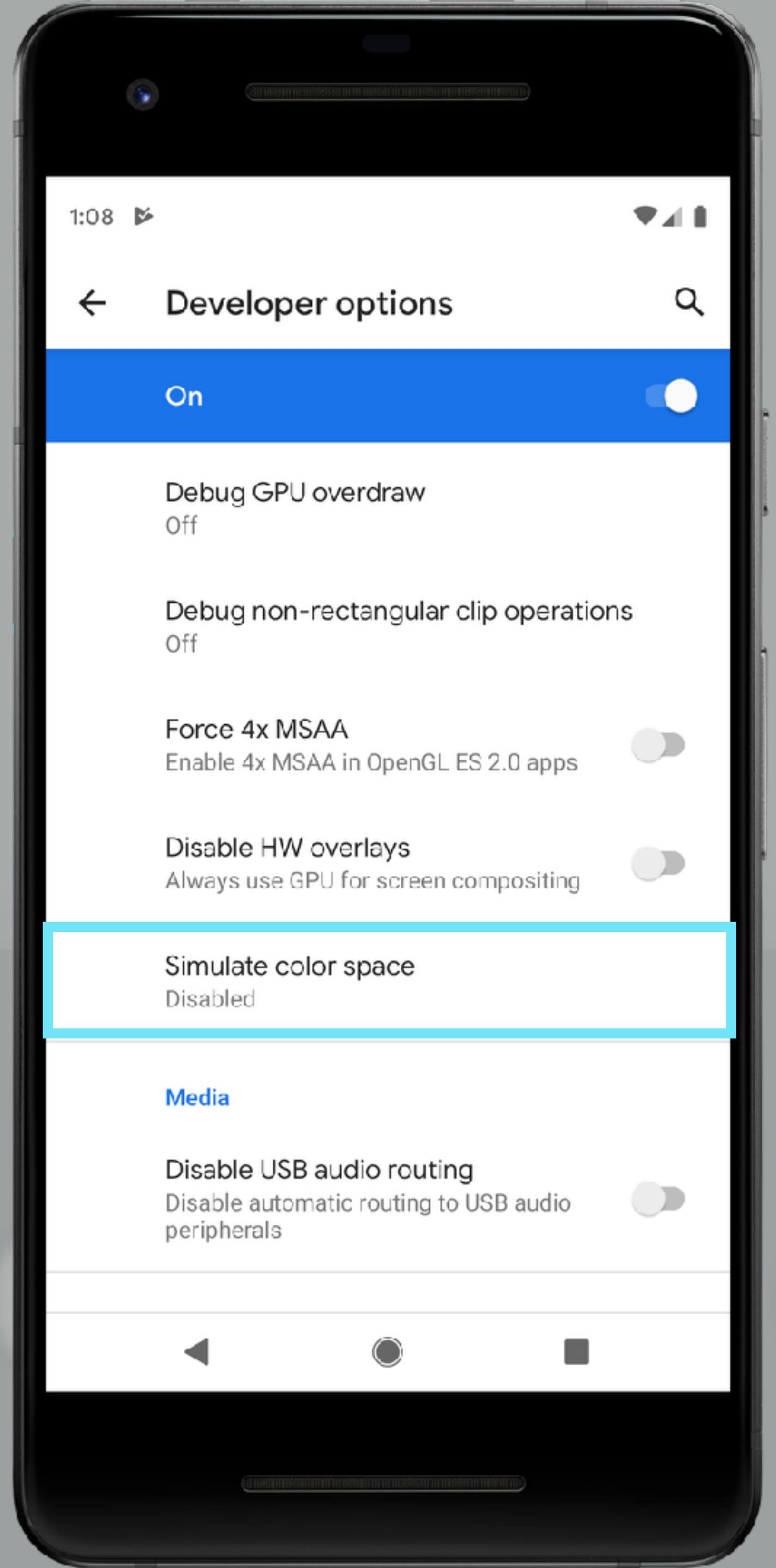
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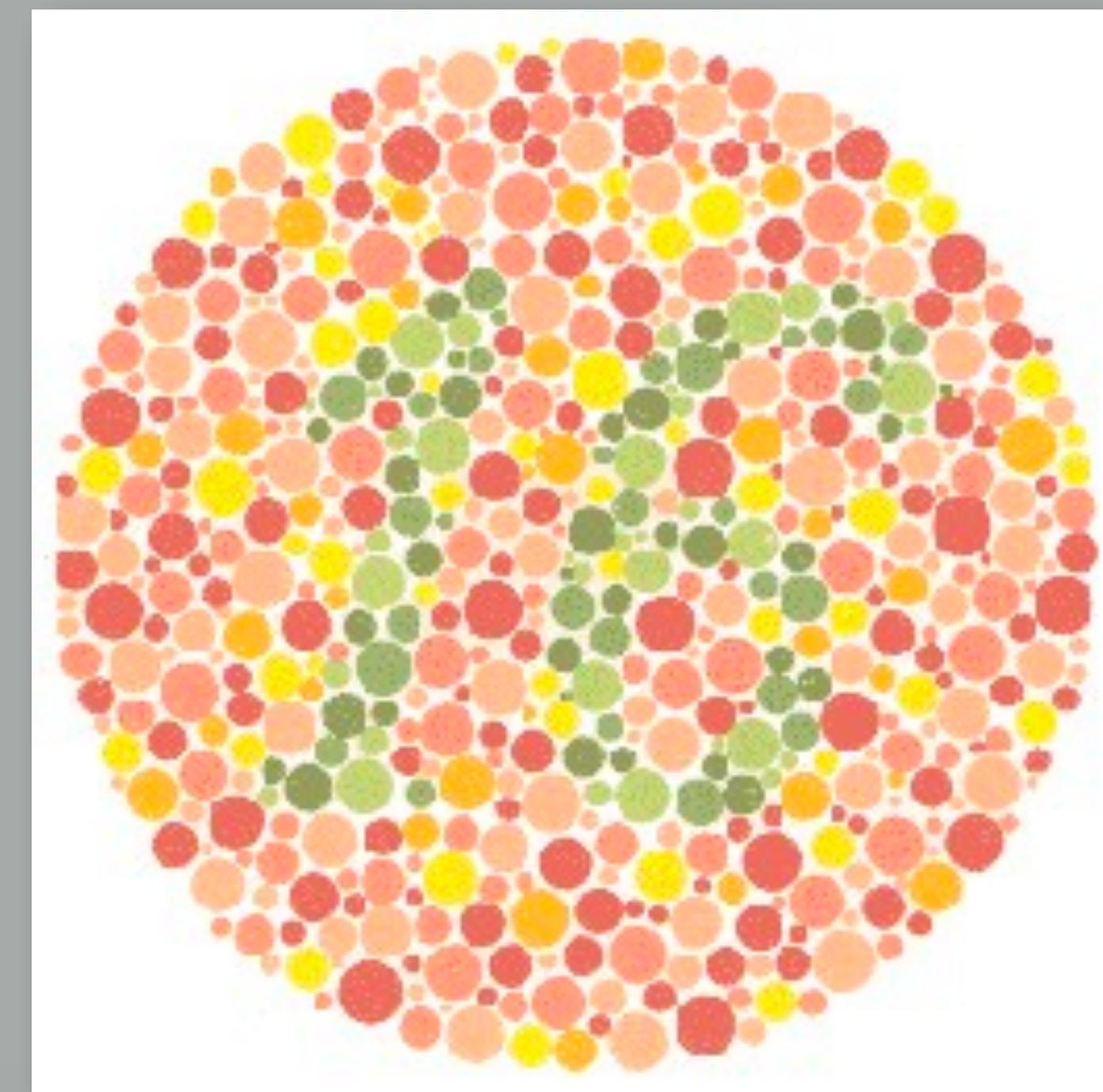
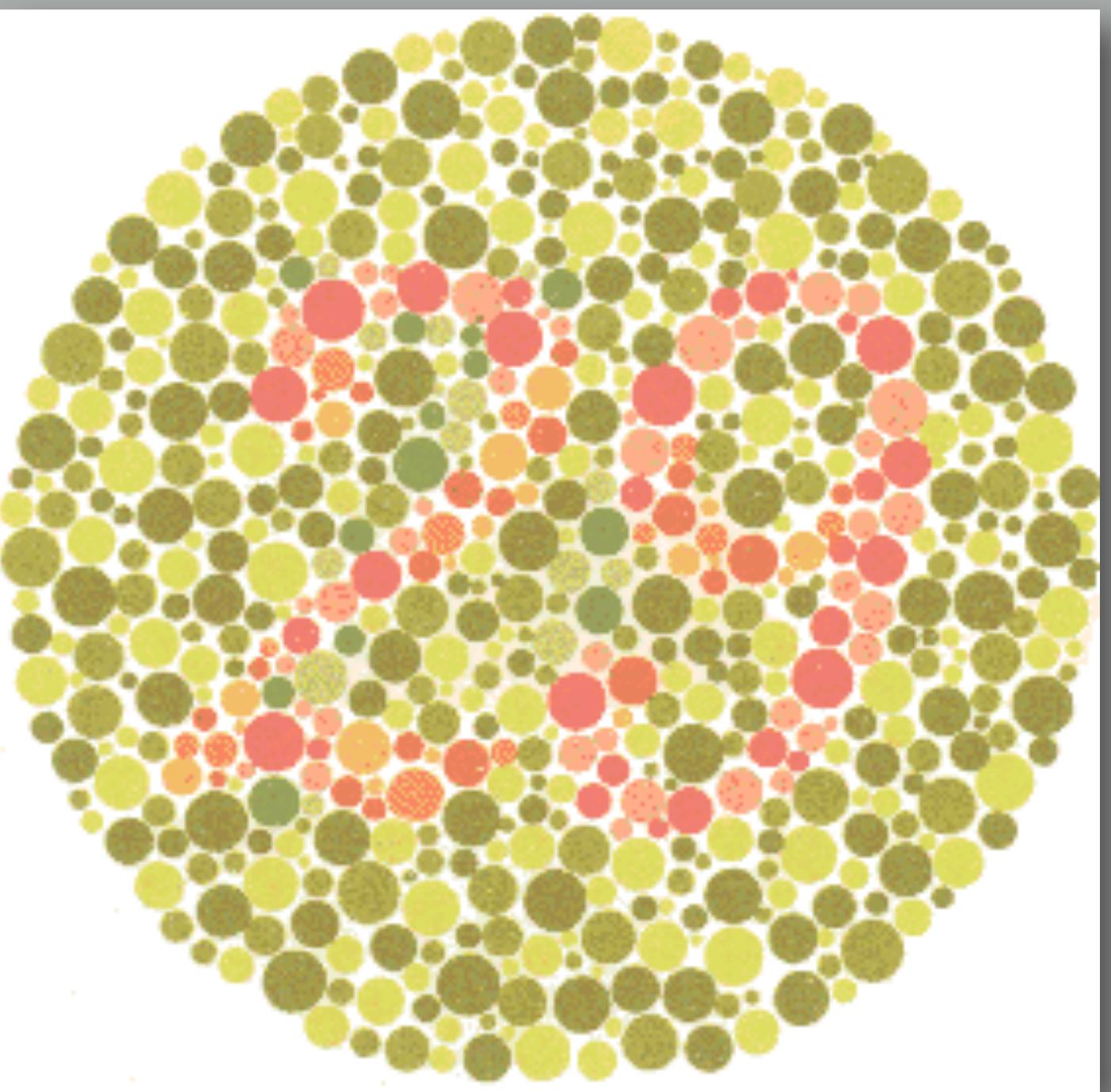
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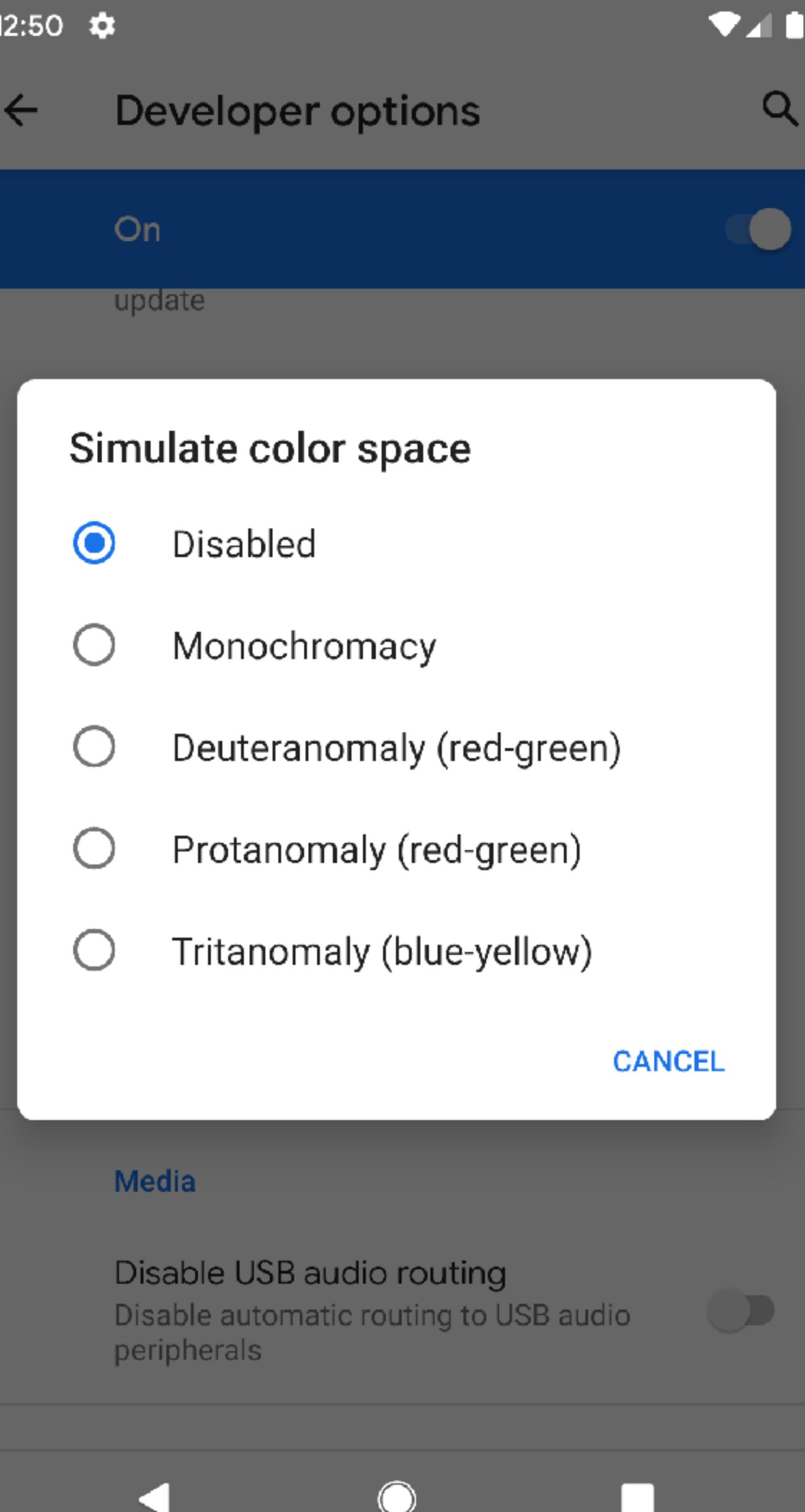


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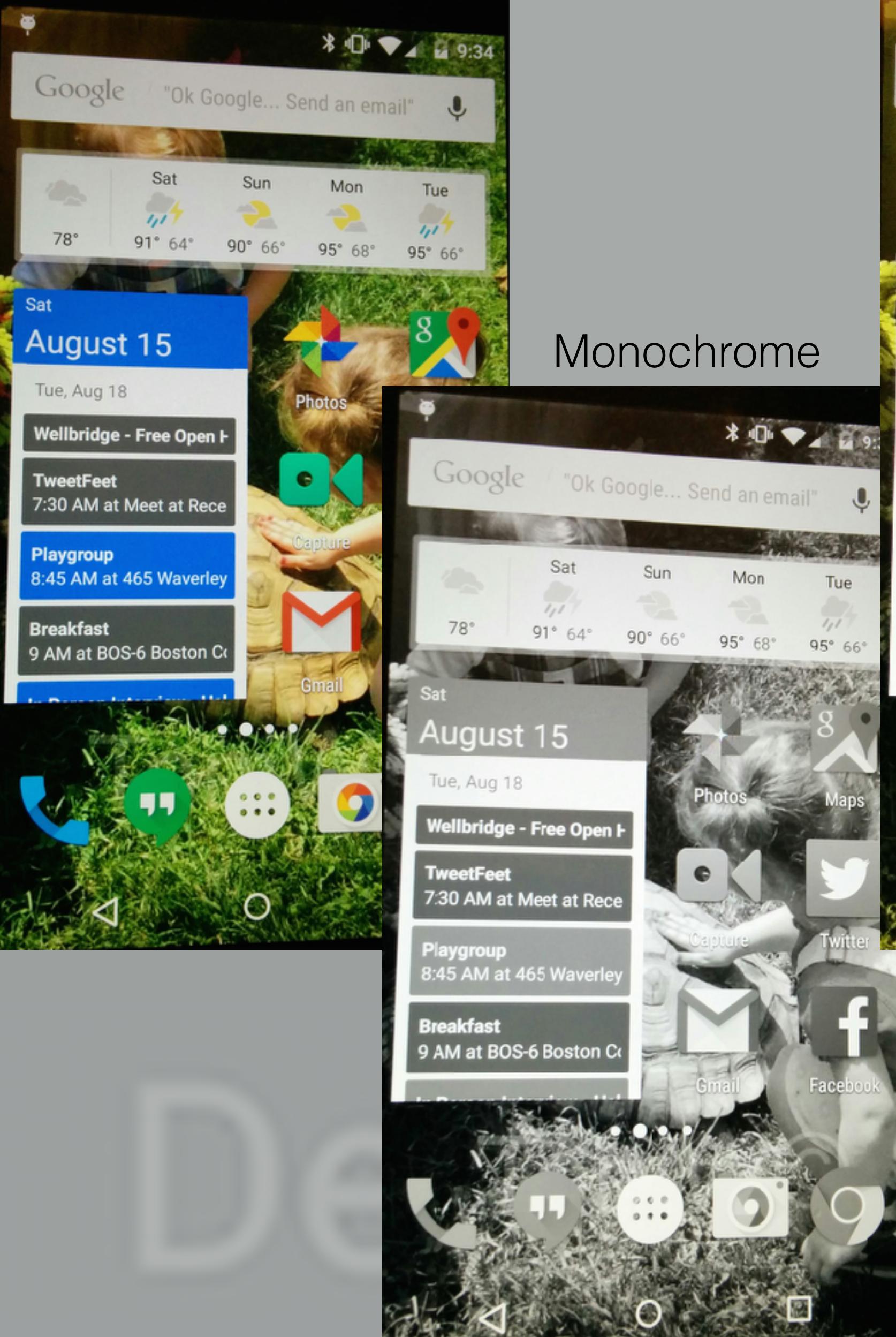


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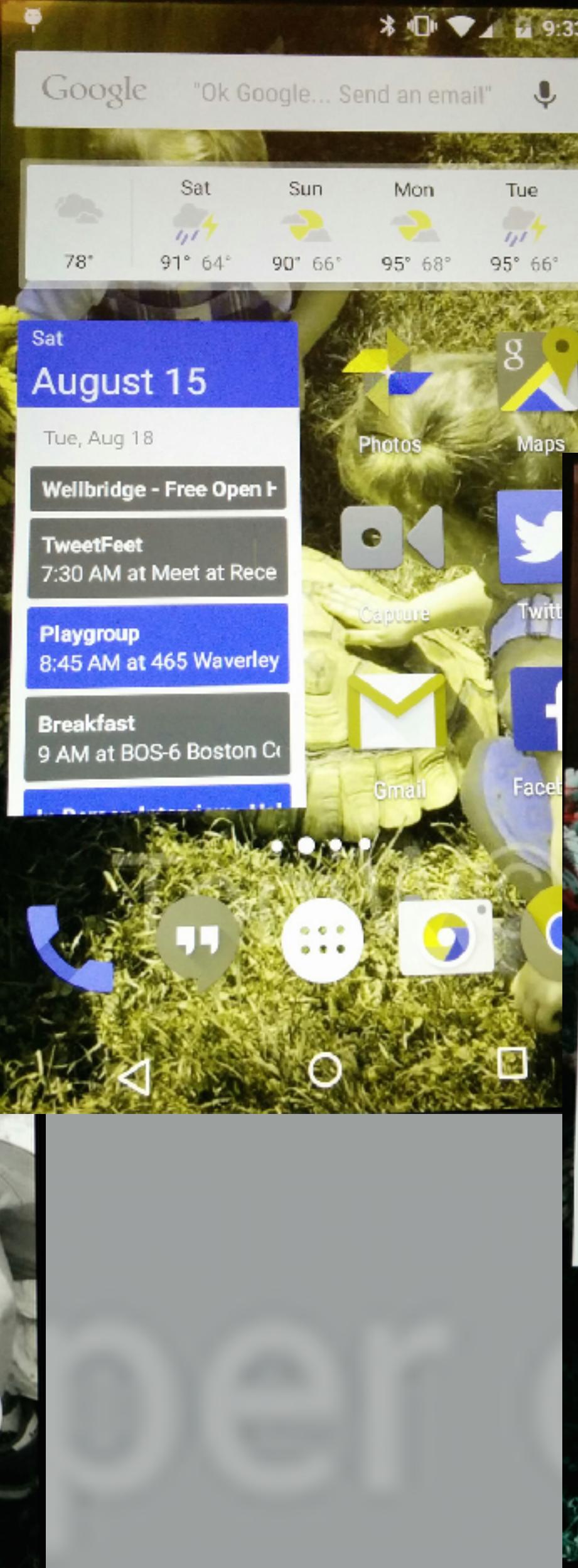
@asfalcone



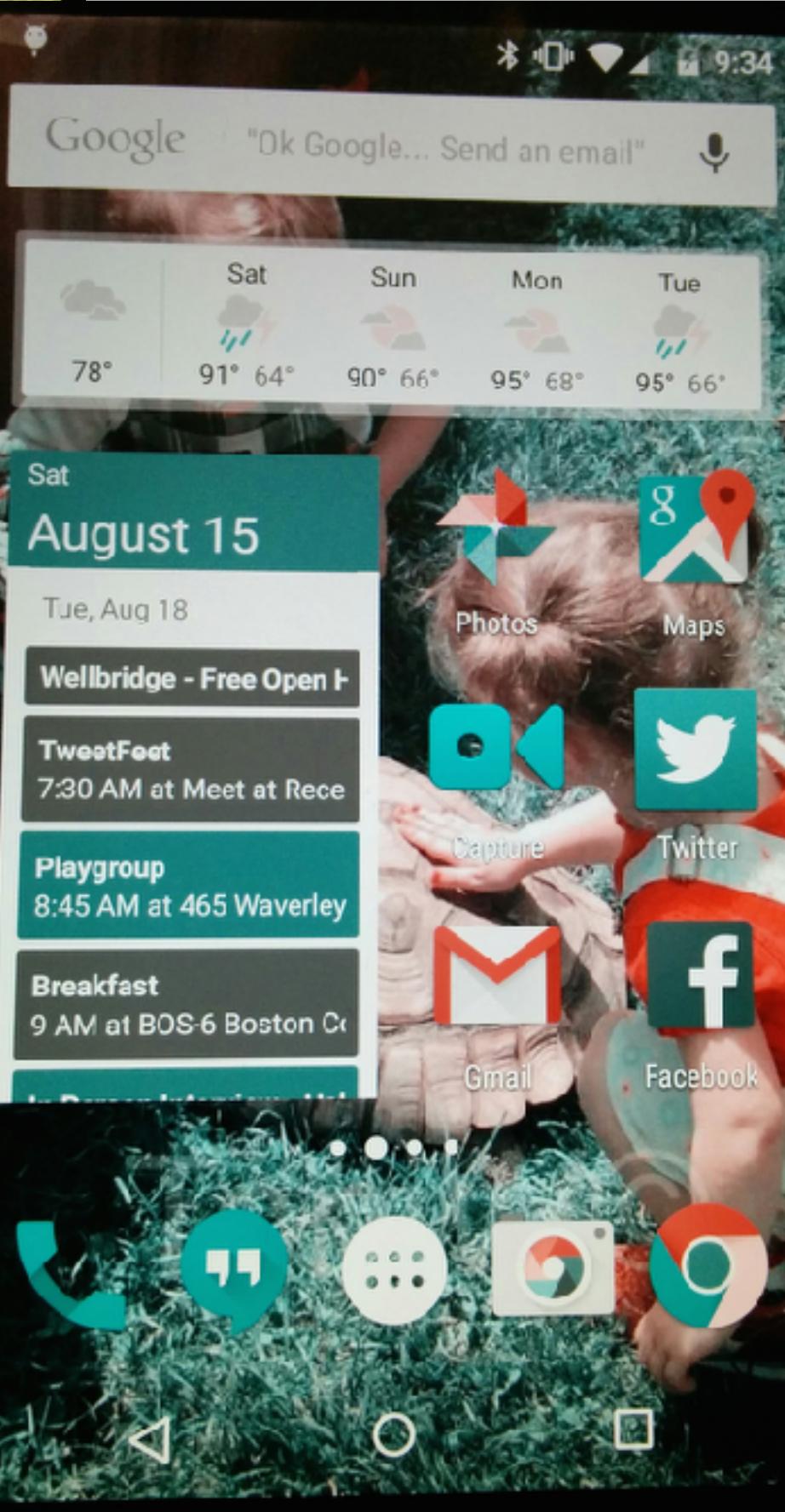
Original



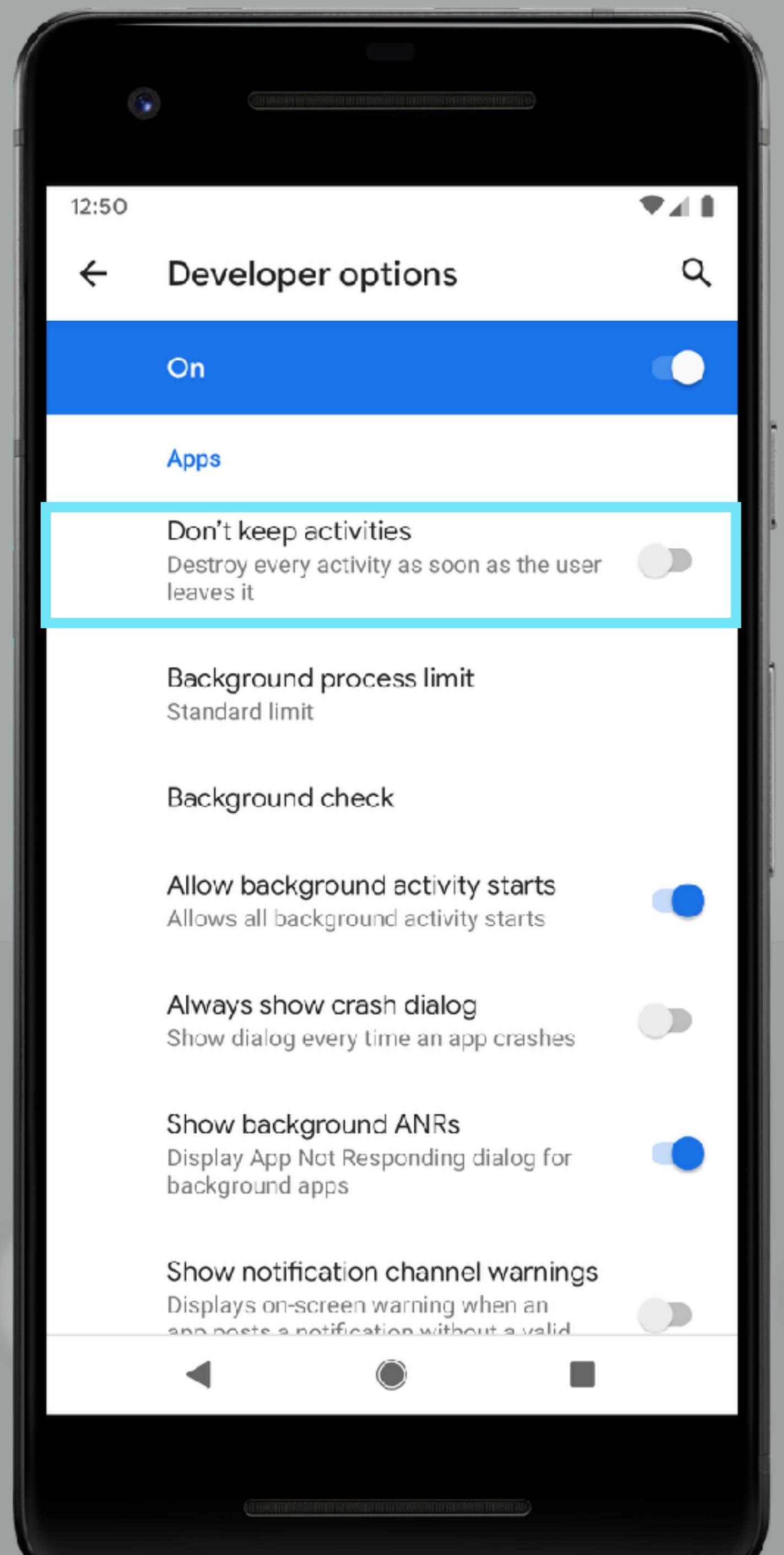
Deuteranomaly



Monochrome



Tritanomaly

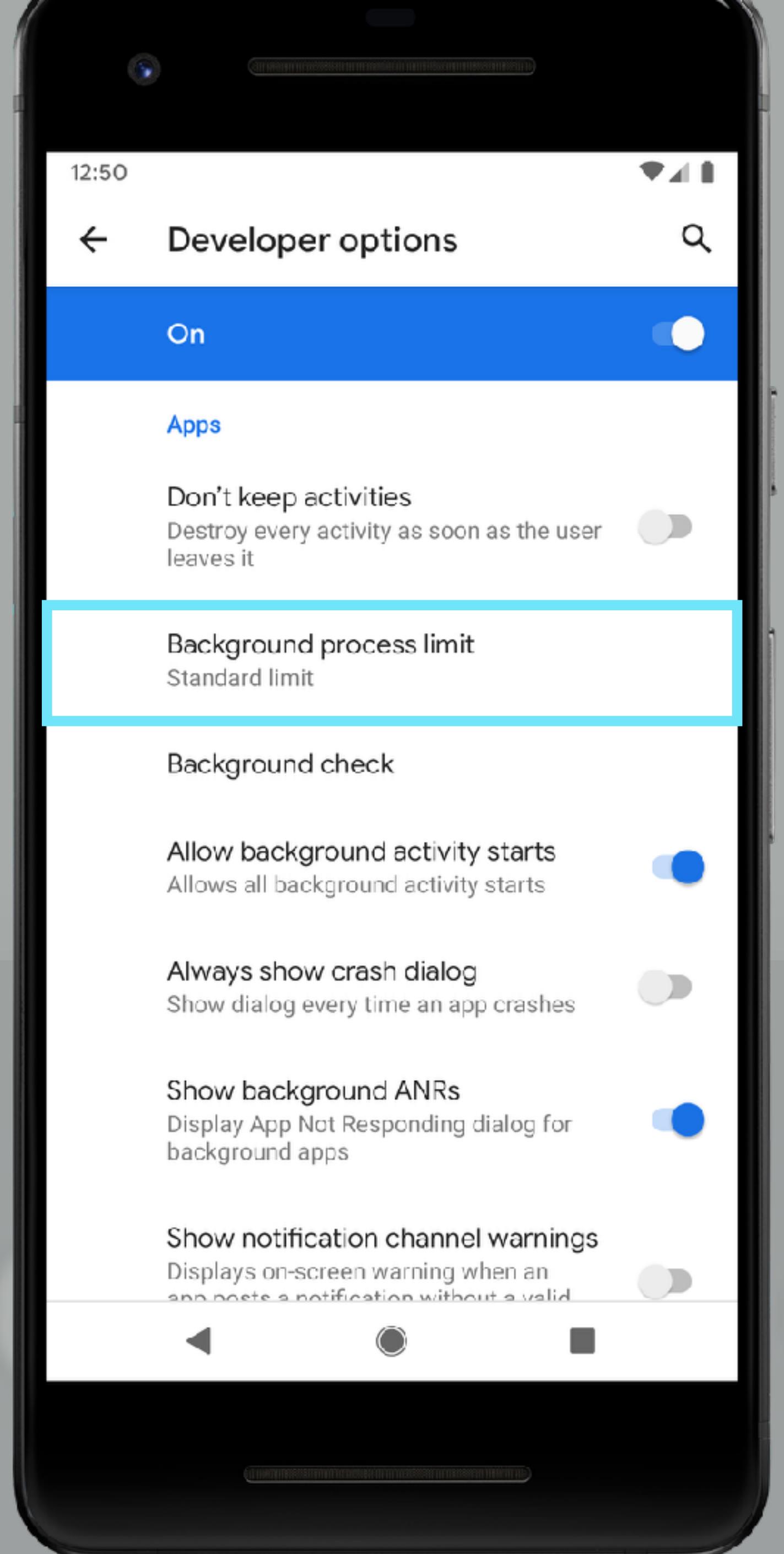


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```
protected void onCreate(Bundle savedInstanceState) {  
    super.onCreate(savedInstanceState);  
  
    if (savedInstanceState != null) {  
        // TODO: Find Bugs Here!  
    } else {  
        ...  
    }  
}
```

```
public void onSaveInstanceState(Bundle savedInstanceState) {  
    // TODO: Find Bugs Here!  
    ...  
  
    super.onSaveInstanceState(savedInstanceState);  
}
```

```
public void onRestoreInstanceState(Bundle savedInstanceState) {  
    super.onRestoreInstanceState(savedInstanceState);  
  
    // TODO: Find Bugs Here!  
    ...  
}
```



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← Developer options



On



Background process limit

- Standard limit
- No background processes
- At most 1 process
- At most 2 processes
- At most 3 processes
- At most 4 processes

CANCEL

Show background ANRs

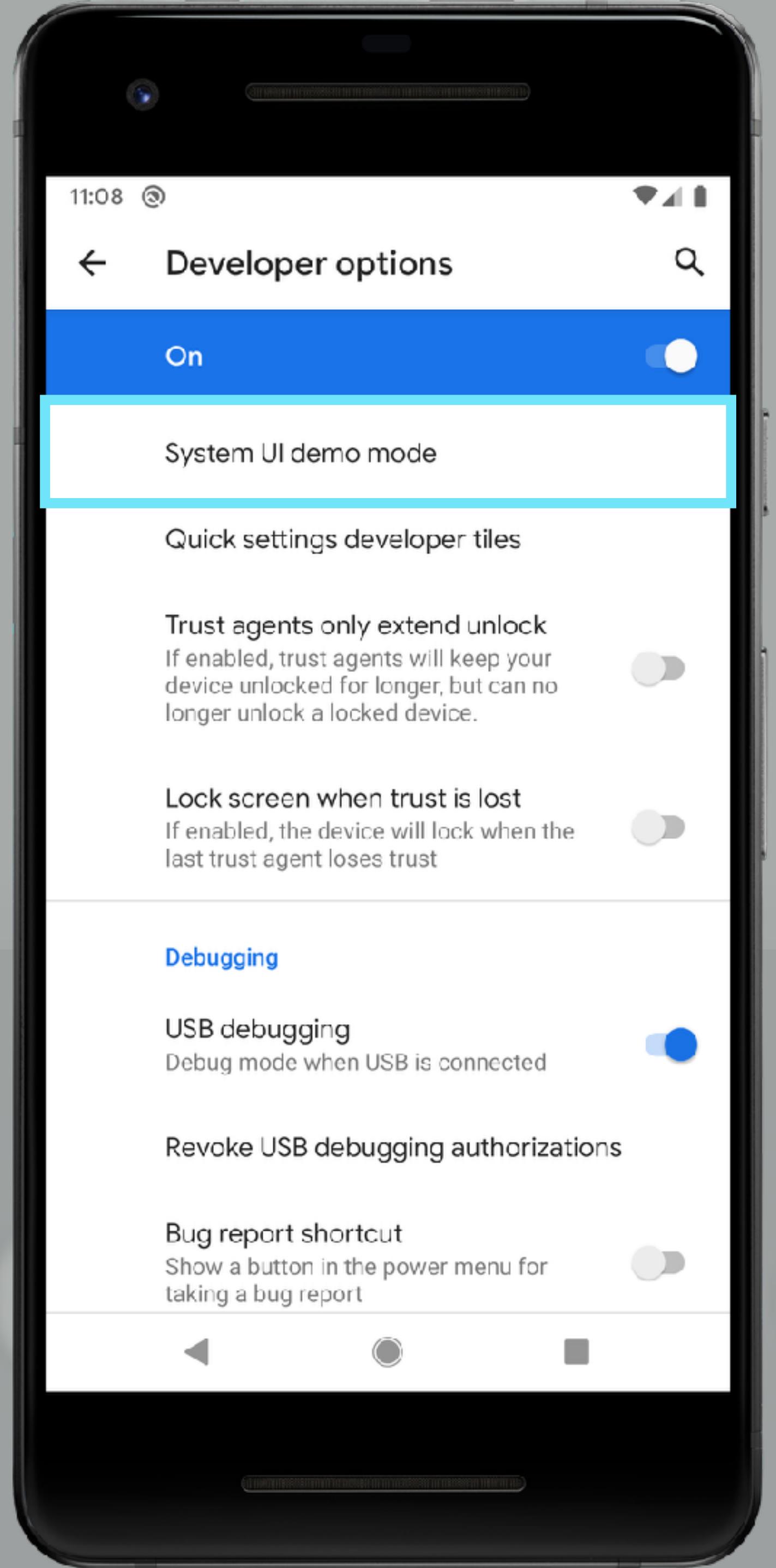
Display App Not Responding dialog for
background apps



Show notification channel warnings

Displays on-screen warning when an
app posts a notification without a valid





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8:51

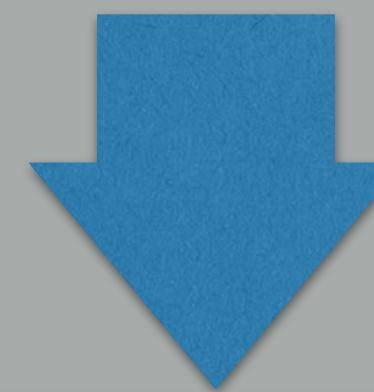


LTE 4:45

Android

LTE 100% 12:23

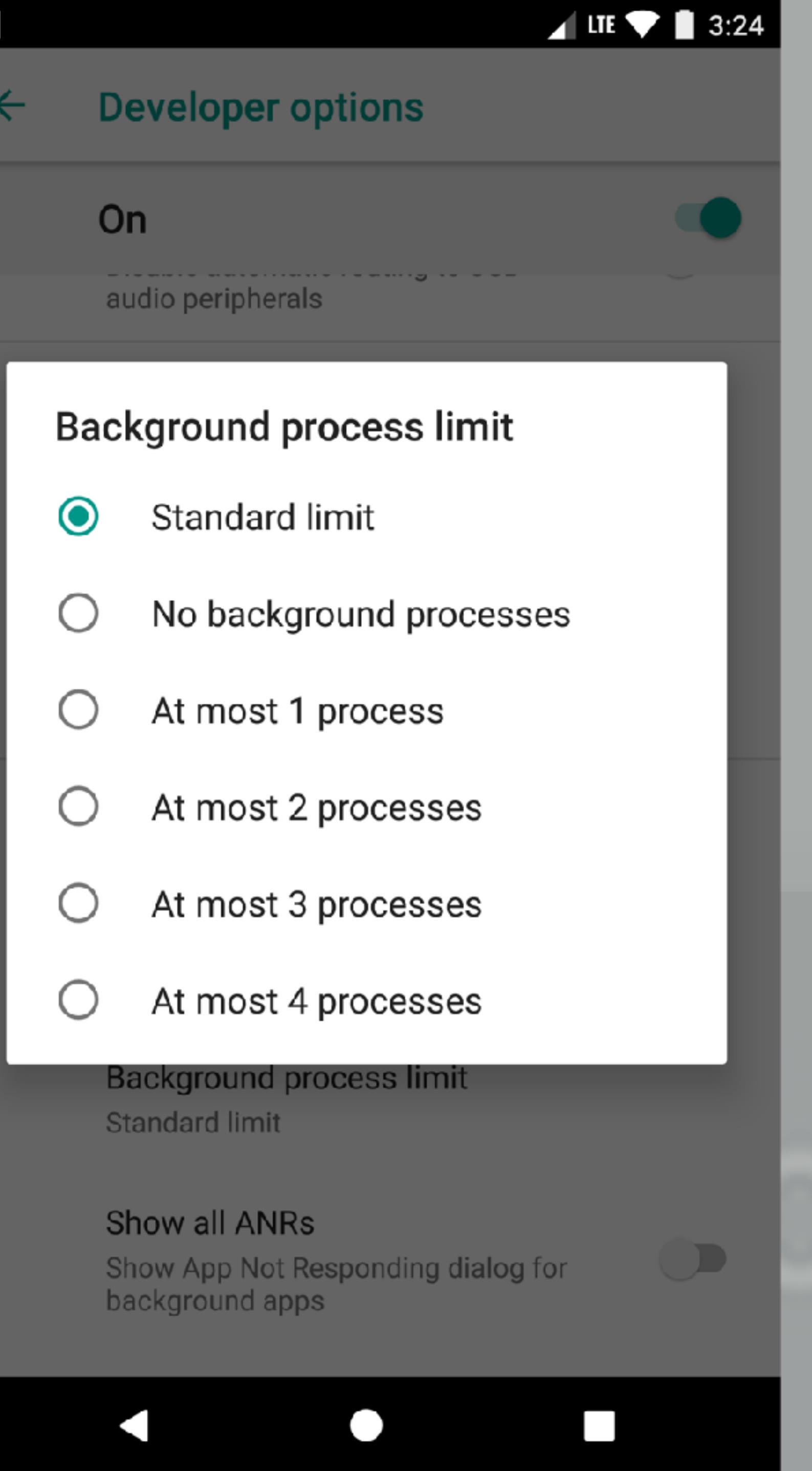
LTE 1:09

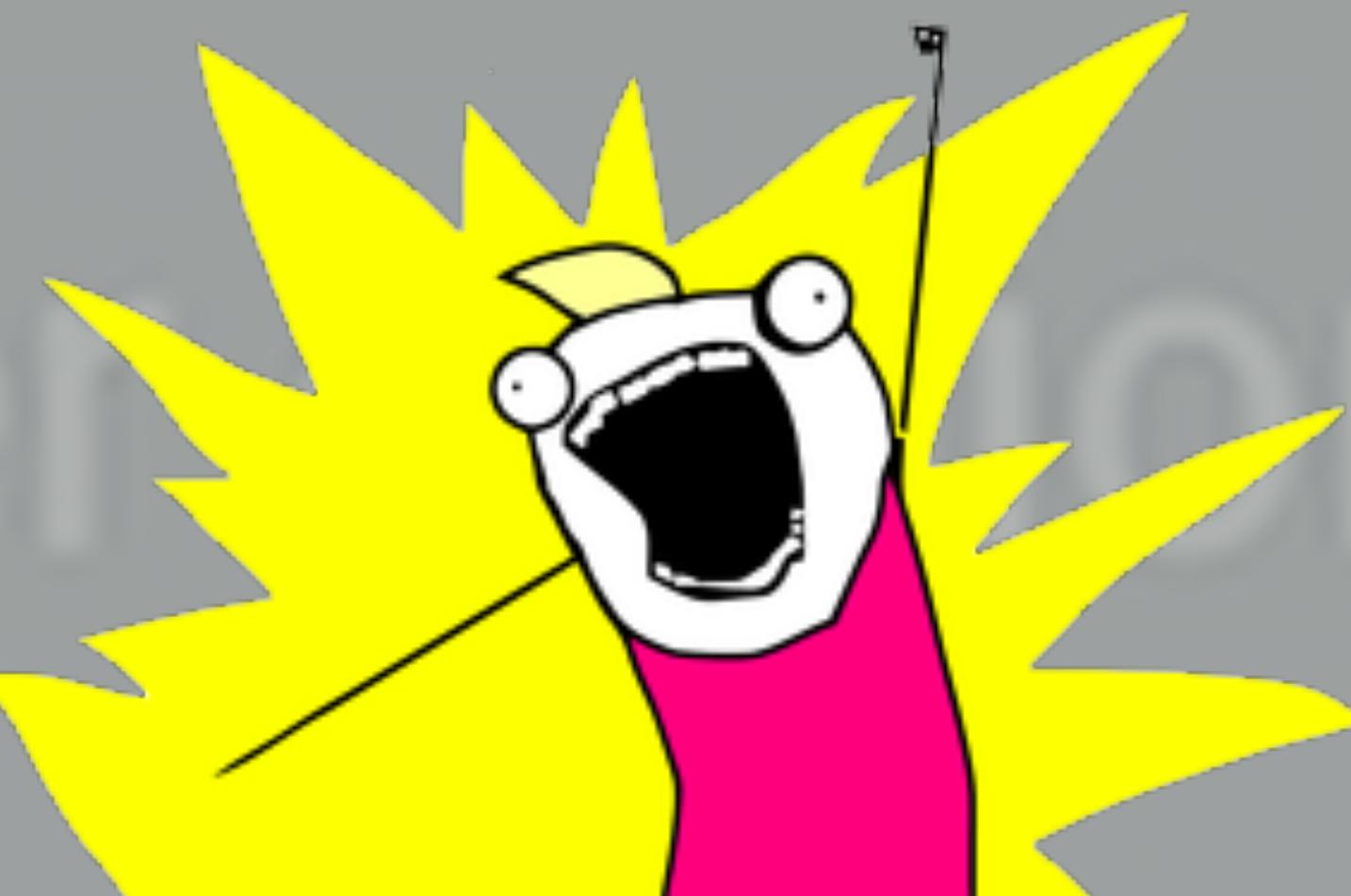
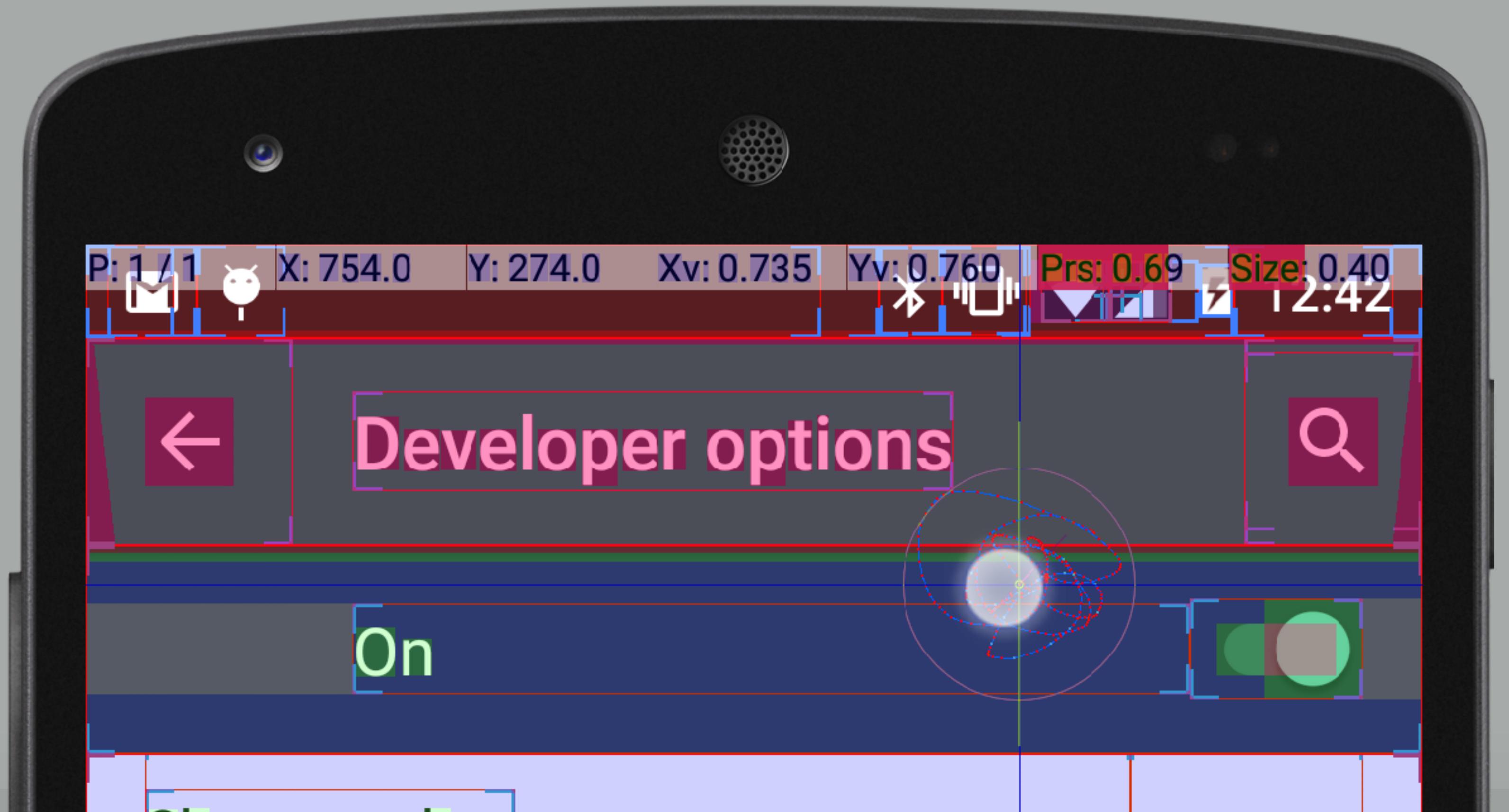


LTE 7:00

{ } Developer options

@asfalcone





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Thank You!

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{ } Developer options