

Firmware upgrade through XCONF server - Turris-Omnia - User Manual - 2020 - M6

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1. Introduction

- The Firmware upgrade will upgrade higher or lower version of the current image for Turris-Omnia with the help of Xconf server and Local TFTP /HTTP server.
- This page dedicated to bringing up and validation of Firmware upgrade in Turris-Omnia.

2. Environment Setup

2.1. Build procedure

Follow the wiki page to make yocto's RDK-B image from yocto workspace in your PC.

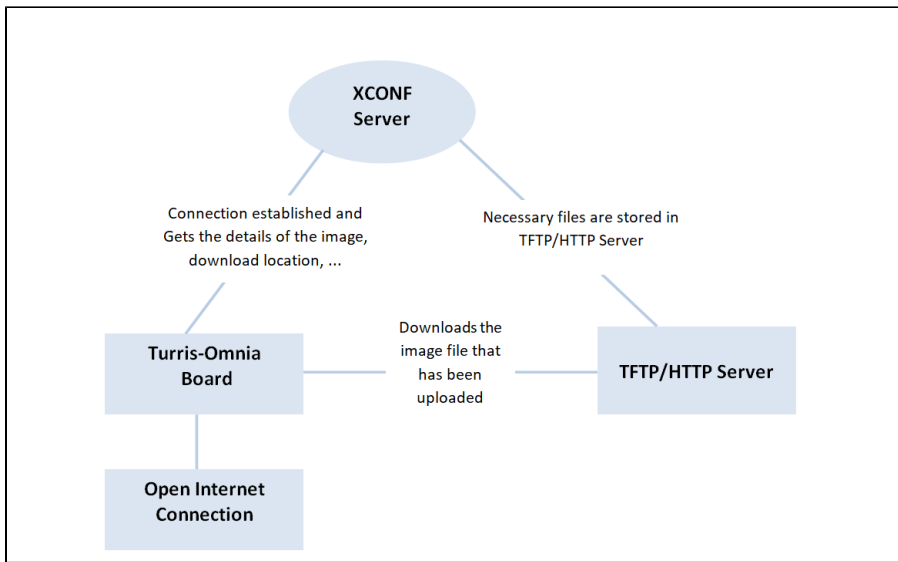
[Wifi-Extender Yocto Build Instructions](#)

2.2. Image Flash procedure

Refer the below link for image flashing

[Turris Omnia Reference Platform: Flashing Instruction](#)

3. Test Setup Block Diagram



4. Firmware Upgrade validation Procedure

4.1. TFTP Server

STEP 1:

Install xinetd and tftpd-hpa application in your local PC to setup tftp server by using below command

TFTP Server Installation Step

```
sudo apt-get install xinetd
sudo apt-get install tftpd-hpa
```

STEP 2:

Create a .tar file and place the image files.

For Example, the image files are,

- zImage--4.14.22-r0-turris-20200629035029.bin
- rdkb-generic-broadband-image_default_20200629035029.rootfs.tar.gz
- armada-385-turris-omnia.dtb

```
tar -cvf <imagefile_name>.tar <path-of-rdkb*.rootfs.tar.gz> <path-of-zImage*.bin> <path-of-armada*.dtb>
```

For Ex:

```
tar -cvf rdkb-generic-broadband-image_default_20200629035029.tar /home/kaviya/rdkb-generic-broadband-image_default_20200629035029.rootfs.tar.gz /home/kaviya/zImage--4.14.22-r0-turris-20200629035029.bin /home/kaviya/armada-385-turris-omnia.dtb
```

STEP 3:

Create checksum file for the upgrading image.

md5sum checksum creation

```
md5sum "<imagefile_name>.tar" > imagefile_name.txt
```

For Ex:

```
md5sum "rdkb-generic-broadband-image_default_20200629035029.tar" > rdkb-generic-broadband-image_default_20200629035029.txt
```

Create new folder for example "tftp" in your PC home directory and place the checksum file and upgrading image file (the .tar file generated).

STEP 4:

Check for tftp file in /etc/xinetd.d/ directory. If not, then create tftp file under this /etc/xinetd.d/ directory and add below content.

vi /etc/xinetd.d/tftp
TFTP File Content

```
service tftp
{
    protocol      = udp
    port          = 69
    socket_type   = dgram
    wait         = yes
    user          = nobody
    server        = /usr/sbin/in.tftpd
    server_args   = -c -v -s /home/xyz/tftp ( upgrading file and checksum file maintained in this directory )
    disable       = no
}
```

STEP 5:

Verify /etc/default/tftpd-hpa file content

vi /etc/default/tftpd-hpa

```
# /etc/default/tftpd-hpa

TFTP_USERNAME="tftp"
TFTP_DIRECTORY="/home/xyz/tftp" ( upgrading file and checksum file maintained in this directory )
TFTP_ADDRESS="0.0.0.0:69"
TFTP_OPTIONS="--secure"
```

STEP 6:

Start tftp server and xinetd server

```
sudo service tftpd-hpa restart
/etc/init.d/xinetd restart
```

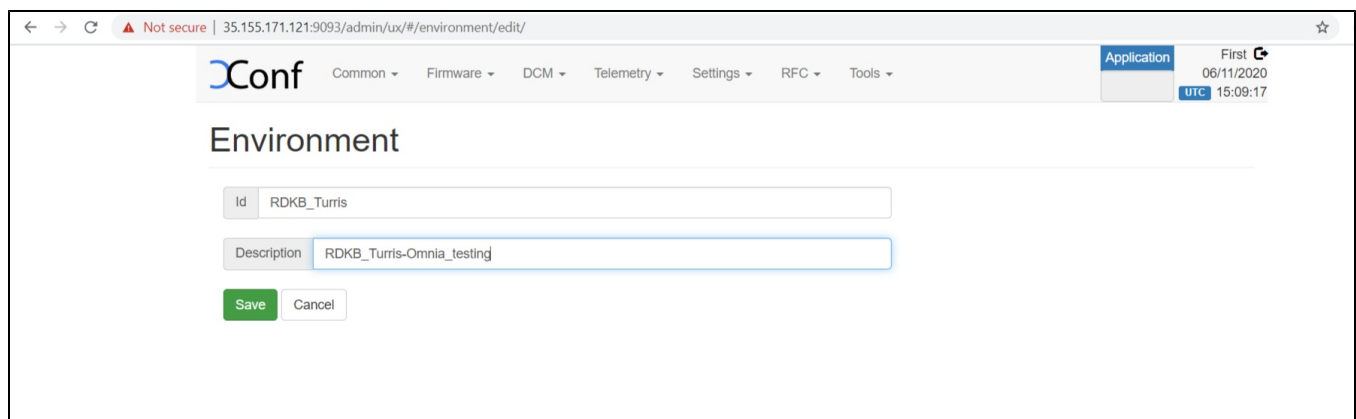
4.2. XCONF Server Setup

XConf URL

```
http://35.155.171.121:9093/admin/ux
```

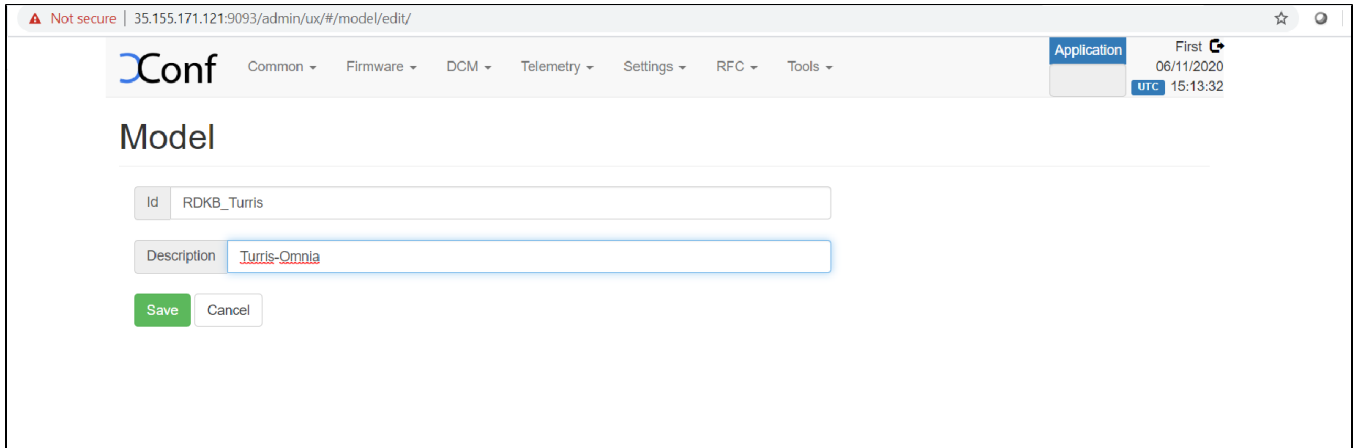
4.2.1. Create Environment

Select common Environments. Then click edit and enter the device environment detail.



4.2.2. Create Model

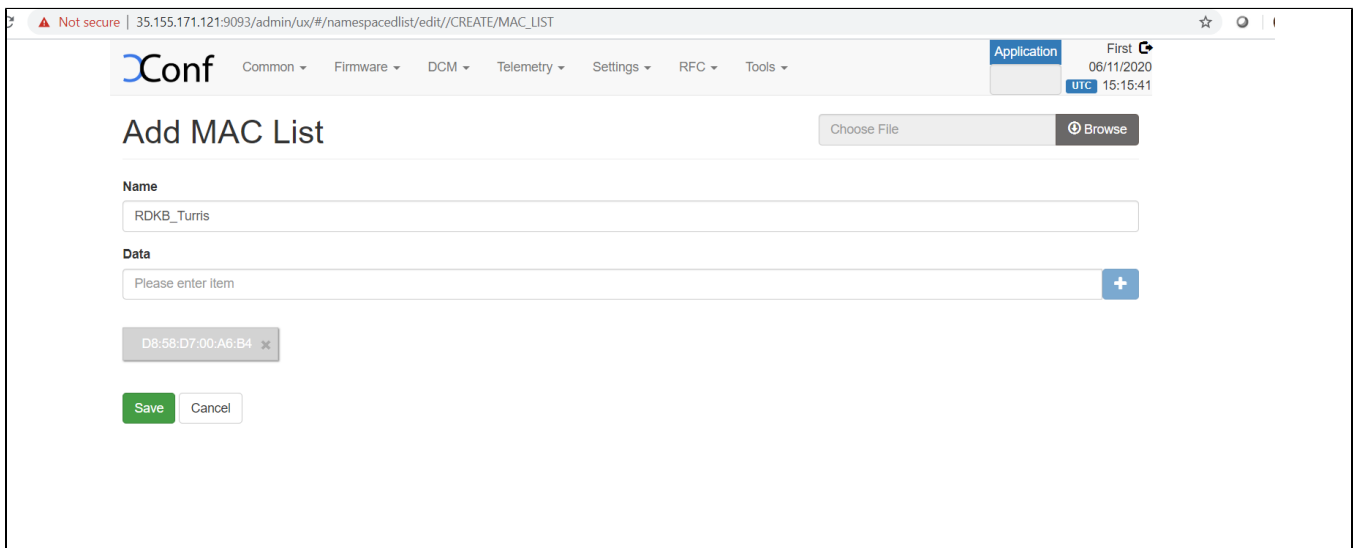
Select common Models. Then add your device model detail.



The screenshot shows the XConf web interface at the URL 35.155.171.121:9093/admin/ux/#/model/edit/. The page has a navigation bar with the XConf logo and several menu items: Common, Firmware, DCM, Telemetry, Settings, RFC, and Tools. On the right, there's a user profile section for 'Application' with a 'First' button and a timestamp '06/11/2020 15:13:32 UTC'. The main content area is titled 'Model' and contains a form with two input fields: 'Id' with the value 'RDKB_Turris' and 'Description' with the value 'Turris-Omnia'. Below the fields are 'Save' and 'Cancel' buttons.

4.2.3. Create Mac List

Select common MAC Lists. Then add your device MAC detail



The screenshot shows the XConf web interface at the URL 35.155.171.121:9093/admin/ux/#/namespacedlist/edit//CREATE/MAC_LIST. The page has the same navigation bar as the previous screenshot. The main content area is titled 'Add MAC List' and includes a 'Choose File' button and a 'Browse' button. Below these, there's a form with two input fields: 'Name' with the value 'RDKB_Turris' and 'Data' with the value 'D8:58:D7:00:A6:B4'. There's also a '+ Add' button next to the 'Data' field. At the bottom, there are 'Save' and 'Cancel' buttons.

NOTE: Before configuring Firmware essentials, Ensure application type is stb. (If the application type is xhome then change it)

4.2.4. Create Firmware Config

Select Firmware Firmware Configs.

Give Description,File name (Upgrading image name),Version(Upgrading image name without extension) and select your model name and save the details in xconf server.

Not secure | 35.155.171.121:9093/admin/ux/#/firmwareconfig/edit/aa2c26fe-b120-4ef1-a624-3fede96f0e14

Common Firmware DCM Telemetry Settings RFC Tools

Application: stb First: 06/30/2020 UTC 06:18:48

Firmware config

Description: RDKB_Turris

File name: rdkb-generic-broadband-image_default_20200629035029.tar

Version: rdkb-generic-broadband-image_default_20200629035029

Models:

ARMV7 AX061AEI COGMATION_BB EMULATOR EMULATOR1 MOCKRT1319_TEST TEST
RDKB-TECHSUMMIT RDKB_RPI **RDKB_TURRIS** RPI RPI0 RPI_BB TESTCPE XYZ123

4.2.5. Create Firmware Rules

Select Firmware Firmware Rules

Choose MAC_RULE in the list of Template displayed.

Once entered into Firmware Rule page, If any estbmac present under build condition then remove that estbmac before adding the device specific Firmware rules.

Add your device specific eStbMac under build condition option.

Select your firmware config under Action option and save your Firmware rule in XConf server.

Not secure | 35.155.171.121:9093/admin/ux/#/firmwarerule/edit/5bec65ee-83e3-49c8-a0ba-f3332e99625f

Common Firmware DCM Telemetry Settings RFC Tools

Application: stb First: 06/29/2020 UTC 08:05:38

Edit Firmware Rule

PROPERTIES

Name: RDKB_Turris Type: MAC_RULE

BUILD CONDITIONS

eStbMac IN_LIST RDKB_Turris

☒ AND
☐ OR
☐ not
eStbMac IN_LIST RDKB_Turris

Please provide value for each condition in the rule:
click condition, enter fixedArg value, then click Plus button to save that condition.
Note: Key value in condition can't be modified. It's not allowed to add new conditions.

ACTION

Action Type: RULE

NoOp: false ☐

Firmware Config: RDKB_Turris

4.2.6. Edit Download Location Round Robin Filter

Select Firmware Download Location Filter

After entered Download Location Round Robin filter, then edit your image downloading details.

FOR TFTP SERVER CONFIGURATION:

Enable Never use HTTP and select your Rogue model.

Give TFTP server running IP address to download image.

Not secure | 35.155.171.121:9093/admin/ux/#/roundrobinfilter/edit

Xconf Common Firmware DCM Telemetry Settings RFC Tools

Application: stb First: 06/30/2020 10:14:53 UTC

Download Location Round Robin Filter

HTTP

Location (FQDN):

Location (full HTTP location):

Never use HTTP: ☒ (if this box is checked TFTP location will always be used no matter what the STB sends)

Rogue models:

ARMV7 AX061AEI COGMATION_BB EMULATOR EMULATOR1 MOCKRT1319_TEST TEST RDKB-TECHSUMMIT

RDKB_RPI **RDKB_TURRIS** RPI RPI0 RPI_BB TESTCPE XYZ123

Firmware versions

Type here...

TFTP

IPv4 locations:

	192.168.1.34	100	
--	---	----------------------------------	-------------------------------

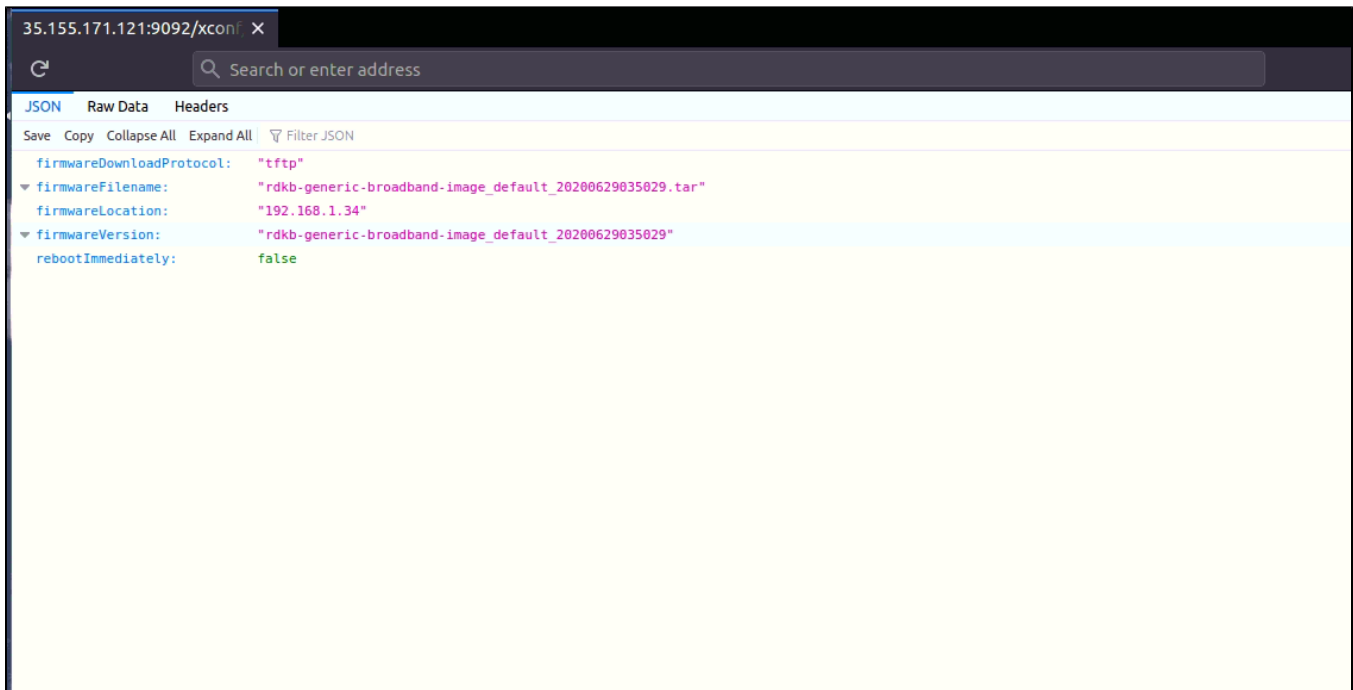
IPv6 locations:

4.2.7. Verify Xconf Server Configuration

Verify that XConf Server configuration displays the Json response from the mentioned URL:

http://35.155.171.121:9092//xconf/swu/stb?eStbMac=<Turris MAC address>&model=<model_name>&capabilities=RCDL&capabilities=supportsFullHttpRequest

Example, http://35.155.171.121:9092//xconf/swu/stb?eStbMac=D8:58:D7:00:A6:B4&model=%3Cmodel_name%3E&capabilities=RCDL&capabilities=supportsFullHttpRequest



5. Turris-Omnia Board

5.1. U-boot-fw-Utills Configuration

- 1) Add the necessary firmware utilities in armada_38x_defconfig
- 2) In fw_env.config, set MTD device specifications
- 3) Device specific details are added and try to retrieve the data by executing fw_printenv
- 4) Once, that is done try to set the bootargs by using fw_setenv and verify the same

Note: The U-boot Configuration is added to handle the uboot environment in linux. This is specifically to change the root value in bootargs (to avoid the old rootfs in mmcblk0p5 and load the downloaded rootfs that has been placed in the mmcblk0p7). And so, the new rootfs comes up while the reboot.

5.2. Firmware upgrade

- 1) Flash the image and confirm for the 7 partitions in the turris-omnia board(ex. mmcblk0p1, mmcblk0p2, mmcblk0p3, mmcblk0p4, mmcblk0p5, mmcblk0p6, mmcblk0p7)
- 2) Ensure Partition7 is of ext2 file system
- 3) verify the CLOUDURL parameter where XConf Server URL is configured
- 4) Start the swupdate.service that initiates the firmware upgrade
- 5) Verify the image version (cat /version.txt) displays the flashed image version
- 6) Download the image in the /tmp folder(image, zImage, dtb file) and move the rootfs filesystem(rdk*.rootfs.tar.gz) into the 7th partition and kernel (zImage*.bin) image into 3rd partition
- 7) By changing the Active partition (mmcblk0p5) by target partition (mmcblk0p7) the downloaded rootfs is loaded
- 8) On reboot, the turris board comes up with the downloaded image
- 9) Verify the version of booted image which shows the downloaded image version

6. Conclusion

Please find the summary on firmware upgrade explained above

- Build the Rdkb Turris Image
- Flash the build image
- Setup xconf server ready with rules and download location, for Turris-Omnia device
- Place the upgrading image and checksum file in tftp server
- Boot the flashed image

7. Limitations

Yet to have https support