



Android Based Product Build Environment on Ubuntu 14.04 64-bit Installation SOP

System Development Environment

Analysis & Design

MT6000

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Document Revision History

Revision	Date	Author	Description
V1.0	2015-10-22	Minhua Hu	Create initial version.
V2.0	2016-05-23	Hailong Liu	1. Update JDK version (Open JDK 1.8) requirement for N. 2. Add Open JDK 1.8 installation steps.
V2.1	2017-01-20	Hailong Liu	Apply the new doc. template (the installation steps are NOT changed).

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1 Introduction

1.1 Purpose

This document provides the Android build environment setup SOP on Ubuntu 14.04 (64-bit version) for all Android based products. It describes how to setup build environment step by step.

1.2 Scope

The document provides the build environment setup steps of all alive Android based products.

1.3 Who Should Read This Document

This document is primarily intended for:

- Engineers who are responsible for Android build environment setup.

1.4 How to Use This Manual

This segment explains how information is distributed in this document, and presents some cues and examples to simplify finding and understanding information in this document. Table 1-1 presents an overview of the chapters and appendices in this document.

Table 1-1. Chapter Overview

#	Chapter	Contents
1	Introduction	Describes the scope and layout of this document.
2	References	Describes which template, external docs/articles referenced.
3	Definitions	The definitions of the terms used in this document.
4	Abbreviations	The explanation of abbreviations used in this document.
5	Overview	Describes what contains in this document.
6	Environment Requirement	Describes build environment requirement.
7	OS Installation	Describes how to install pure Ubuntu OS.
8	Install Required Software and Compilation Toolchain	Describes how to install build process required software and toolchains.
9	Configure Build Profile (Optional)	Describes how to configure build profile. It's optional for some old Android versions.

1.4.1 Terms and Conventions

This document uses special terms and typographical conventions to help you easily identify various information types in this document. These cues are designed to simply finding and understanding the information this document contains.

Table 1-2. Conventions



Convention	Usage	Example
[1]	Serial number of a document in the order of appearance in the References topic	
Ⓔ	Important	

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- [1] MTK Word Template, <http://brandclips.mediatek.inc/uploads/Microsoft-Office-Word-Oct-2014.rar>
- [2] Install Ubuntu Desktop, <https://www.ubuntu.com/download/desktop/install-ubuntu-desktop>
- [3] Establishing a Build Environment, <http://source.android.com/source/initializing.html>

3 Definitions

For the purposes of the present document, the following terms and definitions apply:

Android is a mobile operating system developed by Google, based on the Linux kernel and designed primarily for touchscreen mobile devices such as smartphones and tablets.

AOSP (Android Open Source Project): Android has an active community of developers and enthusiasts who use the Android Open Source Project (AOSP) source code to develop and distribute their own modified versions of the operating system.



4 Abbreviations

Please note the abbreviations and their explanations provided in Table 4-1. They are used in many fundamental definitions and explanations in this document and are specific to the information that this document contains.

Table 4-1. Abbreviations

Abbreviations	Explanation
MTK	MediaTek, Asia's largest fabless IC design company.
AOSP	Android Open Source Project
LTS	Long Term Support
GB	GigaByte

5 Overview

This doc. includes Android based product build environment requirements, step-by-step installation guide of pure OS, required build packages, toolchains...etc. It can help you setup Android based product build environment easily.

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6 Environment Requirement

6.1 Operating System

Ubuntu **14.04.3** (LTS, long term support version) **64bit**, **Windows/ Mac are NOT supported**

6.2 Memory

16+GB RAM/swap (the larger RAM size, the better build performance) to avoid “JVM run out of memory” and speed up build performance

6.3 Disk Space

100GB or more disk space is needed (to build Android tree, pure sources size, NOT including .repo size)

6.4 Make Utility

GNU Make v3.81 (Ubuntu 14.04 default built-in version) or above

6.5 Perl/Python Interpreter

Perl 5.18.4 (Ubuntu 14.04 default built-in version)

Python 2.7.6 (Ubuntu 14.04 default built-in version)

6.6 Compilation Tools

arm-eabi-*, arm-linux-androideabi-*, clang (this setting will be taken care by Android codebase & be transparent to users)

GCC 4.8.4

Oracle JDK1.6.045 for KitKat & old Android versions, OPEN JDK 1.7 for L & M Android versions, OPEN JDK 1.8 for N & afterwards Android versions

6.7 Others

Wine 1.1 or above (optional, ONLY for JB MR0)

Notes: Please make sure you use MediaTek recommended environment to avoid potential issues happened in development stage.

e.g. Please make sure you use GCC 4.8.4 as native GCC compiler, otherwise you may meet nvram_auto_gen error when compiling modem software!

(We already found it will meet problem if you use GCC 4.4.5 or 4.4.7)

7 OS Installation

7.1 Download Ubuntu 14.04 x64 CD Desktop Version

<http://cdimage.ubuntu.com/releases/14.04/release/ubuntu-14.04.3-desktop-amd64+mac.iso>

7.2 Start the Installation

7.2.1 Install Menu Language: English



Figure 7-1. Ubuntu Installation Language Selection Screen

7.2.2 Install Ubuntu

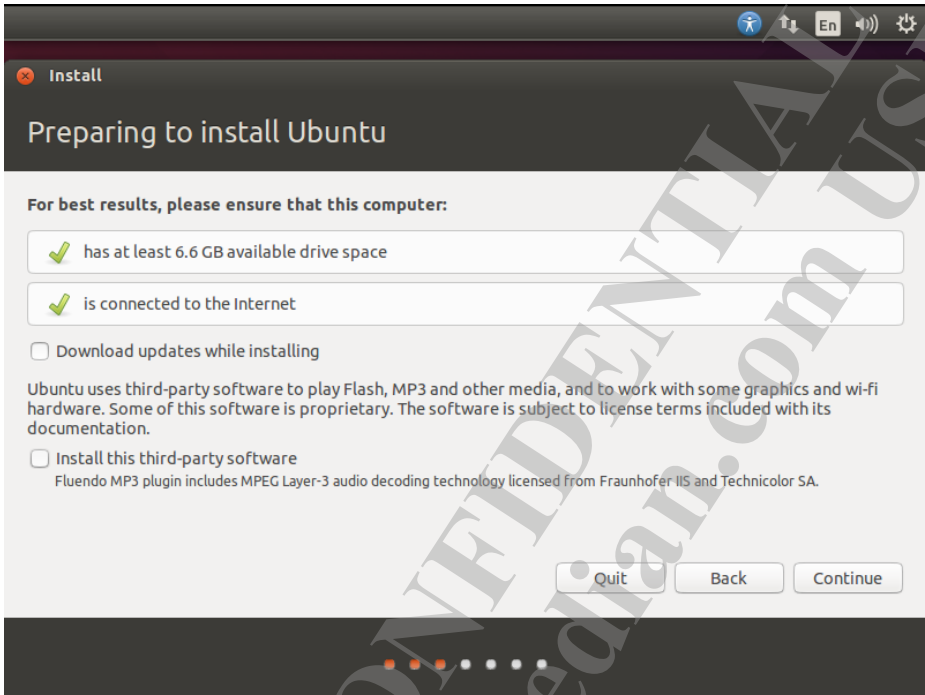


Figure 7-2. Ubuntu Installation Preparation Screen

7.2.3 Prepare Disk Space: Erase and Use the Entire Disk

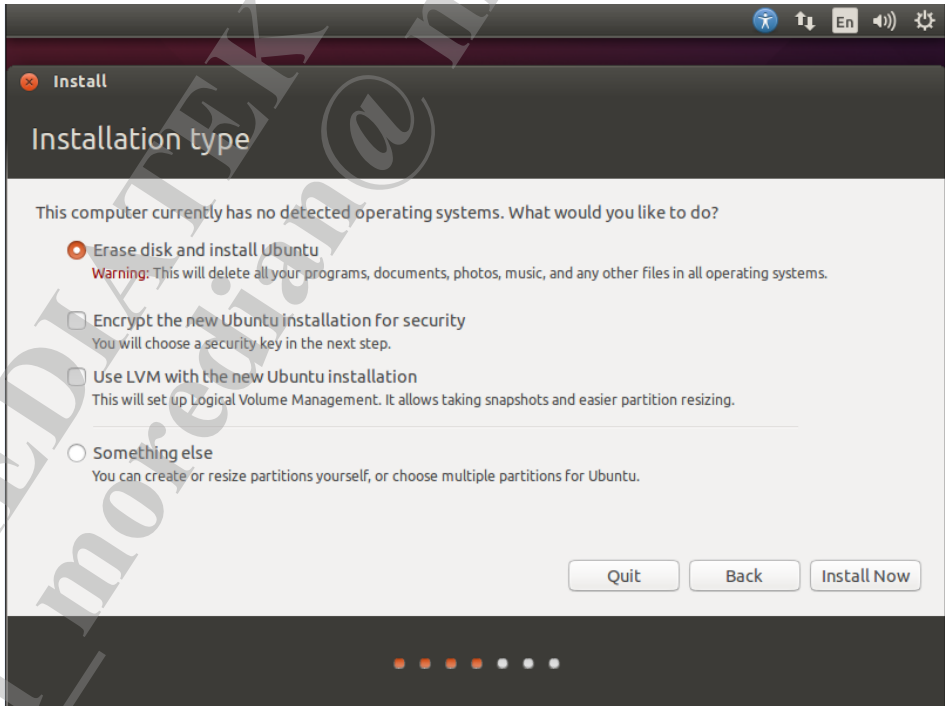


Figure 7-3. Ubuntu Installation Type Screen

7.2.4 Timezone & Conventions: Asia (China)



Figure 7-4. Ubuntu Installation Timezone Screen

7.2.5 Keyboard Layout: USA

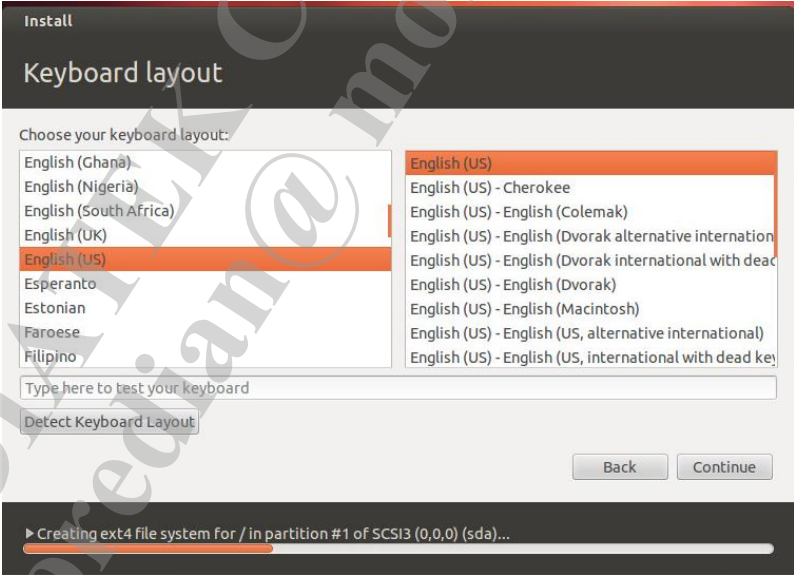


Figure 7-5. Ubuntu Installation Keyboard Layout Screen

7.2.6 Who Are You?

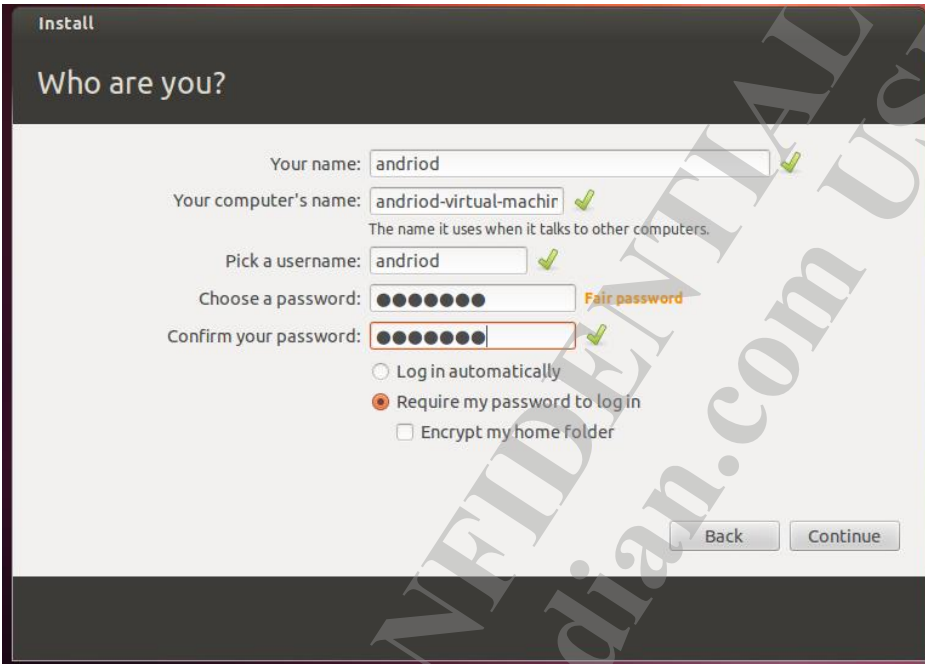


Figure 7-6. Ubuntu Installation Account Setting Screen

7.2.7 Press Install and Start to Install

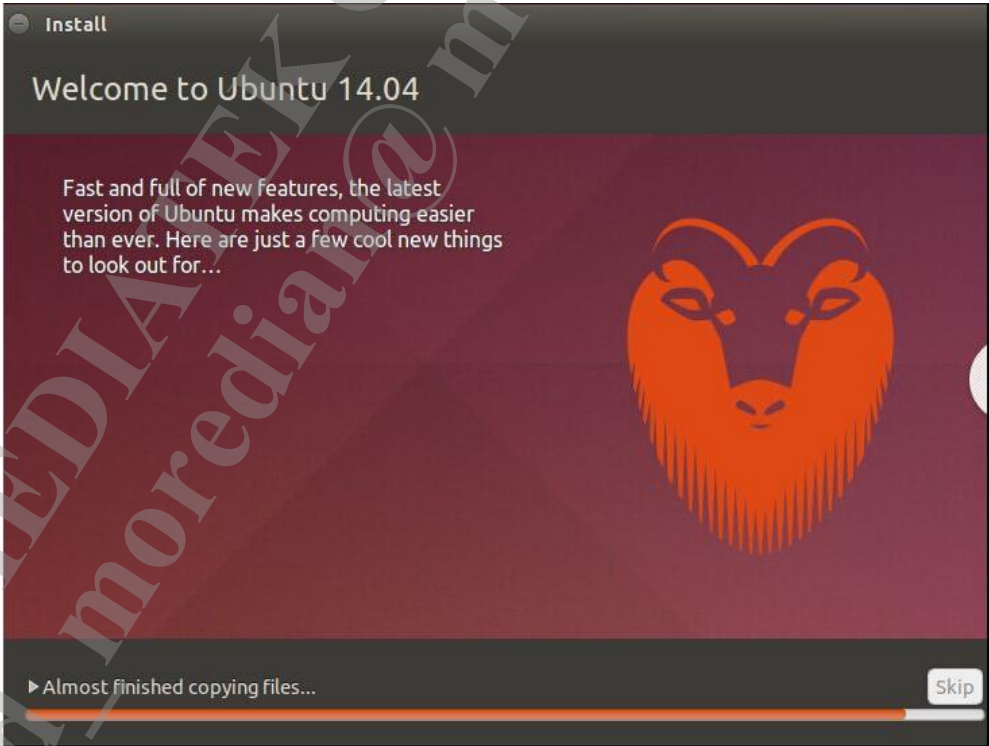


Figure 7-7. Ubuntu Installation Finished Screen

8 Install Required Software and Compilation Toolchain

8.1 Modify /etc/apt/sources.list

```
$ sudo vi /etc/apt/sources.list
deb http://archive.ubuntu.com/ubuntu/ trusty main restricted universe multiverse
deb http://archive.ubuntu.com/ubuntu/ trusty-updates main restricted universe multiverse
deb http://archive.ubuntu.com/ubuntu/ trusty-security main restricted universe multiverse
```

8.2 Required Packages

Step 1. Login As your account name

Step 2. Make your Ubuntu has ability to go on internet

Step 3. Applications → Accessories → Terminal → Run sudo su → apt-get update

Step 4. Update apt information

```
$ sudo su -
[sudo] password for android:*****
root@android-machine:~$ apt-get update
```

Step 5. Install Google recommended packages

```
$ sudo apt-get install bison g++-multilib git;
$ sudo apt-get install gperf libxml2-utils make python-networkx zlib1g-dev:i386
zip build-essential
```

Step 6. Install extra packages (to build KK, JB on Ubuntu 14.04)

```
$ sudo apt-get install flex mingw32 tofrodos libswitch-perl
```

8.3 Install Oracle JDK 1.6 & Open JDK 1.7

8.3.1 Download Oracle JDK 1.6 (ONLY for KK, JB)

<http://www.oracle.com/technetwork/java/javase/downloads/java-archive-downloads-javase6-419409.html#jdk-6u45-oth-JPR>

8 Install Required Software and Compilation Toolchain

Java SE Development Kit 6u45		
You must accept the Oracle Binary Code License Agreement for Java SE to download this software.		
Thank you for accepting the Oracle Binary Code License Agreement for Java SE; you may now download this software.		
Product / File Description	File Size	Download
Linux x86	65.46 MB	jdk-6u45-linux-i586-rpm.bin
Linux x86	68.47 MB	jdk-6u45-linux-i586.bin
Linux x64	65.69 MB	jdk-6u45-linux-x64-rpm.bin
Linux x64	68.75 MB	jdk-6u45-linux-x64.bin
Solaris x86	68.38 MB	jdk-6u45-solaris-i586.sh
Solaris x86 (SVR4 package)	120 MB	jdk-6u45-solaris-i586.tar.Z
Solaris x64	8.5 MB	jdk-6u45-solaris-x64.sh
Solaris x64 (SVR4 package)	12.23 MB	jdk-6u45-solaris-x64.tar.Z
Solaris SPARC	73.41 MB	jdk-6u45-solaris-sparc.sh
Solaris SPARC (SVR4 package)	124.74 MB	jdk-6u45-solaris-sparc.tar.Z
Solaris SPARC 64-bit	12.19 MB	jdk-6u45-solaris-sparcv9.sh
Solaris SPARC 64-bit (SVR4 package)	15.49 MB	jdk-6u45-solaris-sparcv9.tar.Z
Windows x86	69.85 MB	jdk-6u45-windows-i586.exe
Windows x64	59.96 MB	jdk-6u45-windows-x64.exe
Linux Intel Itanium	53.89 MB	jdk-6u45-linux-ia64-rpm.bin
Linux Intel Itanium	56 MB	jdk-6u45-linux-ia64.bin
Windows Intel Itanium	51.72 MB	jdk-6u45-windows-ia64.exe
Back to top		

Figure 8-1. Oracle JDK 1.6 Download Screen

8.3.2 Install Oracle JDK 1.6 (ONLY for KK, JB)

```
$ mkdir /opt/java
$ cp ./jdk-6u45-linux-x64.bin /opt/java/
$ cd /opt/java/

$ chmod a+x jdk-6u45-linux-x64.bin
$ ./jdk-6u45-linux-x64.bin

$ export JAVA_HOME=/opt/java/jdk1.6.0_45
$ export JRE_HOME=$JAVA_HOME/jre
$ export CLASSPATH=$CLASSPATH:$JAVA_HOME/lib:$JRE_HOME/lib
$ export PATH=$PATH:$JAVA_HOME/bin:$JRE_HOME/bin:$JAVA_HOME/lib:$JAVA_HOME
$ source /etc/bash.bashrc
```

8.3.3 Install Open JDK 1.7 (for L, M)

```
$ sudo apt-get install openjdk-7-jdk

$ sudo update-alternatives --config java

$ sudo update-alternatives --config javac
```

8.3.4 Install Open JDK 1.8 (for N)

```
$ sudo add-apt-repository ppa:openjdk-r/ppa

$ sudo apt-get update

$ sudo apt-get install openjdk-8-jdk

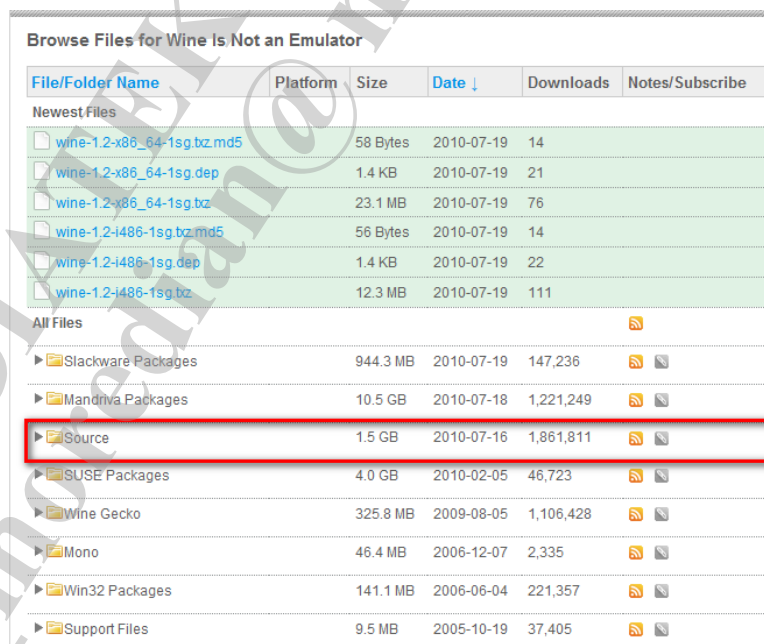
$ sudo update-alternatives --config java

$ sudo update-alternatives --config javac
```

8.4 Install Wine 1.1.33 (Optional, ONLY for JB MR0)

8.4.1 Download Wine 1.1.33 Source Code

<http://sourceforge.net/projects/wine/files/>



File/Folder Name	Platform	Size	Date ↓	Downloads	Notes/Subscribe
Newest Files					
wine-1.2-x86_64-1sg.bz.md5		58 Bytes	2010-07-19	14	
wine-1.2-x86_64-1sg.dep		1.4 KB	2010-07-19	21	
wine-1.2-x86_64-1sg.bz		23.1 MB	2010-07-19	76	
wine-1.2-i486-1sg.bz.md5		56 Bytes	2010-07-19	14	
wine-1.2-i486-1sg.dep		1.4 KB	2010-07-19	22	
wine-1.2-i486-1sg.bz		12.3 MB	2010-07-19	111	
All Files					
Slackware Packages		944.3 MB	2010-07-19	147,236	
Mandriva Packages		10.5 GB	2010-07-18	1,221,249	
Source		1.5 GB	2010-07-16	1,861,811	
SUSE Packages		4.0 GB	2010-02-05	46,723	
Wine Gecko		325.8 MB	2009-08-05	1,106,428	
Mono		46.4 MB	2006-12-07	2,335	
Win32 Packages		141.1 MB	2006-06-04	221,357	
Support Files		9.5 MB	2005-10-19	37,405	

Figure 8-2. Wine 1.1.33 Source Download Screen

8 Install Required Software and Compilation Toolchain**8.4.2 Install Wine 1.1.33**

```
$ tar jxvf wine-1.1.33.tar.bz2 -C /tmp  
  
$ cd /tmp/wine-1.1.33  
$ ./configure --prefix=/opt/wine-1.1.33  
$ make depend && make  
$ make install
```

8.5 Install xRDP (Ubuntu Mate + xRDP, Optional)**8.5.1 Install Ubuntu Mate Desktop**

```
$ sudo apt-add-repository ppa:ubuntu-mate-dev/ppa  
$ sudo apt-add-repository ppa:ubuntu-mate-dev/trusty-mate  
$ sudo apt-get update  
$ sudo apt-get install ubuntu-mate-core ubuntu-mate-desktop
```

8.5.2 Install and Verify xRDP

```
$ apt-get install xrdp  
$ vi /etc/xrdp/xrdp.ini  
[xrdp1]  
#new session  
name=sesman-Xvnc  
lib=libvnc.so  
username=ask  
password=ask  
ip=127.0.0.1  
port=-1  
  
[xrdp2]  
#for reconnect  
name=sesman-any  
lib=libvnc.so
```



```
ip=asklocalhost
port=ask5910
username=ask
password=ask

$ vi /etc/xrdp/startwm.sh
if [ -r /etc/default/locale ]; then
    . /etc/default/locale
    export LANG LANGUAGE
fi
echo mate-session > ~/.xsession
. /etc/X11/Xsession

$ sudo service xrdp restart
```

8.5.3 Press “Windows+R” on Keyboard and Enter “mstsc” Command

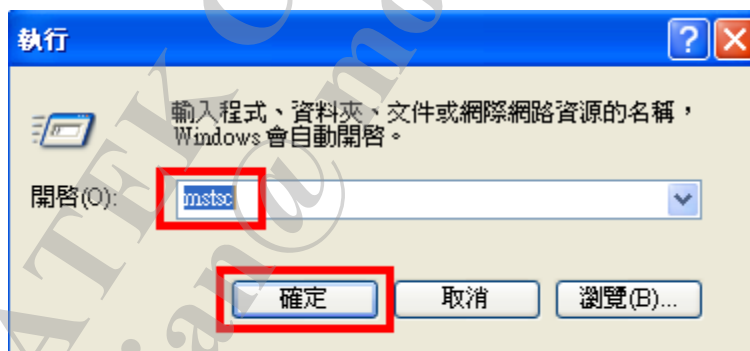


Figure 8-3. Start xRDP Screen 1

8.5.4 The RDP Connection Will Start and Enter the Host Name and Connect



Figure 8-4. Start xRDP Screen 2

8.5.5 Use Your 'username' and 'password' to Login

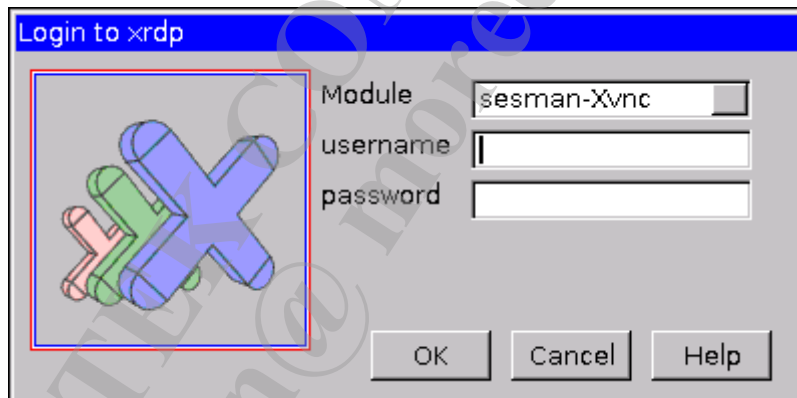


Figure 8-5. xRDP Login Screen

8.6 Advice: Please Remove network-manger After Install Ubuntu Desktop & Mate Desktop (Optional)

Please manual setup network by edit interface, e.g.:

```
#static ip setup

/etc/network/interfaces

# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).
```


8 Install Required Software and Compilation Toolchain

```
# The loopback network interface
auto lo
iface lo inet loopback

# The primary network interface
auto eth0
iface eth0 inet static
address 10.15.21.53
netmask 255.255.255.0
network 10.15.21.0
broadcast 10.15.21.255
gateway 10.15.21.254

#dhcp ip setup

/etc/network/interfaces

# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

# The loopback network interface
auto lo
iface lo inet loopback

# The primary network interface
auto eth0
iface eth0 inet dhcp
```

9 Configure Build Profile (Optional)

Modify Android build profile 'mbldenv.sh' (if existed) which located in codebase (./mbldenv.sh) according to the software installation path (e.g. JDK)

```
# android profile
# Please be noticed, this is just a sample!!!
# Please modify the content according to your real environment

JAVA_HOME=/opt/java/jdk1.6.0_45
export JAVA_HOME

ANDROID_JAVA_HOME=/opt/java/jdk1.6.0_45
export ANDROID_JAVA_HOME

PATH=/opt/java/jdk1.6.0_45/bin:$PWD/prebuilts/gcc/linux-x86/arm/arm-linux-
androideabi-4.7/bin:$PATH
export PATH
```