

Rockchip RK3566 Android 11 低内存设备优化补丁说明

目录

```
.
|-- README.md
|-- device_rockchip_rk356x
|   |-- 0001-Add-process-reclaim-feature-support.patch
|-- frameworks_base
|   |-- 0001-services-Enable-app-compact-by-default.patch
|-- hardware_rockchip
|   |-- reclaimservice.tar.gz
|-- kernel
|   |-- 0001-mm-Add-process-reclaim-support.patch
|   |-- 0002-Increase-max-swappiness-to-200.patch
|-- packages_apps_Launcher3
|   |-- 0001-Fix-runtime-error-if-wallpaper-service-is-disabled.patch

5 directories, 7 files
```

使用说明

1. 对应目录打上 *.patch 和 *.diff
2. 将压缩包 reclaimservice.tar.gz 解压至 hardware/rockchip/
3. kernel需要打开 CONFIG_PROCESS_RECLAIM=y，如果自定义了config文件也要记得打开，编译内核后，请查看.config中有没有使能；如果要一键编译，可以把这个config添加到 kernel/kernel/configs/low_ram.config，device目录中默认配置了
PRODUCT_KERNEL_CONFIG := rockchip_defconfig android-11-go.config
low_ram.config，如果 low_ram.config 文件不存在，去掉即可
4. device_rockchip_rk356x目录的补丁，可以配置回收的间隔，可以根据自己需要调整
5. build_make下的一些裁剪，根据自己的实际产品调整。
 - persist.proc_compact.enable=true 开启进程回收任务
 - persist.proc_compact.app_enable=false 所有App进程强制回收page，不要开启
 - persist.proc_compact.first_pc_delay_mins=1 开机后首次执行回收page的时间，单位是分钟
 - persist.proc_compact.periodic_pc_delay_mins=3 后续每次执行回收page的间隔，单位是分钟

检查方法

1. kernel config
 - .config文件中是否有 CONFIG_PROCESS_RECLAIM=y
 - 开机后，进程pid中是否有reclaim节点，例如：`/proc/self/reclaim`

2. 回收job

- o `adb shell dumpsys jobscheduler|grep RockchipProcessCompactor`
- o `adb logcat -s RockchipProcessCompactor`
- o `adb logcat -s RockchipReclaimD`

裁剪后参考

```
130|rk3566_32bit:/ $ dumpsys meminfo
Applications Memory Usage (in Kilobytes):
Uptime: 195028 Realtime: 195028

Total RSS by process:
 97,060K: com.android.systemui (pid 1056)
 87,024K: com.android.launcher3 (pid 1277 / activities)
 77,144K: system (pid 374)
 17,724K: com.android.inputmethod.latin (pid 1387)
 11,476K: com.android.permissioncontroller (pid 899)
 11,248K: com.android.gallery3d (pid 1883)
 11,004K: com.android.deskclock (pid 1356)
 10,568K: com.android.contacts (pid 1858)
 10,380K: com.android.settings (pid 1202)
 10,224K: surfaceflinger (pid 164)
  9,704K: com.android.traceur (pid 2000)
  9,292K: com.android.camera2 (pid 1831)
  8,428K: com.android.managedprovisioning (pid 1601)
  8,224K: com.android.packageinstaller (pid 1952)
  7,632K: com.android.calendar (pid 1804)
  7,620K: android.process.media (pid 1625)
  7,436K: com.android.quicksearchbox (pid 1779)
  6,764K: com.android.shell (pid 1978)
  6,736K: com.android.keychain (pid 2045)
  6,524K: com.android.providers.calendar (pid 1672)
  6,484K: com.android.onetimeinitializer (pid 1926)
  5,644K: android.ext.services (pid 1344)
  3,920K: android.hardware.graphics.composer@2.1-service (pid 202)
  3,752K: audioserver (pid 247)
  3,352K: adbd (pid 277)
  3,108K: android.system.suspend@1.0-service (pid 162)
  3,044K: dumpsys (pid 2104)
  2,968K: com.android.phone (pid 1143)
  2,956K: com.android.se (pid 1122)
  2,936K: android.hardware.health@2.1-service (pid 240)
  2,924K: logd (pid 137)
  2,912K: vold (pid 148)
  2,868K: storaged (pid 293)
  2,832K: android.hardware.audio.service (pid 235)
  2,756K: statsd (pid 214)
  2,752K: init (pid 1)
  2,692K: servicemanager (pid 139)
  2,684K: cameraserer (pid 279)
  2,660K: android.hardware.graphics allocator@4.0-service (pid 194)
  2,636K: ueventd (pid 124)
  2,604K: lmkd (pid 138)
  2,584K: zygote (pid 216)
  2,572K: netd (pid 215)
```

2,560K: installd (pid 283)
2,556K: media.extractor (pid 285)
2,464K: com.android.providers.media.module (pid 1439)
2,428K: hwservicemanager (pid 140)
2,428K: sh (pid 2092)
2,360K: android.hardware.power-service.rockchip (pid 244)
2,160K: android.hardware.lights-service.rockchip (pid 243)
2,096K: mediaserver (pid 291)
2,088K: media.metrics (pid 290)
2,044K: media.codec (pid 297)
2,040K: incidentd (pid 282)
2,008K: media.swcodec (pid 308)
2,004K: keystore (pid 284)
1,996K: drmserver (pid 280)
1,988K: gatekeeperd (pid 309)
1,972K: android.hidl allocator@1.0-service (pid 234)
1,968K: webview_zygote (pid 1101)
1,948K: wificond (pid 294)
1,944K: android.hardware.bluetooth@1.0-service (pid 238)
1,940K: credstore (pid 248)
1,932K: gpuservice (pid 249)
1,928K: android.hardware.wifi@1.0-service-lazy (pid 863)
1,912K: android.hardware.gatekeeper@1.0-service.optee (pid 239)
1,908K: rockchip.hardware.rocket.hw@1.0-service (pid 246)
1,900K: tee-supplciant (pid 161)
1,892K: android.hardware.keymaster@4.0-service.optee (pid 163)
1,892K: android.hardware.sensors@1.0-service (pid 241)
1,888K: rockchip.hardware.outputmanager@1.0-service (pid 245)
1,864K: android.hardware.weaver@1.0-service (pid 242)
1,856K: tombstoned (pid 207)
1,848K: ip6tables-restore (pid 252)
1,840K: iptables-restore (pid 251)
1,776K: sh (pid 141)
948K: init (pid 121)

Total RSS by OOM adjustment:

131,724K: Native
10,224K: surfaceflinger (pid 164)
3,920K: android.hardware.graphics.composer@2.1-service (pid 202)
3,752K: audioserver (pid 247)
3,352K: adbd (pid 277)
3,108K: android.system.suspend@1.0-service (pid 162)
3,044K: dumpsys (pid 2104)
2,936K: android.hardware.health@2.1-service (pid 240)
2,924K: logd (pid 137)
2,912K: vold (pid 148)
2,868K: storaged (pid 293)
2,832K: android.hardware.audio.service (pid 235)
2,756K: statsd (pid 214)
2,752K: init (pid 1)
2,692K: servicemanager (pid 139)
2,684K: camerasetter (pid 279)
2,660K: android.hardware.graphics.allocator@4.0-service (pid 194)
2,636K: ueventd (pid 124)
2,604K: lmkd (pid 138)
2,584K: zygote (pid 216)

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2,572K: netd (pid 215)
2,560K: installd (pid 283)
2,556K: media.extractor (pid 285)
2,428K: hwservicemanager (pid 140)
2,428K: sh (pid 2092)
2,360K: android.hardware.power-service.rockchip (pid 244)
2,160K: android.hardware.lights-service.rockchip (pid 243)
2,096K: mediaserver (pid 291)
2,088K: media.metrics (pid 290)
2,044K: media.codec (pid 297)
2,040K: incidentd (pid 282)
2,008K: media.swcodec (pid 308)
2,004K: keystore (pid 284)
1,996K: drmserver (pid 280)
1,988K: gatekeeperd (pid 309)
1,972K: android.hidl allocator@1.0-service (pid 234)
1,968K: webview_zygote (pid 1101)
1,948K: wificond (pid 294)
1,944K: android.hardware.bluetooth@1.0-service (pid 238)
1,940K: credstore (pid 248)
1,932K: gpuservice (pid 249)
1,928K: android.hardware.wifi@1.0-service-lazy (pid 863)
1,912K: android.hardware.gatekeeper@1.0-service.optee (pid 239)
1,908K: rockchip.hardware.rocket.hw@1.0-service (pid 246)
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1,892K: android.hardware.sensors@1.0-service (pid 241)
1,888K: rockchip.hardware.outputmanager@1.0-service (pid 245)
1,864K: android.hardware.weaver@1.0-service (pid 242)
1,856K: tombstoned (pid 207)
1,848K: ip6tables-restore (pid 252)
1,840K: iptables-restore (pid 251)
1,776K: sh (pid 141)
  948K: init (pid 121)
77,144K: System
  77,144K: system (pid 374)
102,984K: Persistent
  97,060K: com.android.systemui (pid 1056)
  2,968K: com.android.phone (pid 1143)
  2,956K: com.android.se (pid 1122)
  2,464K: Persistent Service
    2,464K: com.android.providers.media.module (pid 1439)
87,024K: Foreground
  87,024K: com.android.launcher3 (pid 1277 / activities)
  5,644K: Visible
    5,644K: android.ext.services (pid 1344)
17,724K: Perceptible
  17,724K: com.android.inputmethod.latin (pid 1387)
139,520K: Cached
  11,476K: com.android.permissioncontroller (pid 899)
  11,248K: com.android.gallery3d (pid 1883)
  11,004K: com.android.deskclock (pid 1356)
  10,568K: com.android.contacts (pid 1858)
  10,380K: com.android.settings (pid 1202)
  9,704K: com.android.traceur (pid 2000)
  9,292K: com.android.camera2 (pid 1831)
  8,428K: com.android.managedprovisioning (pid 1601)
  8,224K: com.android.packageinstaller (pid 1952)
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7,632K: com.android.calendar (pid 1804)
7,620K: android.process.media (pid 1625)
7,436K: com.android.quicksearchbox (pid 1779)
6,764K: com.android.shell (pid 1978)
6,736K: com.android.keychain (pid 2045)
6,524K: com.android.providers.calendar (pid 1672)
6,484K: com.android.onetimeinitializer (pid 1926)

Total RSS by category:

182,244K: .so mmap
76,520K: .apk mmap
64,192K: .jar mmap
58,888K: Native
39,152K: Other mmap
32,348K: .oat mmap
29,536K: .art mmap
23,052K: Dalvik
19,940K: .dex mmap
13,988K: Other dev
8,400K: Unknown
7,760K: Dalvik Other
7,500K: Stack
540K: .ttf mmap
168K: Ashmem
0K: Cursor
0K: Gfx dev
0K: EGL mtrack
0K: GL mtrack
0K: Other mtrack

Total PSS by process:

87,547K: com.android.systemui (pid 1056)
68,642K: system (pid 374)
60,813K: com.android.launcher3 (pid 1277 / activities)
20,127K: surfaceflinger (pid 164)
17,874K: com.android.settings (pid 1202)
11,749K: com.android.providers.media.module (pid 1439)
10,920K: com.android.inputmethod.latin (pid 1387)
10,196K: com.android.permissioncontroller (pid 899)
8,860K: com.android.deskclock (pid 1356)
7,811K: com.android.contacts (pid 1858)
7,400K: com.android.gallery3d (pid 1883)
6,797K: com.android.managedprovisioning (pid 1601)
6,563K: com.android.traceur (pid 2000)
6,374K: com.android.camera2 (pid 1831)
6,315K: android.process.media (pid 1625)
5,093K: com.android.packageinstaller (pid 1952)
5,061K: com.android.providers.calendar (pid 1672)
4,573K: android.ext.services (pid 1344)
4,423K: com.android.calendar (pid 1804)
4,409K: com.android.quicksearchbox (pid 1779)
3,668K: com.android.shell (pid 1978)
3,638K: com.android.keychain (pid 2045)
3,574K: audioserver (pid 247)
3,529K: com.android.se (pid 1122)
3,263K: com.android.onetimeinitializer (pid 1926)
3,184K: com.android.phone (pid 1143)
2,902K: cameraserer (pid 279)

2,888K: android.hardware.graphics.composer@2.1-service (pid 202)
2,875K: mediaserver (pid 291)
2,830K: webview_zygote (pid 1101)
2,682K: init (pid 1)
2,636K: media.extractor (pid 285)
2,505K: zygote (pid 216)
2,353K: media.codec (pid 297)
2,255K: media.swcodec (pid 308)
1,897K: ueventd (pid 124)
1,869K: android.hardware.audio.service (pid 235)
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1,435K: logd (pid 137)
1,353K: statsd (pid 214)
1,273K: installd (pid 283)
1,236K: android.hardware.health@2.1-service (pid 240)
1,116K: init (pid 121)
1,058K: storaged (pid 293)
1,000K: android.hardware.wifi@1.0-service-lazy (pid 863)
975K: gpuservice (pid 249)
948K: keystore (pid 284)
944K: media.metrics (pid 290)
930K: rockchip.hardware.rocket.hw@1.0-service (pid 246)
915K: wificond (pid 294)
910K: rockchip.hardware.outputmanager@1.0-service (pid 245)
895K: android.hardware.keymaster@4.0-service.optee (pid 163)
883K: credstore (pid 248)
874K: hwservermanager (pid 140)
871K: android.system.suspend@1.0-service (pid 162)
854K: android.hardware.weaver@1.0-service (pid 242)
839K: gatekeeperd (pid 309)
834K: servicemanager (pid 139)
826K: android.hardware.sensors@1.0-service (pid 241)
818K: android.hardware.gatekeeper@1.0-service.optee (pid 239)
814K: android.hardware.power-service.rockchip (pid 244)
803K: dumpsys (pid 2104)
781K: android.hardware.lights-service.rockchip (pid 243)
779K: android.hardware.bluetooth@1.0-service (pid 238)
772K: drmserver (pid 280)
728K: incidentd (pid 282)
682K: sh (pid 2092)
627K: tee-supplciant (pid 161)
551K: android.hidl.allocator@1.0-service (pid 234)
543K: lmkd (pid 138)
478K: sh (pid 141)
452K: ip6tables-restore (pid 252)
452K: iptables-restore (pid 251)
411K: tombstoned (pid 207)

Total PSS by OOM adjustment:

88,134K: Native
20,127K: surfaceflinger (pid 164)
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2,888K: android.hardware.graphics.composer@2.1-service (pid

194)

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2,875K: mediaserver (pid 291)
2,830K: webview_zygote (pid 1101)
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11,749K: Persistent Service
  11,749K: com.android.providers.media.module (pid 1439)
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107,745K: Cached
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    10,196K: com.android.permissioncontroller (pid 899)
    8,860K: com.android.deskclock (pid 1356)
    7,811K: com.android.contacts (pid 1858)
    7,400K: com.android.gallery3d (pid 1883)
    6,797K: com.android.managedprovisioning (pid 1601)
    6,563K: com.android.traceur (pid 2000)
    6,374K: com.android.camera2 (pid 1831)
    6,315K: android.process.media (pid 1625)
    5,093K: com.android.packageinstaller (pid 1952)
    5,061K: com.android.providers.calendar (pid 1672)
    4,423K: com.android.calendar (pid 1804)
    4,409K: com.android.quicksearchbox (pid 1779)
    3,668K: com.android.shell (pid 1978)
    3,638K: com.android.keychain (pid 2045)
    3,263K: com.android.onetimeinitializer (pid 1926)
```

Total PSS by category:

```
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57,821K: Native
44,843K: .so mmap
34,145K: .jar mmap
22,420K: Dalvik
21,022K: .art mmap
19,569K: .dex mmap
12,742K: .oat mmap
7,691K: Dalvik Other
7,487K: Stack
7,279K: Unknown
5,091K: Other mmap
777K: Other dev
540K: .ttf mmap
116K: Ashmem
0K: Cursor
0K: Gfx dev
0K: EGL mtrack
0K: GL mtrack
0K: Other mtrack
```

```
Total RAM: 978,372K (status normal)
Free RAM: 455,117K ( 107,745K cached pss + 279,768K cached kernel +
67,604K free)
ION: 86,216K ( 65,668K mapped + 0K unmapped +
20,548K pools)
Used RAM: 522,027K ( 339,091K used pss + 182,936K kernel)
Lost RAM: 119,327K
ZRAM: 22,884K physical used for 163,584K in swap ( 733,772K
total swap)
Tuning: 128 (large 256), oom 81,920K, restore limit 27,306K
(low-ram)
```


