ARMY RESEARCH LABORATORY

Android Virtual Machine (VM) Setup on Linux

by Ken F Yu

ARL-TN-0651 **December 2014**

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14. ABSTRACT
The native Android Virtual Machine (VM) acts as an actual Android device and has improved speed performance over the Android Software Development Kit (SDK) emulator. The purpose of this document is to provide a detailed guide on how to effectively debug an Android application without the actual Android device and how to improve speed performance over the default Android emulator using an Android VM on an x86 host computer.

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1. Software Requirements

The following software packages are required:

1) VirtualBox[1] can be used as a Virtual Machine (VM) to emulate Android natively.
2) Android-x86[2] can be installed on any Intel-processor-based VM.
3) The Software Development Kit (SDK)[3] can be used to interact with the Android VM, but it is not necessary to install it on an Android VM.

2. Android Setup on VirtualBox

Before the Android VM can be used, the VirtualBox from Oracle must be installed. After VirtualBox is installed, type the command <virtualbox> from the console to start the VirtualBox application. Then, create an Android VM on Linux using the following procedures:

1) Click the <New> button VirtualBox. It will bring up the VirualBox setup screen. Type the name of the VM (i.e., Android). Select the Type: Linux. Select a Linux version, such as <Linux 2.6>. Click <Next> (Fig. 1).

Fig. 1 Select operating system

2) Pick the memory size, such as 1024 MB, click <Next> (Fig. 2).

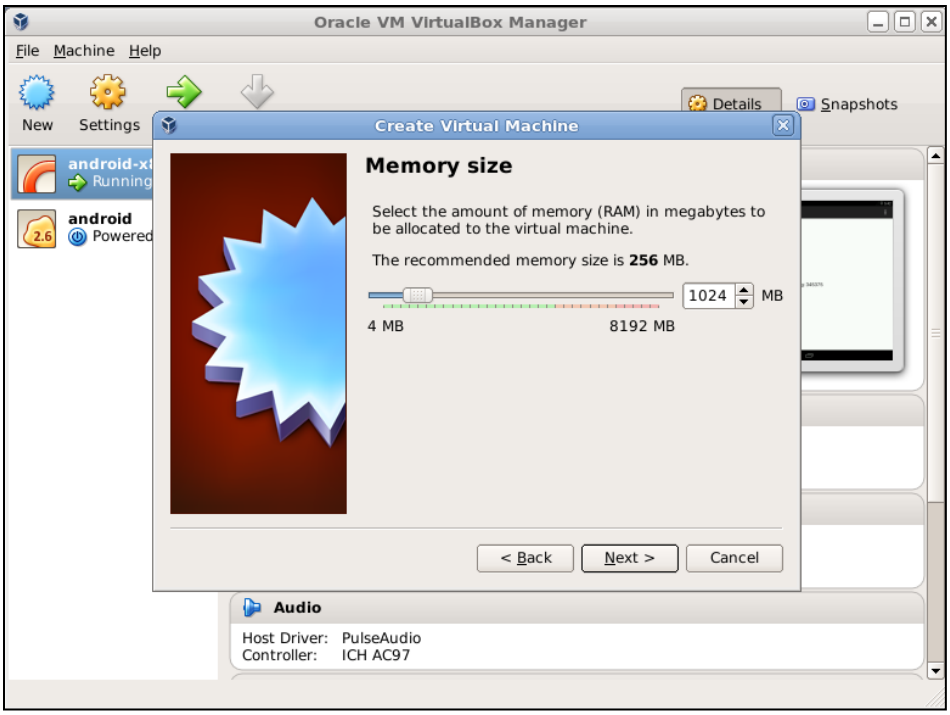

Fig. 2 Select memory size

3) Create a virtual drive, click <Next> (Fig. 3).

Fig. 3 Select hard drive

4) Select <VDI (Virtualbox Disk Image)> disk image type (Fig. 4).

Fig. 4 Select hard drive file type

5) Select the storage type: “Dynamically allocated” is preferred (Fig. 5).

Fig. 5 Select hard drive type

6) Next, pick the VM size (Fig. 6).

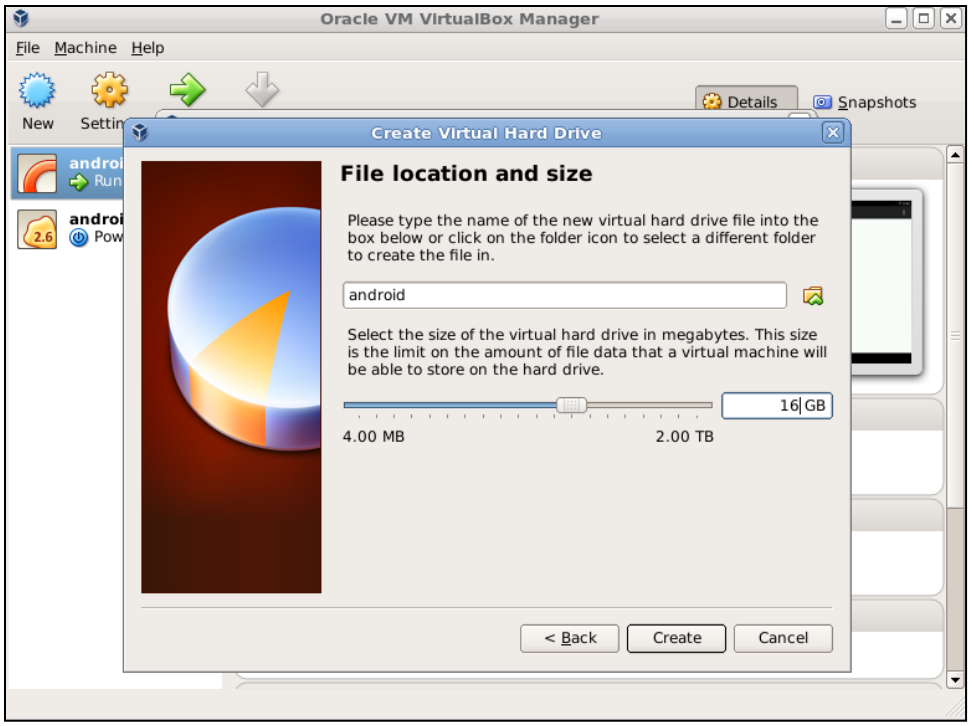

Fig. 6 Select file location and size

7) Go to the VirtualBox setting, select the storage type, and select the Android ISO image that was downloaded (Fig. 7).

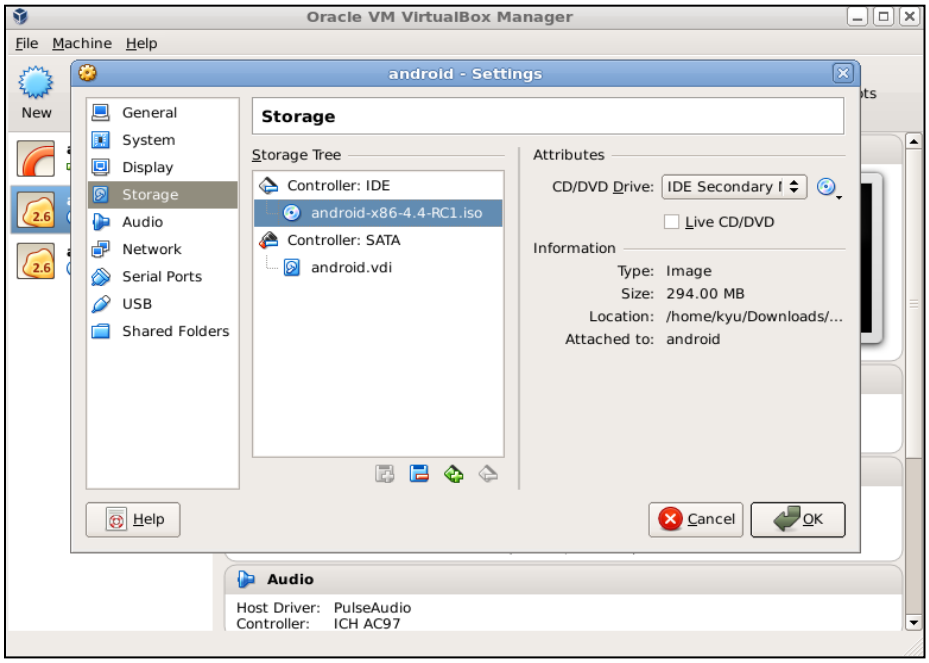

Fig. 7 Select storage type

8) Run the VM that was just created with the Android ISO attached. Select the installation option (Fig. 8).

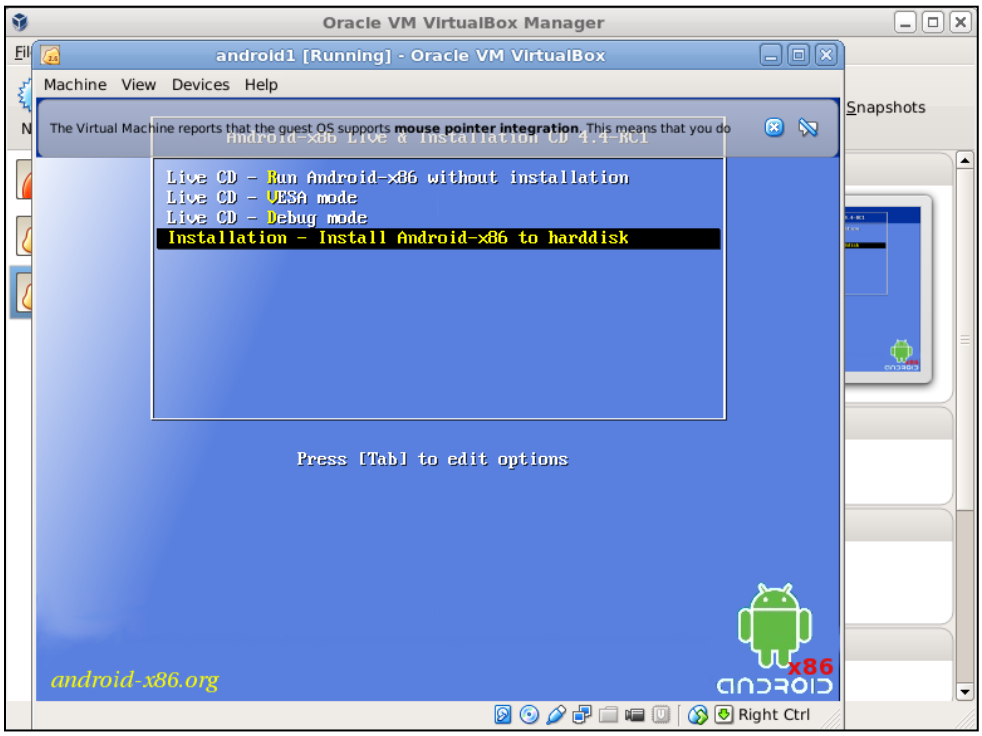

Fig. 8 Select installation option

9) Select the <Create/Modify partitions> option. Click <OK> (Fig. 9).

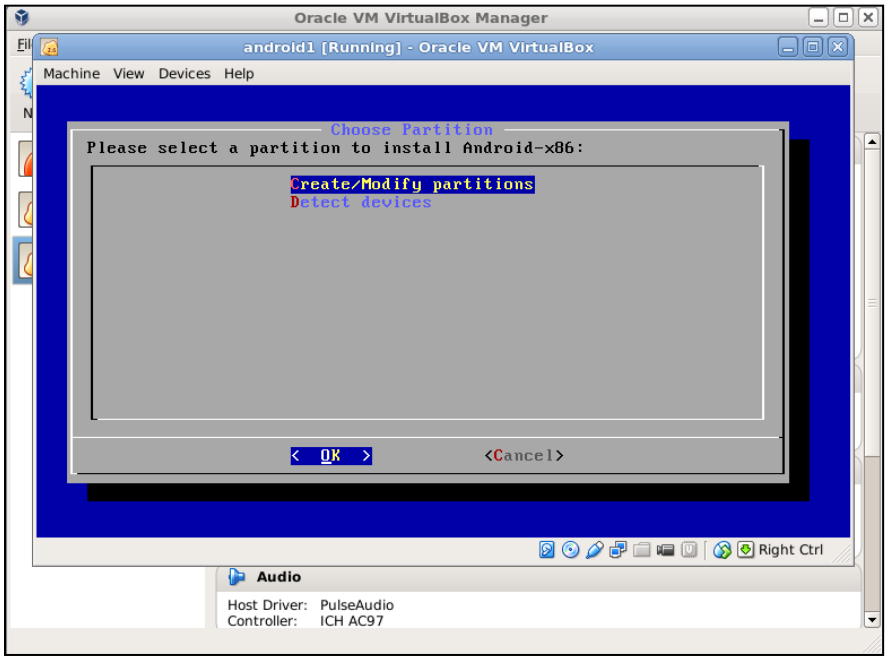

Fig. 9 Select partition option

10) Click <New> for the Primary Drive (Fig. 10).

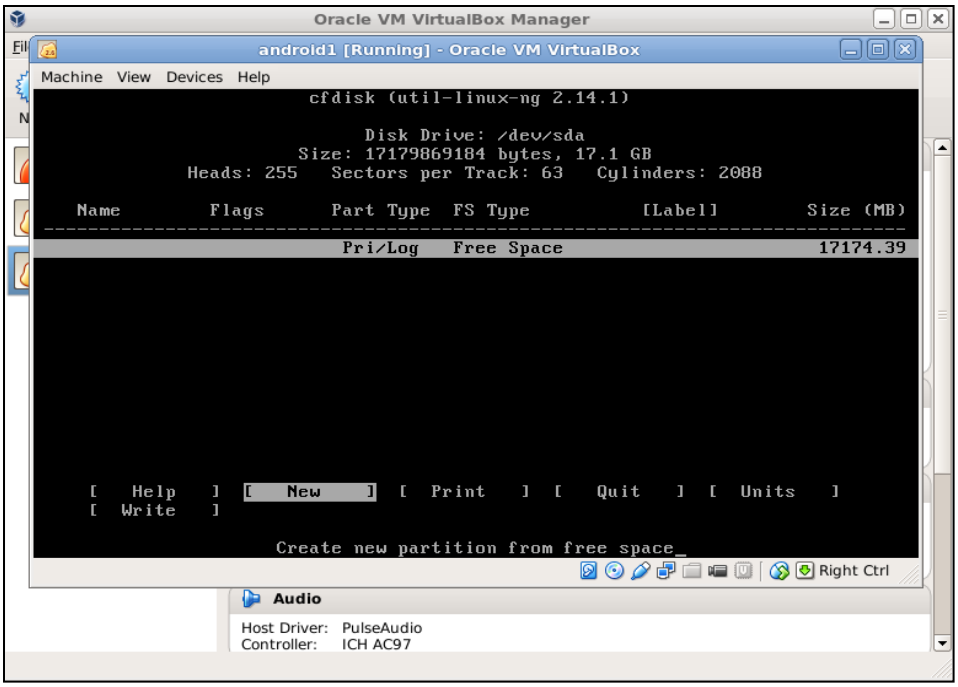

Fig. 10 Select drive type

11) Select the <Primary> option (Fig. 11).

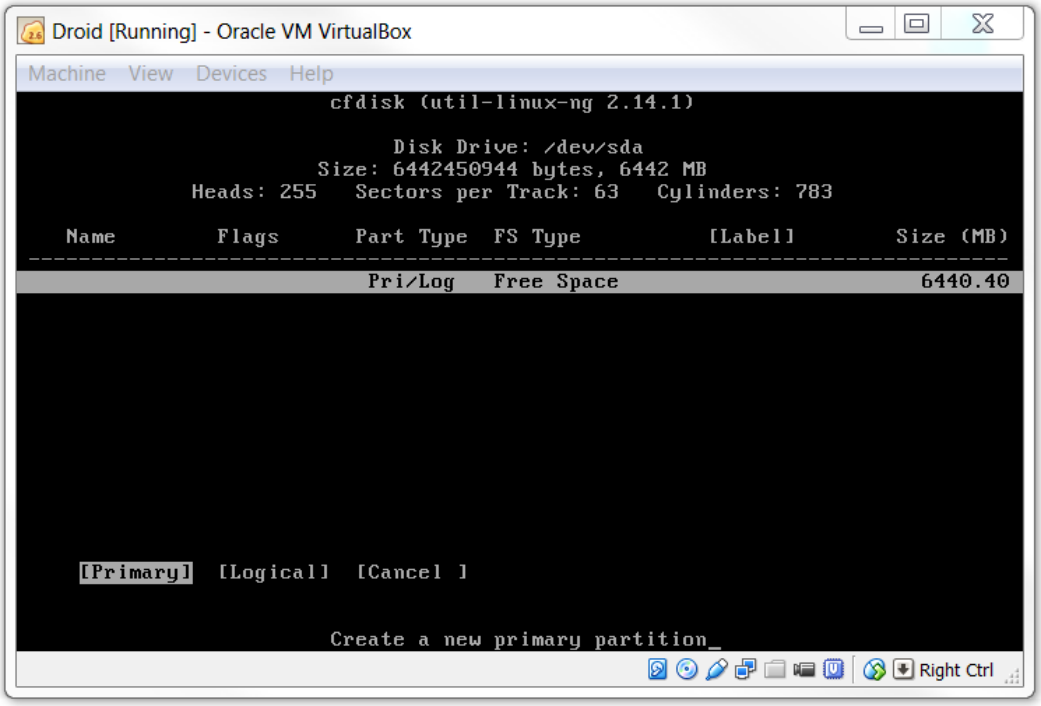

Fig. 11 Set drive type

12) Set the size of the Primary Drive: <default> is sufficient (Fig. 12).

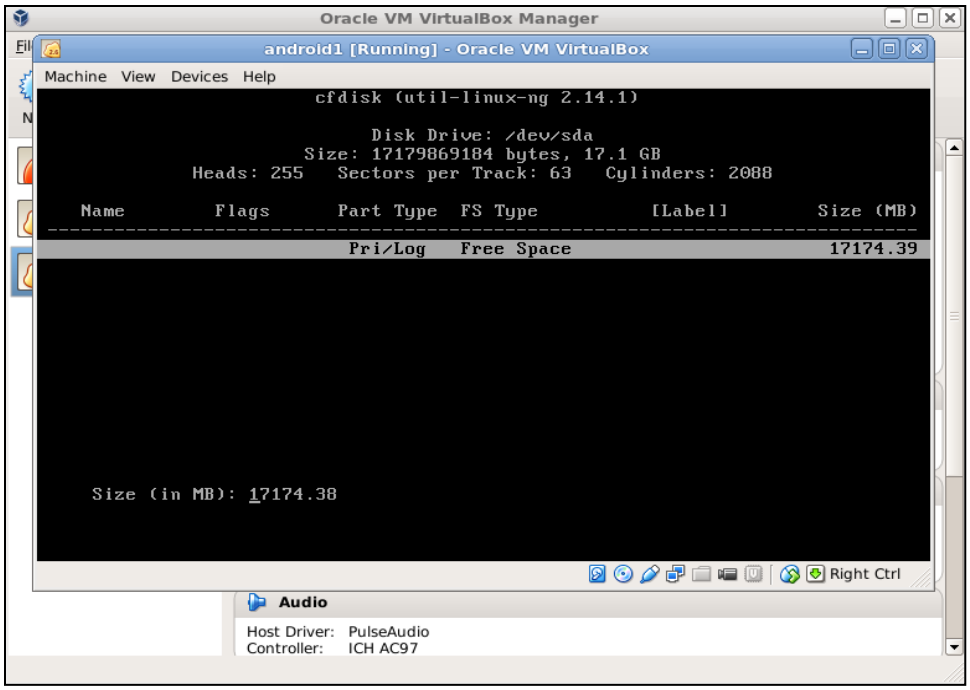

Fig. 12 Set drive size

13) Select a <Bootable> drive (Fig. 13).

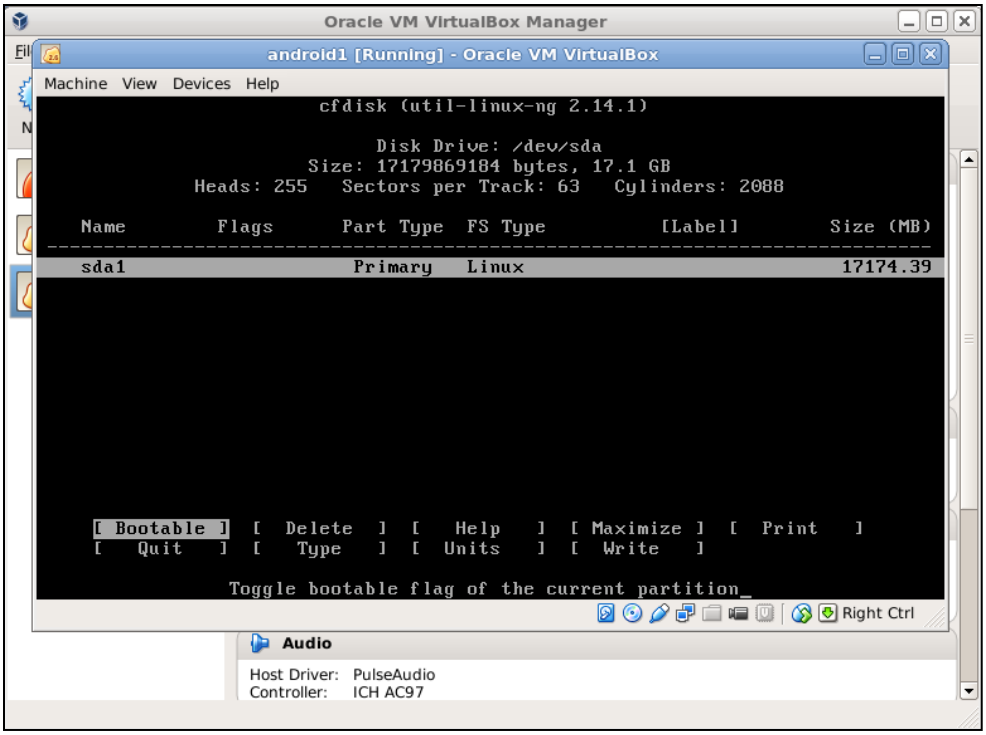

Fig. 13 Select bootable drive

14) Select the <Write> option (Fig. 14).

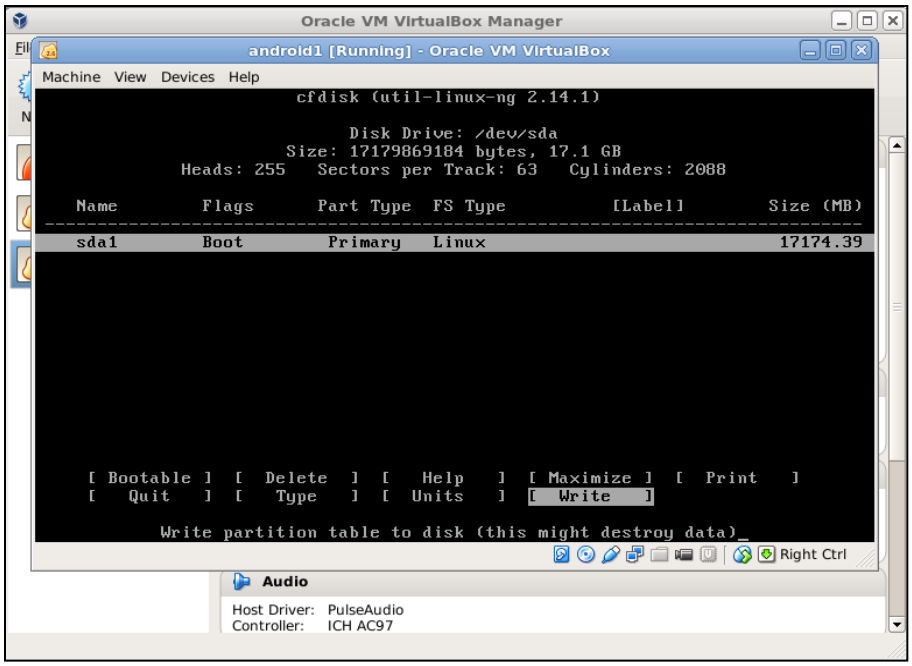

Fig. 14 Select write option

15) Answer <yes> to the <write partition table to disk> question (Fig. 15).

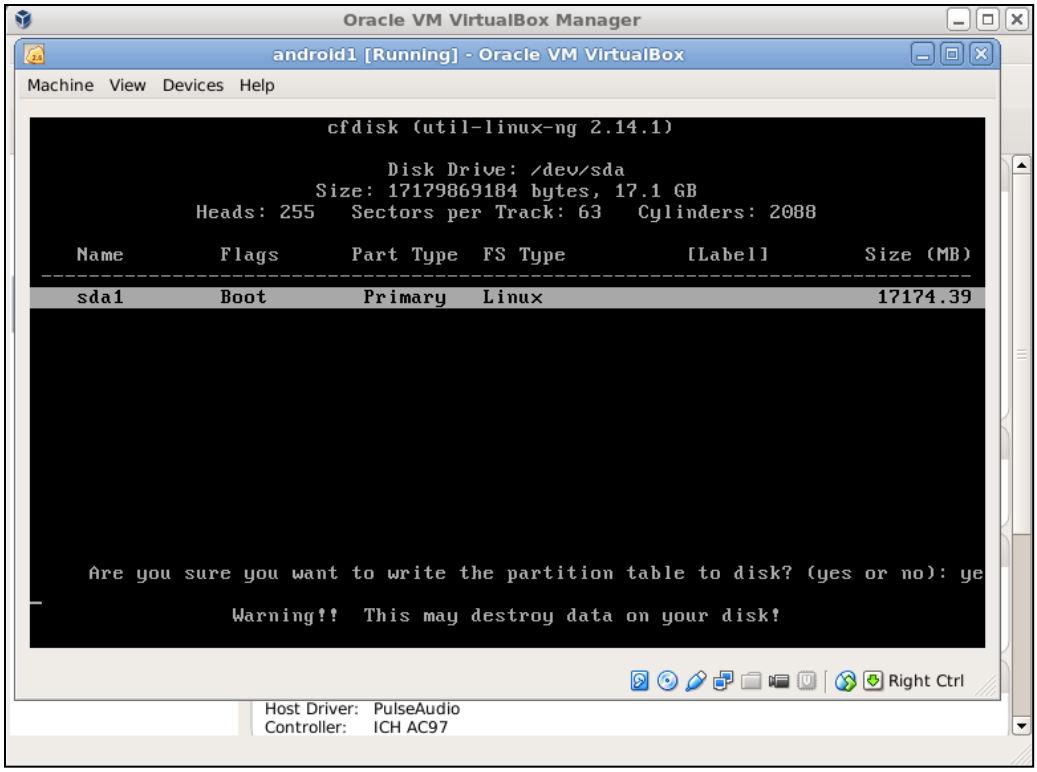

Fig. 15 Answer <yes> to write partition option

16) After the <write> process is done, select <Quit> (Fig. 16).

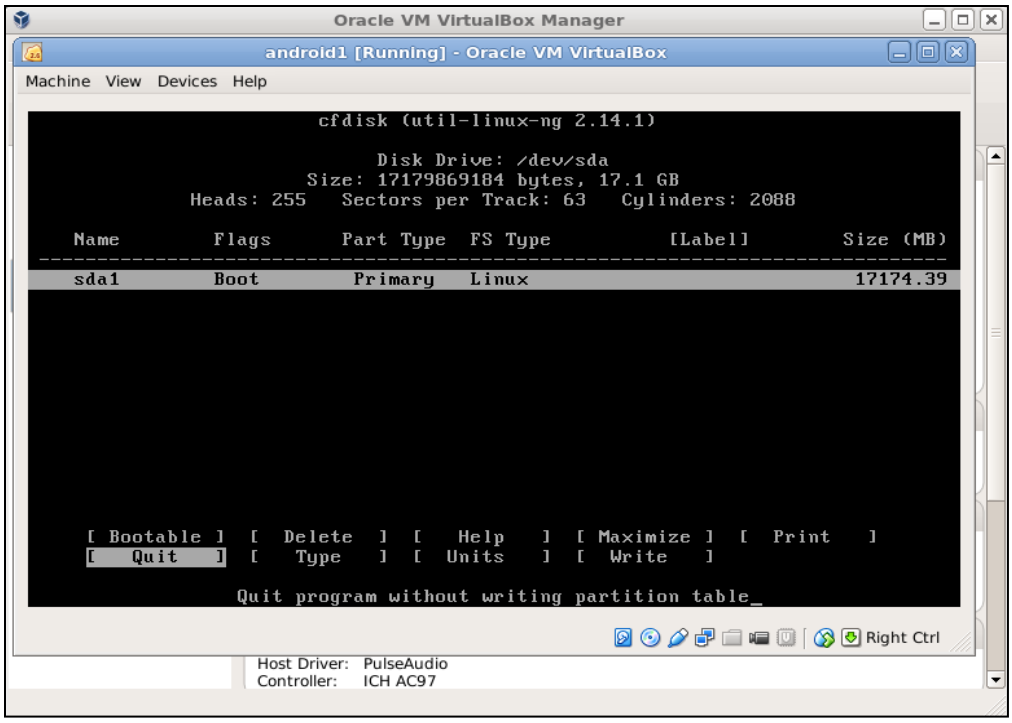

Fig. 16 Quit program

17) Select the <sda1 Linux> option. Click <OK> (Fig.17).

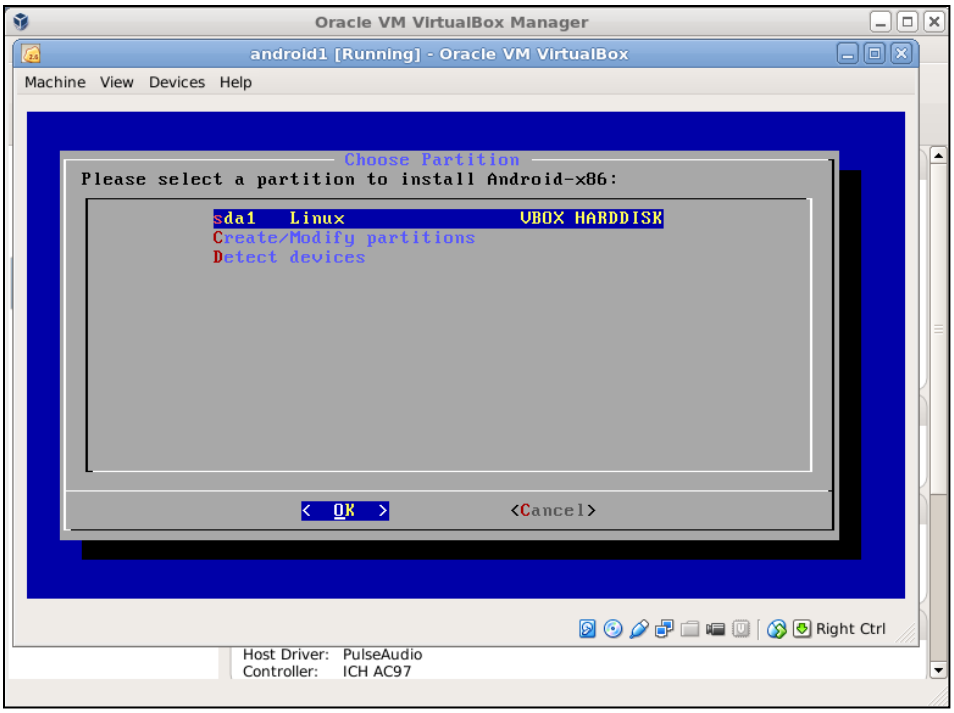

Fig. 17 Select installation partition

18) Select the <ext3> option. Click <OK> (Fig. 18).

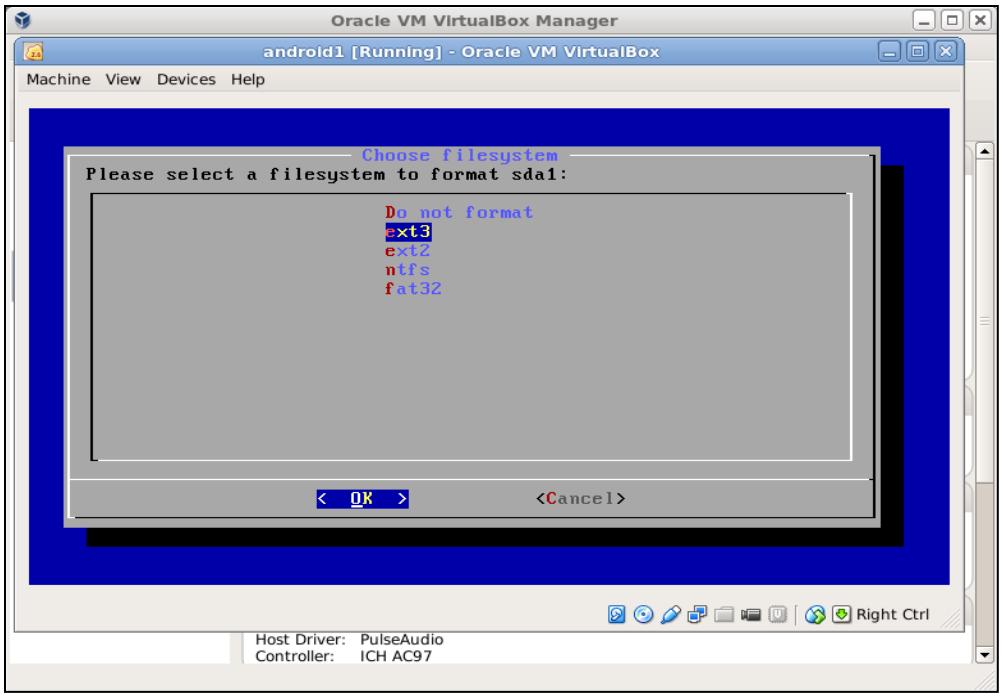

Fig. 18 Select <filesystem> type

19) Click <yes> in response to the formatting question (Fig. 19).

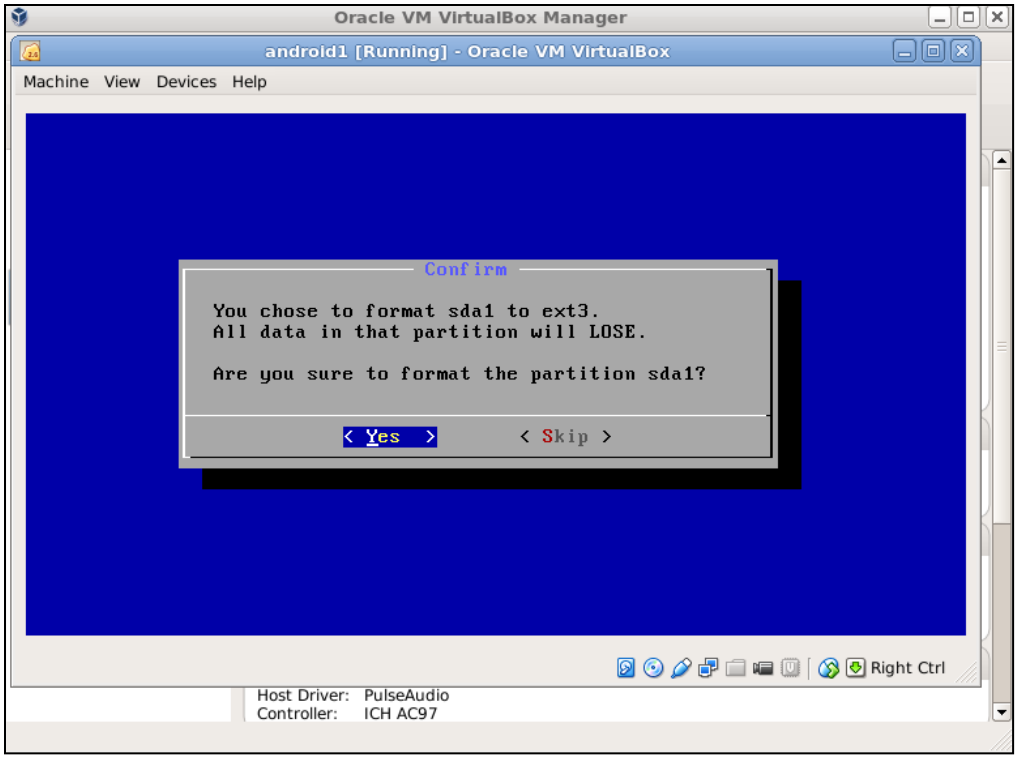

Fig. 19 Answer <yes> to format

20) Install GNU GRand Unified Bootloader (GRUB) and click <Yes> (Fig. 20). GRUB provides more flexibility to boot different Linux installations during startup.

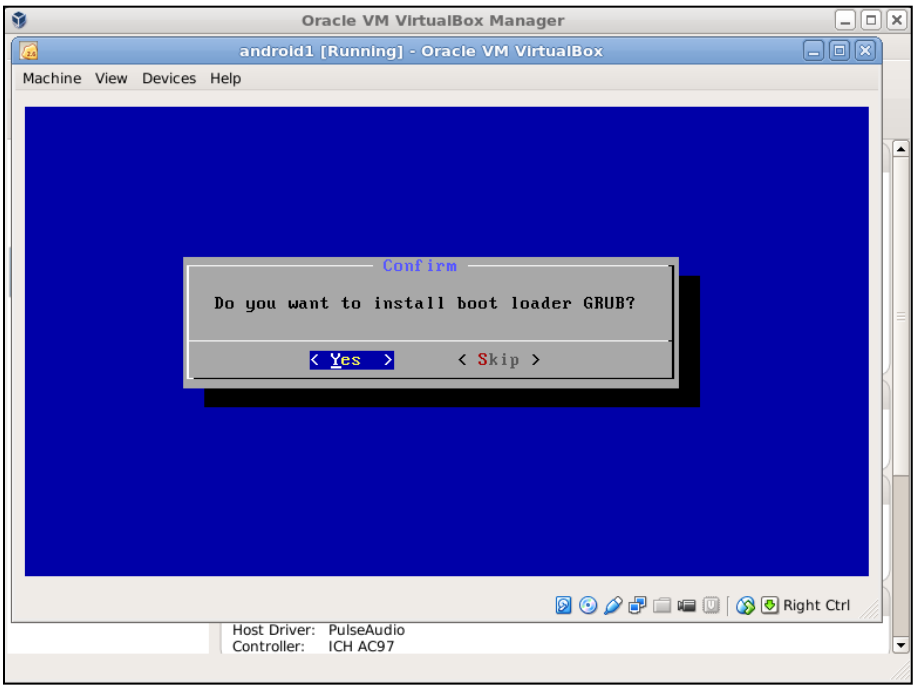

Fig. 20 Answer <yes> to install GRUB

21) Select <Yes> in response to the <install/system directory as read-write> question (Fig. 21).

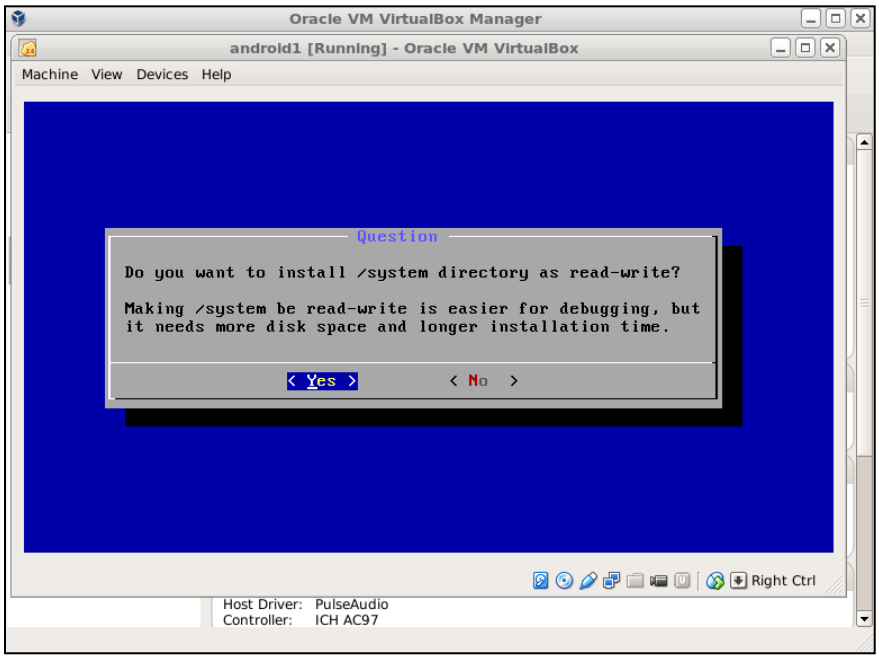

Fig. 21 Answer <yes> to read-write option

22) Select the <Run Android-x86> option (Fig. 22).

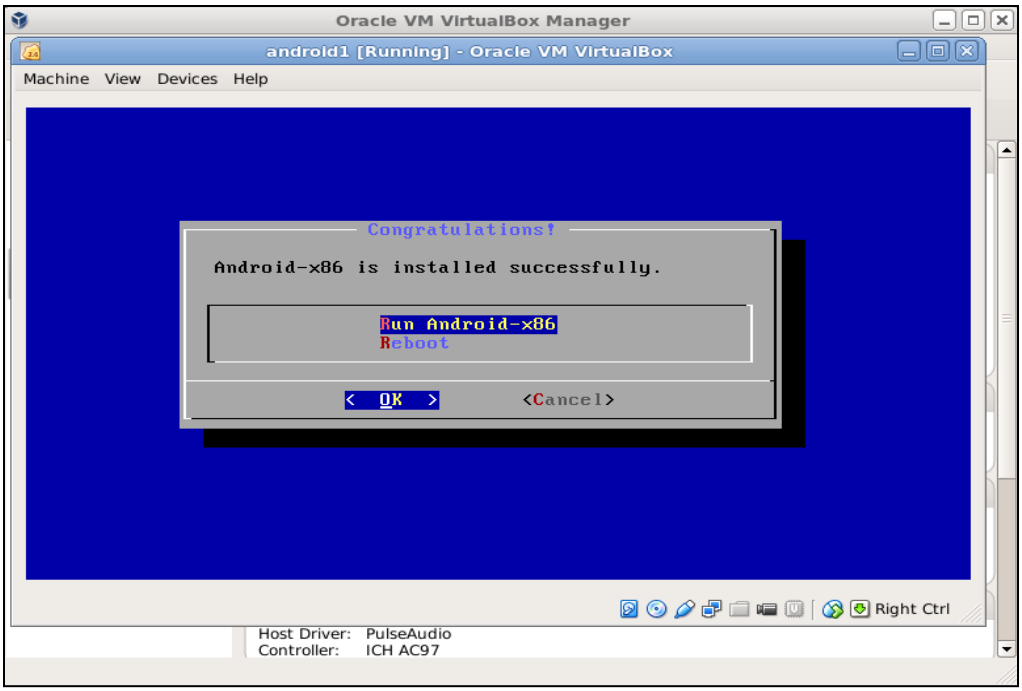

Fig. 22 Select <run> option

23) When Virtualbox is started, go to the <Devices->CD/DVD Devices->Remove the disk from virtual drive> option to remove the Android ISO (Fig. 23).

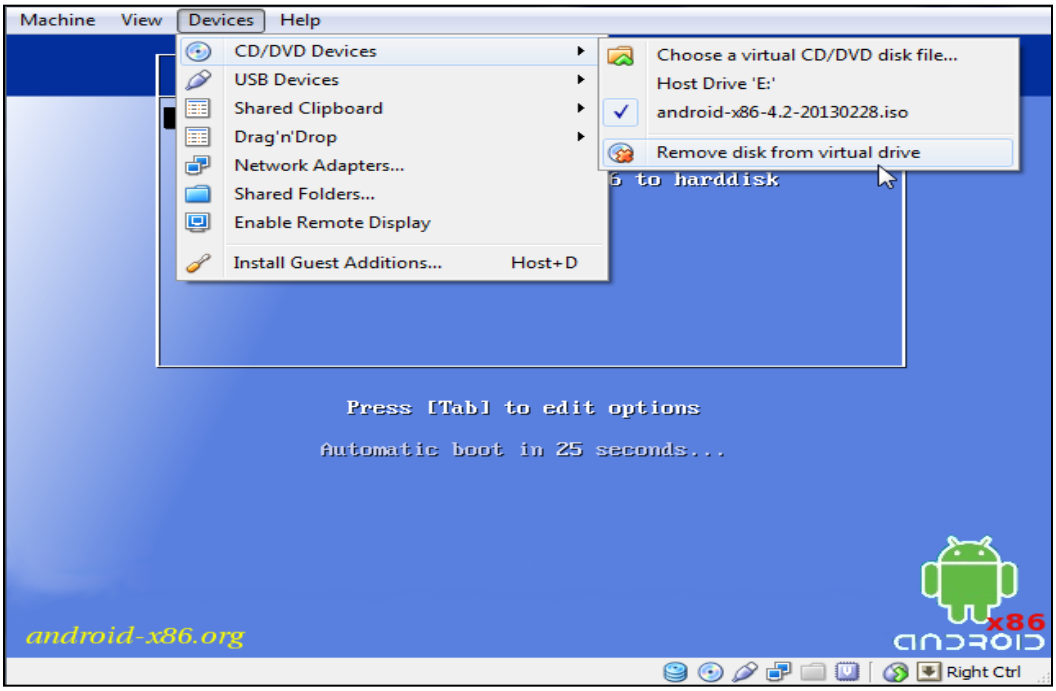

Fig. 23 Disable Android ISO image from launch

24) After Android is booted, the Android Welcome screen appears (Fig. 24). This shows that the installation was successful on the VirtualBox. Next, go through the normal Android setup processes, and the Android device will now be activated for use.

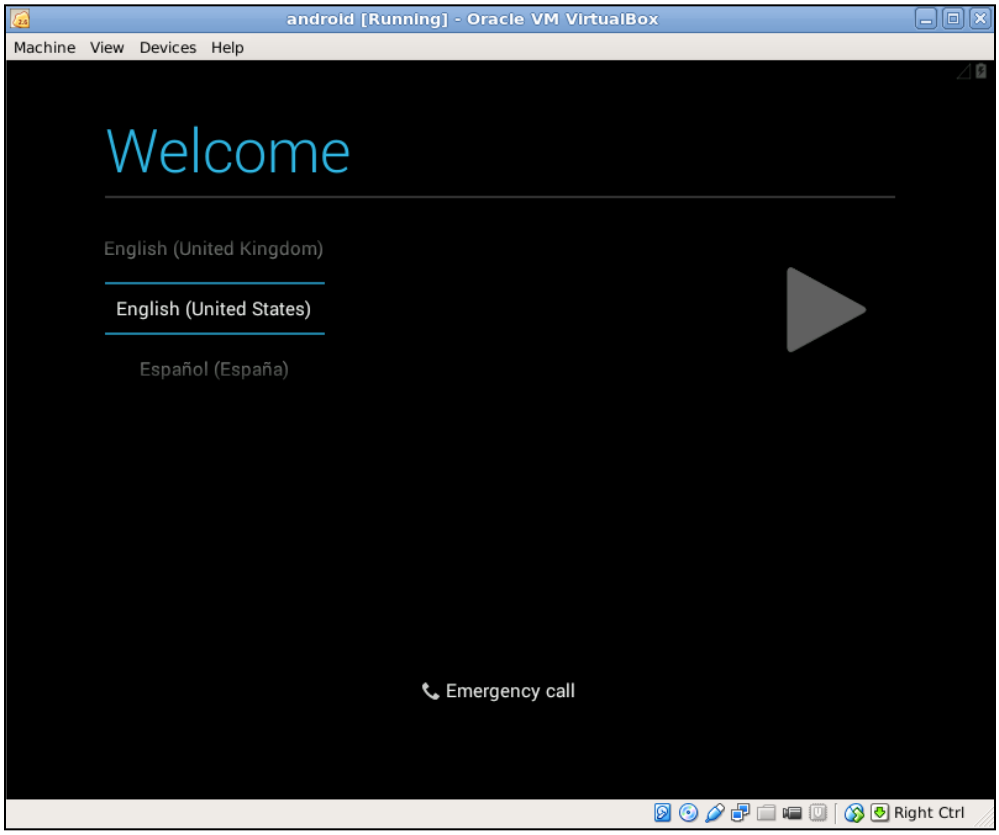

Fig. 24 Android welcome screen

25) After the Android on VM is successfully started, it needs to connect to the Linux host computer.

26) Setup the virtual box as a “Host-only Network” using the VirtualBox Preference Menu. Go to <File->Preference->Network>, choose <Host-only Networks>, and click the <Add> icon. Use the default name <vboxnet0>.

27) Select the VM just created; click the <Settings> button, go to the <Network> setting. Under <Adaptor 1> selection, pick the <Attached to> option to <Host-only Adaptor> and make sure the <Name> is set to <vboxnet0>. Click the <OK> button.

28) Open a new terminal, and type the command <ifconfig> to list all possible connected network devices on the host computer.

29) Find the device with <vboxnet0>, and use the same subnet for the new Android VM. For example, if the Internet Protocol (IP) address for <vboxnet0> is 192.168.56.1, then use 192.168.56.101 as the IP address for the Android VM.

30) Assuming that the Android SDK is installed correctly, type <adb start-server> to start the Android-to-host-computer connection process.

31) Type <adb connect (ip of VM)> to connect the VM—for example, <adb connect 192.168.56.101>.

32) Type <adb devices> to determine whether the VM is actually connected.

33) If there is more than 1 device connected to the host computer, then type <adb –s device-ip shell> to connect the device you want to the host computer—for example, <adb –s 192.168.56.101:5555>. You must type the full name of the device including port (as shown in the <adb devices> command) to connect the device.

34) Type <adb devices> to verify the devices are connected.

3. Conclusions

This step-by-step guide provides details on how to setup the VM running Android on an x86-based processor.

4. References

1. Oracle VirtualBox. [accessed 24 July 2014]. https://www.virtualbox.org/.
2. Android-x86 – Porting Android to x86. [accessed 24 July 2014]. http://www.android-x86.org/.
3. Android SDK. [accessed 24 July 2014]. http://developer.android.com/sdk/index.html.

List of Symbols, Abbreviations, and Acronyms

GRUB	GNU GRand Unified Bootloader
IP	Internet Protocol
ISO	International Organization for Standardization
SDK	Software Development Kit
VDI	Virtualbox Disk Image
VM	Virtual Machine

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