Compiling FFMPEG for Android

Environment:

- ➢ Ubuntu 12.04.4 TLS 64-bit
- ➢ Tested FFmpeg version (2.2.2, 2.1.4, 1.2.6, 1.0.1, 1.0.4)

- Install needed packages by typing the following commands in the Terminal:
  - ■ sudo apt-get install build-essential
  - ■ sudo apt-get install git yasm

  Because we're using a 64-bit Linux, we need to install the following package for Android SDK to work properly

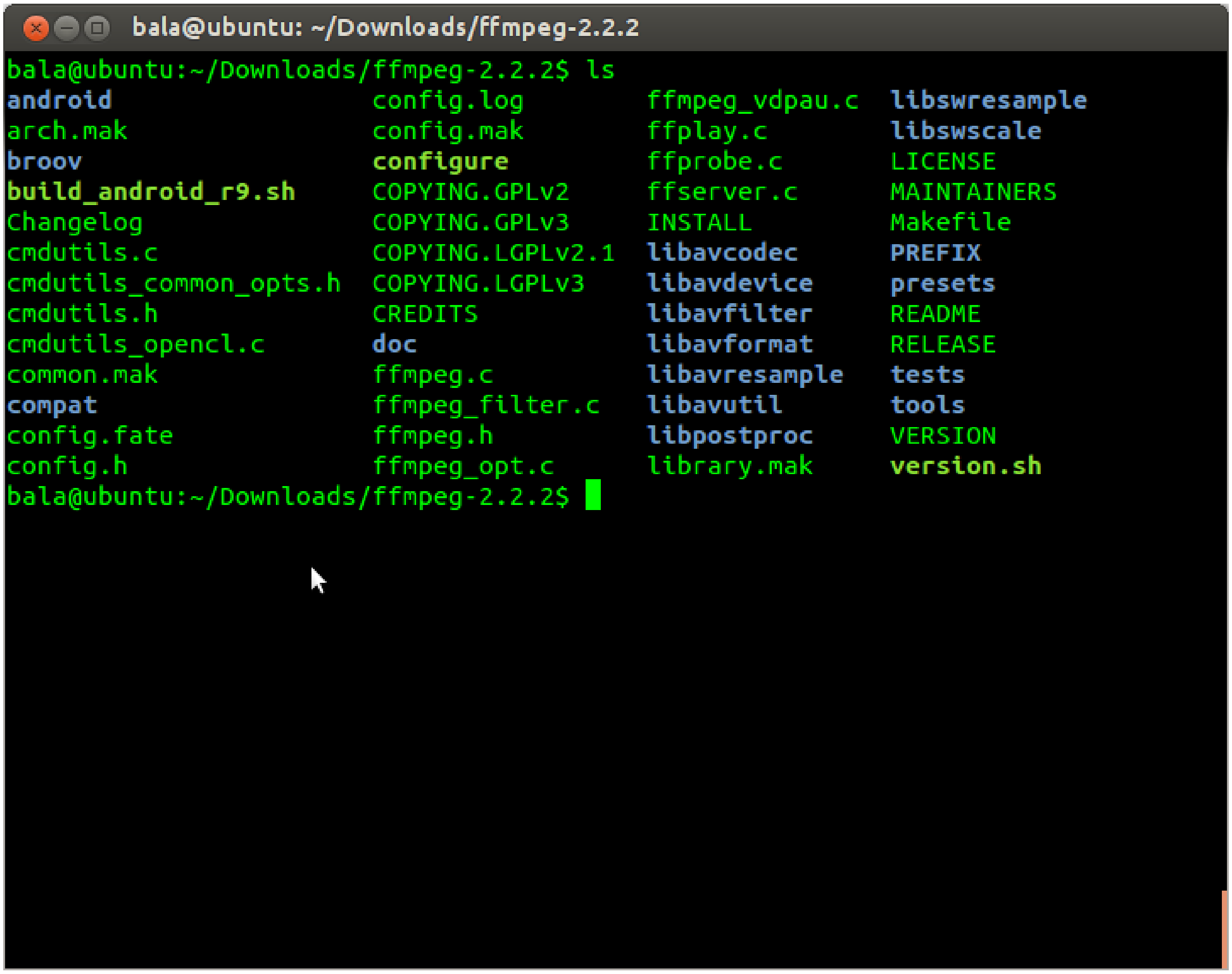
  - ■ sudo apt-get install libncurses5:i386
  - ■ sudo apt-get install libstdc++6:i386
  - ■ sudo apt-get install zlib1g:i386

- Download FFmpeg Source code
  - ■ From http://www.ffmpeg.org/download.html

- Download Android SDK
  - ■ From http://developer.android.com/sdk/index.html
  - ■ The version we use is released on 2014/03/21

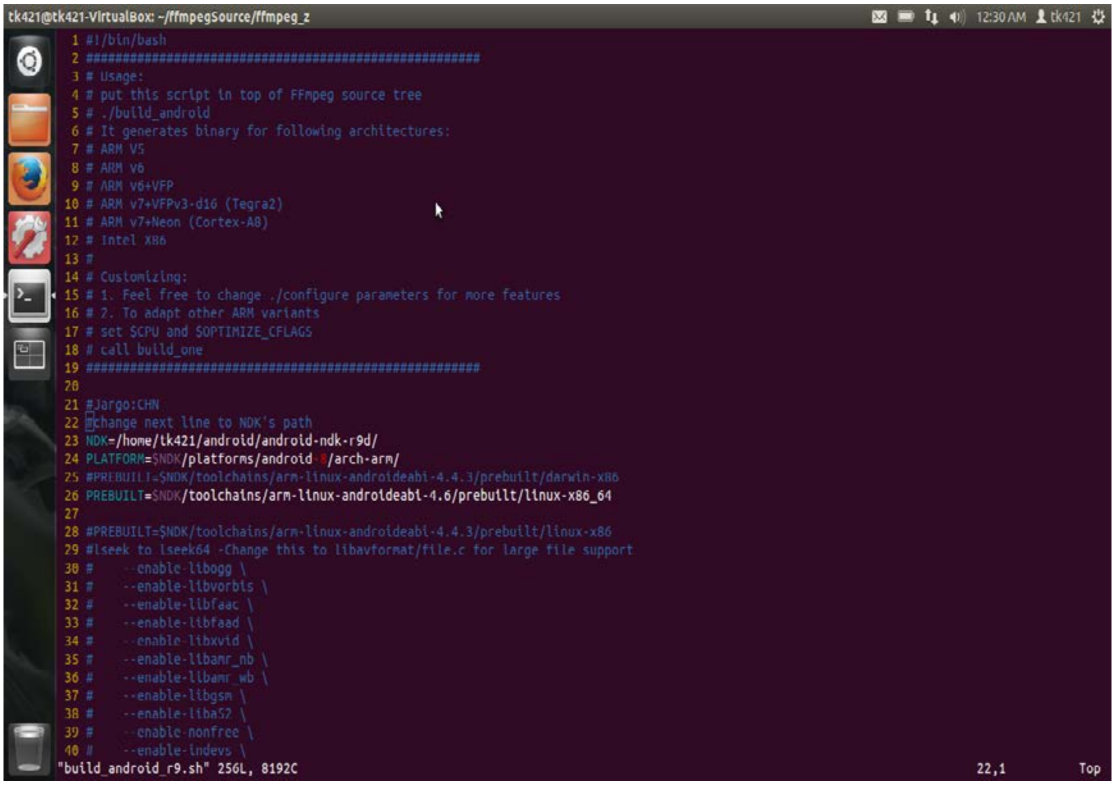
- Download Android NDK
  - ■ From https://developer.android.com/tools/sdk/ndk/index.html
  - ■ The version we use is NDK r9d

- Copy "build_android_r9.sh" file to your FFmpeg source tree root folder "<FFMPEG-ROOT>"



```
bala@ubuntu:~/Downloads/ffmpeg-2.2.2$ ls
android                 config.log          ffmpeg_vdpau.c   libswresample
arch.mak                config.mak          ffplay.c         libswscale
broov                   configure           ffprobe.c        LICENSE
build_android_r9.sh     COPYING.GPLv2       ffserver.c       MAINTAINERS
Changelog               COPYING.GPLv3       INSTALL          Makefile
cmdutils.c              COPYING.LGPLv2.1    libavcodec       PREFIX
cmdutils_common_opts.h  COPYING.LGPLv3      libavdevice      presets
cmdutils.h              CREDITS             libavfilter      README
cmdutils_opencl.c       doc                 libavformat      RELEASE
common.mak              ffmpeg.c            libavresample    tests
compat                  ffmpeg_filter.c     libavutil        tools
config.fate             ffmpeg.h            libpostproc      VERSION
config.h                ffmpeg_opt.c        library.mak      version.sh
bala@ubuntu:~/Downloads/ffmpeg-2.2.2$ 
```

- Open the build_android_r9.sh file and change the NDK variable to your NDK path as shown below in line 23:

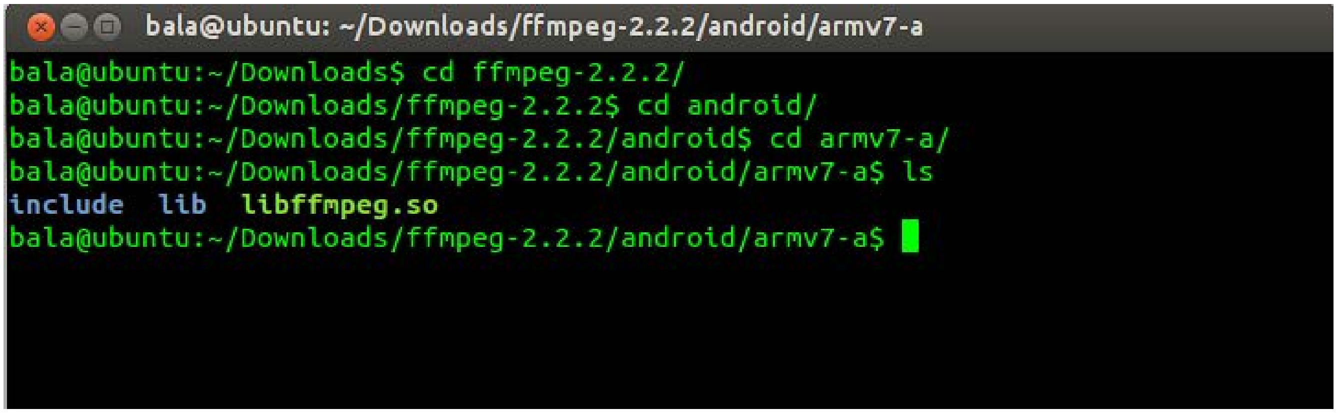


```
tk421@tk421-VirtualBox: ~/ffmpegSource/ffmpeg_z
#!/bin/bash
######################################################
# Usage:
# put this script in top of FFmpeg source tree
# ./build_android
# It generates binary for following architectures:
# ARM V5
# ARM v6
# ARM v6+VFP
# ARM v7+VFPv3-d16 (Tegra2)
# ARM v7+Neon (Cortex-A8)
# Intel X86
#
# Customizing:
# 1. Feel free to change ./configure parameters for more features
# 2. To adapt other ARM variants
# set $CPU and $OPTIMIZE_CFLAGS
# call build_one
######################################################

#Jargo:CHN
#change next line to NDK's path
NDK=/home/tk421/android/android-ndk-r9d/
PLATFORM=$NDK/platforms/android-8/arch-arm/
#PREBUILT=$NDK/toolchains/arm-linux-androideabi-4.4.3/prebuilt/darwin-x86
PREBUILT=$NDK/toolchains/arm-linux-androideabi-4.6/prebuilt/linux-x86_64

#PREBUILT=$NDK/toolchains/arm-linux-androideabi-4.4.3/prebuilt/linux-x86
#lseek to lseek64 -Change this to libavformat/file.c for large file support
#     --enable-libogg \
#     --enable-libvorbis \
#     --enable-libfaac \
#     --enable-libfaad \
#     --enable-libxvid \
#     --enable-libamr_nb \
#     --enable-libamr_wb \
#     --enable-libgsm \
#     --enable-liba52 \
#     --enable-nonfree \
#     --enable-indevs \
"build_android_r9.sh" 256L, 8192C                                22,1          Top
```

- Check the following ffmpeg options:
  - Run the following command
    - ./configure --help | grep armvfp
  - If “armvfp” option does not exists, search for “vfp” option
    - ./configure --help | grep vfp
  - If vfp option exists, change all instances of --enable-armvfp to --enable-vfp in the file “build_android_r9.sh”

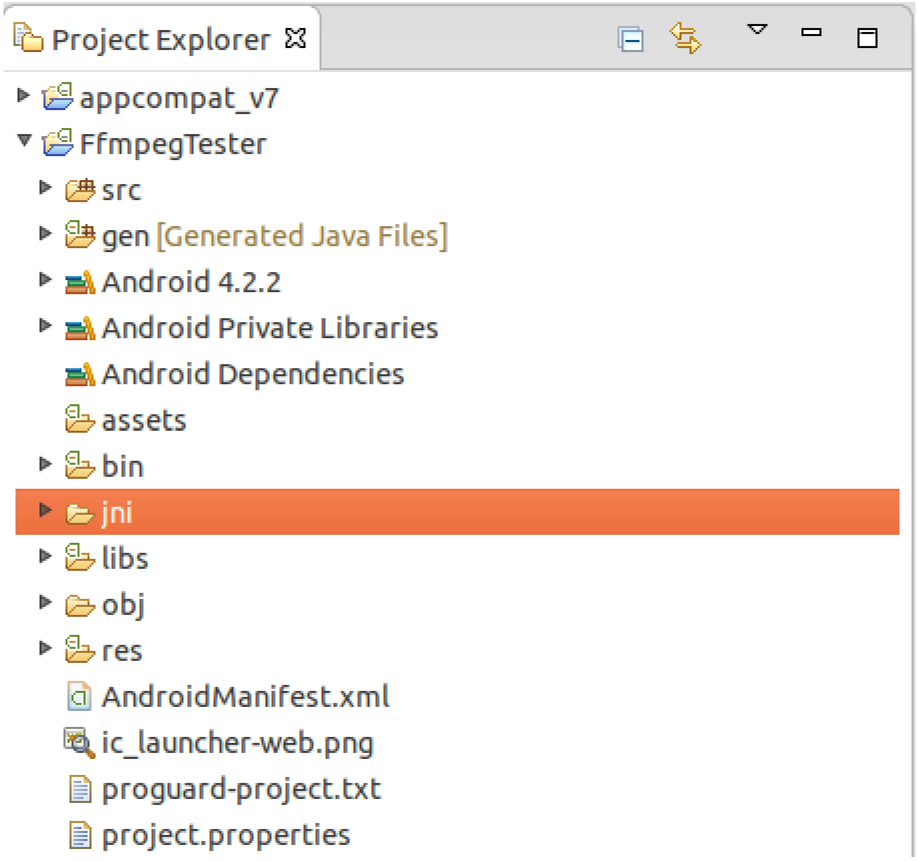
- Run the script file “build_android_r9.sh” with root permission:
  - sudo ./build_android_r9.sh

- The shared library will be in “ffmpeg_2/android/<arch>/” folder



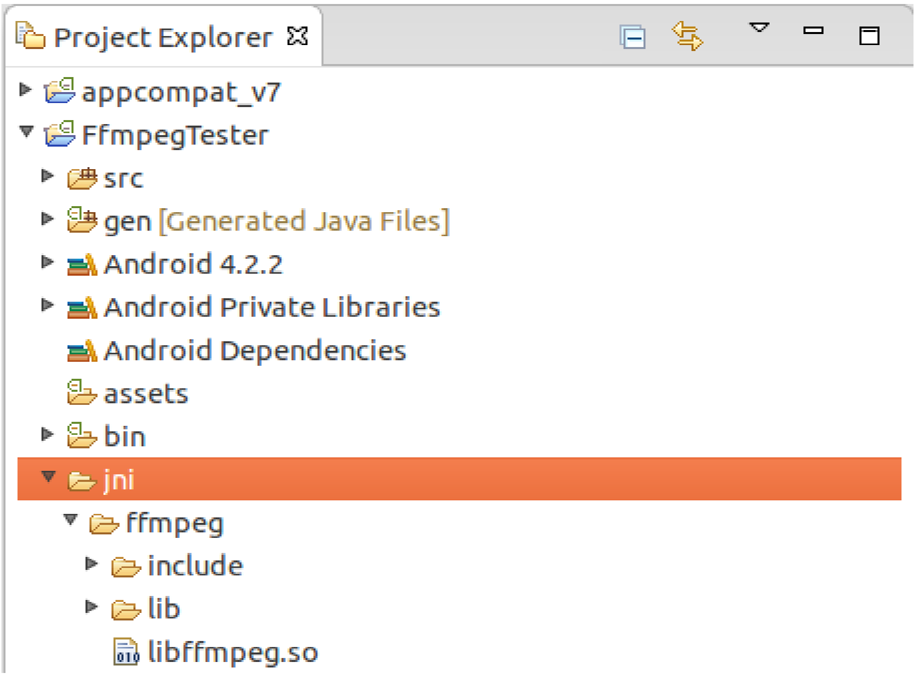
```
bala@ubuntu: ~/Downloads/ffmpeg-2.2.2/android/armv7-a
bala@ubuntu:~/Downloads$ cd ffmpeg-2.2.2/
bala@ubuntu:~/Downloads/ffmpeg-2.2.2$ cd android/
bala@ubuntu:~/Downloads/ffmpeg-2.2.2/android$ cd armv7-a/
bala@ubuntu:~/Downloads/ffmpeg-2.2.2/android/armv7-a$ ls
include  lib  libffmpeg.so
bala@ubuntu:~/Downloads/ffmpeg-2.2.2/android/armv7-a$
```

- Create an Android project in Eclipse ADT and then create a folder named “jni” in your android project directory(referred to as “PROJECT-ROOT”)



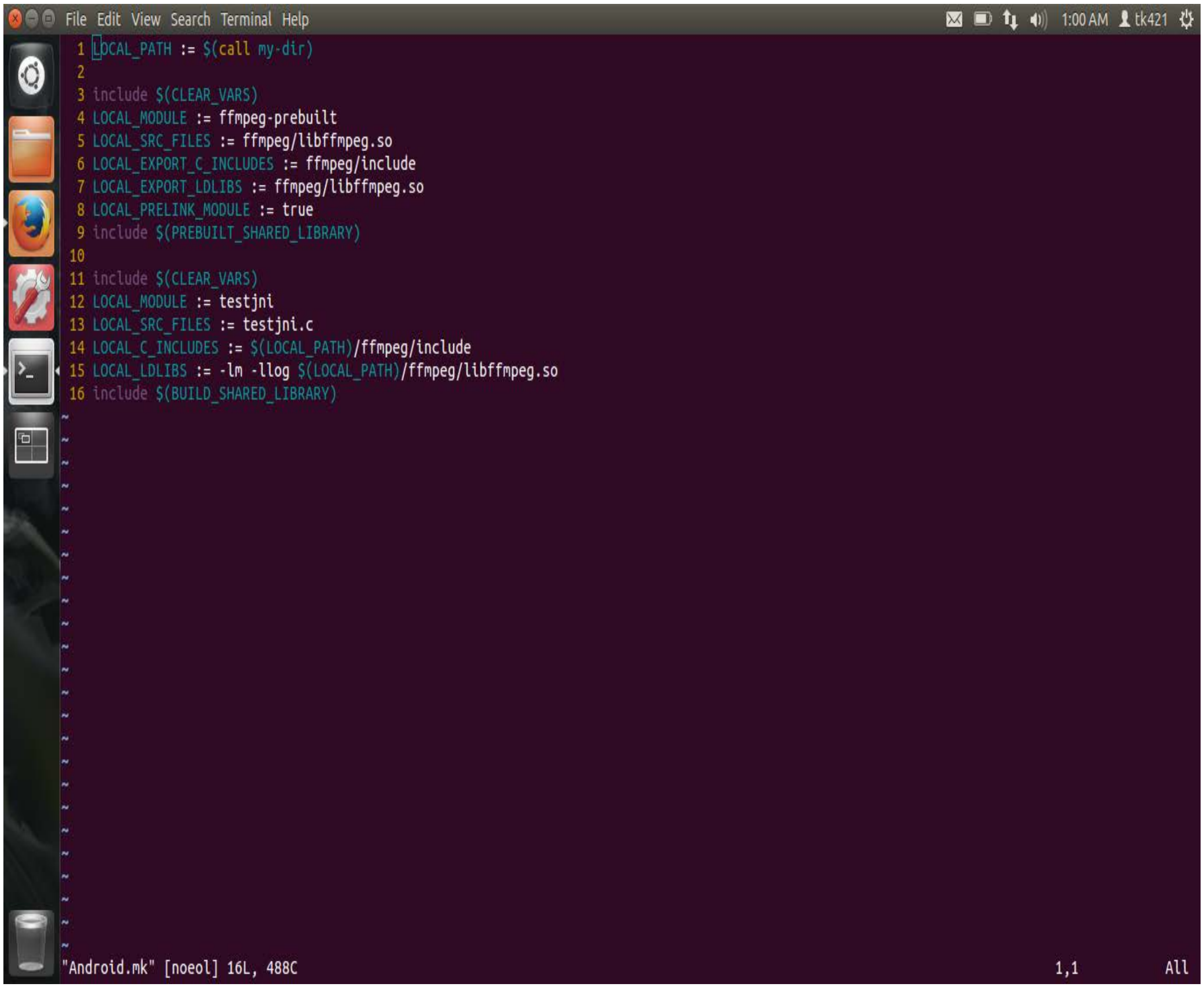
- Create a folder named “ffmpeg” under “jni” folder and copy the ffmpeg library contents from “<FFMPEG-ROOT>/android/armv7-a/” folder to “<PROJECT-ROOT>/jni/ffmpeg/” folder using the following command in Terminal:

```
cp -r <FFMPEG-ROOT>/android/armv7-a/ <PROJECT-ROOT>/jni/ffmpeg/
```



- After copying, check if the following files are copied:
  - ■ ${PROJECT-ROOT}/jni/ffmpeg/include/
  - ■ ${PROJECT-ROOT}/jni/ffmpeg/lib/
  - ■ ${PROJECT-ROOT}/jni/ffmpeg/libffmpeg.so

- Create a C file under “jni” folder named "testjni.c". Also, copy the Android.mk file to the folder “${PROJECT-ROOT}/jni/”. Open the Android.mk file and edit it.
  - ■ You can change LOCAL_MODULE to any name you like
  - ■ Change LOCAL_SRC_FILES to you created C file.i.e. "testjni.c" at line 13:
  - ■



```
 1 LOCAL_PATH := $(call my-dir)
 2
 3 include $(CLEAR_VARS)
 4 LOCAL_MODULE := ffmpeg-prebuilt
 5 LOCAL_SRC_FILES := ffmpeg/libffmpeg.so
 6 LOCAL_EXPORT_C_INCLUDES := ffmpeg/include
 7 LOCAL_EXPORT_LDLIBS := ffmpeg/libffmpeg.so
 8 LOCAL_PRELINK_MODULE := true
 9 include $(PREBUILT_SHARED_LIBRARY)
10
11 include $(CLEAR_VARS)
12 LOCAL_MODULE := testjni
13 LOCAL_SRC_FILES := testjni.c
14 LOCAL_C_INCLUDES := $(LOCAL_PATH)/ffmpeg/include
15 LOCAL_LDLIBS := -lm -llog $(LOCAL_PATH)/ffmpeg/libffmpeg.so
16 include $(BUILD_SHARED_LIBRARY)
~
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"Android.mk" [noeol] 16L, 488C                                   1,1           All
```
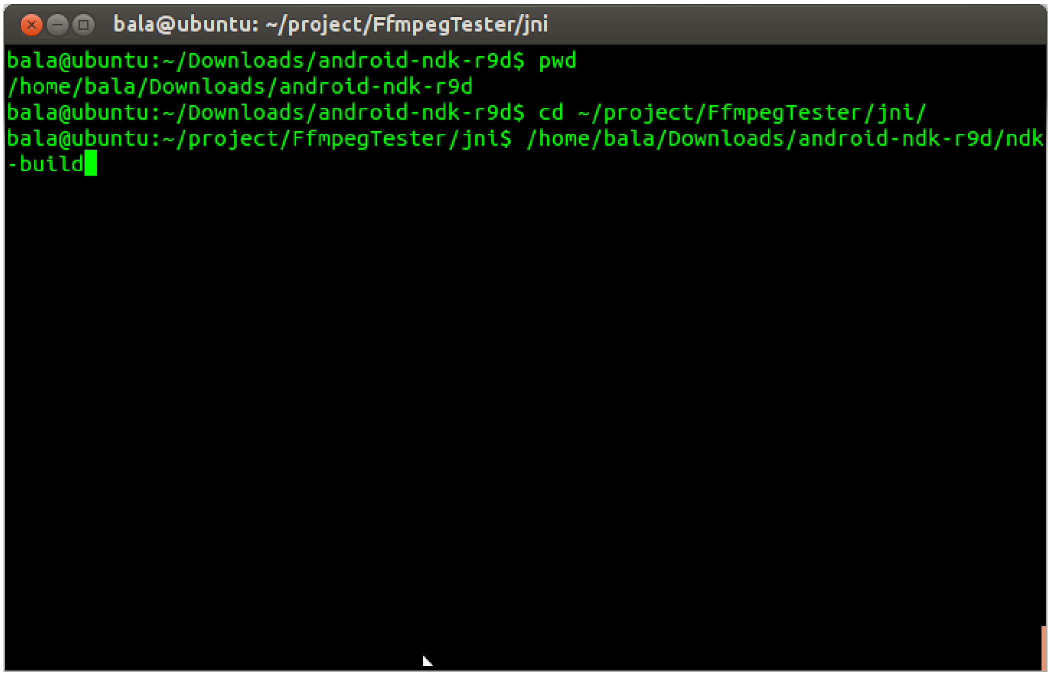
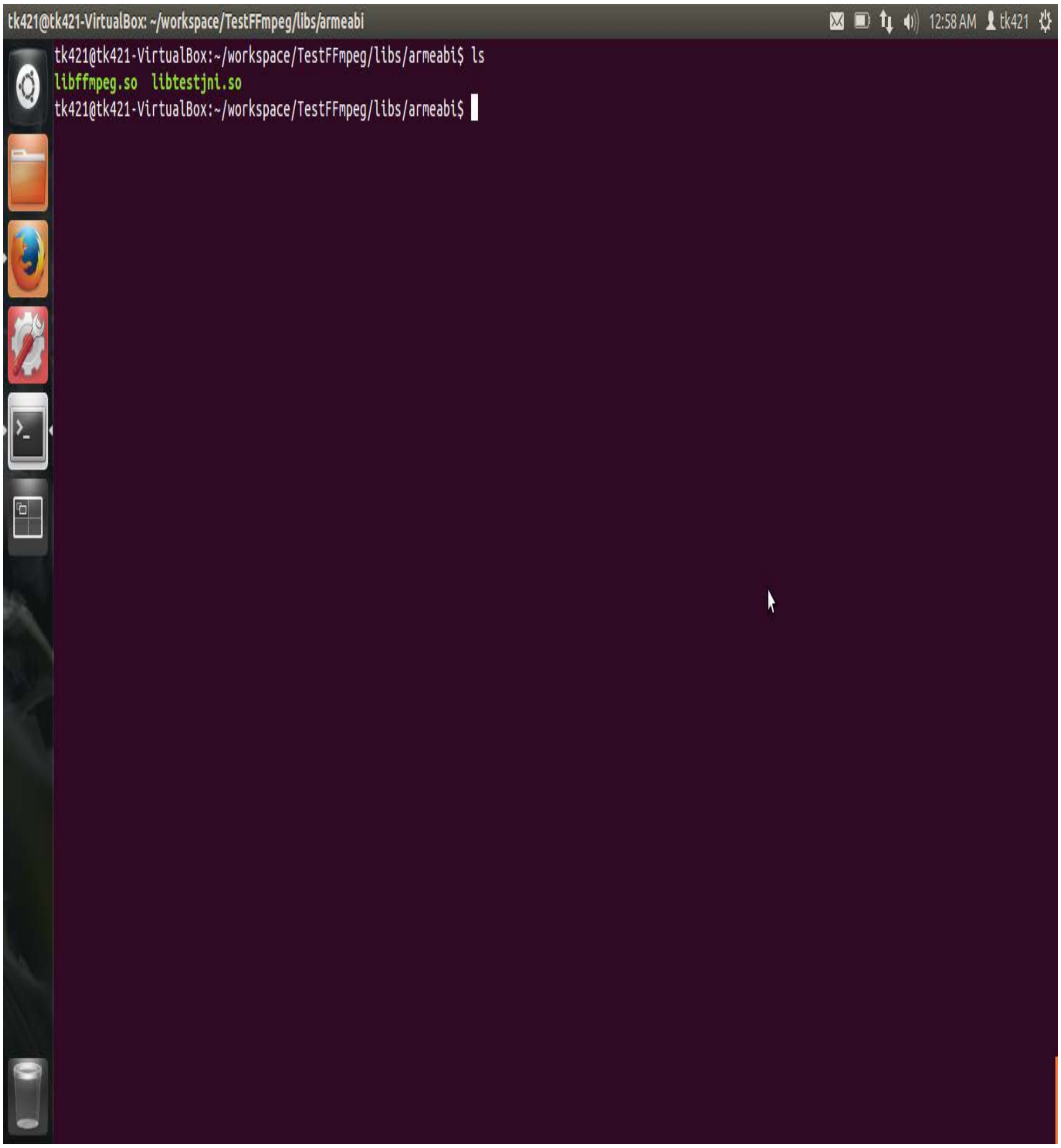

- Build the shared library for android
  - ■ Move to ${PROJECT-ROOT}/jni folder in the terminal
  - ■ Run the following command in the Terminal:

${NDK-ROOT}/ndk-build



```
bala@ubuntu:~/Downloads/android-ndk-r9d$ pwd
/home/bala/Downloads/android-ndk-r9d
bala@ubuntu:~/Downloads/android-ndk-r9d$ cd ~/project/FfmpegTester/jni/
bala@ubuntu:~/project/FfmpegTester/jni$ /home/bala/Downloads/android-ndk-r9d/ndk
-build
```

- Now, the shared object files are located at “${PROJECT-ROOT}/libs/<arch>/*.so”
  - At least two .so files will be here, first one is "libffmpeg.so", second one is lib<LOCAL_MODULE>.so
  - LOCAL_MODULE variable is defined in “${PROJECT-ROOT}/jni/Android.mk” file in the previous steps



```
tk421@tk421-VirtualBox:~/workspace/TestFFmpeg/libs/armeabi$ ls
libffmpeg.so  libtestjni.so
tk421@tk421-VirtualBox:~/workspace/TestFFmpeg/libs/armeabi$ 
```