

# Cuttlefish and Kernels



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# What is Cuttlefish?

- Android Virtual Device used by kernel, systems, and BSP devs across the Android Ecosystem to help develop pre-silicon hardware, kernel software, or test various different android configurations

# Why should you use it?

- Virtio compliant
  - GPU, SND, Input, Net, Wifi (mac80211\_hwsim), Block, pmem
  - QEMU, CrosVM, Gem5, COQOS (OpenSynergy)
- ADB, WebRTC, serial
- GDB! Or printk ;)
- Used to test upstream Linux
  - Android Common Kernel's CI/CD pipeline
- AArch64, AArch32, x86, x86\_64
  - GCE, AWS, w/ or w/o GPU, Ampere Boxes, Rockpi, Emulation
- Bootloader support (U-Boot) + Bootconfig
- Developed upstream (AOSP)

# Getting Started

## Install our host packages

- cuttlefish-base (and recommended cuttlefish-user) - <https://github.com/google/android-cuttlefish>

## Android Build

```
$ mkdir android && cd android
$ repo init -u https://android.googlesource.com/platform/manifest -b master
$ repo sync -j
$ source build/envsetup.sh; lunch aosp_cf_x86_64_phone-userdebug
$ m -j
```

## Kernel + Module Builds

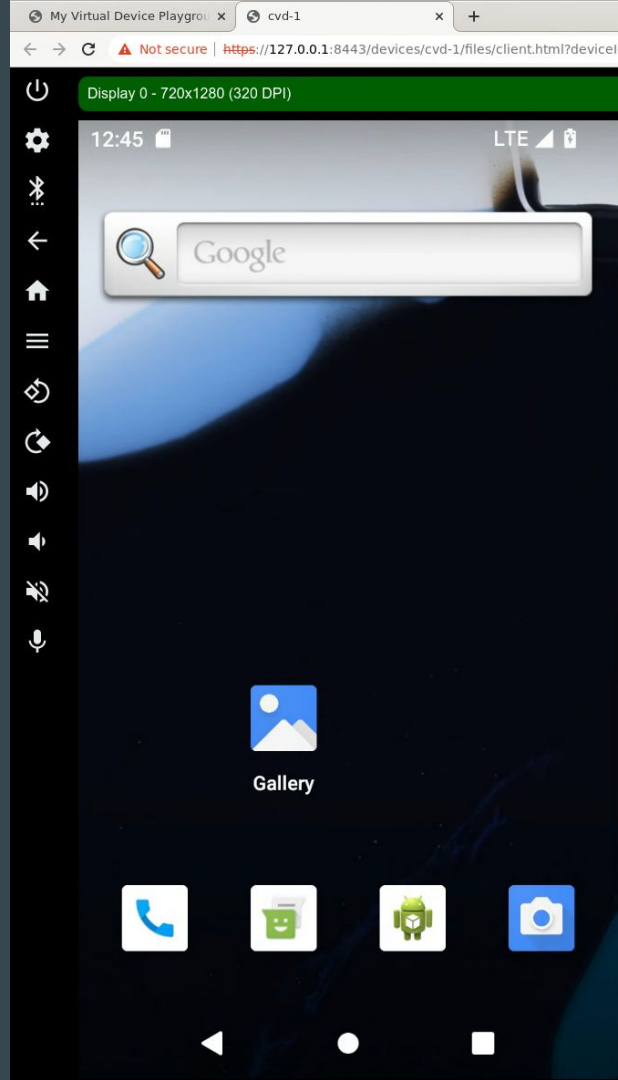
```
$ mkdir kernel && cd kernel
$ repo init -u https://android.googlesource.com/kernel/manifest -b \
common-android-mainline // or common-android14-5.15
$ repo sync -j
$ tools/bazel run //common:kernel_x86_64_dist \
$ tools/bazel run //common-modules/virtual-device:virtual_device_x86_64_dist
```

## Launch/Interact w/ the device

```
$ launch_cvd -kernel_path /path/to/bzImage \  
  -initramfs_path /path/to/kernel/module/ramdisk \  
$ adb shell \  
$ tail -f ~/cuttlefish_runtime/kernel.log // dmesg \  
> Go to https://127.0.0.1:8443/
```

## GDB the kernel

```
$ launch_cvd -kernel_path /path/to/bzImage \  
  -initramfs_path /path/to/kernel/module/ramdisk \  
  -gdb_port 1234 -cpus=1 \  
  -extra_kernel_cmdline nokaslr \  
$ gdb vmlinux \  
(gdb) target remote :1234 \  
(gdb) hbreak start_kernel \  
(gdb) c
```



# Future

- EFI Boot
- EROFS
- Run Cuttlefish on Phones (or on Cuttlefish)
- Automotive Virtio SCMI
- Virtio RPMB
- ARM64 GPU
- Virtio GPIO
- Camera, Video Encode/Decode (no acceleration atm)

# References

[cloud-android-ext@google.com](mailto:cloud-android-ext@google.com) - Feature requests are welcome!

<https://source.android.com/docs/setup/create/cuttlefish> - for more information



**Thank You! Questions?**

# Common Questions

Why cuttlefish?

- Upstream kernels/qemu
- Mostly upstream u-boot
- Easily instrumentable (gdb, kgdb)

Range of Kernels Supported

- android[13|12L|12]-gsi - Easily boot android11-5.4 and upwards
- android[11|10]-gsi - can boot prior kernels