Xperia XA2

Rooting Xperia XA2 on Lineage OS

After a successful installation of Lineage OS on the phone, it's time to get it rooted. Lineage OS doesn't come with root by default, since it's not always desirable to have a rooted phone. However, if we want to change some major things and take back control of our devices, we will need root privileges.

DISCLAMER: I AM NOT RESPONSIBLE FOR ANY DAMAGE CAUSED TO YOU OR YOUR DEVICE. YOU ARE ON YOUR OWN *(but feel free to ask anything in the comments).*

But seriously, the process is not super difficult, just follow the instructions and you should be fine.

Rooting process

*To avoid confusion, my bootloader is already unlocked. In case yours isn't – this **won't work**. However, I assume you have already unlocked it because you have Lineage OS intalled.*

Donwload Magisk

Magisk is a fairly advanced open source tool for customizing Android, but also very simple to use with a modern app and many tutorials online. To mention some of the main features of Magisk from their GitHub page:

- MagiskSU – root access for apps
- Magisk Modules – modify read-only partitions by installing modules
- MagiskHide – prevent system and apps from detecting you are rooted
- MagiskBoot – tool for unpacking and repacking Android boot images

Only download Magisk from the official GitHub page: https://github.com/topjohnwu/Magisk. Any other sources may contain unwanted things like malware. Install (you have to enable installation from third party sources, on the newest Androids this is done on app-to-app basis).

Extract files from the newest image

Head over to https://download.lineageos.org/pioneer and download the latest signed zip build – the one that you used to install Lineage OS.

Compare the SHA256 signature from the website with the downloaded file. If you are on Windows, you can use simple powershell cmdlet *Get-FileHash.* You don't have to check the entire string, just some of the characters, since if the file was modified, the hash would be completely different.

```
Get-FileHash .\lineage-18.1-20210826-nightly-pioneer-signed.zip

Algorithm      Hash                                            Path
---------      ----                                            ----
SHA256         DD82D969CA7898F3C42F7B2373F3C354E2733CED4DF94721E7D06472E6D665A0    D:\Exampledir\dir...
```

Download this utility: https://github.com/vm03/payload_dumper to extract *boot.img* from *payload.bin* located in the ZIP file you just downloaded. You need python and a couple of other dependencies, everything should be described on the GitHub page.

Extract the Lineage OS ZIP and place payload.bin to the root folder of payload_dumper

Name	Date modified	Type	Size
📁 META-INF	27-Aug-21 21:41	File folder	
📄 care_map.pb	01-Jan-09 00:00	PB File	1 KB
📄 payload.bin	01-Jan-09 00:00	BIN File	637,855 KB
📄 payload_properties.txt	01-Jan-09 00:00	TXT File	1 KB

Name	Date modified	Type	Size
📁 __pycache__	11-May-21 10:06	File folder	
📁 old	11-May-21 10:06	File folder	
📁 output	26-May-21 22:23	File folder	
📄 .gitignore	08-Sep-20 19:58	Text Document	1 KB
📄 payload.bin	01-Jan-09 00:00	BIN File	637,855 KB
📄 payload_dumper.py	08-Sep-20 19:58	Python File	5 KB
📄 README.md	08-Sep-20 19:58	MD File	1 KB
📄 requirements.txt	08-Sep-20 19:58	TXT File	1 KB
📄 update_metadata_pb2.py	08-Sep-20 19:58	Python File	29 KB

and run

```
python payload_dumper.py payload.bin
```

Output in the terminal should look something like this:

```
Processing boot partition...........Done
Processing system partition.....................................................................................
.........................................................................................
.........................................................................................
.........................................................................................
.........................................................................................
.........................................................................................
.........................................................................................
.........................................................................................
.........................................................................................
.........................................................................................
.........................................................................................
.........................................................................................
.........................................................................................
....................................................................Done
Processing vendor partition.............................................................................
.........................................................................................
.........................................................................................
.........................................................................................
...................Done
```

After it has finished, you should end up with three files located in the *output* folder
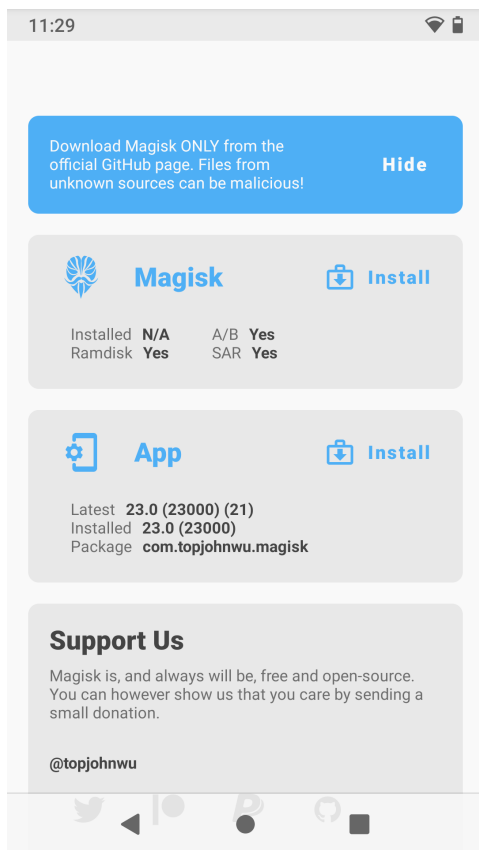
.gitkeep	08-Sep-20 19:58	GITKEEP File	0 KB
boot.img	27-Aug-21 21:44	Disc Image File	22,792 KB
system.img	27-Aug-21 21:45	Disc Image File	2,965,504 KB
vendor.img	27-Aug-21 21:45	Disc Image File	870,400 KB

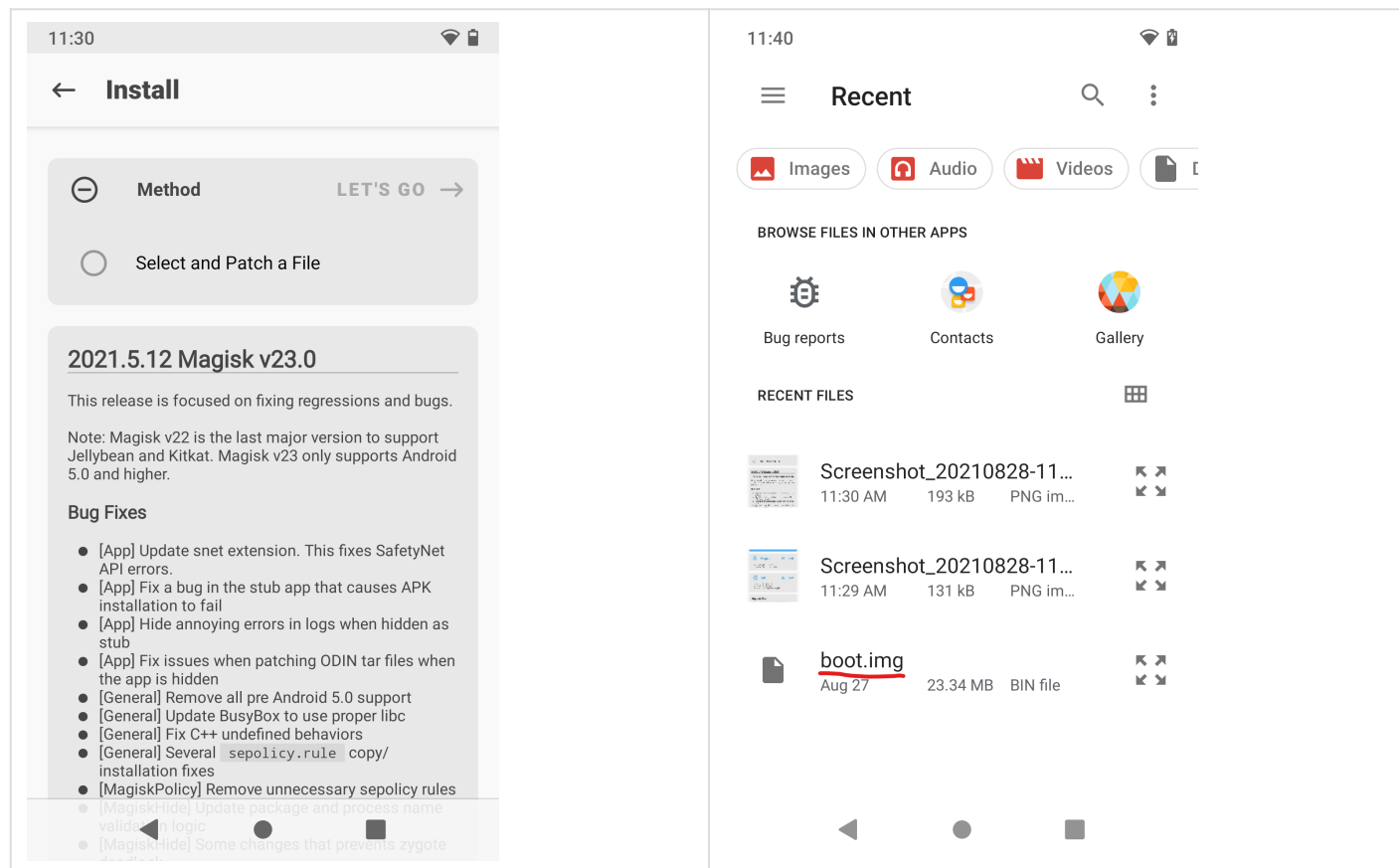Copy the **boot.img** file to your Android device and open Magisk.
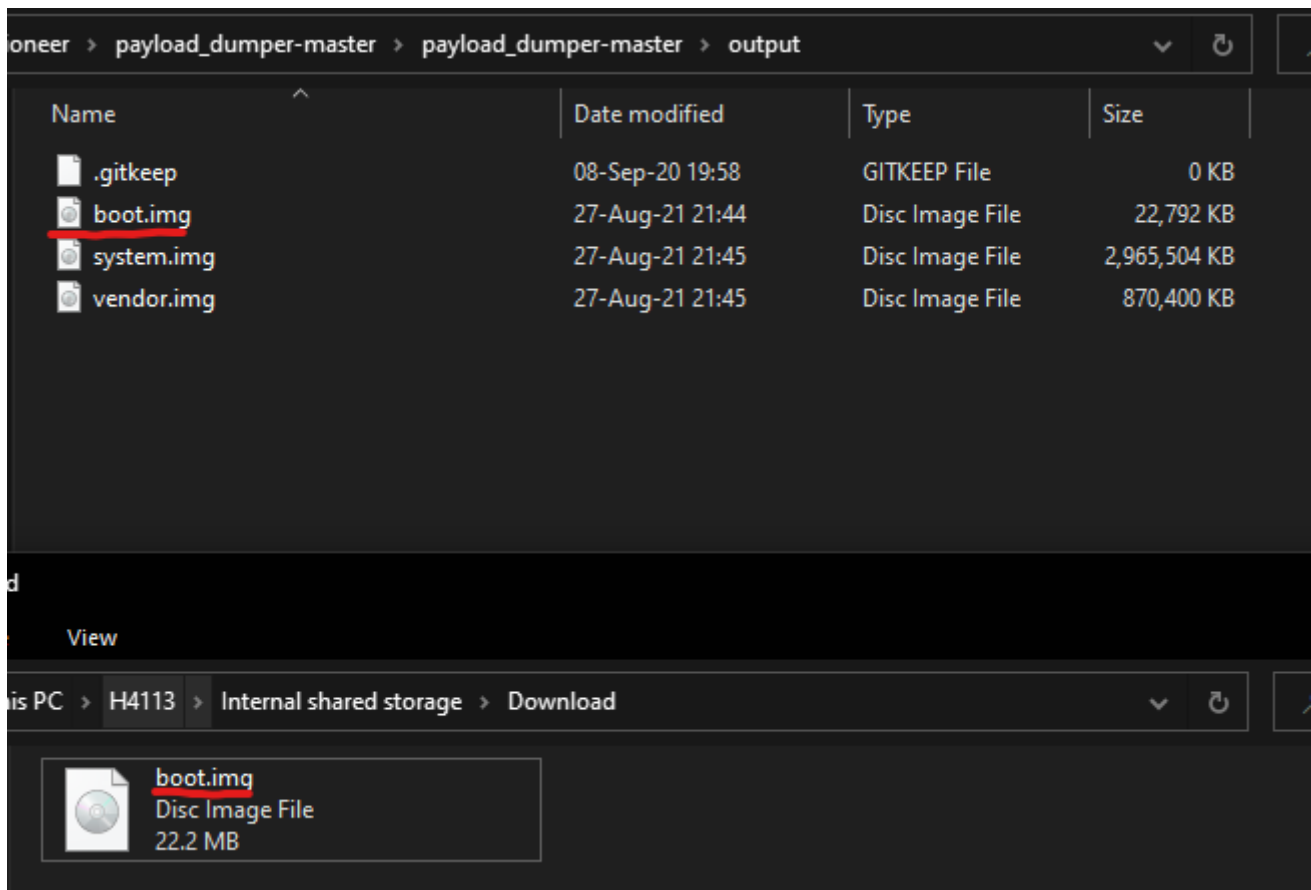
Patch the extracted image with Magisk

Next to Magisk, click Install

Select and Patch a file

11:30

← **Install**

⊖ Method   LET'S GO →

○ Select and Patch a File

2021.5.12 Magisk v23.0

This release is focused on fixing regressions and bugs.

Note: Magisk v22 is the last major version to support Jellybean and Kitkat. Magisk v23 only supports Android 5.0 and higher.

Bug Fixes

- [App] Update snet extension. This fixes SafetyNet API errors.
- [App] Fix a bug in the stub app that causes APK installation to fail
- [App] Hide annoying errors in logs when hidden as stub
- [App] Fix issues when patching ODIN tar files when the app is hidden
- [General] Remove all pre Android 5.0 support
- [General] Update BusyBox to use proper libc
- [General] Fix C++ undefined behaviors
- [General] Several `sepolicy.rule` copy/installation fixes
- [MagiskPolicy] Remove unnecessary sepolicy rules
- [MagiskHide] Update package and process name validation logic
- [MagiskHide] Some changes that prevents zygote deadlock

11:40

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Screenshot_20210828-11...
11:30 AM   193 kB   PNG im...

Screenshot_20210828-11...
11:29 AM   131 kB   PNG im...

boot.img
Aug 27   23.34 MB   BIN file

This will take a few seconds and after it has finished, there should be a new file called something like this:

magisk_patched-23000_eL6xq.img
Disc Image File
22.5 MB
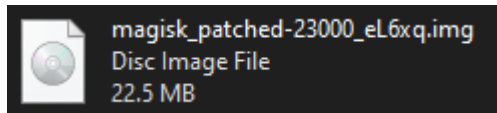
Flash the patched image using ADB

First of all, download appropriate drivers and tools. You should only need these

https://developer.android.com/studio/releases/platform-tools, but in case it doesn't work, look around the internet for more.

Copy this file from your phone back to your PC, ideally into the same folder as you ADB tools that you have just downloaded.

| Name	Date modified	Type	Size
.vs	26-May-21 00:24	File folder	
api	11-May-21 10:06	File folder	
systrace	11-May-21 10:06	File folder	
adb.exe	30-Mar-21 00:11	Application	5,798 KB
AdbWinApi.dll	30-Mar-21 00:11	Application exten...	96 KB
AdbWinUsbApi.dll	30-Mar-21 00:11	Application exten...	62 KB
boot.img	26-May-21 22:22	Disc Image File	22,792 KB
dmtracedump.exe	30-Mar-21 00:11	Application	238 KB
etc1tool.exe	30-Mar-21 00:11	Application	429 KB
fastboot.exe	30-Mar-21 00:11	Application	1,592 KB
hprof-conv.exe	30-Mar-21 00:11	Application	43 KB
libwinpthread-1.dll	30-Mar-21 00:11	Application exten...	227 KB
magisk_patched-23000_eL6xq.img	28-Aug-21 11:41	Disc Image File	23,070 KB
make_f2fs.exe	30-Mar-21 00:11	Application	484 KB
make_f2fs_casefold.exe	30-Mar-21 00:11	Application	484 KB
mke2fs.conf	30-Mar-21 00:11	CONF File	2 KB
mke2fs.exe	30-Mar-21 00:11	Application	738 KB
NOTICE.txt	30-Mar-21 00:11	TXT File	685 KB
source.properties	30-Mar-21 00:11	PROPERTIES File	1 KB
sqlite3.exe	30-Mar-21 00:11	Application	1,189 KB

- Plug a USB cable to your phone and PC.
- Enable developer mode – *Settings --> About phone -->* Click *Build number* 5x times
- Enable USB debugging – *Settings --> System --> Advanced --> Developer options -->* Flip on switch in *USB debugging*
- Advanced settings on reboot – *Settings --> System --> Advanced --> Gestures --> Power menu -->* Flip on switch on *Advanced restart*
- Hold down the power button --> *Power --> Restart --> Bootloader*

Device should now reboot into boot loader, make sure the USB cable is connected.

Now Shift+right click into the folder with ABD tools and your patched image file and open either Windows Terminal (if you have it installed) or regular PowerShell/cmd window.
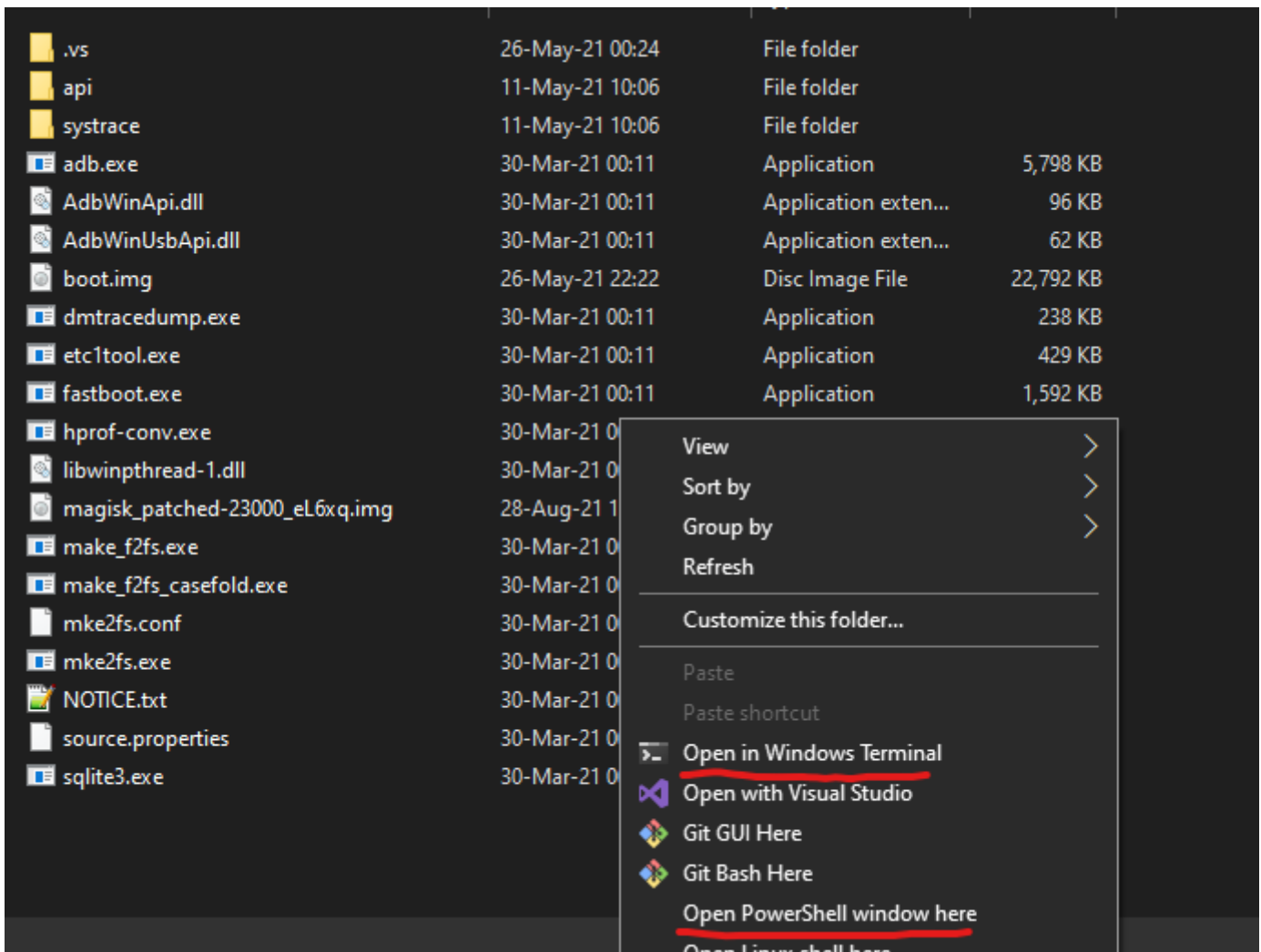
Try running .\fastboot.exe devices. If you can't see any output, open *Device Manager* in Windows and look for something like this:
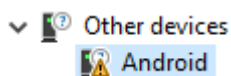
Right click it --> *Update driver* --> *Browser my computer for drivers* --> *Let me pick from a list of available drivers on my computer* --> *List all devices* --> *Google Inc.* --> *Android Bootloader Interface*

Now try running .\fastboot.exe devices again, you should get this:

```
>.\fastboot.exe devices
CQ3000952E     fastboot
```

Flash the patched image to your Android device *(the name of the file might be different)*

```
>.\fastboot flash boot magisk_patched-23000_eL6xq.img


Sending 'boot_b' (23069 KB)                    OKAY [  0.498s]

Writing 'boot_b'                    OKAY [  0.180s]

Finished. Total time: 1.172s
```
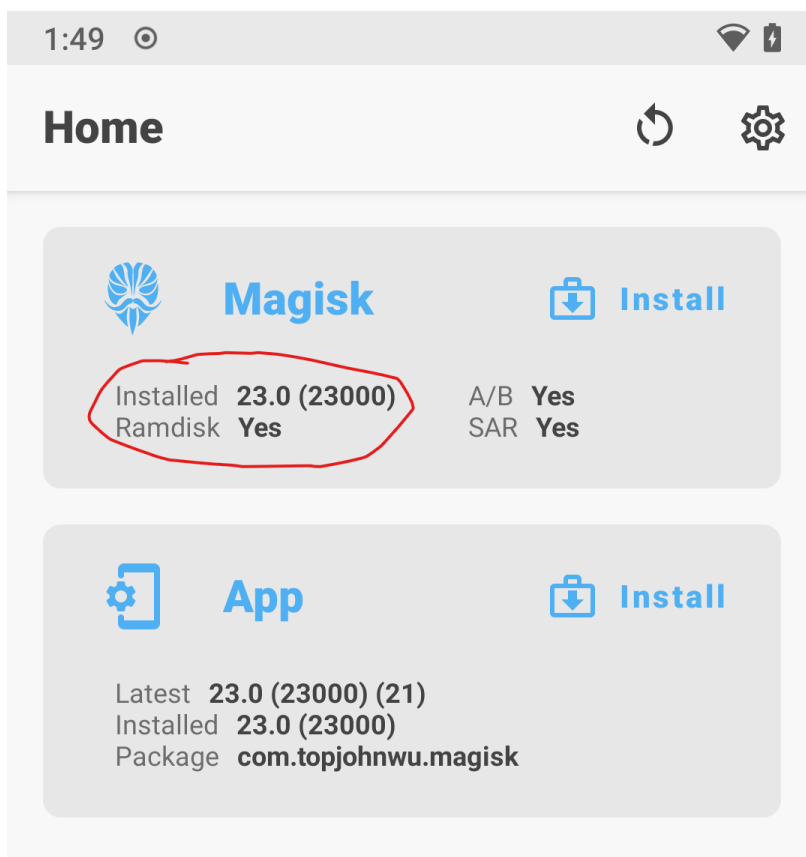
Reboot the device

```
 .\fastboot reboot

Rebooting                    OKAY [  0.000s]

Finished. Total time: 0.002s
```

After the reboot, open up Magisk and check if it is recognized as installed.

That's it! You now have a rooted Lineage OS device. What to do next? Everything you want. In case you need some tips, I have created a <u>list of things that I do.</u>

Things TODO after installation – settings, apps etc.

So you've just successfully installed Lineage OS on your phone, in this case Xperia XA2. I assume you have already went through the initial couple of screens and set basic things like Wi-Fi, unlock password, etc. Now you are staring at a clean Lineage OS, what to do next? I decided to write down some of the things that I do and you might want to do too. I say *might* because not everyone has the same priorities when using their mobile device, so take everything as you wish.

Customizing through basic settings

Enable dark mode

I am one of the dark mode users who describe light mode like this:

That's why the first thing I am going to do will be turning on dark mode in the system settings. *Navigate to Settings --> Display --> Dark theme (on).* Better, isn't it? Due to personal preference, this is completely optional.
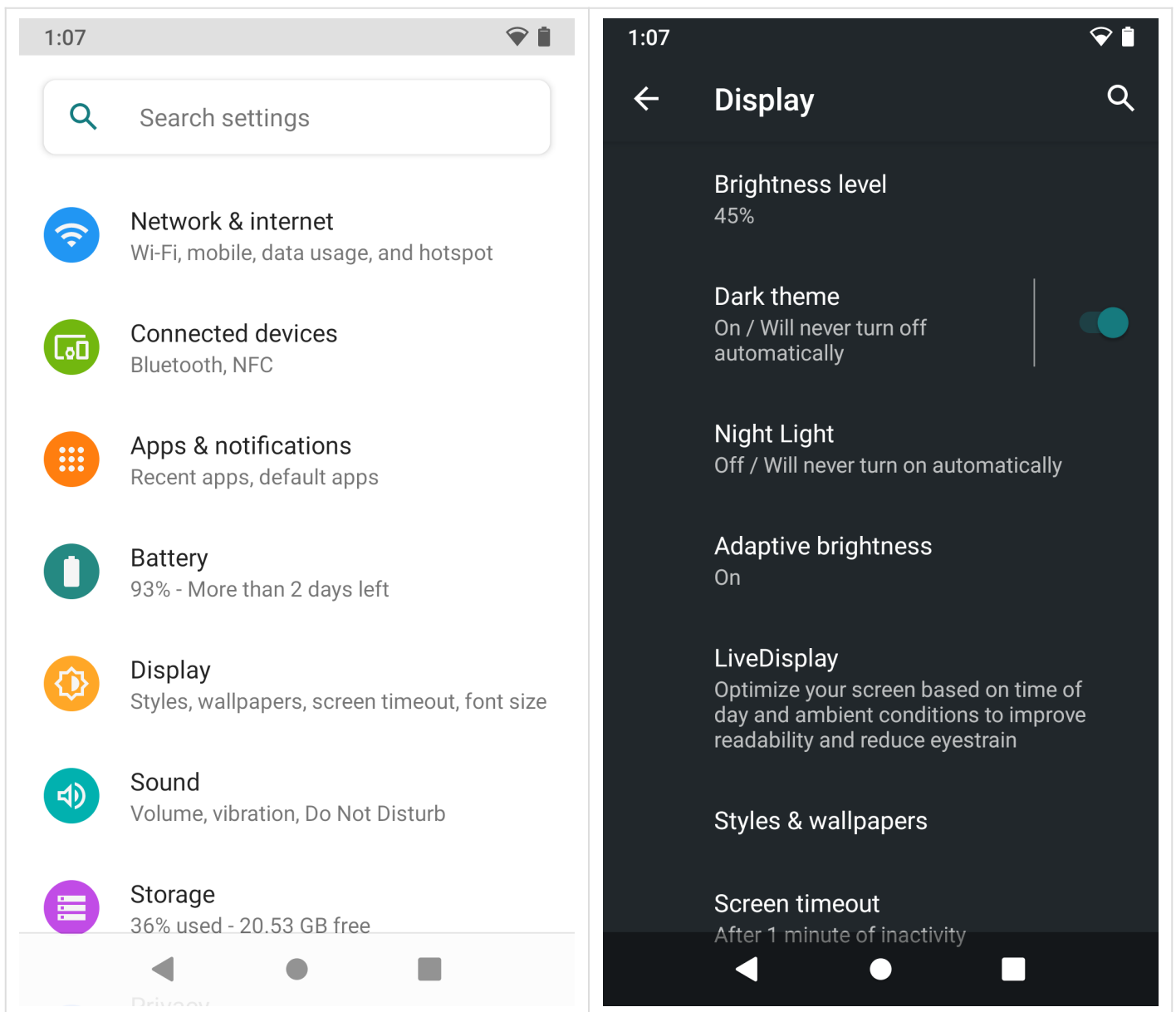
Navigation buttons

Even though I'm not particulary fond of buttonless navigation, especially the latest Android implementation where you go back by swiping from the right or left side instead of the bottom right or left, which interfered less with other gestures, I still prefer having as much screen estate as possible. In order to turn on buttonless navigation:

- *Settings --> System --> Advanced --> Gestures --> System Navigation --> Select Gesture navigation* and click the Settings icon and disable *Navigation hint* to get rid of the white bar the at bottom of the screen

App pinning & Screen lock

In case you need to share your device with someone for a moment, for example to let them search for something in a browser or any other case, consider enabling *App pinning.* With this feature

enabled, open an app and long press its icon in the *Recents* screen (or app switcher, the screen where you can switch between apps). Once the app is pinned, you won't be able to leave the app, unless you *Swipe up* and *hold*. Afterwards you will be asked for your pattern or other kind of screen lock, depending on which one you've set.

Speaking about screen lock. If you are using a pattern, Lineage OS has a net couple of features around it. Go to:

- *Settings --> Security --> Screen lock* and click the Settings icon. In there you can enable hiding the pattern so it's not visible or you can completely remove the dots for best protection. Experiment and determine what you find most secure and convenient enough.
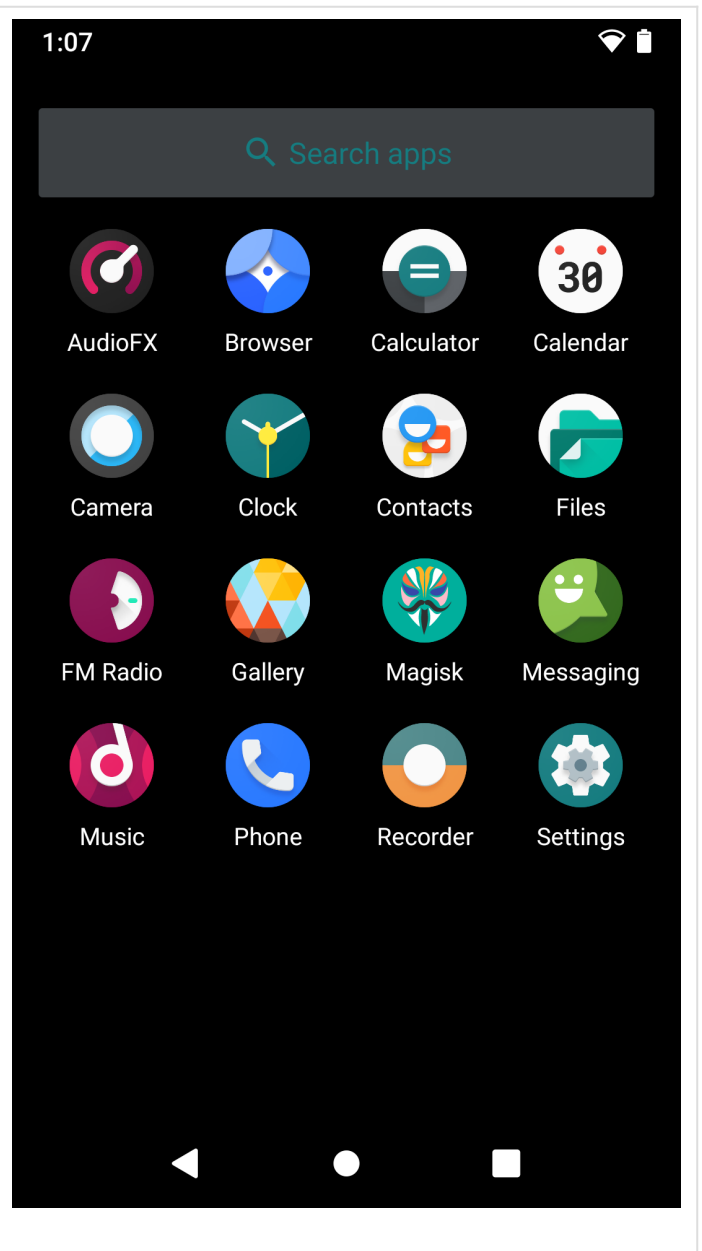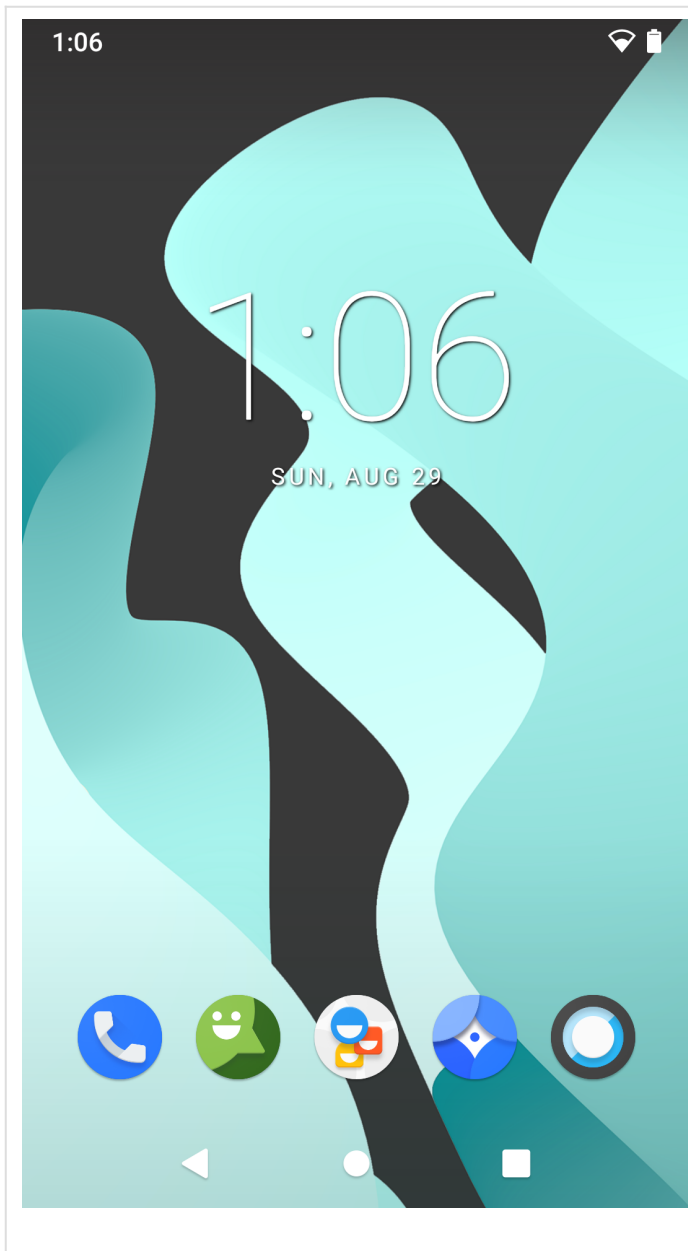
Adjusting scaling

Maybe it's because I got used to a phone with a larger screen, but the 5.2" Xperia simply doesn't feel great with the default scaling, everything seems too big. You can change both the *Display size* and *Font size*. I recommend you try to combine both to see which best suits your eyes.

- *Settings --> Display --> Advanced --> Font size/Display size*

Installing F-Droid

Left screen (home screen):

1:06

1:06

SUN, AUG 29

Right screen (app drawer):

1:07

Search apps

|			
AudioFX	Browser	Calculator	Calendar
Camera	Clock	Contacts	Files
FM Radio	Gallery	Magisk	Messaging
Music	Phone	Recorder	Settings

Updating Lineage OS while keeping root working with Magisk

Decided it would be nice to document how to perform an update, because the releases appear fairly frequently and the process isn't exactly straightforward like clicking *Download and Install* button.

Perform update normally trough OTA

Navigate to Settings --> System --> Advanced --> Updater. Pick the newest update, download and install. After it has finished, reboot your device.
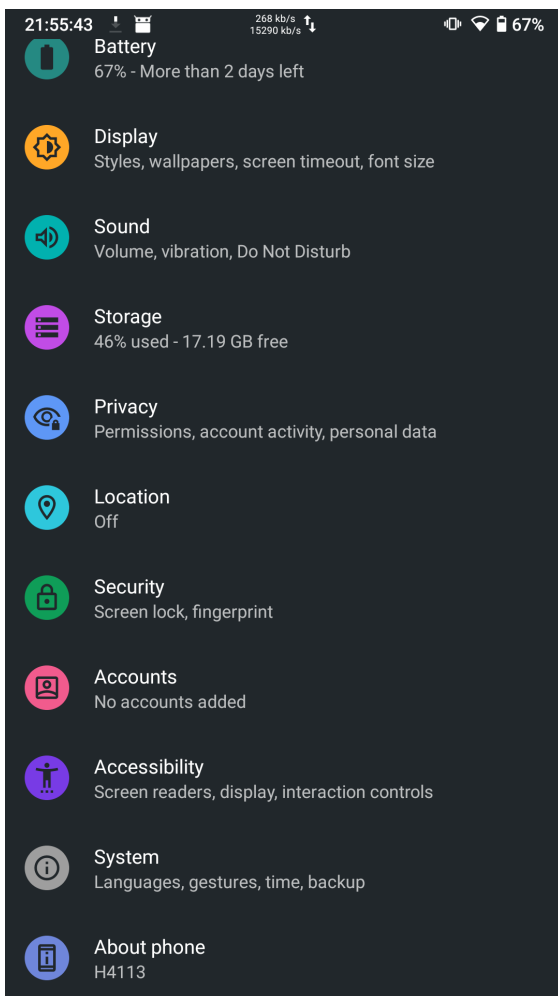
← **System**   🔍

⊕   **Languages & input**
OpenBoard

Fn   **Buttons**

⊡   **System profiles**

▢   **Status bar**

📱   **Gestures**

🕐   **Date & time**
GMT+02:00 Central European Summer Time

☁   **Backup**
Off

🕘   **Reset options**
Network, apps, or device can be reset

👤   **Multiple users**
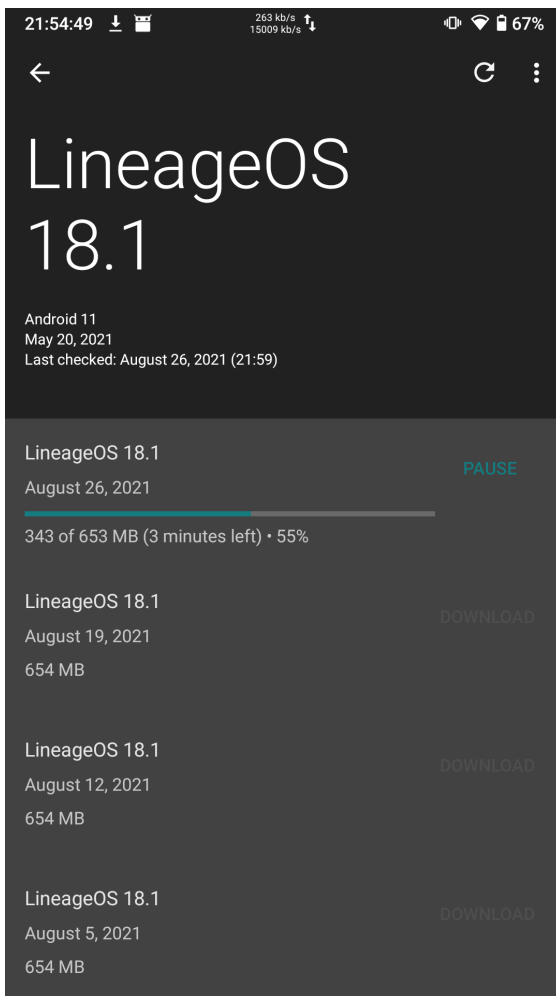Signed in as Owner

{ }   **Developer options**

⬇   **Updater**
Updated to Android 11

After reboot, open Magisk to check if you are still rooted. Most likely, you are not. Now how to fix it. The only way I found working is to basically repeat the whole root process again. In short:

- Download the latest build from Lineage OS website, extract boot.img using payload_dumper
- Copy boot.img to Android, patch with Magisk
- Copy patched image back to PC
- Use fastboot to flash the patched image

These steps are decribed in more detail over here: https://selfhostedfuture.xyz/books/everything-nix-and-libre-software/page/rooting-xperia-xa2-on-lineage-os