Kernel Hacking with Cuttlefish

Linux Plumbers, November 2018
Alistair Strachan <astrachan@google.com>
Agenda

What is cuttlefish?
Basic setup
Future
What is cuttlefish?
What is cuttlefish?

- Android Virtual Device (AVD) based on QEMU x86_64 architecture, uses `--machine pc-i440fx-2.8`, KVM support

- Runs locally, or on the Google Cloud Platform
  Utilizes nested virtualization features for high performance

- Mostly virtio based (block, net, serial, gpu)
  Also uses virtual SoC driver `drivers/staging/android/vsoc.c`, but we are working to remove it

- Kernel `defconfig` to enable virtio/vsoc/android features

- Not to be confused with Android Emulator, goldfish/ranchu
  No `goldfish_pipe, goldfish_address_space`

- Developed upstream: AOSP, mainline Linux
  (The virt_wifi driver is pending review on net-next)
Basic setup
Build the platform:

$ mkdir android && cd android
$ repo init -u https://android.googlesource.com/platform/manifest
$ . build/envsetup.sh
$ lunch aosp_cf_x86_phone-userdebug
$ make -j128 dist

Build the kernel:

$ mkdir kernel && cd kernel
$ git clone https://android.googlesource.com/kernel/common \
   -b android-4.14 # or, android-mainline-tracking
$ cd common
$ ARCH=x86_64 make x86_64_cuttlefish_defconfig
$ make -j128
Launch the platform:

$ launch_cvd \
   -kernel_path \n   $PWD/kernel/common/arch/x86/boot/bzImage

Connect ADB:

$ adb shell

Connect VNC:

$ java -jar tightvnc-jviewer.jar
   127.0.0.1 port 6444

Useful logs:

~/cuttlefish_runtime/kernel.log

~/cuttlefish_runtime/logcat
Future

- Documentation on android.com
- Eliminate the VSoC driver, replace with virtio
- Use `virtio_gpu_3d` to accelerate graphics
- Cuttlefish build and kernel defconfig for arm64 (WIP)

Feedback welcome!
THANK YOU