

FwUpgradeManager Support in RDKB RPI - Broadband - User Manual - 2021 - M8

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Introduction

- This document describes the bring-up of RdkFwUpgradeManager in RPI RDK Broadband devices for firmware upgrade by using HTTP protocol.
- Downloaded firmware from local/public http server with support of http protocol.

Build procedure to generate R-Pi image with Firmware upgrade

Please refer the below link for host environment set-up & flashing procedure for yocto build ,

Dunfell :

[RPI 3B/3B+ Model Reference Platform](#)

Repo Steps

To build, follow below instructions

Dunfell Build

Dunfell Build

```
$ mkdir <workspace dir>
$ cd <workspace dir>
$ repo init -u https://code.rdkcentral.com/r/manifests -b dunfell -m rdkb-extsrc.xml
$ repo sync -j`nproc` --no-clone-bundle
```

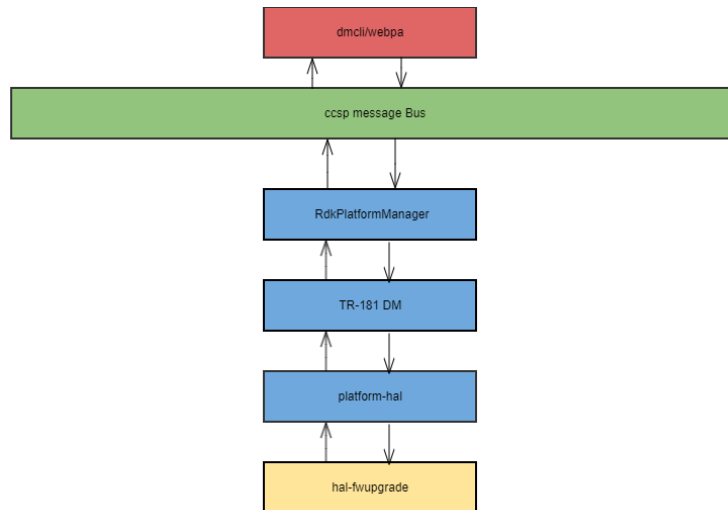
Image Generation Steps

Build steps

```
$ MACHINE=raspberrypi-rdk-broadband source meta-cmf-raspberrypi/setup-environment
$ bitbake rdk-generic-broadband-image
```

Overall Architecture

Following diagram depicts the flow of control among the components,



TR-181 Data Model Parameters

S. NO	DM	Value	Description
1	Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareDownloadURL	http://192.168.0.8	Value should be local/public http server url
2	Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareDownloadProtocol	http	Value should be auto-generated based on above parameter Input
3	Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareToDownload	rdkb-generic-broadband-image_rdk-next_20210525055548.rootfs.wic	Value should be Firmware Image Name . Note: This API does not reboot the device.
4	Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareDownloadStatus	Completed	Returns the current state of the Firmware Download operation.
5	Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareDownloadNow	True	Downloads and upgrades the firmware. The firmware is updated in the passive bank and marks it as active. Reboots the device and the device boots up with the active bank and updated firmware.

Pre-requisites - I

Flashing the image



sd-card size requisite

It is must to have minimal size of 8GB SD-Card for Firmware upgrade support

Command to flash the image

Generated image has to be flashed to an SD card using this command in local PC:

```
$ bzip2 -d <path to ImageName.wic.bz2>
$ sudo -E bmaptool copy --nobmap <path to ImageName.wic> <path to SD card space>
```

Ex:

```
$ bzip2 -d rdk-generic-broadband-image-raspberrypi-rdk-broadband.wic.bz2
$ sudo -E bmaptool copy --nobmap rdk-generic-broadband-image-raspberrypi-rdk-broadband.wic /dev/sdb
```

The SD card is inserted to the Raspberry Pi board and booted to check for containers created.

The Raspberry Pi board is connected to the PC via a USB to serial converter and the logs can be checked in console or can be connected via HDMI cable to a TV and logs will be shown in the terminal

Increasing the rootfs partition size in SD-CARD if Flashed for first time

It is necessary to have partizion size matching to RDKB image size (especially rootfs).

To make compatible, size of RDKB rootfs partition should be increased to **5 GB** (5098 MB) from 300MB default

This resize can be achieved using gparted ui tool which should be available in host pc

Here , example we given as 2GB.



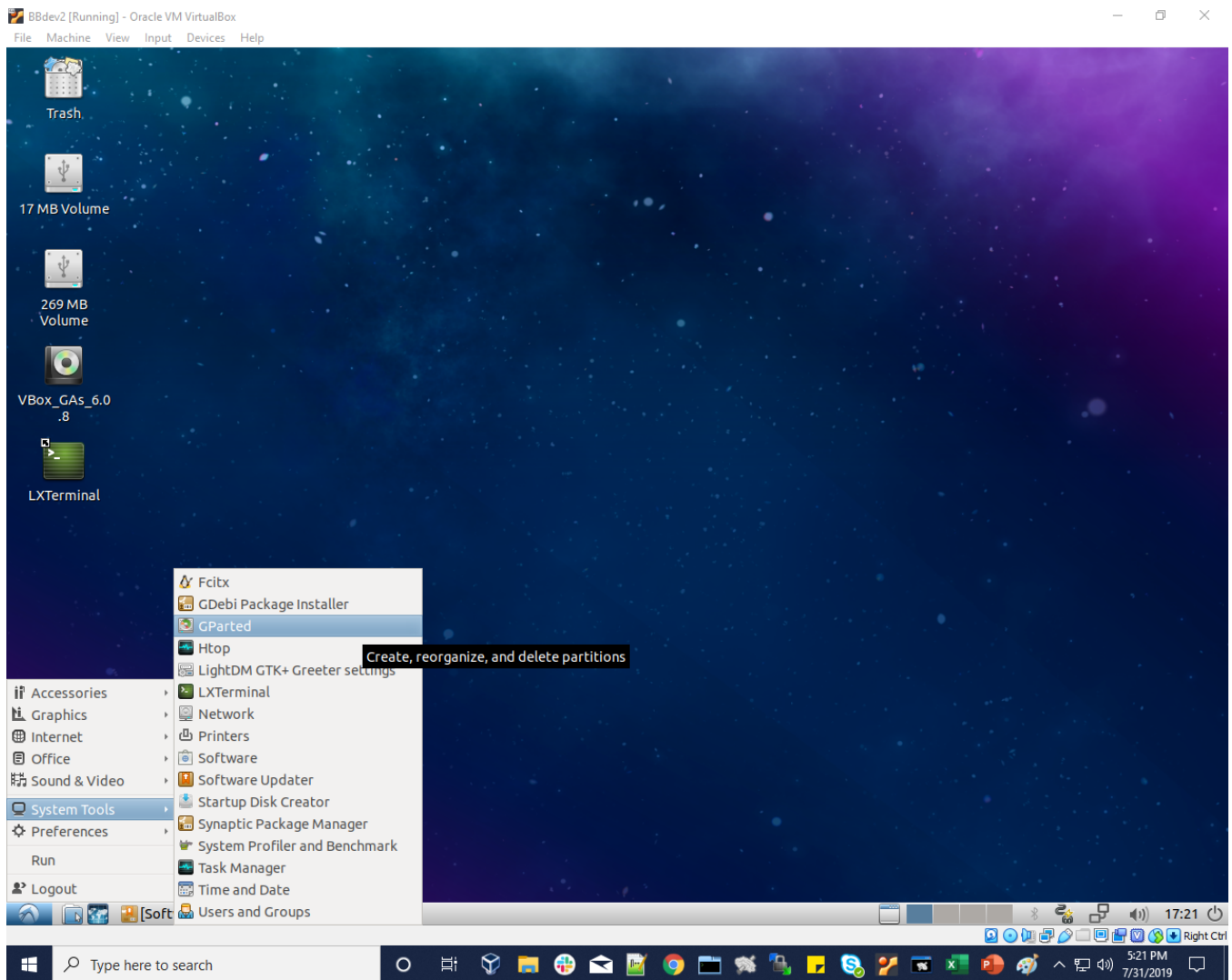
gparted tool Install and usage

sudo apt-get install gparted

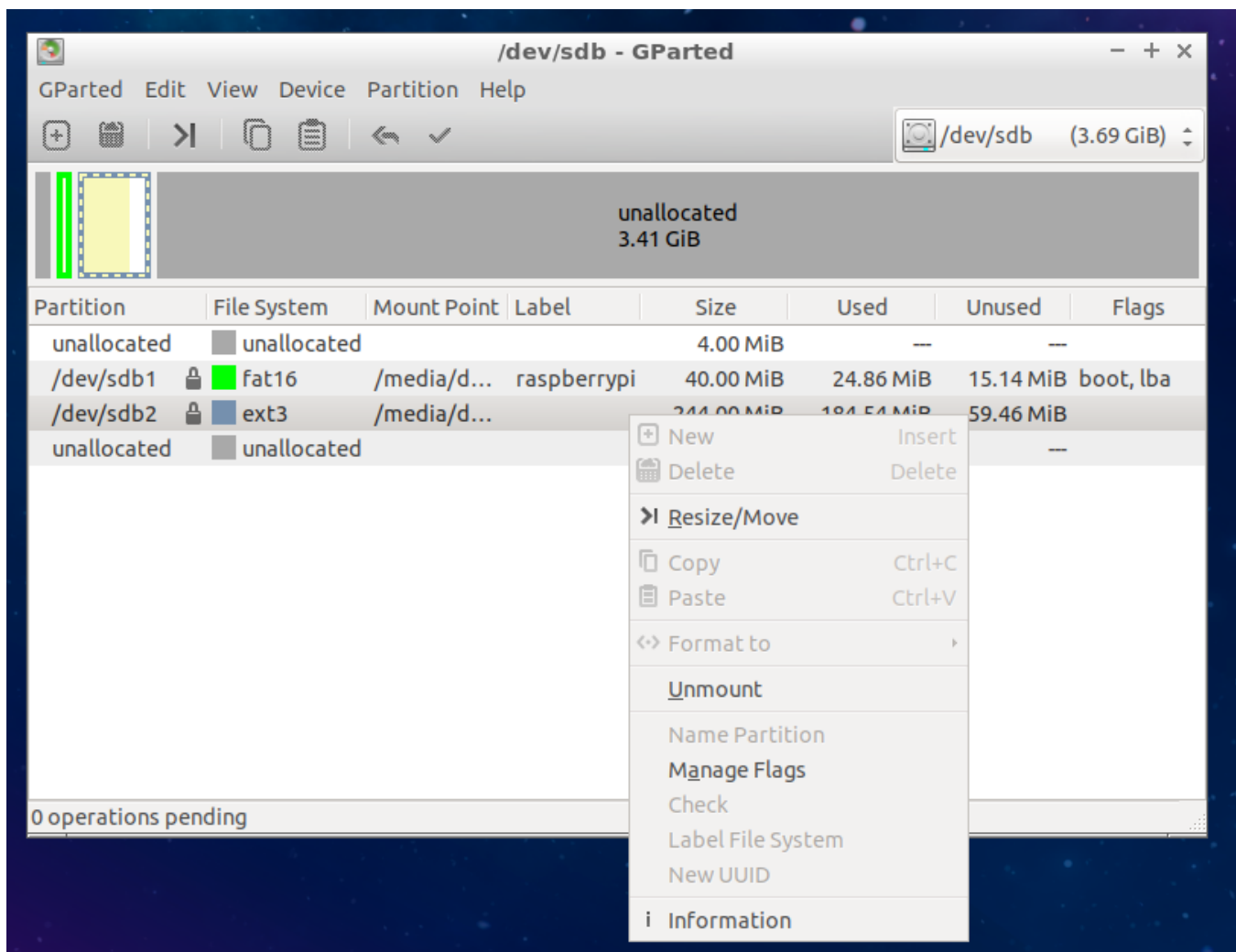
<https://gparted.org/display-doc.php%3Fname%3Dmoving-space-between-partitions>

Please resize the rootfs partition to 2098 MB or 2GB (/dev/sdb1) accordingly from below procedure as captured in various stages

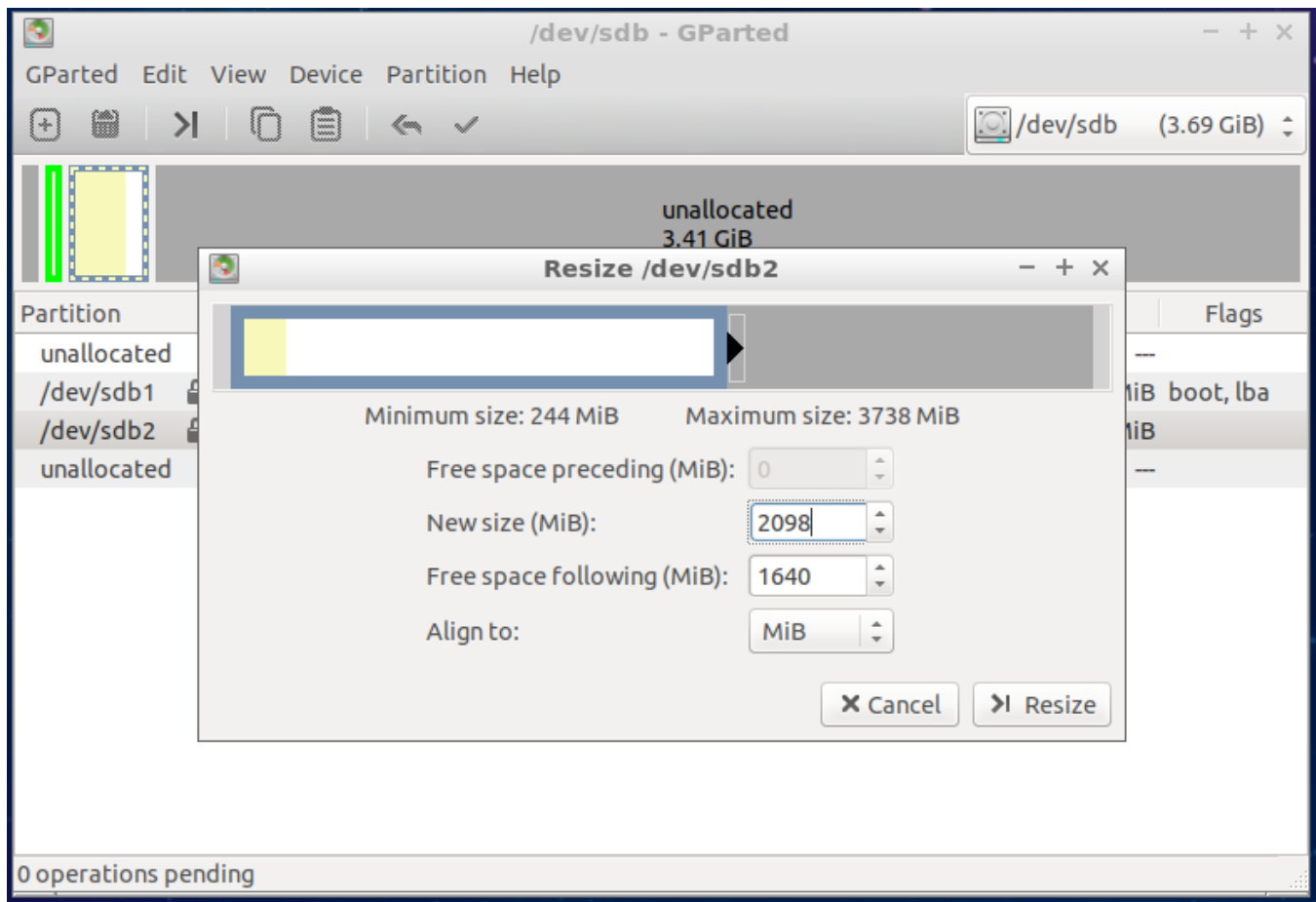
1. Select gparted tool from menu



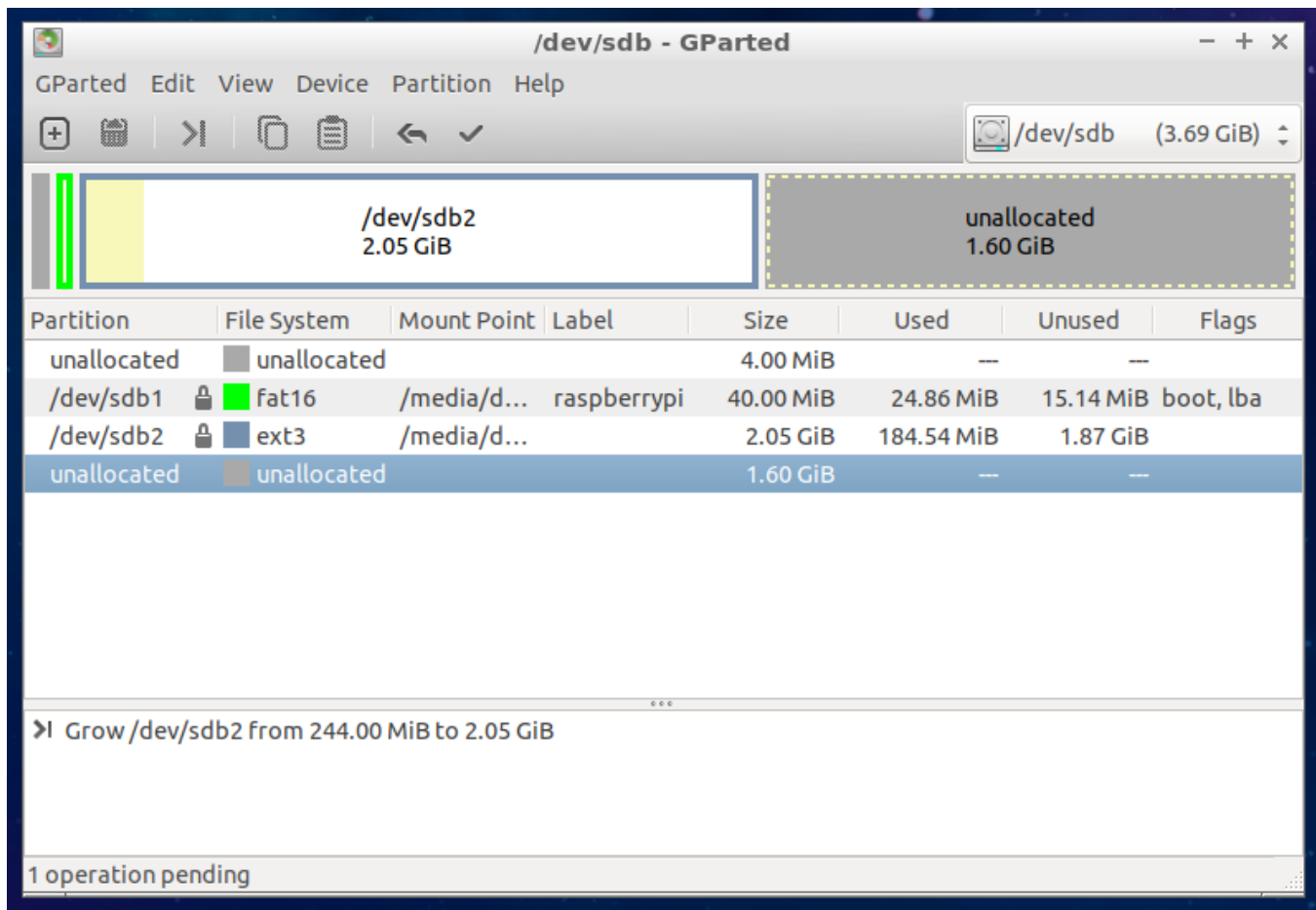
2. Select the rootfs partition of format ext3 for resize/move option



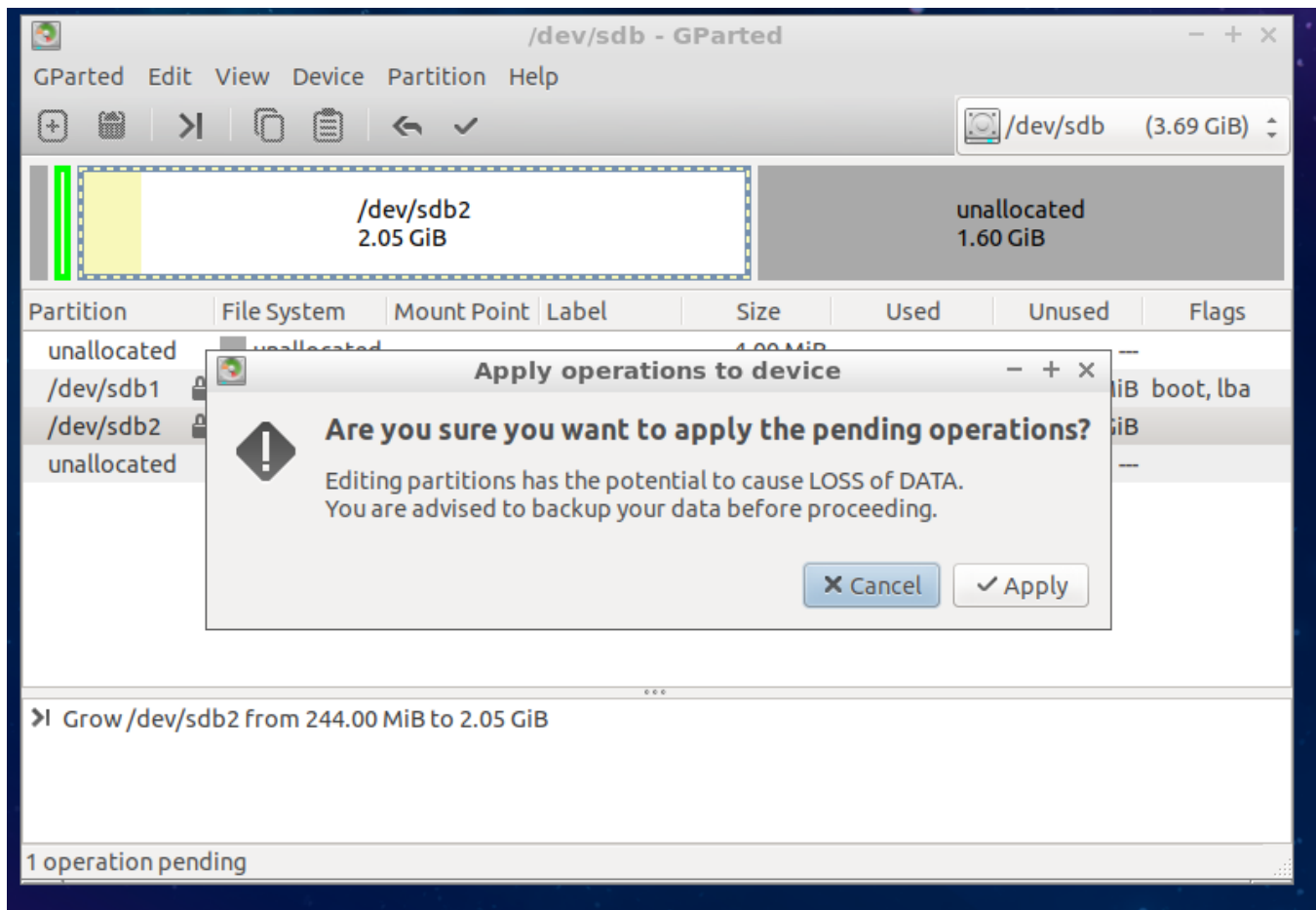
3. Resize the rootfs partition by giving new size image to 2098 MiB



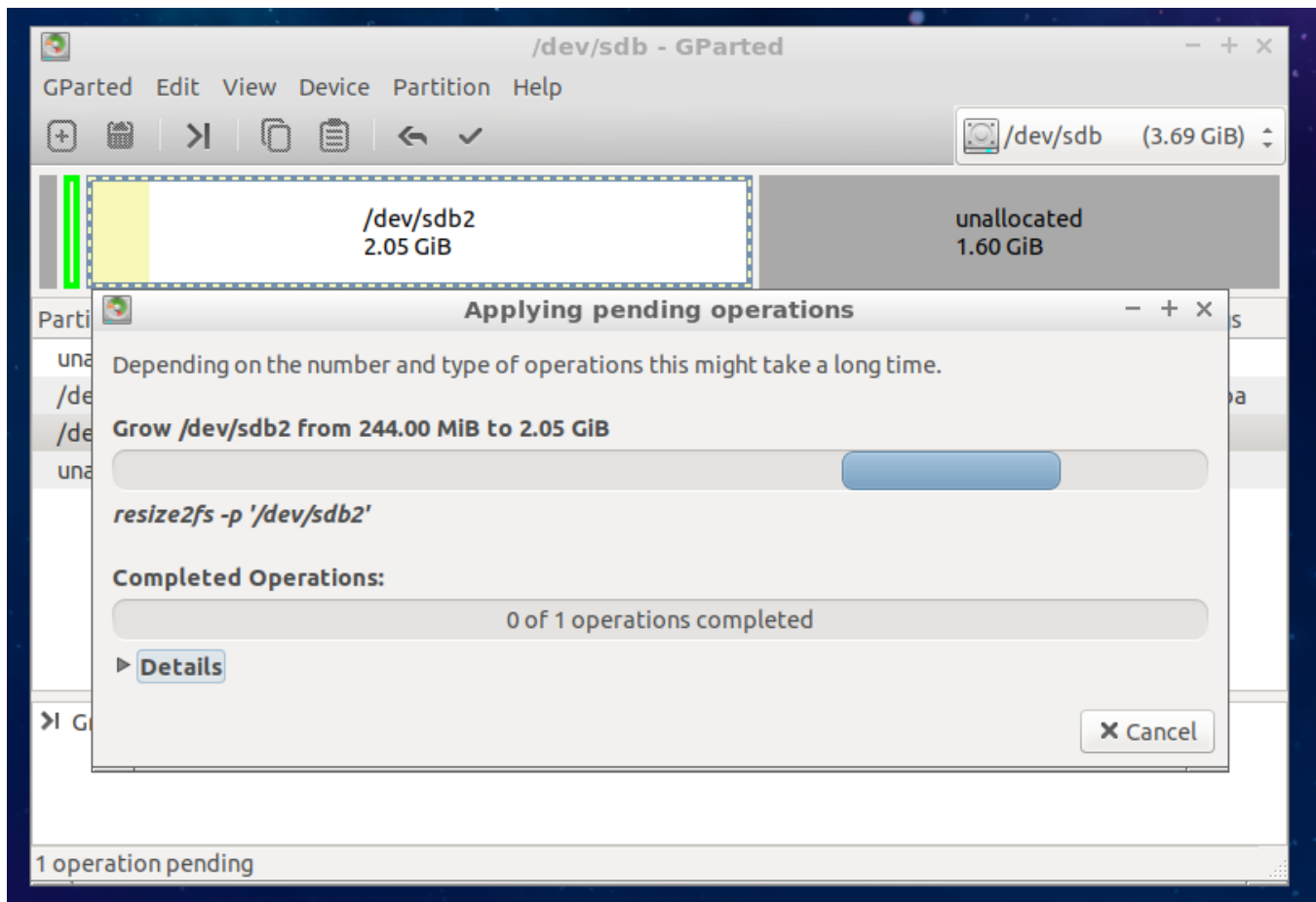
4. After resize , position stands as below



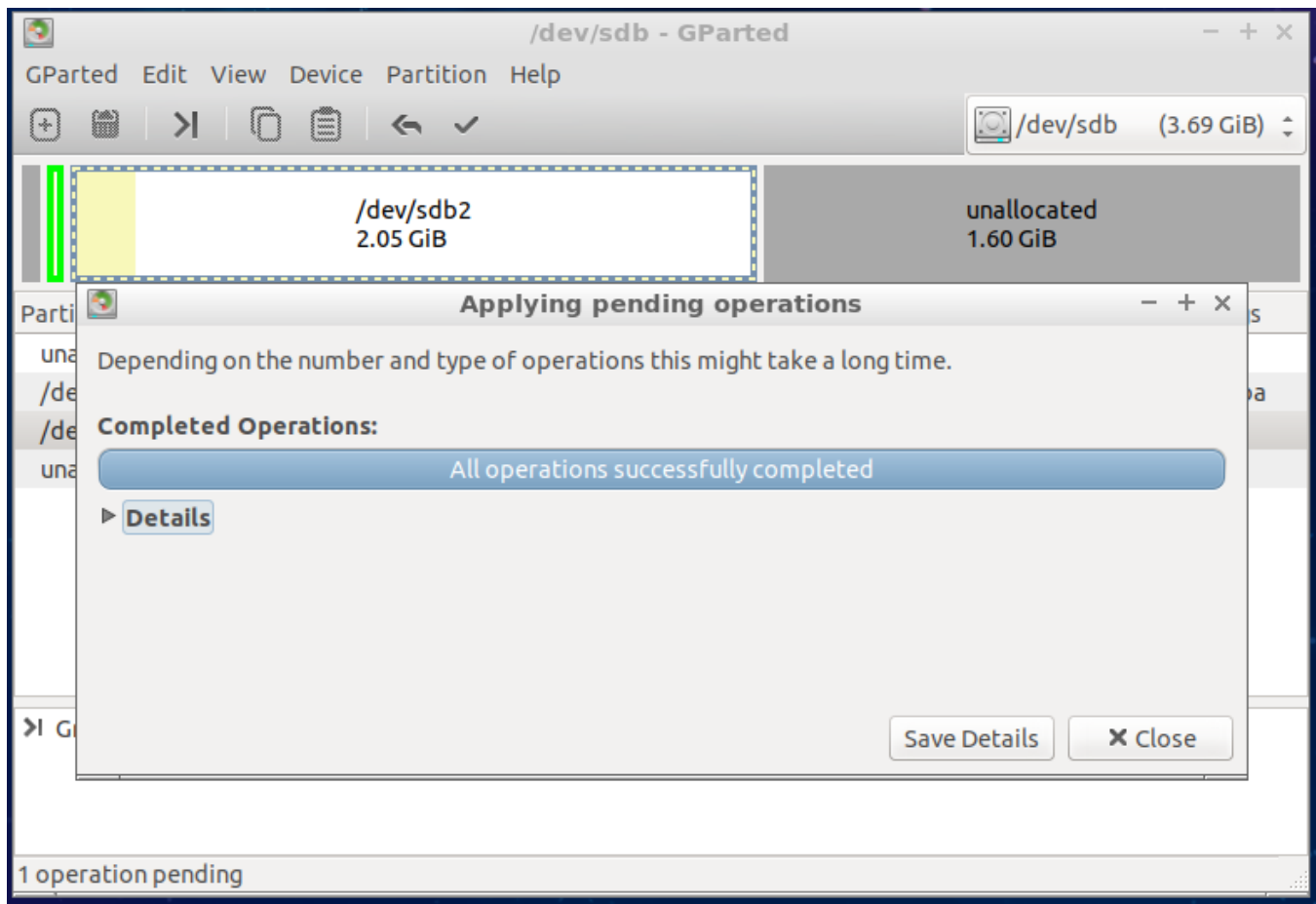
5. After modifying size, "Apply all operations" using tick symbol in UI which displays icon as below



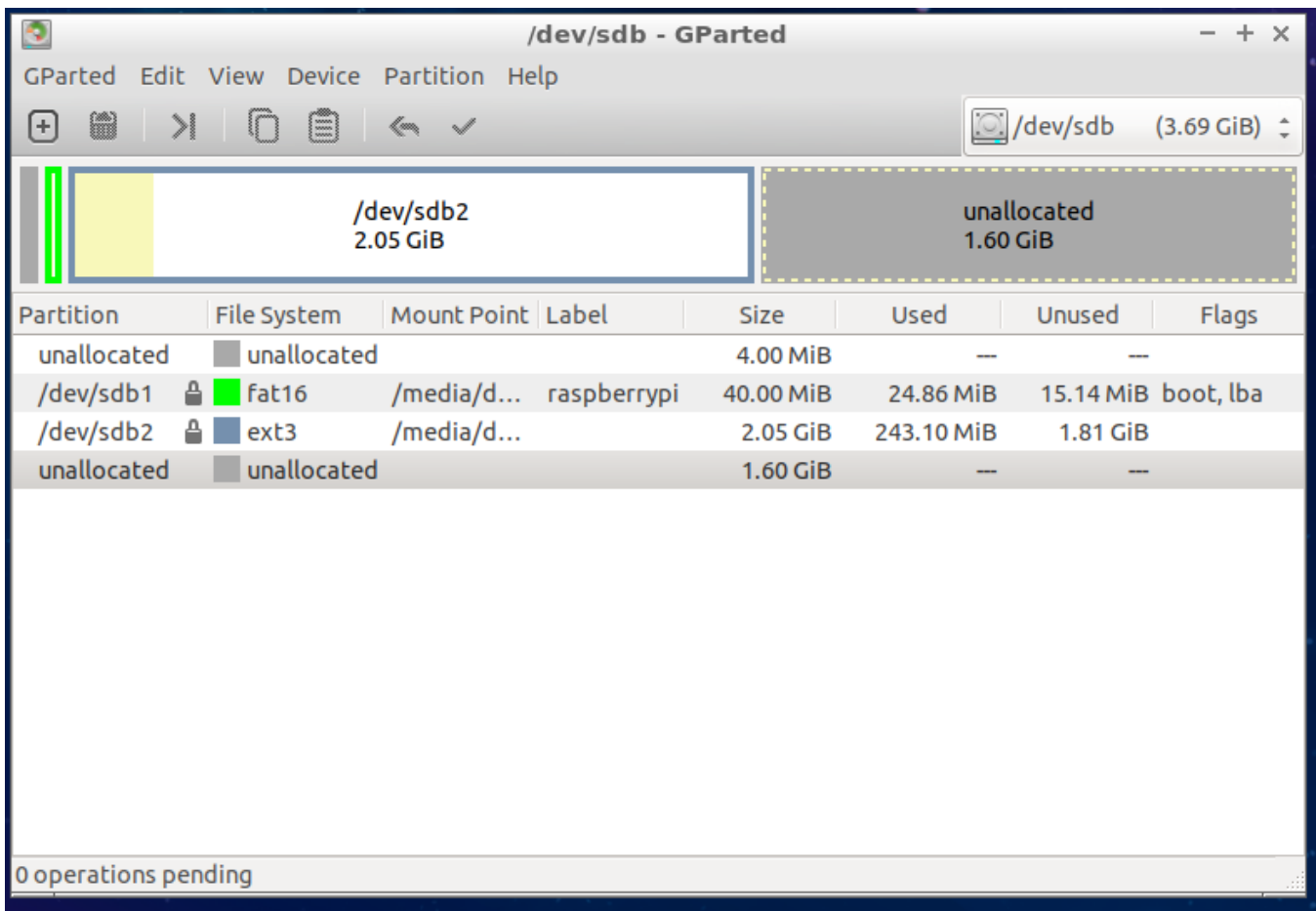
6. After giving "Apply icon" position stands as below



7. After resizing is completed



8. After applying close size increased to 2 GB can be seen



Local Apache2 server set up

Server Set-up

1. Install the apache2 http server in local pc
2. place the rpi image in document root directory.

HTTP Location folder

Verify that rpi image file is present in the http folder. Here , document root directory as "/var/www/html"

Local Http server Document root path

```

keerthana@keerthana-INVALID:/var/www/html$ pwd
/var/www/html
keerthana@keerthana-INVALID:/var/www/html$ ls -lh rdkb-generic-broadband-image_rdk-next_20210813104338.rootfs.wic
-rw-r--r-- 1 root root 316M Aug 13 17:29 rdkb-generic-broadband-image_rdk-next_20210813104338.rootfs.wic
keerthana@keerthana-INVALID:/var/www/html$

```

Pre-requisites - II

Please check the below commands to verify the Fwupgrade Manager is running or not in rpi device,

systemd service

```
root@RaspberryPi-Gateway:~# systemctl status RdkFwUpgradeManager
RdkFwUpgradeManager.service - Firmware Upgrade Manager service
   Loaded: loaded (/lib/systemd/system/RdkFwUpgradeManager.service; enabled; vendor preset: enabled)
   Active: active (running) since Fri 2021-08-13 13:20:04 UTC; 6 days ago
     Process: 696 ExecStart=/usr/bin/fwupgrademanager -subsys $Subsys (code=exited, status=0/SUCCESS)
    Main PID: 701 (fwupgrademanager)
       Tasks: 4 (limit: 830)
      CGroup: /system.slice/RdkFwUpgradeManager.service
              701 /usr/bin/fwupgrademanager -subsys eRT.
```

Warning: Journal has been rotated since unit was started. Log output is incomplete or unavailable.

Before Execution Steps

```
root@RaspberryPi-Gateway:~# dmcli eRT getv Device.DeviceInfo.
CR component name is: eRT.com.cisco.spvtg.ccsp.CR
subsystem_prefix eRT.
getv from/to component(eRT.com.cisco.spvtg.ccsp.fwupgrademanager): Device.DeviceInfo.
Execution succeed.
Parameter      1 name: Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareDownloadStatus
                  type:      string,      value: Not Started
Parameter      2 name: Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareDownloadProtocol
                  type:      string,      value:
Parameter      3 name: Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareDownloadURL
                  type:      string,      value:
Parameter      4 name: Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareToDownload
                  type:      string,      value:
Parameter      5 name: Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareDownloadNow
                  type:      bool,        value: false
Parameter      6 name: Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareDownloadAndFactoryReset
                  type:      int,         value: 0
Parameter      7 name: Device.DeviceInfo.X_RDKCENTRAL-COM_xOpsDeviceMgmt.RPC.DeferFWDownloadReboot
                  type:      uint,       value: 290
```

FwUpgrade Manager Log file ,

Log file

```
root@RaspberryPi-Gateway:~# cat /rdklogs/logs/FwUpgradeManagerLog.txt.0
210805-16:04:07.534093 [mod=FWUPGRADEMANAGER, lvl=INFO] [tid=872]
After daemonize before signal
210805-16:04:07.535782 [mod=FWUPGRADEMANAGER, lvl=INFO] [tid=872] Connect to bus daemon...
210805-16:04:07.536150 [mod=FWUPGRADEMANAGER, lvl=WARN] [tid=872] DBus is enabled
210805-16:04:07.549648 [mod=FWUPGRADEMANAGER, lvl=INFO] [tid=872] INFO: bus_handle: 0x 169ce08
210805-16:04:08.556185 [mod=FWUPGRADEMANAGER, lvl=WARN] [tid=872] Register empty object : com.
210805-16:04:08.556397 [mod=FWUPGRADEMANAGER, lvl=WARN] [tid=872] Register empty object : com.cisco.
210805-16:04:08.556525 [mod=FWUPGRADEMANAGER, lvl=WARN] [tid=872] Register empty object : com.cisco.spvtg.
210805-16:04:08.556656 [mod=FWUPGRADEMANAGER, lvl=WARN] [tid=872] Register empty object : com.cisco.spvtg.ccsp.
210805-16:04:08.558086 [mod=FWUPGRADEMANAGER, lvl=WARN] [tid=872] DM Library module name = CCSP Base Data Model
210805-16:04:08.558481 [mod=FWUPGRADEMANAGER, lvl=INFO] [tid=872] Download_Control_Flag is 1
210805-16:04:08.558714 [mod=FWUPGRADEMANAGER, lvl=INFO] [tid=872] Current FW Version is rdkb-generic-broadband-
image_rdk-next_20210813103706
210805-16:04:08.558846 [mod=FWUPGRADEMANAGER, lvl=WARN] [tid=872] syscfg_get failed
210805-16:04:08.566939 [mod=FWUPGRADEMANAGER, lvl=WARN] [tid=872] DM Library module name =
TR181_RdkFirmwareUpgradeManager
210805-16:04:08.568084 [mod=FWUPGRADEMANAGER, lvl=WARN] [tid=872] Search for empty object in
'dslhCpeCheckEmptyObject'
root@RaspberryPi-Gateway:~#
```

Execution Steps

Please run the below commands for FwUpgrade Manager,

Using dmcli commands

Below steps are used to validate the FwUpgrade by using dmcli commands,

dmcli commands

```
root@RaspberryPi-Gateway:~# dmcli eRT setv Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareDownloadURL string "http://192.168.0.7"
CR component name is: eRT.com.cisco.spvtg.ccsp.CR
subsystem_prefix eRT.
setv from/to component(eRT.com.cisco.spvtg.ccsp.fwupgrademanager): Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareDownloadURL
Execution succeed.

root@RaspberryPi-Gateway:~# dmcli eRT setv Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareToDownload string "rdkb-generic-broadband-image_rdk-next_20210818080531.rootfs.wic"
CR component name is: eRT.com.cisco.spvtg.ccsp.CR
subsystem_prefix eRT.
setv from/to component(eRT.com.cisco.spvtg.ccsp.fwupgrademanager): Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareToDownload
Execution succeed.

root@RaspberryPi-Gateway:~# dmcli eRT setv Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareDownloadNow bool true
CR component name is: eRT.com.cisco.spvtg.ccsp.CR
subsystem_prefix eRT.
setv from/to component(eRT.com.cisco.spvtg.ccsp.fwupgrademanager): Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareDownloadNow
Execution succeed.

root@RaspberryPi-Gateway:~#
```

Get Commands

```
root@RaspberryPi-Gateway:~# dmcli eRT getv Device.DeviceInfo.
CR component name is: eRT.com.cisco.spvtg.ccsp.CR
subsystem_prefix eRT.
getv from/to component(eRT.com.cisco.spvtg.ccsp.fwupgrademanager): Device.DeviceInfo.
Execution succeed.
Parameter      1 name: Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareDownloadStatus
                  type:      string,      value: Completed
Parameter      2 name: Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareDownloadProtocol
                  type:      string,      value: HTTP
Parameter      3 name: Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareDownloadURL
                  type:      string,      value: http://192.168.0.7
Parameter      4 name: Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareToDownload
                  type:      string,      value: rdkb-generic-broadband-image_rdk-next_20210818080531.rootfs.wic
Parameter      5 name: Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareDownloadNow
                  type:      bool,        value: false
Parameter      6 name: Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareDownloadAndFactoryReset
                  type:      int,         value: 0
Parameter      7 name: Device.DeviceInfo.X_RDKCENTRAL-COM_xOpsDeviceMgmt.RPC.DeferFWDownloadReboot
                  type:      uint,        value: 290
```

The New Firmware Image is downloaded at /firmware/imagedwld and Use 'ls -lh' command to check the image size.

NewFw_Imagedwld_path

```
root@RaspberryPi-Gateway:/firmware/imagedwld# pwd
/firmware/imagedwld
root@RaspberryPi-Gateway:/firmware/imagedwld# ls -lh rdkb-generic-broadband-image_rdk-next_20210818080531.
rootfs.wic
-rw-r--r-- 1 root root 316.0M Aug 20 09:40 rdkb-generic-broadband-image_rdk-next_20210818080531.
rootfs.wic
root@RaspberryPi-Gateway:/firmware/imagedwld#
```

Use 'fdisk -l' & mount command to check the available partitions.

fdisk

```
Device      Boot      Start        End Sectors  Size Id Type
/dev/mmcblk0p1 *          8192     112525  104334    51M c W95 FAT32 (LBA)
/dev/mmcblk0p2          114688    9822207  9707520   4.6G 83 Linux
/dev/mmcblk0p3          9822208   14016512  4194305    2G 83 Linux
/dev/mmcblk0p4         14016513   18210817  4194305    2G 83 Linux

root@RaspberryPi-Gateway:/ df -h | grep extblock
/dev/mmcblk0p4 1.9G 246.9M 1.5G 13% /extblock
/dev/mmcblk0p1 50.8M 29.2M 21.6M 58% /extblock/bank0_linux
/dev/mmcblk0p2 4.5G 95.0M 4.2G 2% /extblock/bank0_rootfs

root@RaspberryPi-Gateway: mount | grep extblock
/dev/mmcblk0p4 on /extblock type ext4 (rw,relatime)
/dev/mmcblk0p1 on /extblock/bank0_linux type vfat (rw,relatime,fmask=0022,dmask=0022,codepage=437,iocharset=ascii,shortname=mixed,errors=remount-ro)
/dev/mmcblk0p2 on /extblock/bank0_rootfs type ext4 (rw,relatime)
```

Using Webpa

Below steps are used to validate the fwupgrade by using webpa commands,

prerequisite

Please use the below command to check the webpa & parodus process are running successfully or not.

webpa

```
root@RaspberryPi-Gateway:~# ps aux | grep webpa
5827 root    0:01 /usr/bin/parodus --hw-model=RPI --hw-serial-number=00000000a31b564c --hw-
manufacturer=Raspberry --hw-last-reboot-reason= --fw-name=rdkb-generic-broadband-image_rdk-next_20210813103706
--boot-time=1629896069 --hw-mac=B8:27:EB:1B:56:4C --webpa-ping-time=180 --webpa-interface-used=erouter0 --webpa-
url=http://54.148.37.189:8080 --webpa-backoff-max=9 --parodus-local-url=tcp://127.0.0.1:6666 --partner-
id=comcast --ssl-cert-path=/etc/ssl/certs/ca-certificates.crt --force-ipv4
5884 root    0:02 /usr/bin/webpa &
28195 root    0:00 webpa
28608 root    0:00 grep webpa
root@RaspberryPi-Gateway:~#
```

Curl Commands

WebPA Set

curl - set

```
root@RaspberryPi-Gateway:~# curl -X PATCH http://54.148.37.189:9003/api/v2/device/mac:B8:27:EB:1B:56:4C/config -d '{"parameters": [ {"dataType": 0, "name": "Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareDownloadURL", "value": "http://192.168.0.10"}]}' -H 'Authorization:Basic d3B1c2VyOndlYnBhQDEyMzQ1Njc4OTAK'
{"parameters":[{"name":"Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareDownloadURL","message":"Success"}], "statusCode":200}
root@RaspberryPi-Gateway:~#

root@RaspberryPi-Gateway:~# curl -X PATCH http://54.148.37.189:9003/api/v2/device/mac:B8:27:EB:1B:56:4C/config -d '{"parameters": [ {"dataType": 0, "name": "Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareToDownload", "value": "rdkb-generic-broadband-image_rdk-next_20210818080531.rootfs.wic"}]}' -H 'Authorization:Basic d3B1c2VyOndlYnBhQDEyMzQ1Njc4OTAK'
{"parameters":[{"name":"Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareToDownload","message":"Success"}], "statusCode":200}

root@RaspberryPi-Gateway:~# root@RaspberryPi-Gateway:~# curl -X PATCH http://54.148.37.189:9003/api/v2/device/mac:B8:27:EB:1B:56:4C/config -d '{"parameters": [ {"dataType": 3, "name": "Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareDownloadNow", "value": "true"}]}' -H 'Authorization:Basic d3B1c2VyOndlYnBhQDEyMzQ1Njc4OTAK'
{"parameters":[{"name":"Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareDownloadNow","message":"Success"}], "statusCode":200}

root@RaspberryPi-Gateway:~#
```

WebPA Get

curl - Get

```
root@RaspberryPi-Gateway:~# curl -H 'Authorization:Basic d3B1c2VyOndlYnBhQDEyMzQ1Njc4OTAK' -i http://54.148.37.189:9003/api/v2/device/mac:B8:27:EB:1B:56:4C/config?names=Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareDownloadURL
HTTP/1.1 200 OK
Content-Type: application/json; charset=utf-8
X-Scytale-Build: 0.1.4-1
X-Scytale-Flavor: mint
X-Scytale-Region: east
X-Scytale-Server: 54.148.37.189
X-Scytale-Start-Time: 23 Jul 19 11:55 UTC
X-Talaria-Build: 0.1.3-1
X-Talaria-Flavor: mint
X-Talaria-Region: east
X-Talaria-Server: 54.148.37.189
X-Talaria-Start-Time: 22 Jul 19 09:34 UTC
X-Tr1d1um-Build: 0.1.2-1
X-Tr1d1um-Flavor: mint
X-Tr1d1um-Region: east
X-Tr1d1um-Server: 54.148.37.189
X-Tr1d1um-Start-Time: 22 Jul 19 07:07 UTC
X-Webpa-Transaction-Id: fC0LI-meLU00IKStT94L_w
X-Xmidt-Span: "http://localhost:8080/api/v2/device/send", "2021-08-25T14:03:21Z", "252.811878ms"
Date: Wed, 25 Aug 2021 14:03:22 GMT
Content-Length: 181

{"parameters":[{"name":"Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareDownloadURL","value":"http://192.168.0.10", "dataType":0, "parameterCount":1, "message":"Success"}], "statusCode":200}

root@RaspberryPi-Gateway:~# curl -H 'Authorization:Basic d3B1c2VyOndlYnBhQDEyMzQ1Njc4OTAK' -i http://54.148.37.189:9003/api/v2/device/mac:B8:27:EB:1B:56:4C/config?names=Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareToDownload
HTTP/1.1 200 OK
Content-Type: application/json; charset=utf-8
X-Scytale-Build: 0.1.4-1
X-Scytale-Flavor: mint
X-Scytale-Region: east
X-Scytale-Server: 54.148.37.189
X-Scytale-Start-Time: 23 Jul 19 11:55 UTC
```

```
X-Talaria-Build: 0.1.3-1
X-Talaria-Flavor: mint
X-Talaria-Region: east
X-Talaria-Server: 54.148.37.189
X-Talaria-Start-Time: 22 Jul 19 09:34 UTC
X-Tr1d1um-Build: 0.1.2-1
X-Tr1d1um-Flavor: mint
X-Tr1d1um-Region: east
X-Tr1d1um-Server: 54.148.37.189
X-Tr1d1um-Start-Time: 22 Jul 19 07:07 UTC
X-Webpa-Transaction-Id: jpd1c7t-S8vMwLjENT1niA
X-Xmidt-Span: "http://localhost:8080/api/v2/device/send", "2021-08-25T14:06:59Z", "254.980233ms"
Date: Wed, 25 Aug 2021 14:06:59 GMT
Content-Length: 224

{"parameters":[{"name":"Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareToDownload","value":"rdkb-generic-broadband-image_rdk-next_20210818080531.rootfs.wic","dataType":0,"parameterCount":1,"message":"Success"}],"statusCode":200}

root@RaspberryPi-Gateway:~# curl -H 'Authorization:Basic d3B1c2VyOndlYnBhQDEyMzQ1Njc4OTAK' -i http://54.148.37.189:9003/api/v2/device/mac:B8:27:EB:1B:56:4C/config?names=Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareDownloadProtocol
HTTP/1.1 200 OK
Content-Type: application/json; charset=utf-8
X-Scytale-Build: 0.1.4-1
X-Scytale-Flavor: mint
X-Scytale-Region: east
X-Scytale-Server: 54.148.37.189
X-Scytale-Start-Time: 23 Jul 19 11:55 UTC
X-Talaria-Build: 0.1.3-1
X-Talaria-Flavor: mint
X-Talaria-Region: east
X-Talaria-Server: 54.148.37.189
X-Talaria-Start-Time: 22 Jul 19 09:34 UTC
X-Tr1d1um-Build: 0.1.2-1
X-Tr1d1um-Flavor: mint
X-Tr1d1um-Region: east
X-Tr1d1um-Server: 54.148.37.189
X-Tr1d1um-Start-Time: 22 Jul 19 07:07 UTC
X-Webpa-Transaction-Id: MS7xPw08ZsClcJpUSkqxjQ
X-Xmidt-Span: "http://localhost:8080/api/v2/device/send", "2021-08-25T14:10:13Z", "253.576482ms"
Date: Wed, 25 Aug 2021 14:10:13 GMT
Content-Length: 171

{"parameters":[{"name":"Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareDownloadProtocol","value":"HTTP","dataType":0,"parameterCount":1,"message":"Success"}],"statusCode":200} root@RaspberryPi-Gateway:~# curl -H 'Authorization:Basic d3B1c2VyOndlYnBhQDEyMzQ1Njc4OTAK' -i http://54.148.37.189:9003/api/v2/device/mac:B8:27:EB:1B:56:4C/config?names=Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareDownloadStatus
HTTP/1.1 200 OK
Content-Type: application/json; charset=utf-8
X-Scytale-Build: 0.1.4-1
X-Scytale-Flavor: mint
X-Scytale-Region: east
X-Scytale-Server: 54.148.37.189
X-Scytale-Start-Time: 23 Jul 19 11:55 UTC
X-Talaria-Build: 0.1.3-1
X-Talaria-Flavor: mint
X-Talaria-Region: east
X-Talaria-Server: 54.148.37.189
X-Talaria-Start-Time: 22 Jul 19 09:34 UTC
X-Tr1d1um-Build: 0.1.2-1
X-Tr1d1um-Flavor: mint
X-Tr1d1um-Region: east
X-Tr1d1um-Server: 54.148.37.189
X-Tr1d1um-Start-Time: 22 Jul 19 07:07 UTC
X-Webpa-Transaction-Id: PzFVh-jd0QoM4BkeJxz32Q
X-Xmidt-Span: "http://localhost:8080/api/v2/device/send", "2021-08-25T14:32:35Z", "332.992262ms"
Date: Wed, 25 Aug 2021 14:32:36 GMT
Content-Length: 174

{"parameters":[{"name":"Device.DeviceInfo.X_RDKCENTRAL-COM_FirmwareDownloadStatus","value":"Completed",
```

```
dataType":0,"parameterCount":1,"message":"Success"}]], "statusCode":200}
```

RPI - Board

1. Flash the RDKB image supported for Firmware upgrade feature in the Rpi and verify the 2 partitions(ex. mmcblk0p1, mmcblk0p2) present under dev folder (use command ls /dev)
2. Device auto-reboots and verify there are 2 more additional partitions are created (ex. mmcblk0p3, mmcblk0p4).
3. Verify the image version (cat /version.txt) displays the flashed image version
4. Verify FwUpgradeManagerLog.txt file is generated in /rdklogs/logs directory.
5. Verify the http download is happening by noticing the change of file size using below command : cd /firmware/imagewld ls -lh(use this command frequently to verify the file size change)
6. Once image download completed, the Rpi board will auto reboot and come up with downloaded image
7. Verify the version of booted image which shows the downloaded image version

TroubleShooting

1. check the status of RdkFwUpgradeManager service by using the below command,
 - a. systemctl status RdkFwUpgradeManager.service
2. Check the RdkFwUpgradeManager logs in below path,
 - a. cat /rdklogs/logs/FwUpgradeManagerLog.txt.0
3. Successful logs

Complete journalctl logs

```
root@RaspberryPi-Gateway:~# journalctl -u RdkFwUpgradeManager
-- Logs begin at Fri 2021-08-13 13:19:56 UTC, end at Fri 2021-08-20 10:40:45 UTC. --
Aug 13 13:20:05 raspberrypi-rdk-broadband systemd[1]: Starting Firmware Upgrade Manager service...
Aug 13 13:20:05 raspberrypi-rdk-broadband fwupgrademanager[732]: rdk_dyn_log_initg_dl_socket = 3 __progname =
fwupgrademanager
Aug 13 13:20:06 raspberrypi-rdk-broadband systemd[1]: Started Firmware Upgrade Manager service.
Aug 20 10:38:30 RaspberryPi-Gateway fwupgrademanager[14171]: Entering fwupgrade_hal_set_download_url
Aug 20 10:38:30 RaspberryPi-Gateway fwupgrademanager[14171]: Entering fwupgrade_hal_get_download_url
Aug 20 10:38:30 RaspberryPi-Gateway fwupgrademanager[15453]: rm: can't remove '/tmp/xconf/dload_status': No
such file or directory
Aug 20 10:38:30 RaspberryPi-Gateway fwupgrademanager[14171]: fwupgrade_hal_set_download_url Stored HTTP
download URL and filename to /tmp/httpDwnld.conf file
Aug 20 10:38:30 RaspberryPi-Gateway fwupgrademanager[14171]: Entering fwupgrade_hal_get_download_status
Aug 20 10:38:30 RaspberryPi-Gateway fwupgrademanager[14171]: Entering fwupgrade_hal_set_download_interface
Aug 20 10:38:30 RaspberryPi-Gateway fwupgrademanager[14171]: Entering fwupgrade_hal_download
Aug 20 10:38:30 RaspberryPi-Gateway fwupgrademanager[14171]: Entering fwupgrade_hal_get_download_url
Aug 20 10:38:30 RaspberryPi-Gateway fwupgrademanager[14171]: fwupgrade_hal_get_download_url pfilename: rdkb-
generic-broadband-image_rdk-next_20210818080531.rootfs.wic
Aug 20 10:38:30 RaspberryPi-Gateway fwupgrademanager[14171]: host->h_addrtype = 2, AF_INET
Aug 20 10:38:30 RaspberryPi-Gateway fwupgrademanager[14171]: Host IP address: 192.168.0.7
Aug 20 10:38:30 RaspberryPi-Gateway fwupgrademanager[14171]: download_image_from_server: Curl Command: curl -
fgLo /firmware/imagewld/rdkb-generic-broadband-image_rdk-next_20210818080531.rootfs.wic 'http://192.168.0.7
/rdkb-generic-broadband-image_rdk-next_20210818080531.rootfs.wic';
Aug 20 10:38:30 RaspberryPi-Gateway fwupgrademanager[15458]: % Total % Received % Xferd Average Speed
Time Time Time Current
Aug 20 10:38:30 RaspberryPi-Gateway fwupgrademanager[15458]: Dload Upload
Total Spent Left Speed
Aug 20 10:39:03 RaspberryPi-Gateway fwupgrademanager[15458]: [2.4K blob data]
Aug 20 10:39:03 RaspberryPi-Gateway fwupgrademanager[14171]: ### Debug ### Image download successful at
/firmware/imagewld/rdkb-generic-broadband-image_rdk-next_20210818080531.rootfs.wic
Aug 20 10:39:03 RaspberryPi-Gateway fwupgrademanager[16197]: Checking available partition for bank switch and
image upgrade...
Aug 20 10:39:03 RaspberryPi-Gateway fwupgrademanager[16197]: Creating additional partitions for Bank1 and
storage area, box will go for reboot...
Aug 20 10:39:03 RaspberryPi-Gateway fwupgrademanager[16197]: Creating Bank1 rootfs partition mmc0blkp3...
```

```

Aug 20 10:39:03 RaspberryPi-Gateway fwupgrademanager[16219]: Welcome to fdisk (util-linux 2.35.1).
Aug 20 10:39:03 RaspberryPi-Gateway fwupgrademanager[16219]: Changes will remain in memory only, until you
decide to write them.
Aug 20 10:39:03 RaspberryPi-Gateway fwupgrademanager[16219]: Be careful before using the write command.
Aug 20 10:39:03 RaspberryPi-Gateway fwupgrademanager[16219]: Command (m for help):
Aug 20 10:39:03 RaspberryPi-Gateway fwupgrademanager[16219]: Command (m for help): Partition type
Aug 20 10:39:03 RaspberryPi-Gateway fwupgrademanager[16219]:   p   primary (2 primary, 0 extended, 2 free)
Aug 20 10:39:03 RaspberryPi-Gateway fwupgrademanager[16219]:   e   extended (container for logical partitions)
Aug 20 10:39:03 RaspberryPi-Gateway fwupgrademanager[16219]: Select (default p): Partition number (3,4, default
3): First sector (2048-62333951, default 2048): Last sector, +/-sectors or +/-size{K,M,G,T,P} (9822208-
62333951, default 62333951):
Aug 20 10:39:03 RaspberryPi-Gateway fwupgrademanager[16219]: Created a new partition 3 of type 'Linux' and of
size 2 GiB.
Aug 20 10:39:03 RaspberryPi-Gateway fwupgrademanager[16219]: Partition #3 contains a ext4 signature.
Aug 20 10:39:03 RaspberryPi-Gateway fwupgrademanager[16219]: Command (m for help):
Aug 20 10:39:03 RaspberryPi-Gateway fwupgrademanager[16219]: Disk /dev/mmcblk0: 29.74 GiB, 31914983424 bytes,
62333952 sectors
Aug 20 10:39:03 RaspberryPi-Gateway fwupgrademanager[16219]: Units: sectors of 1 * 512 = 512 bytes
Aug 20 10:39:03 RaspberryPi-Gateway fwupgrademanager[16219]: Sector size (logical/physical): 512 bytes / 512
bytes
Aug 20 10:39:03 RaspberryPi-Gateway fwupgrademanager[16219]: I/O size (minimum/optimal): 512 bytes / 512 bytes
Aug 20 10:39:03 RaspberryPi-Gateway fwupgrademanager[16219]: Disklabel type: dos
Aug 20 10:39:03 RaspberryPi-Gateway fwupgrademanager[16219]: Disk identifier: 0x6da9139c
Aug 20 10:39:03 RaspberryPi-Gateway fwupgrademanager[16219]: Device          Boot      Start          End Sectors   Size
Id Type
Aug 20 10:39:03 RaspberryPi-Gateway fwupgrademanager[16219]: /dev/mmcblk0p1 *            8192      112525   104334
51M  c W95 FAT32 (LBA)
Aug 20 10:39:03 RaspberryPi-Gateway fwupgrademanager[16219]: /dev/mmcblk0p2            114688   9822207   9707520   4.6G
83 Linux
Aug 20 10:39:03 RaspberryPi-Gateway fwupgrademanager[16219]: /dev/mmcblk0p3            9822208  14016512  4194305    2G
83 Linux
Aug 20 10:39:03 RaspberryPi-Gateway fwupgrademanager[16219]: Command (m for help): The partition table has been
altered.
Aug 20 10:39:03 RaspberryPi-Gateway fwupgrademanager[16219]: Failed to add partition 3 to system: Device or
resource busy
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16219]: The kernel still uses the old partitions. The new
table will be used at the next reboot.
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16219]: Syncing disks.
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16197]: Creating Storage partition mmc0blkp4...
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16299]: Welcome to fdisk (util-linux 2.35.1).
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16299]: Changes will remain in memory only, until you
decide to write them.
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16299]: Be careful before using the write command.
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16299]: Command (m for help):
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16299]: Command (m for help): Partition type
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16299]:   p   primary (3 primary, 0 extended, 1 free)
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16299]:   e   extended (container for logical partitions)
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16299]: Select (default e):
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16299]: Selected partition 4
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16299]: First sector (2048-62333951, default 2048): Last
sector, +/-sectors or +/-size{K,M,G,T,P} (14016513-62333951, default 62333951):
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16299]: Created a new partition 4 of type 'Linux' and of
size 2 GiB.
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16299]: Partition #4 contains a ext4 signature.
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16299]: Command (m for help):
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16299]: Disk /dev/mmcblk0: 29.74 GiB, 31914983424 bytes,
62333952 sectors
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16299]: Units: sectors of 1 * 512 = 512 bytes
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16299]: Sector size (logical/physical): 512 bytes / 512
bytes
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16299]: I/O size (minimum/optimal): 512 bytes / 512 bytes
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16299]: Disklabel type: dos
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16299]: Disk identifier: 0x6da9139c
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16299]: Device          Boot      Start          End Sectors   Size
Id Type
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16299]: /dev/mmcblk0p1 *            8192      112525   104334
51M  c W95 FAT32 (LBA)
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16299]: /dev/mmcblk0p2            114688   9822207   9707520   4.6
G 83 Linux
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16299]: /dev/mmcblk0p3            9822208  14016512  4194305
2G 83 Linux

```

```
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16299]: /dev/mmcblk0p4      14016513 18210817 4194305
2G 83 Linux
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16299]: Command (m for help): The partition table has been
altered.
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16299]: Syncing disks.
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16197]: file system type check count partition p3 is 1
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16197]: File system available for partition mmcblk0p3
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16197]: file system type check count partition p4 is 1
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16197]: File system available for partition mmcblk0p4
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16324]: mount: /extblock: /dev/mmcblk0p4 already mounted
on /extblock.
Aug 20 10:39:06 RaspberryPi-Gateway fwupgrademanager[16197]: Downloaded image to be upgrade is rdkb-generic-
broadband-image_rdk-next_20210818080531.rootfs.wic
Aug 20 10:39:34 RaspberryPi-Gateway fwupgrademanager[16197]: Active bank partition is /dev/mmcblk0p3
Aug 20 10:39:34 RaspberryPi-Gateway fwupgrademanager[16197]: Modifying Bank 0 partition mmcblk0p2 Content with
downloaded image ...
Aug 20 10:40:21 RaspberryPi-Gateway fwupgrademanager[16197]: Firmware upgrade successful
Aug 20 10:40:21 RaspberryPi-Gateway fwupgrademanager[16197]: Rebooting with bank switch ...
Aug 20 10:40:41 RaspberryPi-Gateway fwupgrademanager[14171]: Entering fwupgrade_hal_get_download_status
Aug 20 10:40:41 RaspberryPi-Gateway fwupgrademanager[14171]: Entering fwupgrade_hal_reboot_ready
Aug 20 10:40:41 RaspberryPi-Gateway fwupgrademanager[19110]: CR component name is: eRT.com.cisco.spvtg.ccsp.CR
Aug 20 10:40:42 RaspberryPi-Gateway fwupgrademanager[19110]: subsystem_prefix eRT.
Aug 20 10:40:42 RaspberryPi-Gateway fwupgrademanager[19110]: setv from/to component(eRT.com.cisco.spvtg.ccsp.
pam): Device.DeviceInfo.X_RDKCENTRAL-COM_LastRebootReason
Aug 20 10:40:42 RaspberryPi-Gateway fwupgrademanager[19110]: Execution succeed.
Aug 20 10:40:42 RaspberryPi-Gateway fwupgrademanager[19110]:
Aug 20 10:40:42 RaspberryPi-Gateway fwupgrademanager[14171]:
Aug 20 10:40:42 RaspberryPi-Gateway fwupgrademanager[14171]: ntering fwupgrade_hal_download_reb### reboot now
###
```

Complete Fwlogs

```
root@RaspberryPi-Gateway:~# cat /rdklogs/logs/FwUpgradeManagerLog.txt.0
210805-16:04:07.534093 [mod=FWUPGRADEMANAGER, lvl=INFO] [tid=872] After daemonize before signal
210805-16:04:07.535782 [mod=FWUPGRADEMANAGER, lvl=INFO] [tid=872] Connect to bus daemon...
210805-16:04:07.536150 [mod=FWUPGRADEMANAGER, lvl=WARN] [tid=872] DBus is enabled
210805-16:04:07.549648 [mod=FWUPGRADEMANAGER, lvl=INFO] [tid=872] INFO: bus_handle: 0x 169ce08
210805-16:04:08.556185 [mod=FWUPGRADEMANAGER, lvl=WARN] [tid=872] Register empty object : com.
210805-16:04:08.556397 [mod=FWUPGRADEMANAGER, lvl=WARN] [tid=872] Register empty object : com.cisco.
210805-16:04:08.556525 [mod=FWUPGRADEMANAGER, lvl=WARN] [tid=872] Register empty object : com.cisco.spvtg.
210805-16:04:08.556656 [mod=FWUPGRADEMANAGER, lvl=WARN] [tid=872] Register empty object : com.cisco.spvtg.ccpp.
210805-16:04:08.558086 [mod=FWUPGRADEMANAGER, lvl=WARN] [tid=872] DM Library module name = CCSP Base Data Model
210805-16:04:08.558481 [mod=FWUPGRADEMANAGER, lvl=INFO] [tid=872] Download_Control_Flag is 1
210805-16:04:08.558714 [mod=FWUPGRADEMANAGER, lvl=INFO] [tid=872] Current FW Version is rdkb-generic-broadband-
image_rdk-next_20210813103706
210805-16:04:08.558846 [mod=FWUPGRADEMANAGER, lvl=WARN] [tid=872] syscfg_get failed
210805-16:04:08.566939 [mod=FWUPGRADEMANAGER, lvl=WARN] [tid=872] DM Library module name =
TR181_RdkFirmwareUpgradeManager
210805-16:04:08.568084 [mod=FWUPGRADEMANAGER, lvl=WARN] [tid=872] Search for empty object in
'dslhCpeCheckEmptyObject'
210820-10:11:02.271274 [mod=FWUPGRADEMANAGER, lvl=WARN] [tid=11399] DslhObjcoValidate: X_RDKCENTRAL-
COM_FirmwareDownloadURL, bsUpdate = 3

210820-10:11:05.001028 [mod=FWUPGRADEMANAGER, lvl=INFO] [tid=11399] URL is http://192.168.0.7
210820-10:11:41.004477 [mod=FWUPGRADEMANAGER, lvl=WARN] [tid=11399] DslhObjcoValidate: X_RDKCENTRAL-
COM_FirmwareToDownload, bsUpdate = 3

210820-10:11:41.004713 [mod=FWUPGRADEMANAGER, lvl=INFO] [tid=11399] FW DL is rdkb-generic-broadband-image_rdk-
next_20210818080531.rootfs.wic
210820-10:12:14.157871 [mod=FWUPGRADEMANAGER, lvl=WARN] [tid=11399] DslhObjcoValidate: X_RDKCENTRAL-
COM_FirmwareDownloadNow, bsUpdate = 3

210820-10:12:14.158361 [mod=FWUPGRADEMANAGER, lvl=INFO] [tid=11399] Converted image name = rdkb-generic-
broadband-image_rdk-next_20210818080531
210820-10:12:14.171075 [mod=FWUPGRADEMANAGER, lvl=INFO] [tid=11399] Image downloading triggered successfully
210820-10:14:06.797110 [mod=FWUPGRADEMANAGER, lvl=INFO] [tid=14792] Sleeping to prevent 500 error
210820-10:14:16.797612 [mod=FWUPGRADEMANAGER, lvl=INFO] [tid=14792] /tmp/wget.log doesn't exist. Sleeping an
additional 10 seconds
210820-10:14:26.797962 [mod=FWUPGRADEMANAGER, lvl=INFO] [tid=14792] Waiting for FW DL ...
210820-10:14:26.798406 [mod=FWUPGRADEMANAGER, lvl=INFO] [tid=14792] FW DL is over
210820-10:14:26.798506 [mod=FWUPGRADEMANAGER, lvl=INFO] [tid=14792] Waiting for reboot ready ...
210820-10:14:26.798670 [mod=FWUPGRADEMANAGER, lvl=INFO] [tid=14792] Waiting for reboot ready over, setting
last reboot reason
```

version txt

```
root@RaspberryPi-Gateway:~# cat /version.txt
imagename:rdkb-generic-broadband-image_rdk-next_20210818080531
BRANCH=rdk-next
YOCTO_VERSION=dunfell
VERSION=4.08.18.21
SPIN=0
BUILD_TIME="2021-08-18 08:05:31"
Generated on Wed Aug 18 08:05:31 UTC 2021
root@RaspberryPi-Gateway:~#
```

Limitation

Every Firmware Upgrade , it's boots with default values of all dmcli parameters & LastRebootReason value always return as "unknown" because rpi doesn't have the support of NVRAM.