

# Custom ROMs on Android Devices

Mudit Mayank Jha  
Delhi Public School Ghaziabad Vasundhara

**Abstract:-** The growing use of android mobile phones has led to the development of new Customised firmware or operating systems called Custom ROMs. These offer more functionality and powerful features. They are developed by individual developers or a community of developers and not by the manufacturer of mobile devices themselves.

Since the introduction of android, developers have identified the downsides of android and important features that are not available to android users by default. This eventually led to the development of Customized firmware that replaced the factory-installed firmware on android device to unlock powerful features.

This research focuses on the Installation process of Custom ROMs along with their advantages and disadvantages. Most of the data for this research is taken from XDA Developers, Bing, Geek Developers and Reddit.

## I. INTRODUCTION

A majority of mobile users are using Android instead of IOS. According to a report by Petroc Taylor published on May 31, 2023, with 71.4% of the global mobile operating system market, Android is the market leader. A majority of these android users are using Stock ROMs. These are operating systems based on android, that come pre-installed by the manufacturer.

Since Android is an open-source software, Stock ROMs can be customised and modified. These are then called Custom ROMs. These can be used to replace the Stock Rom and help unlock the full potential of the device and provide powerful features. The process of installing a Custom ROM is similar to installing Windows or Linux on laptops. Some popular Custom ROMs include – Cyanogen Mod, LineageOS, Pixel Experience and AOKP.

This Research provides an insight on Custom ROMs and how they can be installed on android devices. I have focused on the features and advantages of using a Custom ROM along with the installation process. Finally, I conclude with the limitations and drawbacks of Custom ROMs.

## II. FEATURES OF CUSTOM ROMS

Custom ROMs can come with a ton of features. Some of these are discussed below.

### ➤ *Personalisation*

The entire look of the android system becomes customizable. The notification bar, quick settings, home screen, app drawer, etc can be redesigned.

### ➤ *Performance*

Custom ROMs are highly optimized and some are even cleaner than Google's own phones. These deliver a smoother android experience and provide a significant performance boost.

### ➤ *Root Access*

When using a Custom ROM, gaining root access is significantly simpler. You get more privileges if you get root access for your smartphone. With root access, you can run specialized applications that require administrator level rights, change and replace system applications and settings, and do other actions that are typically unavailable to Android users.

### ➤ *Uninstall Bloatware*

Android devices usually come packed with bloatware. These clutter the system and waste disk space. These useless apps can easily be eliminated with a Custom ROM.

### ➤ *Faster OTA updates*

Most phones will get OTA updates for no more than 2 years. As a result, customers are stuck with outdated versions of Android, where they are more susceptible to security flaws and are progressively unable to operate the most recent apps. Custom ROMs on the other hand, get OTA updates for several more years.

### ➤ *CPU Overclocking and Underclocking*

The processors of smartphones are clocked to a minimum and maximum speed. They can be overclocked over their maximum speed to boost performance and underclocked below their minimum speed to decrease performance and thereby, increase battery life.

### III. INSTALLATION PROCESS

#### ➤ Prerequisites –

- An android device
- A laptop with ADB and fastboot drivers installed.
- A working USB cable for the target device.
- An Unlocked bootloader – The method for unlocking the bootloader differs from carrier to carrier. Specific guides for each device can be found on XDA forums. Unlocking the bootloader makes it possible to make advanced changes including installation of customized firmware.
- Custom Recovery – TWRP Custom Recovery is the best option. Again, a detailed installation guide is available on XDA forums for specific devices.
- Custom ROM zip file – Custom ROMs are device specific. XDA Forums have a list of available custom ROMs for all devices.

#### ➤ Steps for Installation –

- Back up data – This is the very first step as installing a new custom ROM would erase all data of the device. It is necessary to back up the data of the device. Google drive backup is recommended.
- Booting into custom recovery – Again, there are device specific guides available on XDA Forums. Once booted into TWRP recovery, files can be installed. This is also called flashing.
- Clear data – Stock ROM has to removed first in order to install the custom ROM. On TWRP recovery - Boot, system image, data, modem and EFS have to be wiped.
- Installing the Custom ROM – First the custom Rom zip file has to be transferred to the mobile from the laptop using a USB cable. Then, the install button on TWRP is to be used for browsing the files and installing the custom ROM.
- Reboot – On rebooting the device, it should boot into the newly installed custom ROM.

### IV. LIMITATIONS AND DRAWBACKS OF CUSTOM ROMS

- Device Bricking – Installing a custom ROM requires a certain level of technological understanding. Errors during Installation may lead to a bricked device which won't boot properly.
- Compatibility Issues – Some devices may not support certain custom ROMs.
- Bugs – Some Custom ROMs may come with various issues or bugs.
- Security issues – Installing a Custom ROM may compromise with android security.
- Warranty Voids – Installing a Custom ROM voids the warranty of the android device.
- No updates from original manufacturer – A device running a Custom ROM will stop receiving updates from its original manufacturer.

### V. CONCLUSION

Stock ROMs can be customized and altered since Android is an open-source operating system. Then, they are referred to as Custom ROMs. These can be installing in place of the Stock Rom to enable the device to reach its maximum potential and offer powerful features.

These may also come with some drawbacks. It all depends on the usage and manufacturer of the specific device. Brands like Xiaomi, Oneplus, Realme and Google are more compatible with most custom ROMs. A wide variety of Custom ROMs are available for these devices and they also come with less bugs.

On the other hand, popular brands like Samsung are less compatible with custom ROMs. There are limited Custom ROMs available for these devices and there are several technical difficulties during their installation on these devices.

The most popular Custom ROMs include – Cyanogen Mod, LineageOS, Pixel Experience and AOKP.

### REFERENCES

- [1]. <https://forum.xda-developers.com/>
- [2]. <https://www.xda-developers.com/>
- [3]. <https://www.bing.com/>
- [4]. <https://researchmethod.net/>
- [5]. <https://www.reddit.com/>
- [6]. <https://www.howtogeek.com/>
- [7]. <https://www.makeuseof.com/>
- [8]. <https://www.androidcentral.com/root>
- [9]. <https://www.androidauthority.com/>