**a) What is the difference between Internal Storage & External Storage?**

All Android devices have two file storage areas: "internal" and "external" storage. These names come from the early days of Android, when most devices offered built-in non-volatile memory (internal storage), plus a removable storage medium such as a micro SD card (external storage). Some devices divide the permanent storage space into "internal" and "external" partitions, so even without a removable storage medium, there are always two storage spaces and the API behavior is the same whether the external storage is removable or not.

**Internal storage:**

* It's always available.
* Files saved here are accessible by only your app.
* When the user uninstalls your app, the system removes all your app's files from internal storage.

Internal storage is best when you want to be sure that neither the user nor other apps can access your files.

**External storage:**

* It's not always available, because the user can mount the external storage as USB storage and in some cases remove it from the device.
* It's world-readable, so files saved here may be read outside of your control.
* When the user uninstalls your app, the system removes your app's files from here only if you save them in the directory from [getExternalFilesDir()](https://developer.android.com/reference/android/content/Context.html" \l "getExternalFilesDir(java.lang.String)).

External storage is the best place for files that don't require access restrictions and for files that you want to share with other apps or allow the user to access with a computer.

**b) For how long the data resides in the cache?**

The main reason why cached data exists is to make loading time faster. While cached data is helpful for computers, smartphones, and tablets; it can take up space on your device and it may, over a period of time, get corrupt.

Android devices manage app data very efficiently, and for most of the users, you will not have to worry about managing the cached data manually. However, when the phone begins to face issues and you are trying to fix a problem by following certain troubleshooting steps, then you may come across a step which may ask you to clear cache.

Cached files on your Android phone or tablet can exist for the apps which you access or use, and it will exist for the websites you visit using your smartphone. All apps, whether they are system apps or third party apps will have cached data. Since cached data is automatically created and it does not include any important data, [wiping or clearing the cache](https://www.technobezz.com/how-to-wipe-cache-partition-on-htc-one-m9/)for an app or a device is harmless.

Once the previous data is deleted, you will notice a slight change in the time it takes to accessing websites or using the app for the first time. This is when the cached data will be created once again. Once the data is recreated you will notice that your experience of accessing the app or the website the next time will be faster and smoother.

System cache will have data for all websites and apps that you may have used on your phone. There is a possibility that some of the data is for an app that you may have already uninstalled or for social media posts that you have read already and that you may not be opening again. It is good to clear the system cache every now and then so that you can free up some space on your phone or tablet.

Your Android device may have stored lots of information on the system cache and it gradually needs more and more storage space. It is unnecessary to give away important storage space for [system cache.](https://www.technobezz.com/how-to-clear-cache-on-the-galaxy-note-4/)Clearing cache is also necessary as a part of the troubleshooting process to resolve a number of problems that may arise because of corrupted cache data. With Android getting better with every update, most of the times you may not need to do it on your own. Android systems usually manage cache very effectively.

c) **What are the critical Permissions and Normal Permissions? What are the**

**examples of each?**

Normal Permissions:Many permissions are designated as [PROTECTION\_NORMAL](https://developer.android.com/reference/android/content/pm/PermissionInfo.html#PROTECTION_NORMAL), which indicates that there's no great risk to the user's privacy or security in letting apps have those permissions. For example, users would reasonably want to know whether an app can read their contact information, so users have to grant this permission explicitly. By contrast, there's no great risk in allowing an app to vibrate the device, so that permission is designated as *normal.*

If an app declares in its manifest that it needs a normal permission, the system automatically grants the app that permission at install time. The system does not prompt the user to grant normal permissions, and users cannot revoke these permissions.

As of API level 23, the following permissions are classified as [PROTECTION\_NORMAL](https://developer.android.com/reference/android/content/pm/PermissionInfo.html#PROTECTION_NORMAL):

* [ACCESS\_LOCATION\_EXTRA\_COMMANDS](https://developer.android.com/reference/android/Manifest.permission.html#ACCESS_LOCATION_EXTRA_COMMANDS)
* [ACCESS\_NETWORK\_STATE](https://developer.android.com/reference/android/Manifest.permission.html#ACCESS_NETWORK_STATE)
* [ACCESS\_NOTIFICATION\_POLICY](https://developer.android.com/reference/android/Manifest.permission.html#ACCESS_NOTIFICATION_POLICY)
* [ACCESS\_WIFI\_STATE](https://developer.android.com/reference/android/Manifest.permission.html#ACCESS_WIFI_STATE)
* [BLUETOOTH](https://developer.android.com/reference/android/Manifest.permission.html#BLUETOOTH)
* [BLUETOOTH\_ADMIN](https://developer.android.com/reference/android/Manifest.permission.html#BLUETOOTH_ADMIN)
* [BROADCAST\_STICKY](https://developer.android.com/reference/android/Manifest.permission.html#BROADCAST_STICKY)
* [CHANGE\_NETWORK\_STATE](https://developer.android.com/reference/android/Manifest.permission.html#CHANGE_NETWORK_STATE)
* [CHANGE\_WIFI\_MULTICAST\_STATE](https://developer.android.com/reference/android/Manifest.permission.html#CHANGE_WIFI_MULTICAST_STATE)
* [CHANGE\_WIFI\_STATE](https://developer.android.com/reference/android/Manifest.permission.html#CHANGE_WIFI_STATE)
* [DISABLE\_KEYGUARD](https://developer.android.com/reference/android/Manifest.permission.html#DISABLE_KEYGUARD)
* [EXPAND\_STATUS\_BAR](https://developer.android.com/reference/android/Manifest.permission.html#EXPAND_STATUS_BAR)
* [GET\_PACKAGE\_SIZE](https://developer.android.com/reference/android/Manifest.permission.html#GET_PACKAGE_SIZE)
* [INSTALL\_SHORTCUT](https://developer.android.com/reference/android/Manifest.permission.html#INSTALL_SHORTCUT)
* [INTERNET](https://developer.android.com/reference/android/Manifest.permission.html#INTERNET)
* [KILL\_BACKGROUND\_PROCESSES](https://developer.android.com/reference/android/Manifest.permission.html#KILL_BACKGROUND_PROCESSES)
* [MODIFY\_AUDIO\_SETTINGS](https://developer.android.com/reference/android/Manifest.permission.html#MODIFY_AUDIO_SETTINGS)
* [NFC](https://developer.android.com/reference/android/Manifest.permission.html#NFC)
* [READ\_SYNC\_SETTINGS](https://developer.android.com/reference/android/Manifest.permission.html#READ_SYNC_SETTINGS)
* [READ\_SYNC\_STATS](https://developer.android.com/reference/android/Manifest.permission.html#READ_SYNC_STATS)
* [RECEIVE\_BOOT\_COMPLETED](https://developer.android.com/reference/android/Manifest.permission.html#RECEIVE_BOOT_COMPLETED)
* [REORDER\_TASKS](https://developer.android.com/reference/android/Manifest.permission.html#REORDER_TASKS)
* [REQUEST\_IGNORE\_BATTERY\_OPTIMIZATIONS](https://developer.android.com/reference/android/Manifest.permission.html#REQUEST_IGNORE_BATTERY_OPTIMIZATIONS)

Other permissions include the following:

|  |  |
| --- | --- |
| Constants | |
| int | [FLAG\_COSTS\_MONEY](https://developer.android.com/reference/android/content/pm/PermissionInfo.html#FLAG_COSTS_MONEY)  Flag for [flags](https://developer.android.com/reference/android/content/pm/PermissionInfo.html#flags), corresponding to costsMoney value of [permissionFlags](https://developer.android.com/reference/android/R.attr.html" \l "permissionFlags). |
| int | [FLAG\_INSTALLED](https://developer.android.com/reference/android/content/pm/PermissionInfo.html#FLAG_INSTALLED)  Flag for [flags](https://developer.android.com/reference/android/content/pm/PermissionInfo.html#flags), indicating that this permission has been installed into the system's globally defined permissions. |
| int | [PROTECTION\_DANGEROUS](https://developer.android.com/reference/android/content/pm/PermissionInfo.html#PROTECTION_DANGEROUS)  Dangerous value for [protectionLevel](https://developer.android.com/reference/android/content/pm/PermissionInfo.html" \l "protectionLevel), corresponding to the dangerous value of [protectionLevel](https://developer.android.com/reference/android/R.attr.html" \l "protectionLevel). |
| int | [PROTECTION\_FLAG\_APPOP](https://developer.android.com/reference/android/content/pm/PermissionInfo.html#PROTECTION_FLAG_APPOP)  Additional flag for [protectionLevel](https://developer.android.com/reference/android/content/pm/PermissionInfo.html" \l "protectionLevel), corresponding to the appop value of [protectionLevel](https://developer.android.com/reference/android/R.attr.html" \l "protectionLevel). |
| int | [PROTECTION\_FLAG\_DEVELOPMENT](https://developer.android.com/reference/android/content/pm/PermissionInfo.html#PROTECTION_FLAG_DEVELOPMENT)  Additional flag for [protectionLevel](https://developer.android.com/reference/android/content/pm/PermissionInfo.html" \l "protectionLevel), corresponding to the development value of [protectionLevel](https://developer.android.com/reference/android/R.attr.html" \l "protectionLevel). |
| int | [PROTECTION\_FLAG\_INSTALLER](https://developer.android.com/reference/android/content/pm/PermissionInfo.html#PROTECTION_FLAG_INSTALLER)  Additional flag for [protectionLevel](https://developer.android.com/reference/android/content/pm/PermissionInfo.html" \l "protectionLevel), corresponding to the installer value of [protectionLevel](https://developer.android.com/reference/android/R.attr.html" \l "protectionLevel). |
| int | [PROTECTION\_FLAG\_INSTANT](https://developer.android.com/reference/android/content/pm/PermissionInfo.html#PROTECTION_FLAG_INSTANT)  Additional flag for [protectionLevel](https://developer.android.com/reference/android/content/pm/PermissionInfo.html" \l "protectionLevel), corresponding to the instant value of [protectionLevel](https://developer.android.com/reference/android/R.attr.html" \l "protectionLevel). |
| int | [PROTECTION\_FLAG\_PRE23](https://developer.android.com/reference/android/content/pm/PermissionInfo.html#PROTECTION_FLAG_PRE23)  Additional flag for [protectionLevel](https://developer.android.com/reference/android/content/pm/PermissionInfo.html" \l "protectionLevel), corresponding to the pre23 value of [protectionLevel](https://developer.android.com/reference/android/R.attr.html" \l "protectionLevel). |
| int | [PROTECTION\_FLAG\_PREINSTALLED](https://developer.android.com/reference/android/content/pm/PermissionInfo.html#PROTECTION_FLAG_PREINSTALLED)  Additional flag for [protectionLevel](https://developer.android.com/reference/android/content/pm/PermissionInfo.html" \l "protectionLevel), corresponding to the preinstalled value of [protectionLevel](https://developer.android.com/reference/android/R.attr.html" \l "protectionLevel). |
| int | [PROTECTION\_FLAG\_PRIVILEGED](https://developer.android.com/reference/android/content/pm/PermissionInfo.html#PROTECTION_FLAG_PRIVILEGED)  Additional flag for [protectionLevel](https://developer.android.com/reference/android/content/pm/PermissionInfo.html" \l "protectionLevel), corresponding to the privileged value of [protectionLevel](https://developer.android.com/reference/android/R.attr.html" \l "protectionLevel). |
| int | [PROTECTION\_FLAG\_RUNTIME\_ONLY](https://developer.android.com/reference/android/content/pm/PermissionInfo.html#PROTECTION_FLAG_RUNTIME_ONLY)  Additional flag for [protectionLevel](https://developer.android.com/reference/android/content/pm/PermissionInfo.html" \l "protectionLevel), corresponding to the runtime value of [protectionLevel](https://developer.android.com/reference/android/R.attr.html" \l "protectionLevel). |
| int | [PROTECTION\_FLAG\_SETUP](https://developer.android.com/reference/android/content/pm/PermissionInfo.html#PROTECTION_FLAG_SETUP)  Additional flag for [protectionLevel](https://developer.android.com/reference/android/content/pm/PermissionInfo.html" \l "protectionLevel), corresponding to the setup value of [protectionLevel](https://developer.android.com/reference/android/R.attr.html" \l "protectionLevel). |
| int | [PROTECTION\_FLAG\_SYSTEM](https://developer.android.com/reference/android/content/pm/PermissionInfo.html#PROTECTION_FLAG_SYSTEM)  This constant was deprecated in API level 23. Old name for [PROTECTION\_FLAG\_PRIVILEGED](https://developer.android.com/reference/android/content/pm/PermissionInfo.html#PROTECTION_FLAG_PRIVILEGED), which is now very confusing because it only applies to privileged apps, not all apps on the system image. |
| int | [PROTECTION\_FLAG\_VERIFIER](https://developer.android.com/reference/android/content/pm/PermissionInfo.html#PROTECTION_FLAG_VERIFIER)  Additional flag for [protectionLevel](https://developer.android.com/reference/android/content/pm/PermissionInfo.html" \l "protectionLevel), corresponding to the verifier value of [protectionLevel](https://developer.android.com/reference/android/R.attr.html" \l "protectionLevel). |
| int | [PROTECTION\_MASK\_BASE](https://developer.android.com/reference/android/content/pm/PermissionInfo.html#PROTECTION_MASK_BASE)  Mask for [protectionLevel](https://developer.android.com/reference/android/content/pm/PermissionInfo.html" \l "protectionLevel): the basic protection type. |
| int | [PROTECTION\_MASK\_FLAGS](https://developer.android.com/reference/android/content/pm/PermissionInfo.html#PROTECTION_MASK_FLAGS)  Mask for [protectionLevel](https://developer.android.com/reference/android/content/pm/PermissionInfo.html" \l "protectionLevel): additional flag bits. |
| int | [PROTECTION\_NORMAL](https://developer.android.com/reference/android/content/pm/PermissionInfo.html#PROTECTION_NORMAL)  A normal application value for [protectionLevel](https://developer.android.com/reference/android/content/pm/PermissionInfo.html" \l "protectionLevel), corresponding to the normal value of [protectionLevel](https://developer.android.com/reference/android/R.attr.html" \l "protectionLevel). |
| int | [PROTECTION\_SIGNATURE](https://developer.android.com/reference/android/content/pm/PermissionInfo.html#PROTECTION_SIGNATURE)  System-level value for [protectionLevel](https://developer.android.com/reference/android/content/pm/PermissionInfo.html" \l "protectionLevel), corresponding to the signature value of [protectionLevel](https://developer.android.com/reference/android/R.attr.html" \l "protectionLevel). |