Raspberrypi Memory partition in dunfell

For a raspberrypi image, mainly there are two partitions, kernel and rootfs. The size of kernel size is ~48M. Rootfs is mounted on SD card and its value can be increased using gparted,fdisk or similar tool. By default while flashing an image to SD card, two partitions are created, namely mmcblk0p1 and mmcblk0p2. rootfs image is stored in mmcblk0p2 whereas mmcblk0p1 holds boot information.

The details of sd card partions and its sizes can be found using "fdsik -l command"

```
root@raspberrypi-rdk-hybrid:~# fdisk -l
Disk /dev/mmcblk0: 14 GB, 15552479232 bytes, 30375936 sectors
474624 cylinders, 4 heads, 16 sectors/track
Units: sectors of 1 * 512 = 512 bytes

Device              Boot StartCHS   EndCHS      StartLBA    EndLBA      Sectors     Size        Id Type
/dev/mmcblk0p1 *    64,0,1          841,0,32    8192        107679      99488       48.5M       c Win95 FAT32 (LBA)
/dev/mmcblk0p2      896,0,1         1023,3,32   114688      10711039    10596352    5174M       83 Linux
root@raspberrypi-rdk-hybrid:~#
```

For changing sd card partition using gparted refer below link.

Partioning and Resizing using GParted GUI

Memory Usage

The memory in raspberrypi is partitioned into different sessions and the details of these partitions and allocated size for these partitions can be found out using df command. df -h command gives size allocated to each of these partitions and the size that is already used by different components.

```
root@raspberrypi-rdk-hybrid:~# df -h
Filesystem          Size      Used      Available   Use%    Mounted on
/dev/root           865.5M    552.0M    252.0M      69%     /
devtmpfs            339.6M    0         339.6M      0%      /dev
tmpfs               468.1M    8.0K      468.1M      0%      /dev/shm
tmpfs               194.3M    8.8M      185.6M      5%      /run
tmpfs               468.1M    0         468.1M      0%      /sys/fs/cgroup
tmpfs               468.1M    6.6M      461.5M      1%      /tmp
tmpfs               468.1M    6.6M      461.5M      1%      /etc/snmp/snmpd.conf
tmpfs               468.1M    236.0K    467.9M      0%      /var/volatile
/dev/root           865.5M    552.0M    252.0M      69%     /var/lib
/dev/mmcblk0p1      48.5M     27.4M     21.0M       57%     /boot
tmpfs               93.6M     0         93.6M       0%      /run/user/0
root@raspberrypi-rdk-hybrid
```

The total amount of RAM memory used and the available memory can be found using free command. free -lh command gives the details of the amount of memory used out of the total memory and the available memory that can be used for functions like audio/video playback.

```
root@raspberrypi-rdk-hybrid:~# free -lh
            total       used       free       shared    buff/cache   available
Mem:        936M        571M       217M       26M       147M         311M
Low:        936M        718M       217M
High:       0B          0B         0B
Swap:       0B          0B         0B
root@raspberrypi-rdk-hybrid:~#
```

Boot memory Information

The memory allocated for each component at the time of boot up is given below.

Component	Size
Kernel code	9216K
RW data	737K
RO data	2928K
init	1024K
BSS	853K

vmalloc	1097K
cma total	262K
KernelStack	2536 kB
Shmem	14596 kB

Graphics memory

Graphics memory, commonly called GPU memory is the amount of memory available on graphics card and is used by graphics processor. We can use vcgencmd for getting gpu memory information.

Please refer below link for GPU memory details.

GPU Memory Consumption Analysis

```
root@raspberrypi-rdk-hybrid:~# vcgencmd get_mem gpu
gpu=64M
```

Changing tmpfs partition size

Size of tmpfs partition can be changed by using fstab. Below are the list of tmpfs partitions.

```
tmpfs           468.1M    4.0K    468.1M   0%   /dev/shm
tmpfs           194.3M    8.8M    185.5M   5%   /run
tmpfs           468.1M      0     468.1M   0%   /sys/fs/cgroup
tmpfs           468.1M    2.2M    466.0M   0%   /tmp
tmpfs           468.1M    2.2M    466.0M   0%   /etc/snmp/snmpd.conf
tmpfs           468.1M  320.0K    467.8M   0%   /var/volatile
```

The size of these partitions can be changed by mentioning size in /etc/fstab. For example, we reduce size of /run to ~100M by mentioning size as below. Reboot the device after fstab is modified.

```
root@raspberrypi-rdk-hybrid:~# vi /etc/fstab
# stock fstab - you probably want to override this with a machine specific one

/dev/root          /                    auto      defaults            1  0
proc               /proc                proc      defaults            0  0
devpts             /dev/pts             devpts    mode=0620,ptmxmode=0666,gid=5      0  0
tmpfs              /run                 tmpfs     mode=0755,nodev,nosuid,strictatime,size=103741824 0  0
tmpfs              /var/volatile        tmpfs     defaults            0  0

# uncomment this if your device has a SD/MMC/Transflash slot
#/dev/mmcblk0p1      /media/card         auto      defaults,sync,noauto  0  0

/dev/mmcblk0p1    /boot    vfat    defaults    0    0
```

The changed size can be verified using df command. The above change results in

```
root@raspberrypi-rdk-hybrid:~# df -h
Filesystem                  Size     Used        Available Use%   Mounted on
/dev/root                  865.5M   557.0M   247.0M      69%     /
devtmpfs                   339.6M      0       339.6M      0%      /dev
tmpfs                      468.1M    8.0K     468.1M      0%      /dev/shm
tmpfs                       98.9M    8.8M      90.2M      9%      /run
tmpfs                      468.1M      0       468.1M      0%      /sys/fs/cgroup
tmpfs                      468.1M    6.6M     461.5M      1%     /tmp
tmpfs                      468.1M    6.6M     461.5M      1%      /etc/snmp/snmpd.conf
tmpfs                      468.1M  428.0K     467.7M      0%      /var/volatile
/dev/root                 865.5M   557.0M   247.0M      69%   /var/lib
/dev/mmcblk0p1             48.5M    27.4M     21.0M      57%   /boot
tmpfs                       93.6M      0        93.6M      0%   /run/user/0
```