# Manually resizing the SD card on Raspberry Pi

This document describes how you can resize the partitions of the SD card that your Pi is running on.

Warning: this is a very precise operation. A mistake could render your device unusable.

## Requirements:

1. `fdisk` should be available. Since it is already available in RDKB no need to install it seperately.
2. `resize2fs` should be installed. It is currently not present in Raspberry Pi so it should be integrated to Raspberry Pi. Simple method is to download the resize2fs binary attached with this mail and copy that binary file to `/sbin/` of Raspberry Pi.

## Steps:

- Check the partition details.

```
root@RaspberryPi-Gateway:~# df -h
Filesystem                Size      Used Available Use% Mounted on
/dev/root               240.0M    239.9M         0 100% /
devtmpfs                459.1M         0    459.1M   0% /dev
tmpfs                   463.6M      4.0K    463.6M   0% /dev/shm
tmpfs                   463.6M      5.1M    458.5M   1% /run
tmpfs                   463.6M         0    463.6M   0% /sys/fs/cgroup
tmpfs                   463.6M      1.3M    462.3M   0% /tmp
tmpfs                   463.6M    128.0K    463.5M   0% /var/volatile
```

- Let's Identify the device that will be modified using mount.

```
root@RaspberryPi-Gateway:~# mount
/dev/mmcblk0p2 on / type ext4 (rw,relatime,data=ordered)
devtmpfs on /dev type devtmpfs (rw,relatime,size=470112k,nr_inodes=117528,mode=755)
sysfs on /sys type sysfs (rw,nosuid,nodev,noexec,relatime)
proc on /proc type proc (rw,relatime)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev)
devpts on /dev/pts type devpts (rw,relatime,gid=5,mode=620,ptmxmode=000)
tmpfs on /run type tmpfs (rw,nosuid,nodev,mode=755)
tmpfs on /sys/fs/cgroup type tmpfs (ro,nosuid,nodev,noexec,mode=755)
cgroup on /sys/fs/cgroup/systemd type cgroup
(rw,nosuid,nodev,noexec,relatime,xattr,release_agent=/lib/systemd/systemd-cgroups-
agent,name=systemd)
cgroup on /sys/fs/cgroup/blkio type cgroup (rw,nosuid,nodev,noexec,relatime,blkio)
cgroup on /sys/fs/cgroup/cpu,cpuacct type cgroup (rw,nosuid,nodev,noexec,relatime,cpu,cpuacct)
cgroup on /sys/fs/cgroup/freezer type cgroup (rw,nosuid,nodev,noexec,relatime,freezer)
cgroup on /sys/fs/cgroup/devices type cgroup (rw,nosuid,nodev,noexec,relatime,devices)
cgroup on /sys/fs/cgroup/net_cls type cgroup (rw,nosuid,nodev,noexec,relatime,net_cls)
cgroup on /sys/fs/cgroup/cpuset type cgroup (rw,nosuid,nodev,noexec,relatime,cpuset)
tmpfs on /tmp type tmpfs (rw)
debugfs on /sys/kernel/debug type debugfs (rw,relatime)
mqueue on /dev/mqueue type mqueue (rw,relatime)
configfs on /sys/kernel/config type configfs (rw,relatime)
tmpfs on /var/volatile type tmpfs (rw,relatime)
```

Above we see the device and its partition which is mounted to the root directory '/'. `/dev/ mmcblk0p2` is the partition that we want to resize.

- Next you need to change the partition table with fdisk. You need to remove the existing partition entries and then create a single new partition than takes the whole free space of the

disk. This will only change the partition table, not the partitions data on disk.

```
root@RaspberryPi-Gateway:~# fdisk -u /dev/mmcblk0

The number of cylinders for this disk is set to 243096.
There is nothing wrong with that, but this is larger than 1024,
and could in certain setups cause problems with:
1) software that runs at boot time (e.g., old versions of LILO)
2) booting and partitioning software from other OSs
   (e.g., DOS FDISK, OS/2 FDISK)

Command (m for help): p

Disk /dev/mmcblk0: 15.9 GB, 15931539456 bytes
4 heads, 32 sectors/track, 243096 cylinders, total 31116288 sectors
Units = sectors of 1 * 512 = 512 bytes

        Device Boot      Start         End      Blocks  Id System
/dev/mmcblk0p1   *        8192       90111       40960   c Win95 FAT32 (LBA)
/dev/mmcblk0p2           90112      606207      258048  83 Linux

Command (m for help): d
Partition number (1-4): 2

Command (m for help): n
Command action
   e   extended
   p   primary partition (1-4)
p
Partition number (1-4): 2
First sector (32-31116287, default 32): 90112
Last sector or +size or +sizeM or +sizeK (90112-31116287, default 31116287): Using default value
31116287

Command (m for help): p

Disk /dev/mmcblk0: 15.9 GB, 15931539456 bytes
4 heads, 32 sectors/track, 243096 cylinders, total 31116288 sectors
Units = sectors of 1 * 512 = 512 bytes

        Device Boot      Start         End      Blocks  Id System
/dev/mmcblk0p1   *        8192       90111       40960   c Win95 FAT32 (LBA)
/dev/mmcblk0p2           90112    31116287    15513088  83 Linux

Command (m for help): w
The partition table has been altered.
Calling ioctl() to re-read partition table
Re-reading the partition table failed.: Device or resource busyThe kernel still uses the old
table. The new table will be used at the next reboot.
```

- Reboot the device.

- Resize the filesystem.

```
root@RaspberryPi-Gateway:~# resize2fs /dev/mmcblk0p2
resize2fs 1.43 (17-May-2016)
Filesystem at /dev/mmcblk0p2 is mounted on /; on-line resizing required
old_desc_blocks = 1, new_desc_blocks = 60
The filesystem on /dev/mmcblk0p2 is now 15513088 (1k) blocks long.
```

This will take a few minutes, depending on the size and speed of your SD card.

- Validate the changes.

```
root@RaspberryPi-Gateway:~# df -h
Filesystem                Size      Used Available Use% Mounted on
/dev/root                14.3G    240.9M     13.5G   2% /
devtmpfs                459.1M         0    459.1M   0% /dev
tmpfs                   463.6M         0    463.6M   0% /dev/shm
tmpfs                   463.6M      5.1M    458.5M   1% /run
tmpfs                   463.6M         0    463.6M   0% /sys/fs/cgroup
tmpfs                   463.6M      1.4M    462.2M   0% /tmp
tmpfs                   463.6M    140.0K    463.5M   0% /var/volatile
```

## References:


1. http://warpx.io/wordpress/wp-content/uploads/2016/10/Warp-YoctoLinux-Enlargerootpartition.pdf
2. https://elinux.org/RPi_Resize_Flash_Partitions