Build Source Code in Ubuntu Virtual Machine

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TechNexion

INNOVATORS OF TECHNOLOGY

Contents

1. Introduction

The virtual machine is to reduce the complexity of setting up the development environment of **Android** and **Yocto**. The virtual machine is based Ubuntu-14.04 64 bit to install required packages. This virtual machine can be executed under the OS which is supported by VMware Workstation Player.

This environment supports to develop the software on target board:

Supported Software	Supported Version
U-boot	u-boot 2013.10 u-boot 2014.10 u-boot 2015.04
Linux kernel	Linux 3.0.35 Linux 3.10.53 Linux 3.14.52 Linux 4.1.15
Yocto	Yocto 1.7 Yocto 2.0
Android	Android 5.1.1 Android 6.0.1

*Note: For Yocto 1.5 and Android 4.4, please use old version of virtual machine.

2. System requirement

The build process has been tested under Windows 10 with VMware Workstation Player 12.5.1.

By default, the memory size of virtual machine is set as 4GB. It'd better that your host PC has at 8GB RAM. (4GB for virtual machine, 4GB for host OS.) or you can also decrease the memory size of virtual machine.

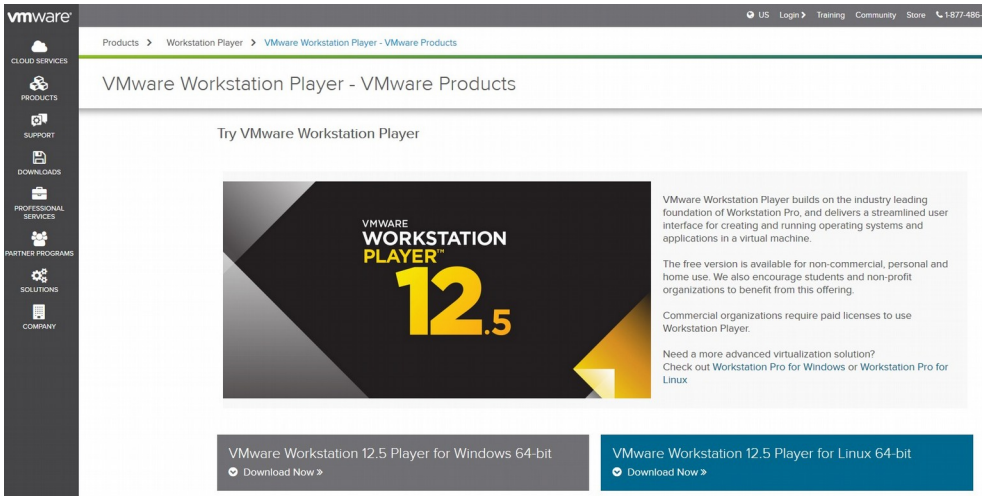
The maximum size of virtual disk in the virtual machine reaches to 175 GB. The virtual disk would keep growing when the system writes to disk. In the building process of android and yocto, it would spend over 50GB hard disk space.

It's safe to ensure your host PC has at least 180G free space of hard disk.

2.1 Download VMware Workstation Player

Download page:
http://www.vmware.com/products/player/playerpro-evaluation.html

Download and install "**VMware Workstation Player**".



2.2 Setup up virtual machine

Download and uncompress Virtual Machine from Technexion FTP:

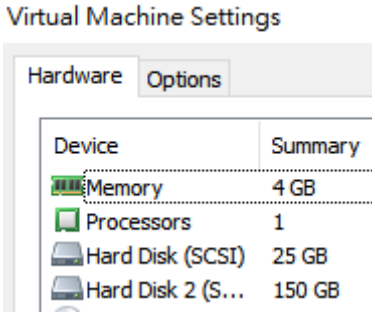
ftp://ftp.technexion.net/development_resources/development_tools/vm/

Open **ubuntu_14.04.5.vmdk** under "vm_ubuntu_14.04.5" directory

By default, the memory size of virtual machine is set as 4GB. In the building process of android and yocto, especially in the linking stage of compiling process, it takes a lot memory to put object file. If there is no sufficient memory, it may fail on building source code.

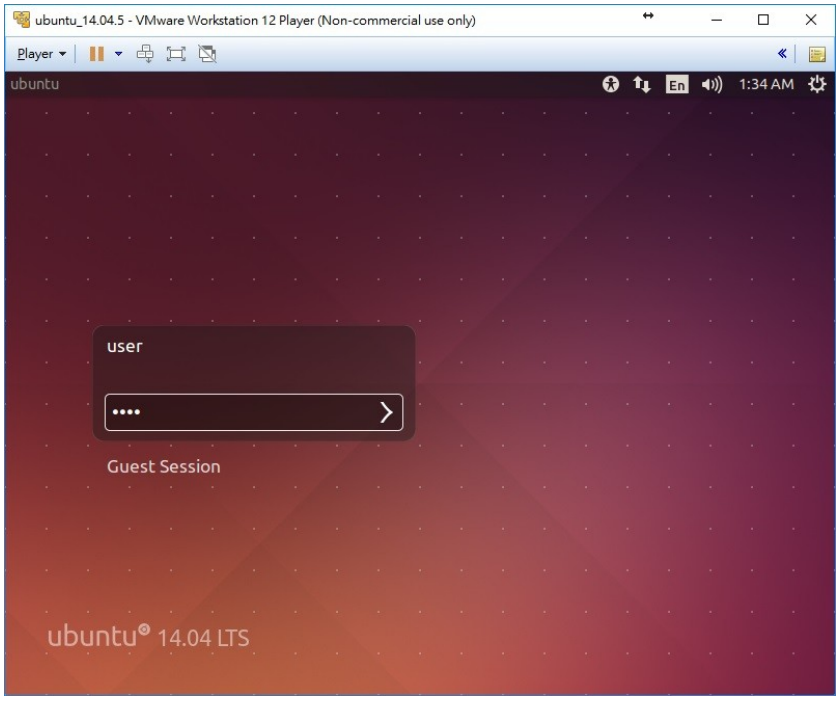
It's safe to ensure the total amount of memory and SWAP partition is more than 15GB.

To speed up the building process, you can also increase the CPU number for virtual machine



Activate virtual machine for the first time, select "**I copied it**".

Enter password to login to Ubuntu guest OS.
Login: user
Password: user



Setup up networking in virtual machine:

By default, the guest OS accesses network via NAT. It means you should make the network functional in the host OS first. The virtual machine gets it's IP via DHCP. It should work by default.

If network doesn't work, please check the network settings as follows:

Open a **terminal** in Ubuntu, and issue the following commands:

Add network settings for DHCP:
$ sudo gedit /etc/network/interfaces

```
auto lo
iface lo inet loopback

auto eth0
iface eth0 inet dhcp
```

Reboot to apply the changes.

Test network:

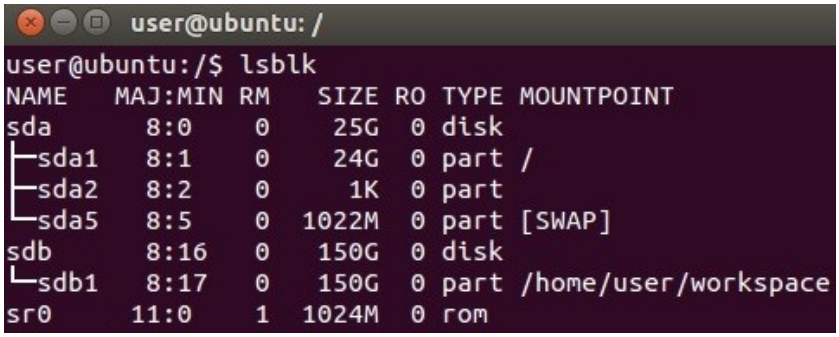
```
user@ubuntu:~$ ping www.google.com
```

2.3 Hard disk allocation in virtual machine

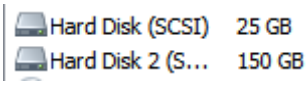
As you can see, there are two virtual disk(**sda** and **sdb**) inside the virtual machine.

ubuntu OS is in **sda**, and the size is only 25GB.

The **sdb** disk has 150GB free space and it is suitable to put the source code.



The **sda** and **sdb** correspond to the virtual hard disk 1 and virtual hard disk 2 in the virtual machine.



It means you can create your own bigger virtual disk to replace virtual disk 2.

2.4 SWAP in virtual machine

The default settings of memory size in virtual machine is 4GB, it's not sufficient to build Android and Yocto. It's necessary to have bigger SWAP space to complete to build Android and Yocto.

It's safe to have at least 8GB(memory + SWAP) space to build android and 15GB(memory + SWAP) space to build Yocto.

We create 15GB swapfile under "~/workspace" (under sdb) to ensure there is enough SWAP space to complete building task.

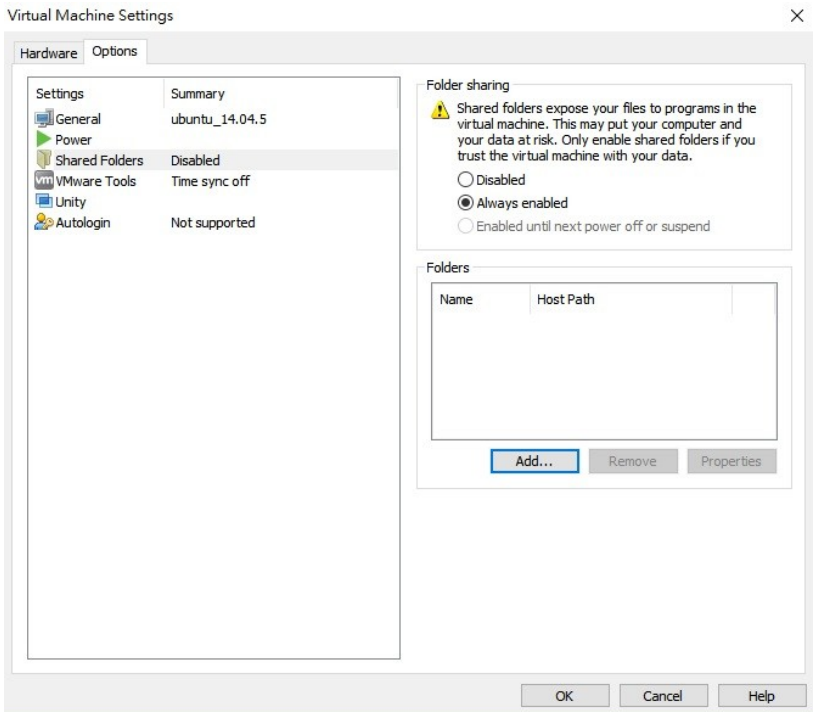
```
user@ubuntu:~$ ls ~/workspace/
lost+found  swapfile
```

```
user@ubuntu:~$ free -l
             total       used       free     shared    buffers     cached
Mem:       4029048     952948    3076100       5800      61788     352328
Low:       4029048     952948    3076100
High:            0          0          0
-/+ buffers/cache:     538832    3490216
Swap:     16775160          0   16775160
```

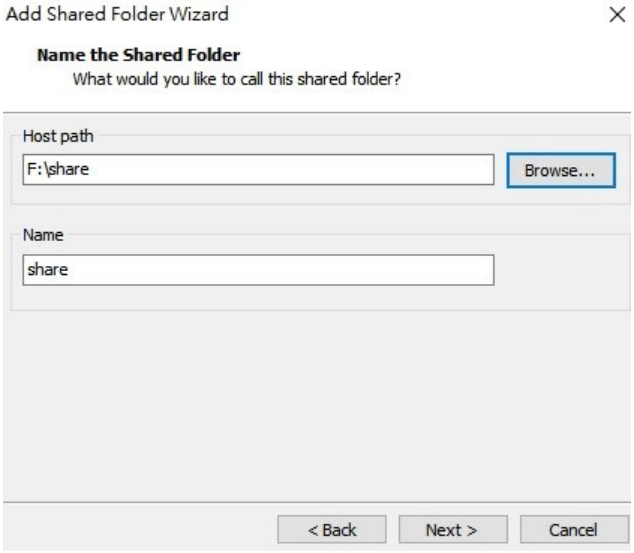
2.5 Shared folder between virtual machine and host PC

It's convenient to share files between virtual machine and host PC.

"**Edit virtual machine settings**" –> Tab "**Options**" –> "**Shared Folders**" –> select "**Always enabled**"



"**Add**" –> specify the "**path of shared folder**"



Then, start virtual machine to see if it is able to mount share folder automatically.

```
user@ubuntu:~$ mount | grep hgfs
vmhgfs-fuse on /mnt/hgfs type fuse.vmhgfs-fuse (rw,nosuid,nodev,allow_other)
user@ubuntu:~$ ls /mnt/hgfs/
share
```

3. Build source code for target board

3.1 Build u-boot and linux kernel

There are two versions of toolchain (GCC-4.6.2 and GCC-5.1) we install in the virtual machine to be compatible different version of u-boot and linux kernel.

By default, we install toolchain into "**/opt**" directory.

```
user@ubuntu:/opt$ ls
gcc-4.6.2-glibc-2.13-linaro-multilib-2011.12
gcc-5.1-2015.08-x86_64_arm-linux-gnueabihf
```

There are two ways to get the **source code**:

1. Download the *source* code of u-boot and linux kernel from **Technexion FTP**:
ftp://ftp.technexion.net/development_resources/NXP/linux/

2. Fetch the source code from **Technexion github**:
https://github.com/TechNexion/linux.git
https://github.com/TechNexion/u-boot-edm

Recommended toolchain for u-boot/kernel:

Toochain	u-boot	linux kernel
GCC-4.6.2_201112	u-boot 2013.10 u-boot 2014.10	Linux 3.0.35 Linux 3.10.53
GCC-5.1_201508	u-boot 2015.04	Linux 3.14.52 Linux 4.1.15

Here, we create "**environment_legacy.sh**" and "**environment.sh**" to export the environment for GCC-4.6 and GCC-5.1 under "**/home/user**" directory:

Before compiling the source code, please export environment:

For linux 3.0.35/3.10.53 and u-boot 2013.10/2014.10:

```
user@ubuntu:~$ source ~/environment_legacy.sh
```

For linux 3.14.52/4.1.15 and u-boot 2015.04

```
user@ubuntu:~$ source ~/environment.sh
```

Follow the release note to select u-boot and kernel configuration to complete the building task.
ftp://ftp.technexion.net/development_resources/NXP/linux/

3.2 Build Android

Download the Source code tarball of Android 5.x or Android 6.x:
ftp://ftp.technexion.net/development_resources/NXP/android/

Or, fetch android 6.1.1 source code from Technexion-Android github:

```
repo init -u https://github.com/Technexion-Android/manifest.git -b tn-m6.0.1_2.0.0-ga
repo sync -j8
```

Follow the document to complete the building task.

3.3 Build Yocto

Download the Source code tarball of Yocto 1.7(dizzy) or 2.0(jethro):
ftp://ftp.technexion.net/development_resources/NXP/yocto/

Or, fetch Yocto source code from Technexion github:

For Yocto 1.7, please follow the guide:
https://github.com/TechNexion/edm-yocto-bsp

For Yocto 2.0, please follow the guide:
https://github.com/TechNexion/meta-edm-bsp-release/tree/jethro_4.1.15-1.1.0_GA