

Marshmallow Porting on Beaglebone Black

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<http://www.globaledgesoft.com/>

Quick Guide for Android Porting on ARM Architecture By Globaledge Software Pvt

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1. General Porting Activity

i. Linux Kernel Changes to make an Android Kernel

Binder,ashmem,Pmem,Logger,wakelock,OOMHandling,alarm timer,Paranoid Network security,
Time out/Timed GPIO,RAM,Console,ADB etc

ii. ARM SoC(System On chip) Changes:

Processor and SoC manufacture specific
Example -Cortex series – Qualcomm, TI, Nvidia, ST etc...

iii. BSP(Board Support package) specific Changes:

Example - Snapdragon, DM356, DM368 etc....

iv. OEM Changes:

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Example -LG, Samsung, MI etc

v. OEM's Customer Changes:

Example -Reliance, Verizon etc.....

vi. Library Integration:

Example - Modem ,GPU ,Telephony, Camera, OPENGL,OPENMAX etc.....

2. Case Study

i.Previous android version is up and running on TI Board

Lollipop is running on TI platform
 How to port next Android version on this Platform?
 Get the difference between AOSP and currently running android version
 Will get TI specific changes and any proprietary library.
 These Changes need to incorporate to next version AOSP porting (ex: Lollipop to Marshmallow).
 This is baseline code.
 Once the Base line is ready, distribute to the Other team (middleware and application Team).
 We ported Marshmallow on Beagle Bone Black ,RPI etc.
 Skills required Moderate on Linux.

ii.No Android version is Running on board - But Linux is running

Convert Linux Kernel to Android Kernel.
 Incorporate HAL, Middleware, Vendor specific, third party library Changes.
 Needs file system modifications.
 Skills required - Experts on Linux Porting

iii.New Board and No Linux Kernel

Porting U-boot and Linux Kernel
 Follow The Case study ii.
 Skills Required -Strong Linux Kernel Porting On New SoC & Board.

3.Marshmallow porting on Beaglebone black:

steps:

Get AOSP source from Google

```
$ curl http://commondatastorage.googleapis.com/git-repo-downloads/repo > ~/bin/repo
$ chmod a+x ~/bin/repo
$ mkdir ~/aosp
$ cd aosp
$ repo init -u https://android.googlesource.com/platform/manifest -b android-6.0.0_r5
$ repo sync -c
```

Get device files for the BeagleBone Black

```
$ cd ~/aosp/device
$ mkdir ti
$ cd ti
$ git clone https://github.com/csimmonds/bbb-android-device-files.git beagleboneblack
$ cd beagleboneblack
```

Get the Rowboat kernel configure and compile

```
$ cd ~/aosp
$ git clone https://gitorious.org/rowboat/kernel.git
$ cd kernel
$ git checkout rowboat-am335x-kernel-3.2
$ patch -p1 < ../device/ti/beagleboneblack/kernel-patches/0001-Tweak-backlight-PWM-for-LCD4-Beaglebone-cape.patch
$ patch -p1 < ../device/ti/beagleboneblack/kernel-patches/0002-Reboot-reason-flags-for-BBB.patch
$ make ARCH=arm CROSS_COMPILE=arm-eabi- am335x_evm_android_defconfig
```

```
$ make ARCH=arm CROSS_COMPILE=arm-eabi- -j4 uImage
$ croot
```

Get U-Boot configure and compile:

```
$ cd ~/aosp
$ git clone https://github.com/csimmonds/u-boot
$ cd u-boot
$ make CROSS_COMPILE=arm-eabi- am335x_evm_config
$ make CROSS_COMPILE=arm-eabi-
```

Build AOSP

```
$ . build/envsetup.sh
$ lunch
  - select your device
$ make -j8
```

Put the images on micro SD card: You need a micro SD card of at least 2 GiB capacity.

```
$ croot
$ device/ti/beagleboneblack/write_sdcard.sh
```

Issues and Modifications:

Build has been tested on a BBB.

```
The initial boot time is bit long.
The screen flickers whenever it is updated
Dont use gcc 4.8 toolchain that comes with AOSP 6.0 insted use gcc 4.7 toolchain
```

(1)init: could not import file '/init.unknown.rc' from '/init.rc'

```
It has to be our device file init.am335xevm.rc
Need to modify the BoardConfig.mk file in device/ti/beagleboneblack
BOARD_KERNEL_CMDLINE := console=tty00,115200n8 androidboot.console=tty00 rootwait ro qemu=1 qemu.gles=0
```

modify the above line as below

```
BOARD_KERNEL_CMDLINE := console=tty00,115200n8 androidboot.console=tty00 androidboot.hardware=am335xevm rootwait ro qemu=1 qemu.gles=0
```

(2)init: Service 'sdcard' (pid 124) exited with status 1 init: Service 'sdcard' (pid 124) killing any children in process group

```
sol:modified the two file fstab.am335xevm-sd & init.am335xevm.rc. Its worked!
The modifications are as follows:
device/ti/beagleboneblack/fstab.am335xevm-sd
Add the following line at the end of the above file
    /devices/*xhci-hcd.0.auto/usb*          auto    auto    defaults    voldmanaged=usb:auto
device/ti/beagleboneblack/ init.am335xevm.rc
Remove the following lines:
on init
    mkdir /mnt/shell/emulated 0700 shell shell
    mkdir /storage/emulated 0555 root root
    export EXTERNAL_STORAGE /storage/emulated/legacy
    export EMULATED_STORAGE_SOURCE /mnt/shell/emulated
    export EMULATED_STORAGE_TARGET /storage/emulated
    symlink /storage/emulated/legacy /sdcard
    symlink /storage/emulated/legacy /mnt/sdcard
    symlink /storage/emulated/legacy /storage/sdcard0
    symlink /mnt/shell/emulated/0 /storage/emulated/legacy
on post-fs-data
    mkdir /data/media 0770 media_rw media_rw
on fs
    # virtual sdcard daemon running as media_rw (1023)
    service sdcard /system/bin/sdcard /data/media /mnt/shell/emulated 1023 1023
    class late_start
Add the following lines:
on init
    # Load persistent dm-verity state
    verity_load_state
    # Support legacy paths
```

```
symlink /sdcard /mnt/sdcard  
symlink /sdcard /storage/sdcard0
```

compile the AOSP source: ~/aosp\$ make -j8

Put the images on micro SD card: ~/aosp\$ device/ti/beagleboneblack/write_sdcard.sh

MaheshKalmeshwar (talk) 10:18, 4 December 2015

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