

Turris Omnia Reference Platform

1. Introduction

Upgrading Yocto version from morty to dunfell(Yocto 3.1) for Turris Omnia Reference Platform

Considerations for broadband & extender build:

- OpenEmbedded and Yocto: Dunfell
- Linux kernel 4.14
- Version upgrades for bitbake and other oe recipes(if needed).

2. Environment Setup

2.1. Host Environment

1. In Ubuntu 18.04 version, consider the versions of **git**(1.8.3.1 or greater), **tar**(1.27 or greater), **Python**(3.4.0 or greater), **Coreutils**.
2. Take a look on the following packages,

```
$ sudo apt-get install gawk wget git-core diffstat unzip texinfo gcc-multilib build-essential chrpath socat cpio python python3 python3-pip python3-pexpect xz-utils debianutils iputils-ping python3-git python3-jinja2 libegl1-mesa libsdl1.2-dev pylint3 xterm
```

3. Configure repo
4. Ensure the .netrc and .gitconfig files

2.2. Build instructions for creating rdk-generic-broadband-image

The following commands fetches the source code of turris using repo tool and create the image using bitbake

```
repo init -u https://code.rdkcentral.com/r/manifests -m rdkb-turris-extsrc.xml -b dunfell

repo sync -j4 --no-clone-bundle

MACHINE=turris source meta-turris/setup-environment

bitbake rdk-generic-broadband-image
```

3. Errors and Challenges

	Error/ Issues	Layer and Recipe	Fix
1	Unable to start bitbake server (None) ERROR: Server log for this session	meta-java	In layer.conf Added LAYERSERIES_COMPAT_meta-java = " dunfell"
2	Unable to parse Var <AVAILABLE_LICENSES[:=]> bb.data_smart.ExpansionError: Failure expanding variable AVAILABLE_LICENSES[:=], expression was '\${@' '.join(available_licenses(d))}' which triggered exception FileNotFoundError: [Errno 2] No such file or directory	meta-cmf	Need to create a licenses directory under the meta-layer and add RDK license file to it
3	Deprecated variable(s) found: "IMAGE_DEPENDS_wic". Use do_image_<type>[depends] += "<recipe>:<task>" instead Failed to parse recipe: /meta-java/recipes-images/images/java-test-image.bb	meta-marvell	In armada38x-base.inc , Removed IMAGE_DEPENDS_wic_append_armada3 8x = " virtual/bootloader" added WKS_FILE_DEPENDS ?= ""
4	ParseError at /meta-marvell/recipes-kernel/linux/linux-marvell.inc:16: Could not include required file recipes-kernel/linux/linux-dtb.inc	meta-turris	In recipes-kernel/linux, added linux-dtb.inc

5	<p>ExpansionError during parsing / meta-cmf-mesh/recipes-common/mesh-agent/mesh-agent.bb</p> <p>ExpansionError during parsing /meta-rdk-broadband/recipes-rdkb/sysint-broadband/sysint-broadband.bb</p>	<p>meta-cmf-mesh mesh-agent.bb</p> <p>meta-rdk-broadband sysint-broadband.bb</p>	<p>In mesh-agent.bb replace base_contains by bb.utils.contains</p>
6	<p>ParseError at /meta-browser/recipes-mozilla/mozilla-devscripts/mozilla-devscripts_git.bb:15: Could not inherit file classes/distutils.bbclass</p>	meta-cmf-broadband	<p>In rdk-bbmask-broadband.inc, add BBMASK .= " meta-browser/"</p>
7	<p>ParseError at /Migration-3.1/meta-rdk-broadband/recipes-ccsp/ccsp/ccsp-webui.bb:32: Could not inherit file classes/lxc.bbclass</p>	meta-virtualization	<p>Under classes, remove inherit lxc from ccsp-webui.bb</p>
8	<p>ExpansionError during parsing /meta-rdk-broadband/recipes-ccsp/ccsp/ccsp-wifi-agent.bb</p> <p>ExpansionError during parsing /meta-rdk-broadband/recipes-ccsp/ccsp/parodus2ccsp.bb</p>	<p>meta-rdk-broadband ccsp-wifi-agent.bb parodus2ccsp.bb</p>	<p>replace base_contains by bb.utils.contains</p>
9	<p>ExpansionError during parsing /meta-rdk-opensync/recipes/opensync/opensync_1.4.0.bb</p> <p>ExpansionError during parsing /meta-rdk-ext/recipes-support/base64/base64_git.bb</p>	<p>meta-turris opensync_1.4.0.bbappend meta-rdk-ext base64_git.bb</p>	<p>change branch to master</p>
10	<p>Nothing RPROVIDES '\${ROOTFS_PKGMANAGE_BOOTSTRAP}' (but /openembedded-core/meta/recipes-core/images/core-image-minimal.bb RDEPENDS on or otherwise requires it)</p> <p>ERROR: Required build target 'core-image-minimal' has no buildable providers.</p>	openembedded-core	<p>add ROOTFS_PKGMANAGE_BOOTSTRAP = "postinsts"</p>
11	<p>Nothing RPROVIDES 'wireless-tools' (but /meta-turris/recipes-core/packagegroups/packagegroup-up-turris-core.bb RDEPENDS on or otherwise requires it)</p> <p>Nothing RPROVIDES 'trace-cmd' (but /meta-turris/recipes-core/packagegroups/packagegroup-turris-core.bb RDEPENDS on or otherwise requires it)</p> <p>Nothing RPROVIDES 'iperf' (but /meta-turris/recipes-core/packagegroups/packagegroup-turris-core.bb RDEPENDS on or otherwise requires it)</p>	<p>openembedded-core openembedded-core meta-openembedded</p>	<p>remove wireless-tools ,trace-cmd , iperf from packagegroup-turris-core.bb</p>
12	<p>ERROR: 265 unbuildable tasks were found. These are usually caused by circular dependencies and any circular dependency chains found will be printed below. Increase the debug level to see a list of unbuildable tasks.</p>	<p>openembedded-core python3_3.8.2.bb</p>	<p>BBMASK openssl unused version</p>
13	<p>ERROR: kern-tools-native-0.2+gitAUTOINC+7604d2d1a4-r12 do_patch: Command Error: 'quilt --quiltrc /build-turris/tmp/work/x86_64-linux/kern-tools-native/0.2+gitAUTOINC+7604d2d1a4-r12/recipe-sysroot-native/etc/quiltrc push' exited with 0 Output</p>	meta-rdk-opensync	<p>Recreate the patch file ./meta-rdk-opensync/recipes/kern-tools/files/dont_install_kconfiglib.patch</p>
14	<p>dbus-1.12.16-r0 do_fetch: Fetcher failure: Unable to find file file://01-dbus-ccsp-apis-1.12.16.patch anywhere.</p>	meta-rdk-ext	<p>rename the existing patch for dbus version 1.12.16 and recreate the patch with the following name</p> <p>01-dbus-ccsp-apis-1.12.16.patch</p>
15	<p>u-boot-marvell-2013.01+gitAUTOINC+25998da8b6-r0 do_configure: Execution of /build-turris/tmp/work/turris-rdk-linux-musleabi/u-boot-marvell/2013.01+gitAUTOINC+25998da8b6-r0/temp/run.do_configure.12492' failed with exit code 1</p>	<p>meta-turris u-boot-marvell_2013.01.bbappend</p>	<p>Add,</p> <pre>do_configure_prepend() { touch \${S}/.config cp \${WORKDIR}/recipe-sysroot-native/usr/bin/oldconfig \${WORKDIR}/uboot/oldconfig }</pre>

16	ERROR: /build-turris/tmp/work/turris-rdk-linux-musleabi/u-boot-marvell/2013.01+gitAUTOINC+25998da8b6-r0/u-boot/fs/jffs2/mini_inflate.c:222: undefined reference to `cramfs_memset'	meta-turris u-boot-marvell_2013.01.bbappend	Create a patch and apply u-boot-inline-error.patch
17	dnsmasq-2.80-r0 do_patch: Command Error: 'quilt --quiltrc /home/krishna/RAJ/Migration-3.1/build-turris/tmp/work/armv7ahf-neon-rdk-linux-musleabi/dnsmasq/2.80-r0/recipe-sysroot-native/etc/quiltrc push' exited with 0	meta-rdk-ext	recreate the patch 130-fingerprint-dhcp-lease-file.patch
18	kern-tools-native-0.2+gitAUTOINC+7604d2d1a4-r12 do_populate_lic: QA Issue: kern-tools-native: LIC_FILES_CHKSUM points to an invalid file: /build-turris/tmp/work/x86_64-linux/kern-tools-native/0.2+gitAUTOINC+7604d2d1a4-r12/git/Kconfiglib/LICENSE.txt [license-checksum]	meta-rdk-opensync kern-tools-native_%.bbappend	comment LIC_FILES_CHKSUM = "file://git/Kconfiglib/LICENSE.txt; md5=448ee4da206e9be8f4a79c48e0741295"
19	core-image-minimal-1.0-r0 do_rootfs: Unable to install packages. - nothing provides fftw needed by packagegroup-turris-core-1.0-r0.all - do not ask to install a package providing packagegroup-turris-core		add fftw.bbappend
20	When reparsing /openembedded-core/meta/recipes-core/images/core-image-minimal.bb: do_rootfs, the basehash value changed from 1c76594fd609e77323d32b96b490551409f1dd7494e75119b74115805687e530 to 435cd9fd2595cbf5d3420df8cdf1366179c1c68f804f4ab735b6cff5f84d03f. The metadata is not deterministic and this needs to be fixed. ERROR: \$ bitbake core-image-minimal -cdo_rootfs -Snone ERROR: \$ bitbake core-image-minimal -cdo_rootfs -Sprintdiff	meta-turris minimal.bbappend	add BB_HASH_IGNORE_MISMATCH = "1"
21	ERROR: core-image-minimal-1.0-r0 do_rootfs: Postinstall scriptlets of ['systemd'] have failed. If the intention is to defer them to first boot, then please place them into pkg_postinst_ontarget_\${PN} ()		Removed installing resolv.conf for dunfell branch
22	ERROR: core-image-minimal-1.0-r0 do_rootfs: Taskhash mismatch 8f27e0dbdfe3ca200423ce2c2b7235163592522452134eeb952f0ed25647769d versus 7db8ecb95cf063d5b230c2eefa967d5e6888f6c0455f20a701f8c2113198ce9b for /openembedded-core/meta/recipes-core/images/core-image-minimal.bb:do_rootfs ERROR: Taskhash mismatch	meta-turris core-image-minimal.bbappend	add IMAGE_NAME[vardepsexclude] = "DATETIME"
23	ERROR: core-image-minimal-1.0-r0 do_image_wic: Execution of /build-turris/tmp/work/turris-rdk-linux-musleabi/core-image-minimal/1.0-r0/temp/run.do_image_wic.29811' failed with exit code 1: ERROR: _exec_cmd: install -m 0644 -D /build-turris/tmp/deploy/images/turris/zImage-armada-385-turris-omnia.dtb /images/turris/zImage-armada-385-turris-omnia.dtb: No such file or directory	meta-turris turris.conf	remove zImage-armada-385-turris-omnia.dtb from IMAGE_BOOT_FILES
24	ERROR: Nothing PROVIDES 'wireless-tools'	meta-rdk-opensync meta-rdk	In opensync_1.4.0.bb , remove wireless-tools from depends And in packagegroup-rdk-oss-broadband.bb , remove wireless-tools for dunfell branch
25	ERROR: Nothing PROVIDES 'bridge-utils-native' ERROR: Nothing PROVIDES 'virtual/kernel-native'	meta-virtualization openvswitch_git.bb upgraded from 2.6.3 to 2.13	Add, DEPENDS_remove = "virtual/kernel bridge-utils" DEPENDS_append_class-target = " virtual /kernel" DEPENDS_append_class-target = " bridge-utils"
26	ERROR: Nothing RPROVIDES 'cpp-symlinks' ERROR: Nothing RPROVIDES 'cpp'	meta-openembedded python3-pycparser_2.19.bb	Add, RDEPENDS_\${PN}_class-target_remove = " cpp cpp-symlinks"
27	ERROR: mosquito-1.4.8-r0 do_compile: oe_runmake failed security_default.c:773:13: error: storage size of 'context' isn't known	meta-rdk-ext mosquitto_1.4.8.bb	In rdk.conf Include preferred version of mosquito with 1.6.9
28	make: *** No targets specified and no makefile found. Stop. ERROR: oe_runmake failed	meta-rdk-broadband ccsp-common-library.bb	change source directory by including, S = "\${WORKDIR}/ccsp-common-library-yocto-dunfell-upgrade+git\${SRCPV}"
29	error: dereferencing pointer to incomplete type 'SSL' {aka 'struct ssl_st'} error: 'SSL_ST_OK' undeclared (first use in this function); did you mean 'TLS_ST_OK'?	meta-rdk-broadband ccsp-common-library.bb	remove "SSL_ST_OK" (that has been removed for openssl version 1.1.0g)

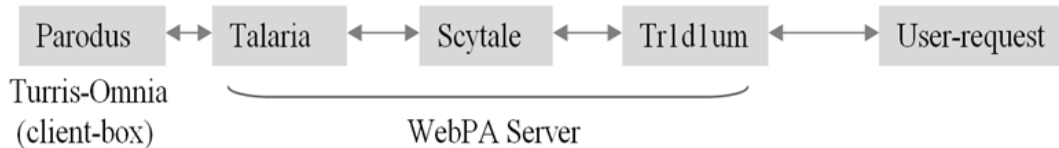
30	error: 'void* memcpy(void*, const void*, size_t)' copying an object of non-trivial type	msgpack-c	Reference: https://github.com/msgpack/msgpack-c/pull/659/commits/a05d92ae85024d0648f69f95307a1d3e8e51109c
31	undefined reference to `SSLay_add_all_algorithms' collect2: error: ld returned 1 exit status	meta-rdk-broadband utopia.bb	In user_openssl.c, Add condition for the function, #if OPENSSSL_VERSION_NUMBER < 0x1010000L #endif
32	fatal error: cJSON.h: No such file or directory	meta-rdk-broadband utopia.bb , ccsp-psm.bb meta-rdk-ext, ccsp-tr069-pa.bb wdmp-c_1.0.bb meta-rdk dca_git.bb	In apply_system_defaults.c, wdmf_internal.c, wdmf-c.c, cosa_x_cisco_com_mta_apis.h, libpd.c, ssp_cfmif.c, dcautils.h, dca.c, ssp_ccsp_cwmp_cfg.c add the path for header file, #include "cjson/cJSON.h"
33	error: format '%ld' expects argument of type 'long int', but argument 8 has type 'time_t'	meta-rdk-opensync opensync_1.4.0.bb	In sm_survey_report.c, change long int to long long int
34	error: 'strncpy' output truncated before terminating nul copying 23 bytes from a string of the same length	meta-rdk-ext wrp-c_1.0.bb	In wrp-c.c, change strncpy with memcpy
35	error: implicit declaration of function 'strlen' 'gmtime_r' 'localtime_r', 'asctime_r' error: nested extern declaration of 'gmtime_r', 'localtime_r', 'asctime_r' error: assignment to 'struct tm * restrict' from 'int' makes pointer from integer without a cast	meta-openembedded safec_3.5.bb	In safec_3.5.bb Add, CFLAGS += " -D_POSIX_C_SOURCE"
36	error: implicit declaration of function 'explicit_bzero'	meta-openembedded safec_3.5.bb	In memzero_s.c, Add, #undef HAVE_EXPLICIT_ZERO
37	configure: error: Package requirements (openssl >= 1.0.1f) were not met: No package 'openssl' found	meta-rdk-broadband sso.bb	In sso.bbappend Add openssl in depends
38	Patch 0001-DELIA-19972-Dibbler-client-crash-in-checkDecline.patch does not apply	meta-openembedded dibbler_git.bb	In dibbler_%.bbappend Remove the patch file included.
39	checking for and configuring transport modules to use... configure: error: IPv6 transports not available if IPv6 support is not enabled	meta-openembedded net-snmp_5.8.bb	Edit IPv6 configurations according to the support needed
40	aclocal: error: couldn't open directory 'cfg': No such file or directory	meta-rdk-broadband notify-comp.bb	In configure.ac, change cfg to m4
41	fatal error: avro.h: No such file or directory	meta-rdk-broadband ccsp-wifi-agent.bb	In ccsp-wifi-agent.bbappend Add, DEPENDS += "avro-c"
42	undefined reference to symbol 'breakpad_ExceptionHandler' error adding symbols: DSO missing from command line	meta-rdk-broadband ccsp-epon-agent.bb , ccsp-eth-agent.bb , ccsp-p-and-m.bb	In respective recipes, Add, LDFLAGS += " -lbreakpadwrapper"

43	error: storage size of 'ctx' isn't known	meta-rdk-broadband ccsp-p-and-m.bb , ccsp-tr069-pa.bb	Its applicable for openssl version < 1.1, for updated version use dynamic allocations for ctx
44	undefined reference to `syscfg_get'	meta-rdk-broadband ccsp-eth-agent.bb ccsp-p-and-m.bb	In ccsp-eth-agent.bb Add -lsyscfg in LDFLAGS_append,
45	fatal error: uuid/uuid.h: No such file or directory	meta-rdk-ext miniupnpd_2.1.bb	In miniupnpd_2.1.bb Add, DEPENDS += "util-linux"
46	dibbler-1.0.1/scripts/notify-scripts/client-notify-bsd.sh: No such file or directory	meta-openembedded dibbler_git.bb	In dibbler_%.bb Change the installation path of the client-notify-bsd.sh
47	ERROR: \$ bitbake rdk-generic-broadband-image -cdo_populate_lic_deploy -Snone ERROR: \$ bitbake rdk-generic-broadband-image -cdo_populate_lic_deploy -Sprintdiff	meta-rdk-broadband ccsp-p-and-m.bb	In rdk-generic-broadband-image.bbappend Add, BB_HASH_IGNORE_MISMATCH = "1"
48	requires /bin/bash, but no providers	ccsp-p-and-m.bb dibbler_%.bbappend mesh-agent.bb	In respective recipe, Add according to the component, For Example, RDEPENDS_\${PN}-ccsp_append_dunfell = "bash"
49	contained in package hal-wifi-generic requires libwpa_client.so, but no providers found in RDEPENDS_hal-wifi-generic?	meta-rdk-broadband hal-wifi-generic_git.bb	In hal-wifi-generic_git.bbappend Add, RDEPENDS_\${PN}_append_dunfell = "wpa-suplicant"
50	Postinstall scriptlets of ['utopia'] have failed	meta-rdk-rdk-generic-broadband-image.bb	In utopia.bb comment out ALTERNATIVE_LINK_NAME[syslog-conf] = "\${sysconfdir}/syslog.conf"
51	rdk-generic-broadband-image-1.0-r0 do_rootfs: Taskhash mismatch	meta-turris rdk-generic-broadband-image.bbappend	IMAGE_NAME[vardepsexclude] = "DATETIME"
52	ERROR: Configure error in PAM , tr069, dmcli and webui	meta-rdk-broadband	Safec version has been upgraded from 3.5 to 3.5.1 Changed LDFLAGS to libsafec-3.5.1
53	ERROR: Nothing RPROVIDES 'cpp-symlinks' ERROR: Nothing RPROVIDES 'cpp'	meta-openembedded meta-turris	python3-pycparser version has been upgraded from 2.19 to 2.20 renamed the bbappend to 2.20 version
54	ERROR: Mosquitto compile error, build breakage	meta-rdk-ext	patch-set In has been provided to fix this issue with openssl
55	wan interface erouter0 did not get IP	Utopia -repo	service_wan.c code seem not proper, Fails in dhcp_parse_vendor_info API
56	lan interface brlan0 not acquiring the IP	meta-turris /utopia.bbappend	Provided the patch-set as work-around in lan_handler.sh
57	Interfaces did not acquire inet6 address	meta-turris /machine/conf /turris.conf	DISTRO_FEATURES_append = " ipv6"
58	check.php gives the blank image, after logged on in RDKB-WebUI	webui - repo	Replaced the suspicious line in check.php
59	WebUI does not allow to navigate after Logging in	webui-repo/webgui.sh	export LANG=

	ccspwifagent.service requires manual restart to run	meta-rdk-ext/ recipes-connectivity/wireless-tools/wireless-tools_30.pre9.bb meta-turris/ ccsp-common-library /checkturriswifisupport.service	Add wireless-tools recipe for iwconfig binary Add Restart=always
60	Both SSID are grey out in WEBUI under connections	CcspWifiagent repo	Exclude Forcedisable radios() by adding Turris Macro
61	WebPA support on dunfell Turris-Omnia	meta-turris	Added the script files needed.
62	Firmware upgrade support on dunfell Turris	meta-turris	Included u-boot-fw-utils.bb
63	opkg build failure for 3.1 images	meta-rdk-ext	Added a proper SRC_URI and checksum
64	Opensync verification , with plume NOC and meshagent support	meta-turris rdkb-turris-hal	Made rdkb-turris-hal repo as rdk-next Fixed the issue with openswitch
65	WEBUI AP's are disabled with rdkb-turris-hal changes	meta-turris	Updated proper hostapd-init.sh file in dunfell
66	ERROR: ExpansionError during parsing /meta-cmf-mesh/recipes-common/mesh-agent/ mesh-agent.bb	meta-cmf-mesh	added meta-cmf-mesh/recipes-common /mesh-agent/ mesh-agent.bb " at BBMASK in BBMASK . = ".meta-cmf-mesh/recipes-common/mesh-agent/ mesh-agent.bb " rdkb.inc at below path meta-rdk/conf/distro/include

4. WebPA Support

System flow between the major components/services involved in fetching the data,



Ensure the parodus service is active on client-side and execute the curl commands ,

Getting the value,

- `curl -H 'Authorization:Basic d3B1c2VyOndlYnBhQDEyMzQ1Njc4OTAK' -i 'http://54.148.37.189:9003/api/v2/device/mac:d858d700a5d6/config?names=Device.DeviceInfo.Manufacturer'`

Response Message:

```
{
  "parameters": [
    {
      "name": "Device.DeviceInfo.Manufacturer",
      "value": "Turris CZ",
      "dataType": 0,
      "parameterCount": 1,
      "message": "Success"
    }
  ],
  "statusCode": 200
}
```

Setting the value,

- `curl -X PATCH http://54.148.37.189:9003/api/v2/device/mac:d858d700a5d6/config -d '{"parameters": [{"dataType": 0,"name":"Device.WiFi.SSID.10001.SSID","value":"Turris"}]}' -H 'Authorization:Basic d3B1c2VyOndlYnBhQDEyMzQ1Njc4OTAK'`

Response Message:

```
{
  "parameters": [
    {
      "name": "Device.WiFi.SSID.10001.SSID",
      "message": "Success"
    }
  ],
  "statusCode": 200
}
```

Validated below list of parameter from client(Turris-Omnia) device

WebPA Get-Only Parameters	WebPA Get/Set Parameters
<p>Note: In below Get/Set parameters, able to set the value successfully, but retrieving the same data set is failing. Wifi-HAL need to be updated in yocto_3.1 for this issue.</p> <ul style="list-style-type: none"> Device.DeviceInfo.Manufacturer Device.DeviceInfo.ManufacturerOUI Device.DeviceInfo.ModelName Device.DeviceInfo.SerialNumber Device.DeviceInfo.HardwareVersion Device.Users.User.1.X_CISCO_COM_Password Device.DeviceInfo.SoftwareVersion Device.WiFi.Radio.10000.Channel Device.DeviceInfo.MemoryStatus.Total Device.DeviceInfo.MemoryStatus.Free Device.DeviceInfo.UpTime Device.DeviceInfo.ProcessorStatus.CPUUsage Device.Hosts.X_CISCO_COM_ConnectedDeviceNumber 	<ul style="list-style-type: none"> Device.Users.User.1.X_CISCO_COM_Password Device.WiFi.SSID.10001.SSID Device.WiFi.AccessPoint.10001.Security.KeyPassphrase Device.WiFi.SSID.10001.Enable Device.WiFi.Radio.10000.Enable Device.WiFi.Radio.10000.Channel

5. Firmware Upgrade

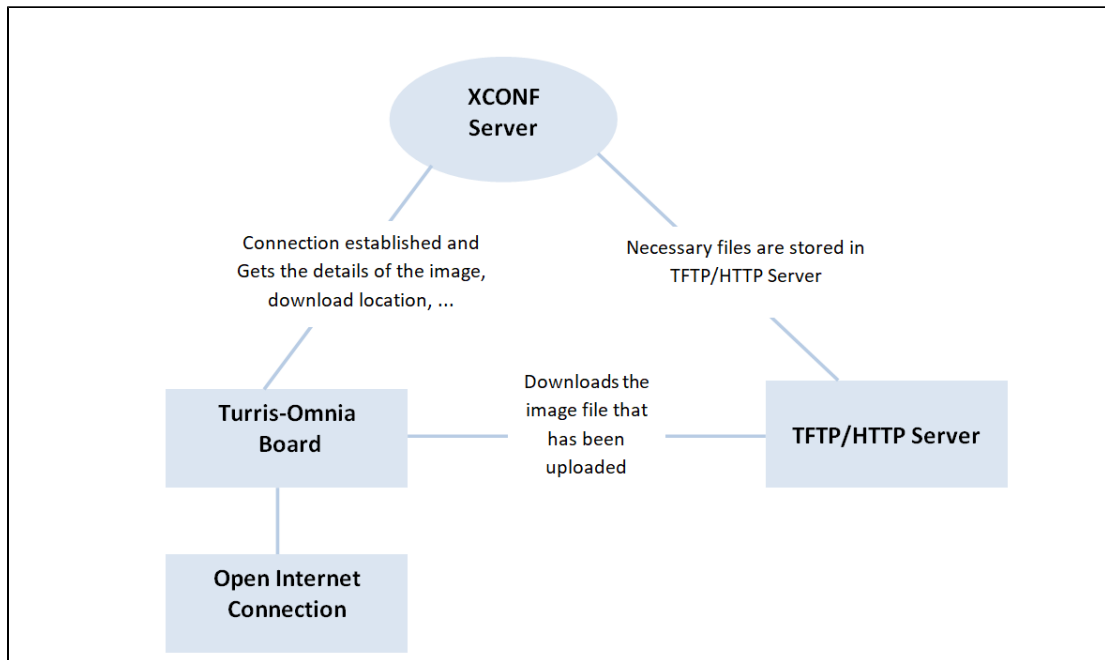
For TFTP and Xconf Server Setup, Refer: [Firmware upgrade through XCONF server](#)

- Verifying the XConf Server configuration through Json response,

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



Block Diagram:



Procedures to be carried out on Turris-Omnia:

- Flash the image and confirm for the 7 partitions in the turris-omnia board

- 2) Verify the CLOUDURL parameter where XConf Server URL is mentioned
 - 3) swupdate.service initiates the firmware upgrade
 - 4) Download the image in the /tmp folder and move the rootfs filesystem(rdk*.rootfs.tar.gz) into the 7th partition and kernel (zImage*.bin) image into 3rd partition
 - 5) By changing the Active partition (mmcblk0p5) by target partition (mmcblk0p7) the downloaded rootfs is loaded
 - 6) On reboot, the turris board comes up with the downloaded image
 - 7) Verify the version of booted image which shows the downloaded image version(cat /version.txt)
- Limitation:** Image download process was verified through tftp server, Yet to have http support

6. OpenSync Verification, with Plume NOC and MeshAgent Support

Opensync covers layers from just above the drivers within a device, to the connection to the cloud within that device. It is responsible for translating Cloud management commands to the hardware driver calls and reports to the Cloud state and telemetry in a mesh multi-AP Wi-Fi network

6.1. Components Involved:

- 1) **Openvswitch** - Provides OVSDDB for opensync communication
- 2) **OpenSync** - Provides Various managers (DM,CM,WM,NM,etc..)
- 3) **MeshAgent** - Ensures the sync between RDKB and Plume
- 4) **rdkb-turris-hal** - Contains the hardware level code to retrieve AP and stats information, using Netlink, hostapd_cli and iw

6.2. Version and branches of Components

Openvswitch Version has been upgraded from 2.6.0 to 2.13.0 (dunfell branch)

OpenSync Version 1.4.0.1 (master branch)

MeshAgent CMF git (dunfell branch)

rdkb-turris-hal rdkcentral GitHub (dunell branch)

6.3. Set-up Considerations

Opensync has to be manually triggered , and respective certificate has to be copied into the image (/nvram/certs)

Execute the below script , for linking the back-haul interfaces

```
root@TurrisOmnia-GW:# sh start_hostapd.sh

#!/bin/bash

killall dnsmasq
dnsmasq -u root -a 10.0.0.1 -i brlan0 -F 10.0.0.2,10.0.0.20 --dhcp-option=3,10.0.0.1 --dhcp-option=6,10.0.0.1 \
-a 169.254.2.1 -i wifi2 -F 169.254.2.2,169.254.2.10 \
-a 169.254.3.1 -i wifi3 -F 169.254.3.2,169.254.3.10 \
-C /dev/null -z --except-interface=lo -l /nvram/dnsmasq.leases --dhcp-script=/nvram/scripts/restart_mesh.sh \
--log-facility=/tmp/dnsmasq.log --log-dhcp

#touch /tmp/hostapd-ac10
#touch /tmp/hostapd-ac11
touch /tmp/hostapd-ac12
touch /tmp/hostapd-ac13

#hostapd_cli -i global raw ADD bss_config=wlan0:/nvram/hostapd0.conf
#hostapd_cli -i global raw ADD bss_config=wlan1:/nvram/hostapd1.conf
hostapd_cli -i global raw ADD bss_config=wlan2:/nvram/hostapd2.conf
hostapd_cli -i global raw ADD bss_config=wlan3:/nvram/hostapd3.conf
```

Execute the below script for running the opensync Managers


```

root@TurrisOmnia-GW:/# sh start_plume.sh
#temporary fix
iptables -P INPUT ACCEPT

brctl addbr br-home

#ln -s /nvram/dnsmasq.leases /tmp/dnsmasq.leases

if [ ! -f /usr/plume/etc/certs/ca.pem ];
then
cp /nvram/certs/c* /usr/plume/etc/certs/
fi

killall meshAgent
cd /usr/ccsp/mesh
meshAgent &
cd /usr/plume/etc/
/usr/plume/scripts/managers.init stop
/usr/plume/scripts/managers.init start

```

Note: Cert files are provided by Opensync for Licencees

Opensync managers and NOC status can be verified by querying OVSDB table

```
root@TurrisOmnia-GW:# /usr/plume/tools/ovsh s Manager
```

```

_uuid | cdf~a085 |
_version | b6e7~58ac |
connection_mode | ["set",[]] |
external_ids | ["map",[]] |
inactivity_probe | 30000 |
is_connected | true |
max_backoff | ["set",[]] |
other_config | ["map",[]] |
status | ["map",[["sec_since_connect","31"],["state","ACTIVE"]]] |
target | ssl:54.200.0.59:443 |

```

6.4. User Access Considerations

1) Log on to plume NOC, with the following URL <https://piranha-osacademy.dev.us-west-2.aws.plume.tech/noc/login>

UserName and Password are provided for Opensync Licencees

2) We should be able to view Plume NOC with Connected device graph (If Device is connected)

6.5. Limitations

SSID name change sync between Plume NOC and RDKB WEBUI is not supported.

7. Yocto 3.1 migration from topic dunfell for meta-turris and Opensync 2.0.5 build support

7.1. Build instruction

Build Instruction for the migration of meta-turris layer,

- repo init -u <https://code.rdkcentral.com/r/manifests> -m rdkb-turris-extsrc.xml -b yocto-dunfell-upgrade

Once the repo init is done, the below repos revision must be changed in **.repo/manifests/rdk-turris-extsrc.xml**

```
meta-turris master
rdkb-turris-hal master
halinterafce rdk-next
meta-rdk-opensync osync_2.0.5
```

- repo sync -j4 --no-clone-bundle
- MACHINE=turris source meta-turris/setup-environment
- bitbake rdk-generic-broadband-image

7.2. Layers and its change-sets

S. No	Layer	recipes updated	Change-sets	Remarks
-------	-------	-----------------	-------------	---------

1.	meta-turris	opensync_2.0.5 u-boot-fw-utils-turris_2019.07 recipes-bsp/u-boot/u-boot-turris_2019.07 kern-tools-native ccsp-common-library ccsp-cr ccsp-epon-agent ccsp-eth-agent ccsp-logagent ccsp-misc ccsp-p-and-m ccsp-wifi-agent ccsp-psm notify-comp hal-wifi-turris_git utopia mesh-agent rbus-core rtmessage_git glibc_2.31 core-image-minimal rdk-generic-broadband-image rdk-generic-extender-image packagegroup-rdk-ccsp-broadband packagegroup-turris-core systemd_244.3 python3-pycparser_2.20 openvswitch_git sysint-broadband fftw_3.3.8	https://github.com/rdkcentral/meta-turris/pull/216 https://github.com/rdkcentral/meta-turris/pull/212 https://github.com/rdkcentral/meta-turris/pull/219	Resolved
2.	meta-cmf-broadband		https://code.rdkcentral.com/r/c/components/generic/rdk-oe/meta-cmf-broadband/+45199 https://github.com/rdkcentral/meta-turris/pull/205	Resolved
3.	meta-cmf		https://code.rdkcentral.com/r/c/components/generic/rdk-oe/meta-cmf/+45938 https://code.rdkcentral.com/r/c/components/generic/rdk-oe/meta-cmf/+47065	In-progress

8. Migration and Validation from dunfell to rdk-next

- Comcast and CMF layers dunfell changes have been migrated from topic dunfell to rdk-next, and oe-layers (openembedded-core,meta-openembedded) are pointing dunfell

8.1. Build Instruction

```
repo init -u https://code.rdkcentral.com/r/manifests -m rdkb-turris-extsrc.xml -b yocto-dunfell-upgrade
repo sync -j4 --no-clone-bundle
MACHINE=turris source meta-turris/setup-environment
bitbake rdk-generic-broadband-image
```

8.2. Challenges/Issues observed

SNO	ISSUES	CHANGE-SET
1	specific breakpad_git.bb recipe has been added for dunfell in meta-openembedded layer	https://github.com/rdkcentral/meta-turris/pull/223 https://github.com/rdkcentral/meta-turris/pull/228 https://code.rdkcentral.com/r/c/manifests/+48477 https://code.rdkcentral.com/r/c/components/generic/rdk-oe/meta-cmf-broadband/+48474
2	Linked the safec-3.5.1 library for ccsp components	
3	Added the patch-sets for dunfell external source ccsp components	
4	Resolved the library linking issues with some components	
5	WAN interface erouter0 did not get IP, because of ethtool	
6	Wireless-tools recipe has been moved to iw for dunfell	

8.3. Features Validated

- **dmcli** - Retrieved the data from all ccsp components
- **Test and Diagnostics** - Validated with ping and Tracroute commands
- **2.4 GHz Band Support** - Client is able to connect on 2.4 GHz
- **5 GHz Band Support** - Client is able to connect on 5 GHz
- **Persistent Storage Management** - Psm service running fine and syscfg
- **EthWan** - gwprovapp-etwan is used

8.4. Known Issues

- WebUI is not working , throwing "500 Internal Server Error"
- Opensync Status is in "BACKOFF"

9. Validation of RDKB features of dunfell Image with opensync

- Incorporated the changes from comcast team and validated the features Supported in rdk-next
- Migrated all the changes from topic branch to rdk-next and oe-layers are pointing to dunfell

9.1. Build Instruction

```
repo init -u https://code.rdkcentral.com/r/manifests -m rdkb-turris-extsrc.xml -b dunfell
repo sync -j4 --no-clone-bundle
MACHINE=turris source meta-turris/setup-environment
bitbake rdk-generic-broadband-image
```

9.2. Challenges/Issues observed

SNO	ISSUES	CHNAGE-SET
1	WEBUI issue "500 Internal Error"	https://github.com/rdkcentral/meta-turris/pull/231 https://github.com/rdkcentral/meta-turris/pull/234
2	Opensync build failure, with abs()	
3	Opensync NM segmentation fault	
4	linux-libc-headers changes from comcast had an impact on turris	

9.3. Set-up Considerations

Opensync has to be manually triggered , and respective certificate has to be copied into the image (/usr/opensync/etc/certs/)

Execute the below script , for linking the back-haul interfaces

```

root@TurrisOmnia-GW:# sh start_hostapd.sh

#!/bin/bash

killall dnsmasq
dnsmasq -u root -a 10.0.0.1 -i brlan0 -F 10.0.0.2,10.0.0.20 --dhcp-option=3,10.0.0.1 --dhcp-option=6,10.0.0.1 \
-a 169.254.0.1 -i wifi2 -F 169.254.0.2,169.254.0.10 \
-a 169.254.1.1 -i wifi3 -F 169.254.1.2,169.254.1.10 \
-C /dev/null -z --except-interface=lo -l /nvram/dnsmasq.leases --dhcp-script=/nvram/scripts/restart_mesh.sh \
--log-facility=/tmp/dnsmasq.log --log-dhcp

touch /tmp/hostapd-acl2
touch /tmp/hostapd-acl3

hostapd_cli -i global raw ADD bss_config=wlan2:/nvram/hostapd2.conf
hostapd_cli -i global raw ADD bss_config=wlan3:/nvram/hostapd3.conf

```

Execute the below script for running the opensync Managers

```

root@TurrisOmnia-GW:/# sh start_plume.sh
#temporary fix
iptables -P INPUT ACCEPT

/usr/opensync/scripts/managers.init stop
/usr/opensync/scripts/managers.init start

```

Note: Cert files are provided by Opensync for Licencees

Opensync mangers and NOC status can verified by querying OVSDB table

```
root@TurrisOmnia-GW:# /usr/opensync/tools/ovsh s Manager
```

```

_uuid | cdf~a085 |
_version | b6e7~58ac |
connection_mode | ["set",[]] |
external_ids | ["map",[]] |
inactivity_probe | 30000 |
is_connected | true |
max_backoff | ["set",[]] |
other_config | ["map",[]] |
status | ["map",[["sec_since_connect","31"],["state","ACTIVE"]]] |
target | ssl:54.200.0.59:443 |

```

9.4. Known Issues

- Plume NOC shows the device offline
- WEBUI on LAN interface is not working(10.0.0.1)

10. Features Supported

No	Feature	Supported
1	LAN Connected Devices-Ethernet	✓
2	WAN Connected Devices-Wi-Fi	✓
3	Parental Control	✗
4	Firewall settings	✗
5	Advanced Config: Port Triggering	✗
6	Advanced Config: Port Forwarding	✗
7	Advanced Config: Remote Management	✗
8	Advanced Config: DMZ	✗
9	Xfinity Wi-Fi 2.4/5 GHz – Public Hotspot	✗

10	Test and Diagnostics	✗
11	Local WebUI Configuration	✓
12	Factory Reset	✗
13	DHCP /Reserved IP	✓
14	EthWan	✓
15	Eth Agent	✗
16	2.4 GHz Band Support	✓
17	5 GHz Band Support	✓
18	Bridge Mode Support	✗
19	Persistent Storage Management	✓
20	WebPA for Comcast,community	✗
21	Lost and Found	✗
22	Bluetooth	✗
22	Harvester Support	✗
23	TR-69	✗
24	SNMP	✗
27	Boot time data measurement	✗
28	Wireless Protection Setup(WPS)	✗
29	Captive Portal	✗
30	Wi-Fi MAC Filtering	✗
31	Log Rotation Support	✗
32	Firmware Upgrade Support	✗
33	Multiboot Support	✗
34	Telemetry Support	✗
35	IPV6	✗

11. Flashing procedure

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