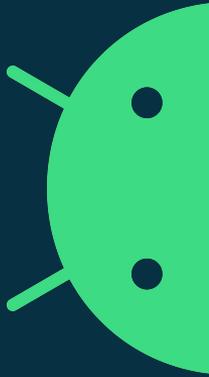


Generic Kernel Image - Progress

Linux Plumbers 2019

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tl;dr

- Generic ARM64 kernel for all Android devices.
 - Many more details : <https://lwn.net/Articles/771974/>
- Reduce fragmentation
- Target Kernel: android-4.19 and android-mainline (android-5.4)
- First Target Hardware: Cuttlefish (x86, arm64), DB845c/ Hikey?

What, why, where ..

Branches

- android-mainline
- android-4.19
- android-5.4*

Configuration

- Single Kernel Configuration (gki_defconfig)
- Suitable for all ARM64 based devices

Toolchain

- Single Toolchain (Clang)
- Hermetic Build

Scope

- All ARM64 / x86_64* android devices

Workstreams

- ABI Monitoring
- Default kernel configurations
- Device dependencies
- Finalize user space APIs
 - SDCardFS, Ion
- Android changes
 - Kernel module loading
 - Split initramfs

ABI Monitoring and Enforcement

- Define a baseline ABI
- Keep it along with your sources
- Establish ABI checking (e.g. `build_abi.sh`) as mandatory test before merging
- Changes targeting Android Common Kernels have to pass this test in AOSP Gerrit

```
--- a/include/linux/utsname.h
+++ b/include/linux/utsname.h
@@ -22,6 +22,7 @@ struct user_namespace;
extern struct user_namespace init_user_ns;

struct uts_namespace {
+   int dummy;
   struct kref kref;
   struct new_utsname name;
   struct user_namespace *user_ns;
```

M [include/linux/utsname.h](#) | +1 -0

+36368 -36143

Presubmit Lint Checks

Status	Category
■	CommonTypos
■	KernelCommit
■	KernelABI

Line	Col	Filepath	Message	Subcategory
			ABIs broken! : rc=4, output=Leaf changes summary: 3 artifacts changed Changed leaf types summary: 1 leaf type changed Removed/Changed/Added functions summary: 0 Removed, 1 Changed, 0 Added function Removed/Changed/Added variables summary: 0 Removed, 0 Changed, 0 Added variable	
			1 function with some sub-type change:	
			'struct uts_namespace at utsname.h:24:1' changed: type size hasn't changed 1 data member insertion: 'int uts_namespace::dummy' at offset 0 (in bits) at utsname.h:25:1 there are data member changes: 'kref uts_namespace::kref' offset changed from 0 to 32 (in bits) (by +32 bits) 'new_utsname uts_namespace::name' offset changed from 32 to 64 (in bits) (by +32 bits)	
			6244 impacted interfaces: Qdisc_ops bffo_qdisc_ops	

Defconfig

- Collection of ARM64 default configurations in 'gki_defconfig' in each kernel
- Problems
 - A lot of subsystem configs are only selected by other drivers
 - PINCTRL, REGMAP, DRM configs etc
 - Unnecessary Kconfig dependencies on CONFIG_ARCH_XXXX

Device dependencies

- Deferred probe works, but ...
 - Costs unacceptable delays during boot.
- Cyclic dependencies between devices
- Post boot device state clean up

Finalize UAPI

- Ion
 - Make heaps modular (we have to)
- SDCardFS
- Imkd

Android

- Modprobe support with dependency tracking
- Split ramfs

Contributions

- Linaro
 - Helping with AOSP dev boards running GKI
- Upstream / Android changes, problems, questions
 - Email us at: kernel-team@android.com

Questions?

