RDK-B Emulator User Guide

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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`	1. rdklogger 2. utopia 3. ccsp components	1. Wan Manager 2. parental control 3. firewall 4. Remote Managment 5. 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

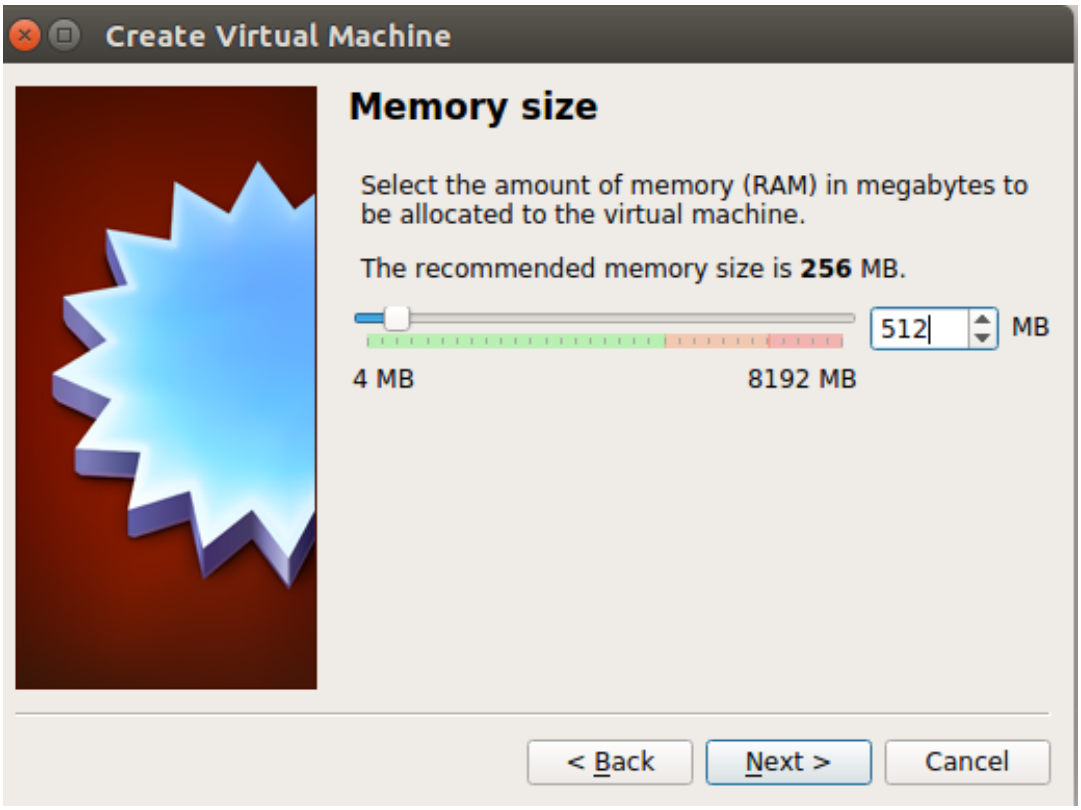
Install Virtual Box and follow the following steps to bring up RDK Emulator on Virtual Box:

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"**

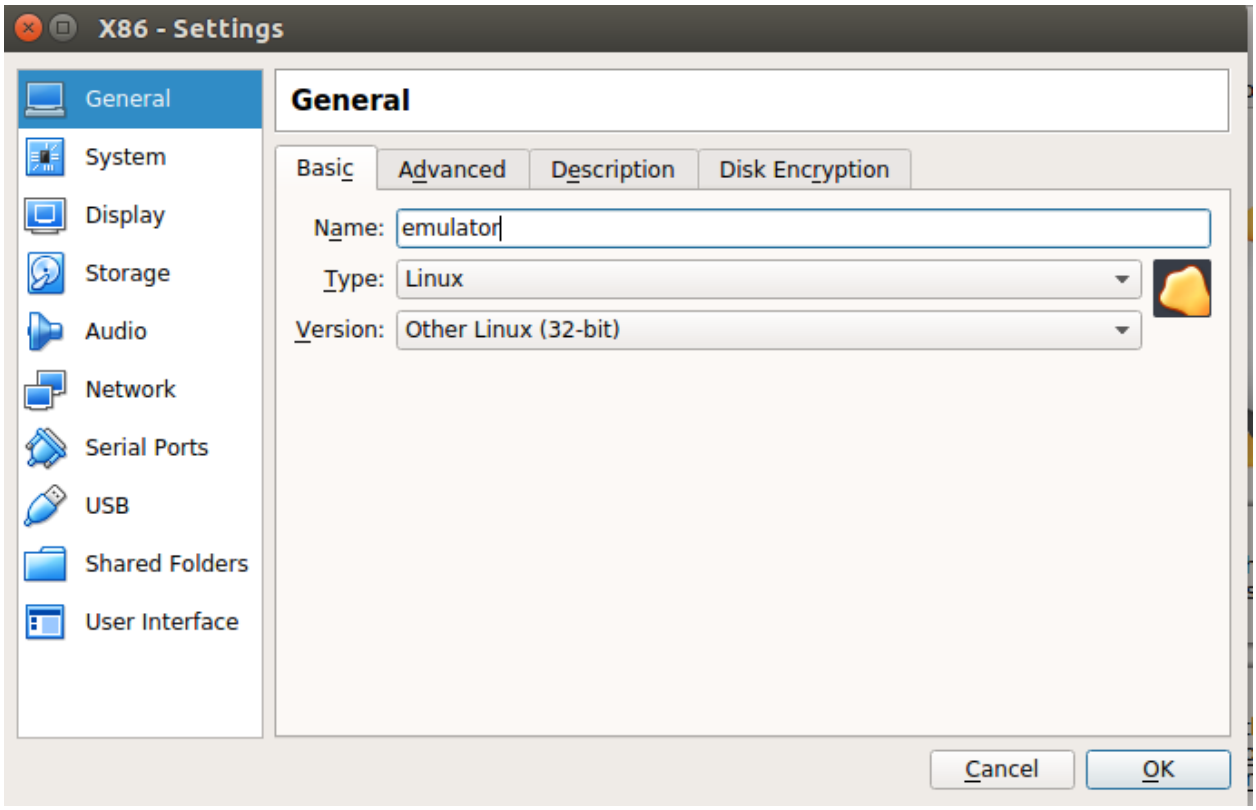
- **Choose a Memory Size of 512 MB**



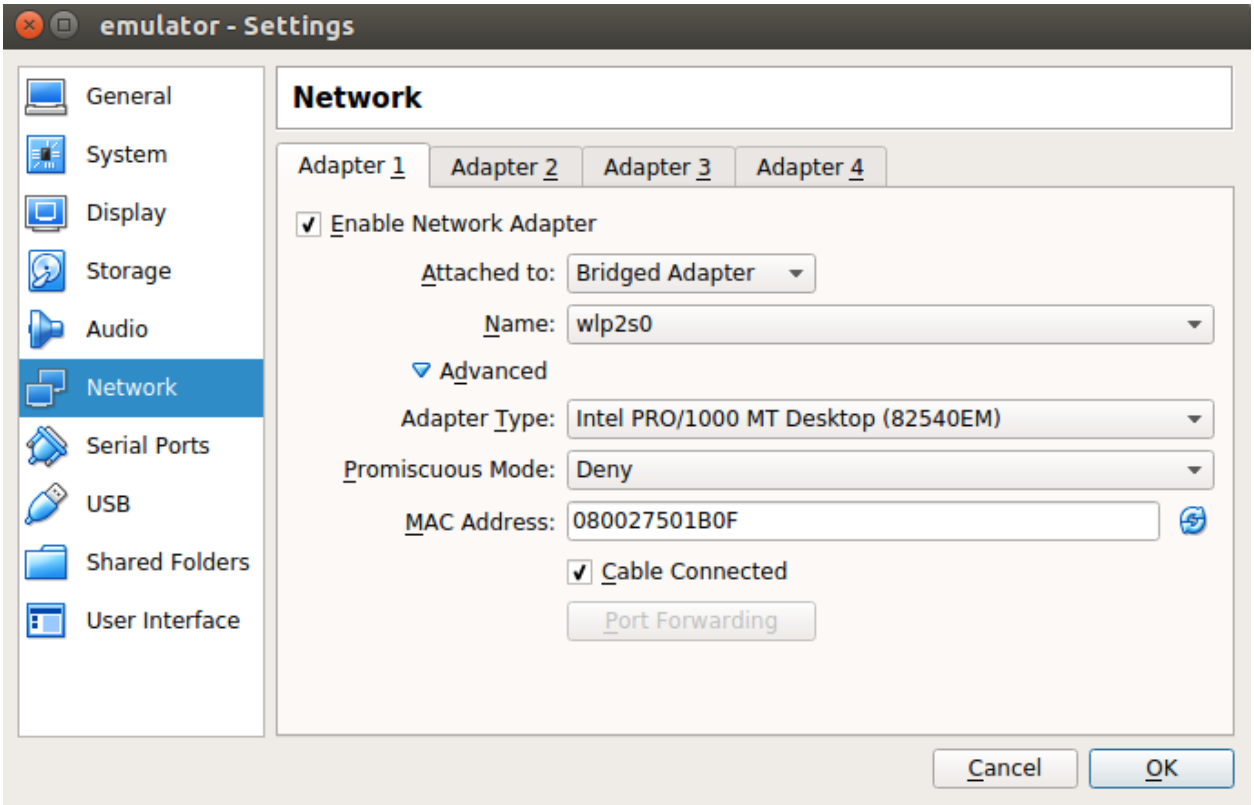
- **Use an existing virtual hard drive file which would be your newly built image in *.vmdk format and create your VM:**

STEP 2: Configure your new VM Instance:

- **Click on “Settings” tab to configure your new VM instance**



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



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>
```

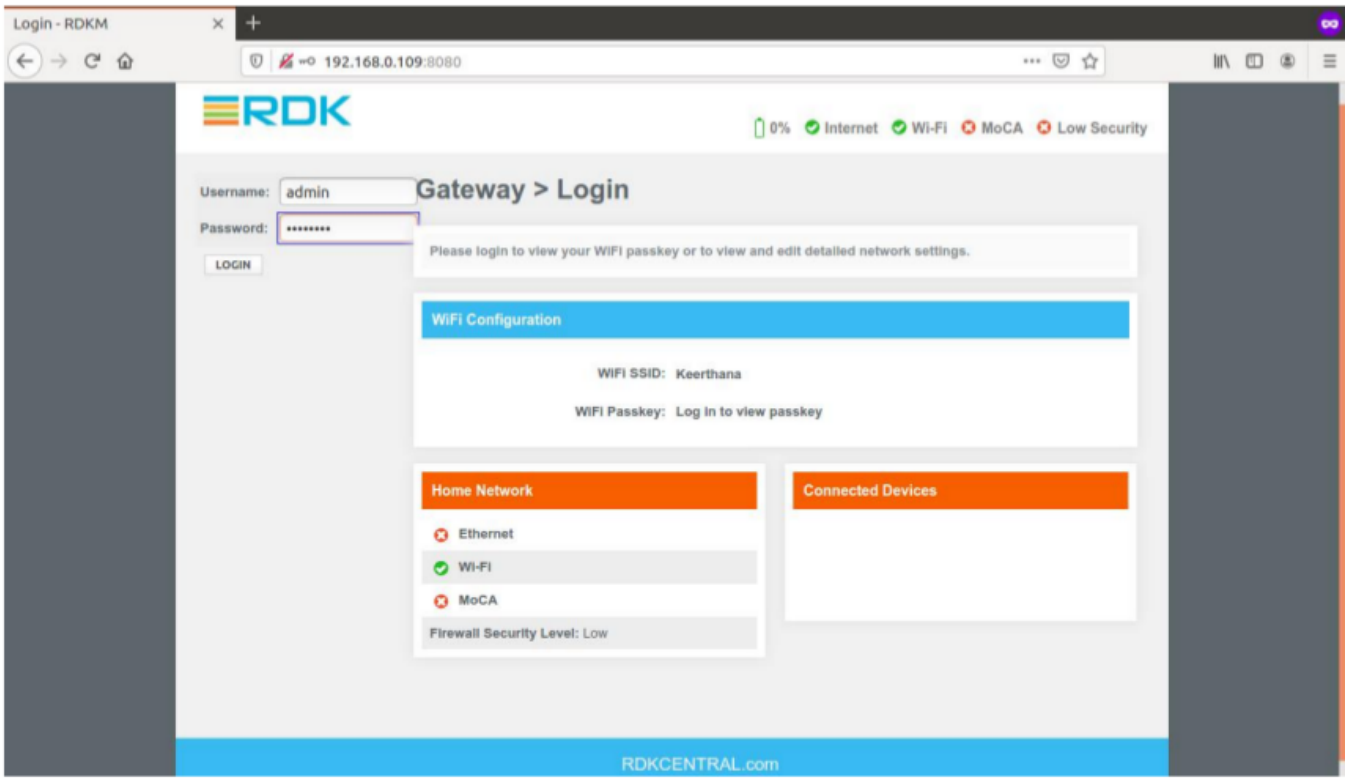
```
root@qemux86broadband:/# ifconfig
br106     Link encap:Ethernet  HWaddr E6:B3:27:79:E4:79
          inet addr:192.168.106.1  Bcast:192.168.106.255  Mask:255.255.255.0
          inet6 addr: fe80::e4b3:27ff:fe79:e479/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          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:255.255.255.0
          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)

gre0      Link encap:UNSPEC  HWaddr 00-00-00-00-00-00-00-00-00-00-00-00-00-00-00-00
          UP RUNNING NOARP  MTU:1476  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)

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 :

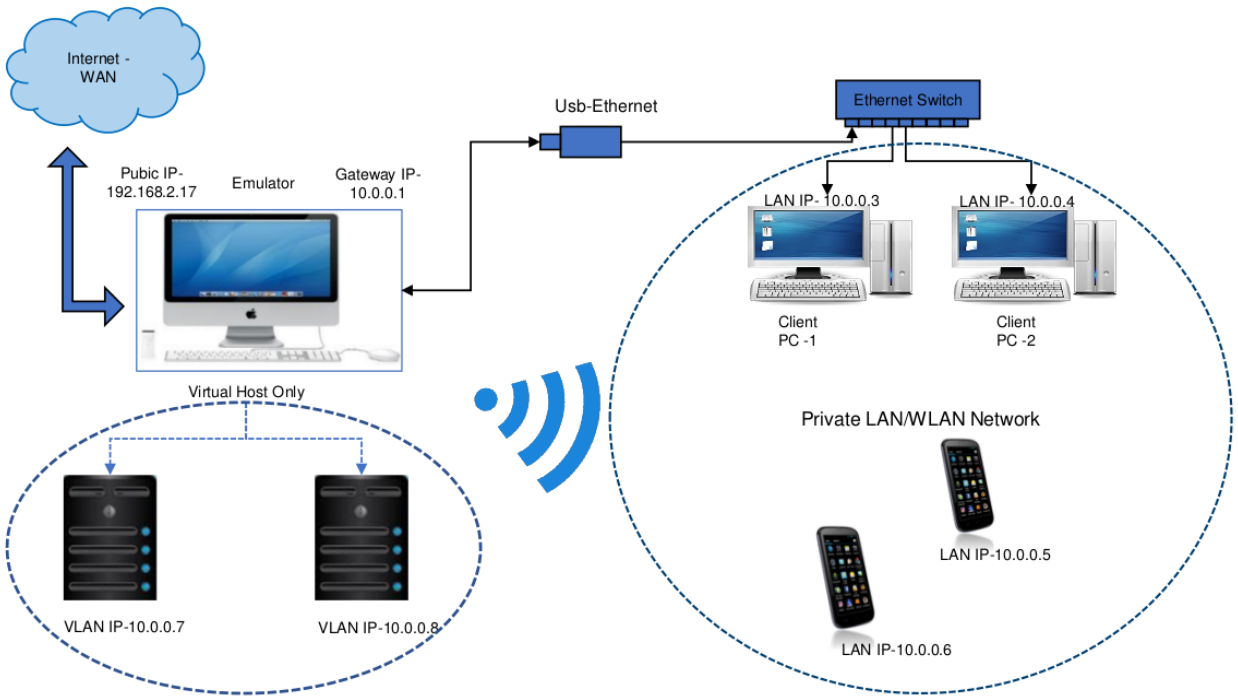
- **In the Host-PC Browser, Enter the eth0/erouter0 IP:8080 to get WebUI**
  Ex:http://192.168.1.49:8080
- **WebUI Login Credential's**
  Username: admin
  Password: password

Launching WebUI App

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



RDK-B Environment Setup


Internet - WAN
Usb-Ethernet
Ethernet Switch
Pubic IP- 192.168.2.17
Emulator
Gateway IP- 10.0.0.1
LAN IP- 10.0.0.3
LAN IP- 10.0.0.4
Client PC -1
Client PC -2
Virtual Host Only
Private LAN/WLAN Network
LAN IP-10.0.0.5
LAN IP-10.0.0.6
VLAN IP-10.0.0.7
VLAN IP-10.0.0.8