Linux Plumbers Conference

Vienna, Austria | September 18-20, 2024

memcg developments for Android

T.J. Mercier
tjmercier@google.com

News

cgroup v1 controllers are currently being deprecated upstream
- memcg: https://lore.kernel.org/all/20240814220021.3208384-1-shakeel.butt@linux.dev/ (deprecated)
- cpuset: https://lore.kernel.org/all/20240827062111.580296-1-chenridong@huawei.com/ (v1/v2 code split)

Plan:
Configure in support for both memcg v1 and v2 in Android 16 (2025)
Remove support for memcg v1 in Android 17 (2026)

Other controllers (blkio, cpu, cpuset): WIP
- Historically, performance regressions associated with switch to v2 based on how Android uses them.
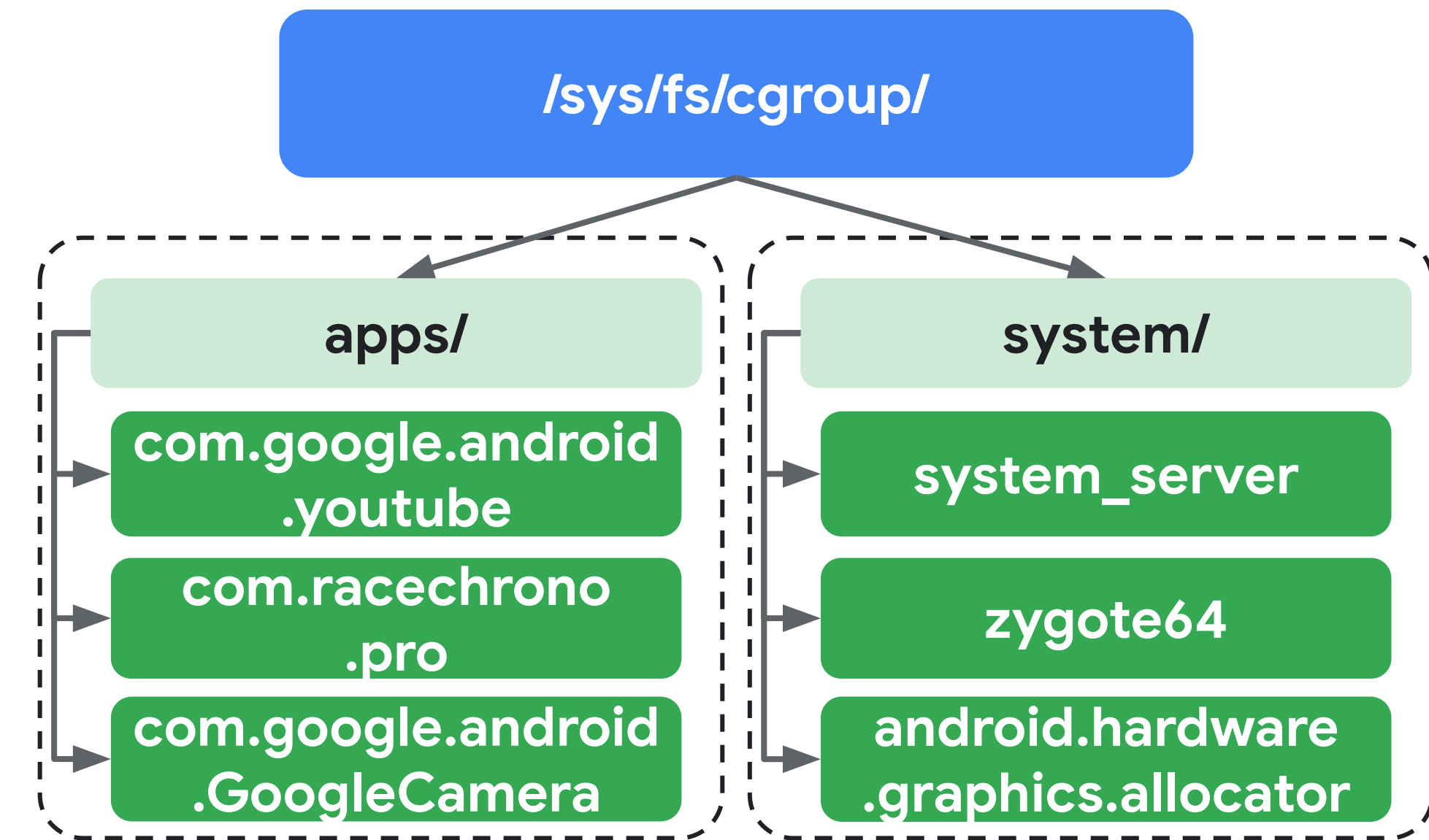- Some ideas for how to address, but no code yet.

memcg v2 updates (Android 15)

Android 15 supports memcg v2
- Opt-in required for Android 15:
  `PRODUCT_MEMCG_V2_FORCE_ENABLED := true`
- Or use vendor cgroups.json

Android 15 supports system / application cgroup v2 hierarchy split
- Opt-in required for Android 15:
  `PRODUCT_CGROUP_V2_SYS_APP_ISOLATION_ENABLED := true`
- Cgroup controls can be applied at the apps and system level
- Currently based only on package UID, more to come.

/sys/fs/cgroup/

apps/
- com.google.android.youtube
- com.racechrono.pro
- com.google.android.GoogleCamera

system/
- system_server
- zygote64
- android.hardware.graphics.allocator

memcg v2 updates (Android 16)

Android 16 supports memcg v2 activation depth control
- Add **"MaxActivationDepth"** key to cgroups.json
  https://r.android.com/3114673
- Reduce overhead associated with number of memcgs

Likely that the default will change from v1 to v2 in Android 16
- Possible to opt-out to v1, but only temporary until Android 17
  (Allow vendors more time to prepare for v2 transition, if necessary)
- Still possible to turn off memcg entirely (`cgroup_disable=memory`)

memcg v2 issues

- Kernel reports incorrect number of v2 cgroup controllers
  https://lore.kernel.org/all/20240528163713.2024887-1-tjmercier@google.com/

  I would prefer to have a single global count at the root.

  Does anybody actually want it in each cgroup?

- Any other desired features?