RDK-B Emulator User Guide



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Document Status

Document Title	RDK Emulator Users Guide
Version	
Date	18/11/2021

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Introduction

RDK (Reference Design Kit) is an integrated set of software components, tools and documentation that help in the development of the software stack for set-top box based on the standard Linux operating system which is designed to meet the requirements of the latest generation media servers and clients.

The RDK emulator is an x86 based implementation of the RDK software stack. It is primarily targeted towards the RDK development community (integrators, component developers and application developers) that attempts to simplify the process of working with the RDK software stack without the need for a reference hardware platform.

Purpose of this Document

The purpose of this document is to enable RDK users and developers to be able to bring up the RDK stack and emulator on the PC platform. The document also includes step-by-step procedures to setup & build RDK Emulator

Known Issues

- eth0/erouter0 interface <ip address> is failing to connect ssh . But, able to connect ssh with host using port forwarding in Network settings of Virtual Box.
- Client is getting the <ip address> from Emulator . But, not in 10.x.x.x
- Failed to open webUI configuration .

Abbreviations and Acronyms

The following table describes the acronyms and abbreviations used in this document

Abbreviation/Acronym	Description
RDK	Reference Development Kit
VM	Virtual Machine
VBox	Virtual Box

Overview of RDK Emulator

- Executes on x86-based platforms including virtualization environments such as Virtual Box and QEMU.
- Built using Yocto and RDK build frameworks
- RDK-B Emulator runs RDK-B stack on PC platform, validated through the virtual box based virtualization platform.
- Hardware Abstraction Layer supporting Ethernet and Wi-Fi functionalities are introduced to adopt the PC platform.
- Wi-Fi Hotspot support through external wireless adapter.USB to Ethernet Adapter is used for Ethernet LAN connections.
- Support of advance configurations like firewall, parental control, WAN Manager and remote management etc ...

Supported Build Types

Build Types	RDK Components Involved	Features/Applications Supported	Final Image Name	Startup Application
rdk-generic-broadband- image	 rdklogger utopia ccsp components 	 Wan Manager parental control firewall Remote Managment yocto 3.1, dunfell 	rdk-generic-broadband-image-qemux86broadband.wic. vmdk	WebUI configuration

Build Setup Instructions

Setting up the Host Environment

How to Build#SettinguptheHostEnvironment

Downloading Source Code & Building

RDK-B Emulator Dunfell Build Instructions

Bringing up the Emulator on Virtual Box

Host Requirements

Requirement

Remarks

Linux	32/64 bit Ubuntu 16.04 operating system
Free HDD Space	Minimum 100GB Free Memory
Oracle Virtual Box	4.3.18 or higher

Install Virtual Box and follow the following steps to bring up RDK Emulator on Virtual Box:

In the following steps, it is recommended to review the description and screenshot completely before proceeding with steps.

STEP 1: Create your new VM Instance:

- Open Virtualbox
- Select New [A popup will come up]
 Select Type as 'Linux'
- Select Version as 'Other Linux (32 Bit)'
- Click on "Next"

😕 🔲 Create Virtual	Machine			
	Name and operating system			
	Please choose a descriptive name for the new virtual machine and select the type of operating system you intend to install on it. The name you choose will be used throughout VirtualBox to identify this machine.			
	Name: emulator			
	Type: Linux 🔹			
	Version: Other Linux (32-bit)			
	Expert Mode < Back Next > Cancel			

• Choose a Memory Size of 512 MB

😰 💷 Create Virtual Machine				
Create Virtual	Machine Memory size Select the amount of mem be allocated to the virtual The recommended memor	emory size elect the amount of memory (RAM) in megabytes to a allocated to the virtual machine. The recommended memory size is 256 MB. (512 \$ MB MB 8192 MB		
	< <u>B</u> ack	Next > Cancel		

• Use an existing virtual hard drive file which would be your newly built image in *.vmdk format and create your VM:

😣 🗉 Create Virtual	Machine	
	Hard disk	
	If you wish you can add a virtual hard disk to the new machine. You can either create a new hard disk file or select one from the list or from another location using the folder icon.	
	If you need a more complex storage set-up you can skip this step and make the changes to the machine settings once the machine is created.	
	The recommended size of the hard disk is 8.00 GB.	
	Do not add a virtual hard disk	
	<u>Create a virtual hard disk now</u>	
	Use an existing virtual hard disk file	
	rdk-generic-broadband-image-qemux86bro 👻 🔀	
	< <u>B</u> ack Create Cancel	

STEP 2: Configure your new VM Instance:

• Click on "Settings" tab to configure your new VM instance

8	X86 - Setting	s					
	General	Genera	General				
, ₽ III	System	Basi <u>c</u>	A <u>d</u> vanced	Description	Disk Encryption		
	Display	N <u>a</u> me:	emulator				
\bigcirc	Storage	<u>Type</u> :	Linux				
	Audio	<u>V</u> ersion:	Other Linux	(32-bit)			
₽	Network						
	Serial Ports						
Ø	USB						
	Shared Folders						
:	User Interface						
						Cancel	<u>0</u> K

- Configure your VMs network settings
 Choose "Bridged Adapter" mode as shown in the screenshot below

80	emulator - Se	ttings	
	General	Network	
F	System	Adapter <u>1</u> Adapter <u>2</u> Adapter <u>3</u> Adapter <u>4</u>	
	Display	✓ Enable Network Adapter	
\bigcirc	Storage	Attached to: Bridged Adapter 💌	
	Audio	Name: wlp2s0	-
P	Network	✓ A <u>d</u> vanced	
	Serial Ports	Adapter Type: Intel PRO/1000 MT Desktop (82540EM)	
	USB	Promiscuous Mode: Deny	
		MAC Address: 080027501B0F	9
	Shared Folders	✓ Cable Connected	
:	User Interface	Port Forwarding	
		<u>C</u> ancel <u>O</u> K	

STEP 3: Run Emulator in Vbox :

• Boot up your VM by clicking on start

- Click "start" to launch the Emulator vmdk image
- Provide "root" to login Emulator as shown in the screen shot
 Emulator usually fetches IP address by default,i.e "ifconfig erouter0"
- If not then assign statically using the commands.
 For ex: ifconfig eth0/erouter0 192.168.1.49
- route add default gw 192.168.1.1 eth0/erouter0
- Once IP address for Emulator is up, Emulator shall be accessed in the Host PC using the below command

Once you have the IP address you may SSH into your VM from your linux shell console. Use root as the ssh user.

\$ ssh root@<erouter0 ip>

- root@qemux86broadband:/# ifconfig br106 Link encap:Ethernet HWaddr E6:B3:27:79:E4:79 inet addr:192.168.106.1 Bcast:192.168.106.255 Mask:255.255.255.0 inet6 addr: fe80::e4b3:27ff:fe79:e479/64 Scope:Link UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1 RX packets:0 errors:0 dropped:0 overruns:0 frame:0 TX packets:14 errors:0 dropped:0 overruns:0 carrier:0 collisions:0 txqueuelen:1000 RX bytes:0 (0.0 B) TX bytes:1124 (1.0 KiB)
- br403 Link encap:Ethernet HWaddr 3E:7D:94:CE:18:42 inet addr:192.168.245.1 Bcast:192.168.245.255 Mask:255.255.255.0 inet6 addr: fe80::3c7d:94ff:fece:1842/64 Scope:Link UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1 RX packets:0 errors:0 dropped:0 overruns:0 frame:0 TX packets:14 errors:0 dropped:0 overruns:0 carrier:0 collisions:0 txqueuelen:1000 RX bytes:0 (0.0 B) TX bytes:1124 (1.0 KiB)
- brebhaul Link encap:Ethernet HWaddr DA:B4:09:16:BD:69 inet addr:169.254.85.1 Bcast:169.254.85.255 Mask:255.255.255.0 inet6 addr: fe80::d8b4:9ff:fe16:bd69/64 Scope:Link UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1 RX packets:0 errors:0 dropped:0 overruns:0 frame:0 TX packets:14 errors:0 dropped:0 overruns:0 carrier:0 collisions:0 txqueuelen:1000 RX bytes:0 (0.0 B) TX bytes:1124 (1.0 KiB)
- brlan0 Link encap:Ethernet HWaddr 42:39:B8:18:9B:F3
 inet addr:10.0.0.1 Bcast:10.0.0.255 Mask:255.255.255.0
 inet6 addr: fe80::4039:b8ff:fe18:9bf3/64 Scope:Link
 UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
 RX packets:0 errors:0 dropped:0 overruns:0 frame:0
 TX packets:12 errors:0 dropped:0 overruns:0 carrier:0
 collisions:0 txqueuelen:1000
 RX bytes:0 (0.0 B) TX bytes:1320 (1.2 KiB)
- erouter0 Link encap:Ethernet HWaddr 08:00:27:B4:EB:E3
 inet addr:192.168.1.49 Bcast:192.168.1.255 Mask:255.255.00
 inet6 addr: fe80::a00:27ff:feb4:ebe3/64 Scope:Link
 UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
 RX packets:223 errors:0 dropped:0 overruns:0 frame:0
 TX packets:52 errors:0 dropped:0 overruns:0 carrier:0
 collisions:0 txqueuelen:1000
 RX bytes:17548 (17.1 KiB) TX bytes:9684 (9.4 KiB)

lo Link encap:Local Loopback inet addr:127.0.0.1 Mask:255.0.0.0 inet6 addr: ::1/128 Scope:Host UP LOOPBACK RUNNING MTU:65536 Metric:1 RX packets:14866 errors:0 dropped:0 overruns:0 frame:0 TX packets:14866 errors:0 dropped:0 overruns:0 carrier:0 collisions:0 txqueuelen:1000 RX bytes:763416 (745.5 KiB) TX bytes:763416 (745.5 KiB)

sit0 Link encap:IPv6-in-IPv4 inet6 addr: ::127.0.0.1/96 Scope:Unknown UP RUNNING NOARP MTU:1480 Metric:1 RX packets:0 errors:0 dropped:0 overruns:0 frame:0 TX packets:0 errors:0 dropped:0 overruns:0 carrier:0 collisions:0 txqueuelen:1000 RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)

STEP 4: Lanching Emulator in WebUI :

- In the Host-PC Browser, Enter the eth0/erouter0 IP:8080 to get WebUI Ex:http://192.168.1.49:8080
- WebUI Login Credential's Username: admin Password: password

Launching WebUI App

- In the Host-PC Browser, Enter the eth0 /erouter0 IP:8080 to get WebUI
 Ev: http://102.168.1.40:908
- Ex: http://192.168.1.49:808
 WebUI Login Credential's Username: admin Password: password

Login - RDKM	× +				
€ → C û	0 🔏 == 0 192.168.	0.109 :8080	··· 🖂 🕁	III\ 🗊 🤃	≣ ¢
	ERDK	🗋 0% 🧿 Internet 🧔	Wi-Fi 🖸 MoCA 🧿 Low Security		
	Username: admin Password:	Gateway > Login			
		Please login to view your WIFI passkey or to view and edit detailed network settings.			
		WiFi Configuration			
		WiFi SSID: Keerthana			
		WIPI Passkey: Log in to view passkey			
		Home Network Connected Dev	ices		
		C Ethernet			
		O WI-FI			
		O MoCA			
		Firewall Security Level: Low			
		RDKCENTRAL.com			

RDK-B Environment Setup

