RDK-V IP Client based STB on Raspberrypi 3

Introduction

RDK-V IP Client is a IP based Client Set-Top-Box (STB) with RDK 4.0 features which connnects directly with Network Gateways. Targets on Accelerator platforms and utilizes only open-sourced RDK components.

Host Setup

Refer to the below link for Host Machine Setup

How to Build#SettinguptheHostEnvironment

Yocto Build Setup

All RPi based RDK images with the latest features are from the rdk-next branch

Initializing the Build Environment

To build RDK images from ipstb_bringup branch, follow the below build procedure

dunfell image

mkdir workspace

cd workspace

initialize the manifest with repo tool

repo init -u https://code.rdkcentral.com/r/rdkcmf/manifests -b dunfell -m rdkv-extsrc.xml

repo sync -j `nproc` --no-clone-bundle --no-tags

Morty image

mkdir workspace

cd workspace

initialize the manifest with repo tool

repo init -u https://code.rdkcentral.com/r/rdkcmf/manifests -b rdk-next -m rdkv-extsrc.xml

repo sync -j `nproc` --no-clone-bundle --no-tags

generic image

```
MACHINE=raspberrypi-rdk-ipmc source meta-cmf-raspberrypi/setup-environment

bitbake rdk-generic-ipclient-image
```

Image build

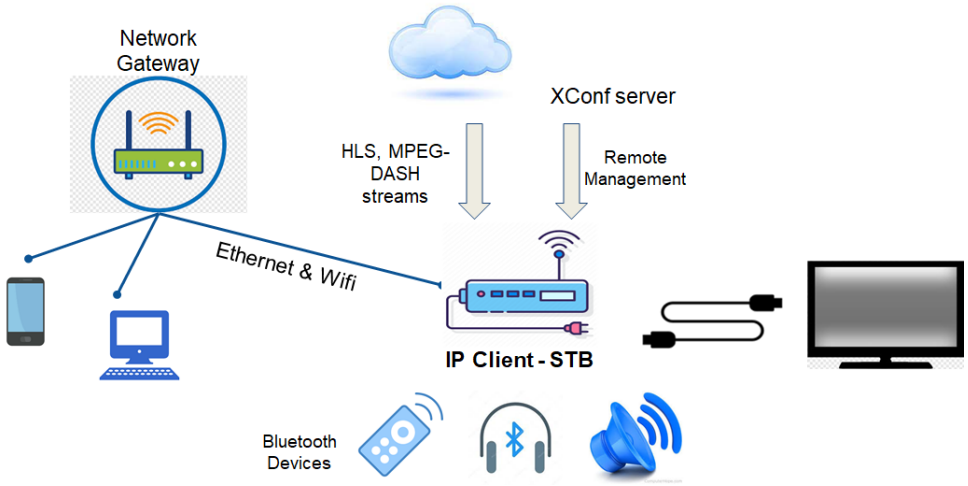
- Note. The kernel Image and root filesystem will be created under the ./tmp/deploy/images/raspberrypi-rdk-ipmc folder

Flashing Procedure

The micro SD card should not have any partition while flashing the image. The complete memory of the card should be free.

```
# Insert the micro SD card to the host system and mention the card's device file name
# of - output file (the device file for the inserted micro SD card
 bzcat <image name> | sudo dd of=/dev/<sd file> bs=4M iflag=fullblock oflag=direct conv=fsync
```

System View



JIRA Tracker

key	summary	type	created	updated	due	assignee	reporter	priority	status	resolution

⚠ Jira project doesn't exist or you don't have permission to view it.

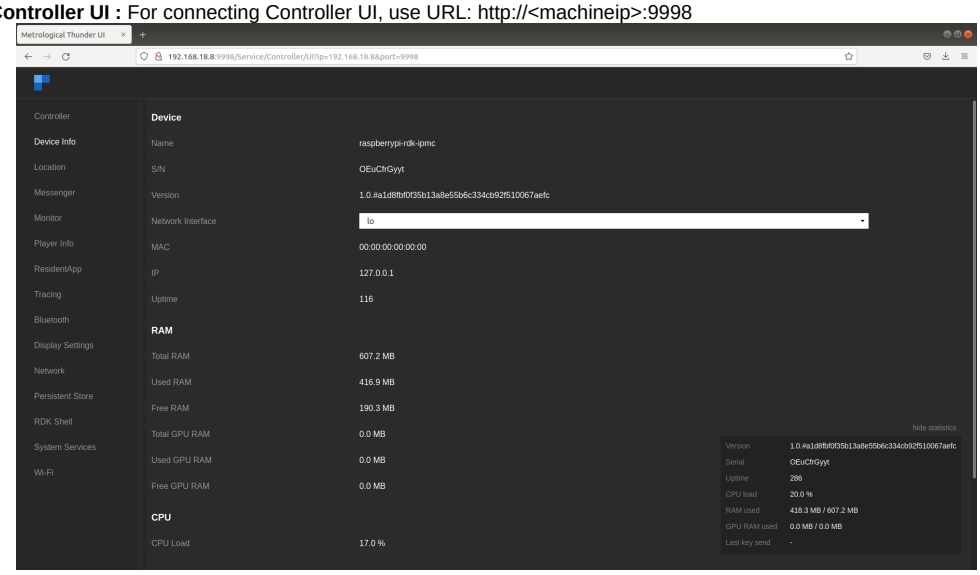
View these issues in Jira

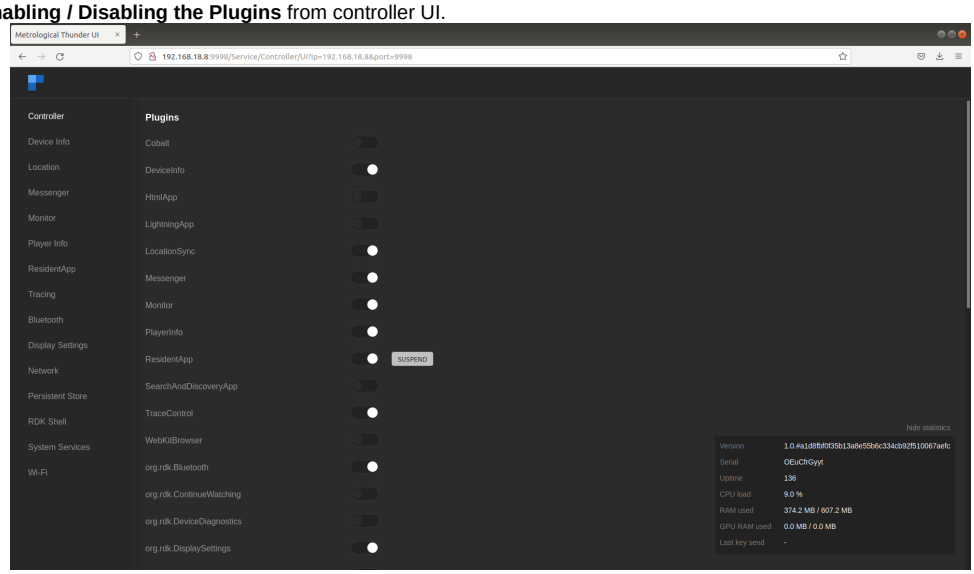
Compilation Errors(Now all are resolved)

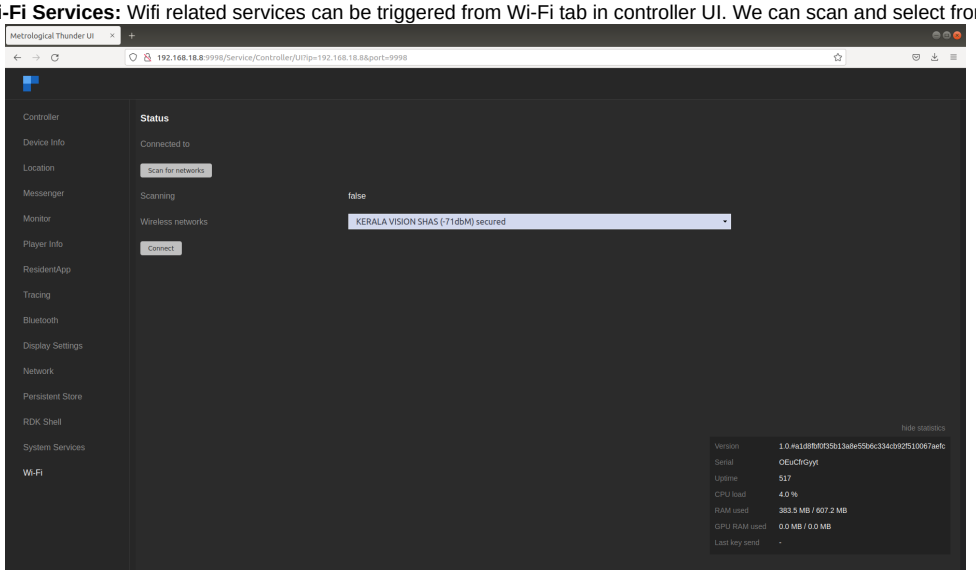
S. No	Component	Recipe	Dependent on	Remarks

1	sysint	No bb file	It is not yet opensourced	If added in meta-rdk it is fixed
2	sysint-conf	No bb file	Removing from package oss file	Build is proceeding further
3	virtual/mfrlib		Opensourcing	
4	tenablehdcp-dev	meta-rdk-video/recipes-extended/tenablehdcp/tenablehdcp_git.bb	iarmmgrs	virtual/mfrlib
5	ledmgr-dev	meta-rdk-video/recipes-extended/ledmgr/ledmgr_git.bb	iarmmgrs	
6	iarm-query-powerstate-dev	meta-rdk-video/recipes-extended/sys_mon_tools/iarm-query-powerstate_git.bb	iarmmgrs	virtual/mfrlib
7	tr69hostif-dev	meta-rdk-video/recipes-thirdparty/tr69hostif/tr69hostif_git.bb	Bluetooth-mgr -> audiocapture -> iarmargs	
8	Netsrvmgr-pni-controller, netsrvmgr-pni-settings-loader, netsrvmgr-dev	meta-rdk-video/recipes-extended/networkmgr/netsrvmgr_git.bb	iarmmgrs	
9	iarm-set-powerstate-dev	meta-rdk-video/recipes-extended/sys_mon_tools/iarm-set-powerstate_git.bb	iarmmgrs	
10	rdkservices-dev	meta-rdk-video/recipes-extended/rdkservices/rdkservices_git.bb	iarmmgrs	
11	Key-simulator-dev	meta-rdk-video/recipes-extended/sys_mon_tools/key-simulator_git.bb	iarmmgrs	
12	iarmmgrs-dev	meta-rdk-video/recipes-extended/iarmmgrs/iarmmgrs_git.bb	virtual/mfrlib	
13	ledmgr-extended-noop-dev	meta-rdk-video/recipes-extended/ledmgr/ledmgr-extended-noop_git.bb	iarmmgrs	
14	bluetooth-mgr-dev	meta-rdk/recipes-connectivity/bluetooth/bluetooth-mgr_git.bb	Audiocapturemgr -> iarmargs	
15	aamp	meta-rdk-video/recipes-extended/aamp/gst-plugins-rdk-aamp_git.bb, meta-rdk-ext /recipes-extended/webkitbrowser-plugin/webkitbrowser-plugin_git.bb, meta-rdk-video /recipes-extended/injectedbundle/injectedbundle.bb	iarmmgrs	
16	mfrlibs-rpi			
17	Wpe-webkit-dev, wpe-webkit-web-inspector-plugin, wpe-webkit	meta-rdk-ext/recipes-extended/wpe-webkit/wpe-webkit_2.22.2.bb		
18	audiocapturemgr, audiocapturemgr-dev	virtual/media-utils iarmbus iarmmgrs	iarmmgrs	virtual/mfrlib
19	tts	meta-cmf-video/recipes-graphics/tts/tts.bbappend	wpeframework-clientlibraries	security agent library is added to LD flag to fix the issue
20	mediautils			removed mediautils

Testing Procedure

- **Controller UI :** For connecting Controller UI, use URL: http://<machineip>:9998
- 

- **Enabling / Disabling the Plugins** from controller UI.
- 

- **Wi-Fi Services:** Wifi related services can be triggered from Wi-Fi tab in controller UI. We can scan and select from available networks.
- 

- **R-Pi Board Console Access :** Execute ssh root@machineip from your host PC
- **Image Details Verification:** For verifying the image details, we can use cat /version.txt command.

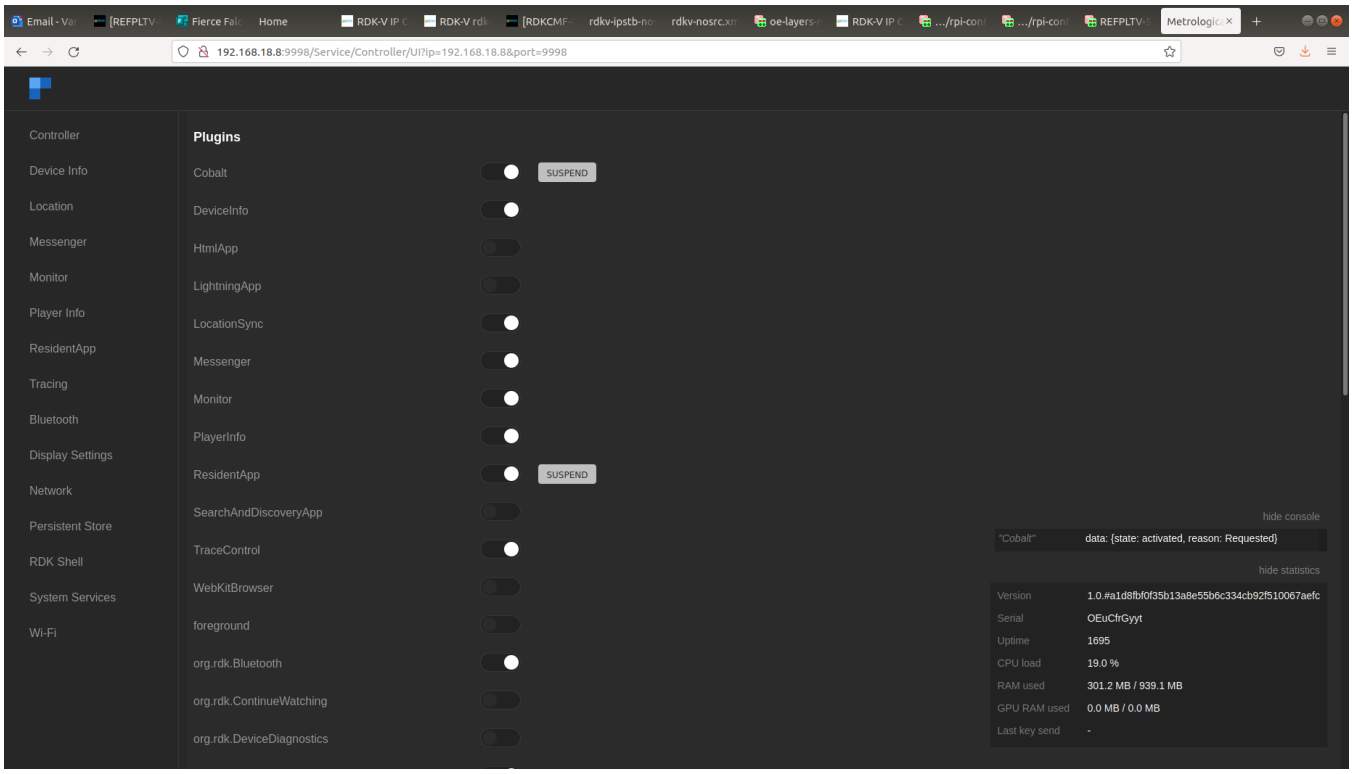
```
root@raspberrypi-rdk-ipmc:~# cat /version.txt

imagename:rdk-generic-ip-stb-client_rdk-next_20210902101930

BRANCH=rdk-next

YOCTO_VERSION=dunfell

 SPIN=0

BUILD_TIME="2021-09-02 10:19:30"

Generated on Thu Sep 02  10:19:30 UTC 2021

root@raspberrypi-rdk-ipmc:~#
```

- **Playing a video using gstreamer, with aamp as gstreamer plugin element by using aamp:// in the uri:**

  eg :- gst-launch-1.0 playbin uri=aamp://bitdash-a.akamaihd.net/content/MI201109210084_1/m3u8s/f08e80da-bf1d-4e3d-8899-f0f6155f6efa.m3u8 video-sink=westerossink
- **Playing a video using gstreamer, with gst-launch-1.0.**

eg :- gst-launch-1.0 playbin uri=aamp://bitdash-a.akamaihd.net/content/MI201109210084_1/m3u8s/f08e80da-bf1d-4e3d-8899-f0f6155f6efa.m3u8 video-sink=westerossink

- **Playback through Youtube Application :** For launching youtube from controller UI, enable cobalt plugin, youtube page will be loaded in TV UI.



UI Navigation

For details on UI page, visit RDK Accelerator Home UI - Version 2.0#ControllerUI.

Cobalt lifecycle using terminal:

Launching cobalt using RDK Shell : execute below command from ssh terminal

```
curl --data-binary '{"jsonrpc":"2.0", "id":3, "method":"org.rdk.RDKShell.1.launch", "params":{"callsign": "Cobalt", "type":"", "uri":""}}' -H 'content-type:text/plain;' http://127.0.0.1:9998/jsonrpc
```

Setting a video URL using deeplink method.

```
curl --data-binary '{"jsonrpc":"2.0", "id":3, "method":"Cobalt.1.deeplink","params": "<videoURL>"}' -H 'content-type:text/plain;' http://127.0.0.1:9998/jsonrpc
```

Sending enter key to proceed video playback

```
curl --header "Content-Type: application/json" --request POST --data '{"jsonrpc":"2.0", "id":3, "method":"org.rdk.RDKShell.1.generateKey", "params": {"keys":[ {"keyCode": 13,"modifiers": [],"delay":1.0}]}}' http://127.0.0.1:9998/jsonrpc
```

Suspending the plugin using RDKShell

```
curl --data-binary '{"jsonrpc":"2.0", "id":3, "method":"org.rdk.RDKShell.1.suspend", "params":{"callsign": "Cobalt"}}' -H 'content-type:text/plain;' http://127.0.0.1:9998/jsonrpc
```

Resuming the plugin

```
curl --data-binary '{"jsonrpc":"2.0", "id":3, "method":"org.rdk.RDKShell.1.launch", "params":{"callsign": "Cobalt", "type":"", "uri":""}}' -H 'content-type:text/plain;' http://127.0.0.1:9998/jsonrpc
```

Destroy

```
curl --data-binary ' {"jsonrpc":"2.0", "id":3, "method":"org.rdk.RDKShell.1.destroy", "params":{"callsign":"Cobalt"}}' -H 'content-type:text/plain;' http://127.0.0.1:9998/jsonrpc
```

Trouble Shooting

- **Overcoming build time fetch errors:**
    - **If fetch failure occurs for libinput, comment SRC_URI related changes from meta-cmf/recipes-graphics/libinput/libinput_git.bbappend.**
    - **If fetch failure occurs for gst-plugins-ugly,use mirror source, for that comment out SRC_URI related changes from meta-cmf /recipes-multimedia/gstreamer/gstreamer1.0-plugins-ugly_git.bbappend.**
- If the wireless networks are not listed in controller wifi page, try after disabling and enabling wifi from Network page, networks will be listed.
- Disable cntlm-main.service if device reboot occasionally.