

V3s 项目

CamDroid 编译第三方程序
/ V1.0

文档履历

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1. 交叉编译环境

- 交叉编译工具 arm-linux-androideabi-
- 使用的动态链接库 SYSTEM_LIB、BASE_LIB
- 使用的头文件 SYSTEM_INCLUDE、BASE_INCLUDE

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2. 第三方库的 Makefile 示例

```

TARGET=libdemo.so
SHARED=-shared
FPIC=-fPIC

BASE_ENV=xxx/cdr/prebuilts/gcc/linux-x86/arm/arm-linux-androideabi-4.6/bin
CROSS=arm-linux-androideabi-
CC = $(BASE_ENV)/$(CROSS)gcc
CPP = $(BASE_ENV)/$(CROSS)g++
STRIP = $(BASE_ENV)/$(CROSS)strip
AR = $(BASE_ENV)/$(CROSS)ar
LD = $(BASE_ENV)/$(CROSS)ld

BASE=xxx/cdr/prebuilts/ndk/8/platforms/android-14/arch-arm/usr
BASE_LIB=$(BASE)/lib
BASE_INCLUDE=$(BASE)/include

LDFLAGS=-L$(BASE_LIB)
LDFLAGS += -nostdlib -lstdc++ -lc -ldl -Bdynamic -Wl,-dynamic-linker,/system/bin/linker
EXTRA_OBJS = $(BASE_LIB)/crtbegin_dynamic.o $(BASE_LIB)/crtend_android.o
CFLAGS =-Wall -O0 -g
INCLUDES:=$(foreach dir,$(SRCDIRS),-I$(dir))
INCLUDES+= -I(BASE_INCLUDE)

BUILDPATH=.
SRCDIRS:=.
DATA_SRC=file

SRCCS=$(foreach dir,$(SRCDIRS),$(wildcard $(dir)/*.c))
LIBOBJ=$(addprefix $(BUILDPATH)/, $(addsuffix .o, $(basename $(SRCCS))))

all: $(TARGET)

$(BUILDPATH)/%.o:%.c
    $(CC) $(CFLAGS) ${INCLUDES} $(FPIC) -o $@ -c $<

$(TARGET):$(LIBOBJ)
    $(CC) $(LDFLAGS) $(SHARED) -o $@ $^ $(EXTRA_OBJS) $(LIBS)

clean:
    rm -f $(TARGET) $(LIBOBJ)

```

3. 第三方应用 Makefile 示例

```

TARGET=demo

BASE_ENV=xxx/cdr/prebuilts/gcc/linux-x86/arm/arm-linux-androideabi-4.6/bin
CROSS=arm-linux-androideabi-
CC = $(BASE_ENV)/$(CROSS)gcc
CPP = $(BASE_ENV)/$(CROSS)g++
STRIP = $(BASE_ENV)/$(CROSS)strip
AR = $(BASE_ENV)/$(CROSS)ar
LD = $(BASE_ENV)/$(CROSS)ld

BASE=xxx/cdr/prebuilts/ndk/8/platforms/android-14/arch-arm/usr
BASE_LIB=$(BASE)/lib
BASE_INCLUDE=$(BASE)/include

LDFLAGS=-L$(BASE_LIB) -L.
LDFLAGS += -nostdlib -lstdc++ -lc -ldl -Bdynamic -Wl,-dynamic-linker,/system/bin/linker -ldemo
EXTRA_OBJS = $(BASE_LIB)/crtbegin_dynamic.o $(BASE_LIB)/crtend_android.o
CFLAGS =-Wall -O0 -g
INCLUDES:=$(foreach dir,$(SRCDIRS),-I$(dir))
INCLUDES+= -I$(BASE_INCLUDE)

BUILDPATH=.
SRCDIRS:=.
DATA_SRC=file

SRCCS=$(foreach dir,$(SRCDIRS),$(wildcard $(dir)/*.c))
LIBOBJ=$(addprefix $(BUILDPATH)/, $(addsuffix .o, $(basename $(SRCCS))))

all: $(TARGET)

$(BUILDPATH)/%.o:%.c
    $(CC) $(CFLAGS) ${INCLUDES} -o $@ -c $<

$(TARGET):$(LIBOBJ)
    $(CC) $(LDFLAGS) -o $@ $^ $(EXTRA_OBJS) $(LIBS)

clean:
    rm -f $(TARGET) $(LIBOBJ)

```

4. 第三方应用 **CamLinux.mk** 示例

```
LOCAL_PATH:= $(call my-dir)
include $(CLEAR_VARS)
LOCAL_LDFLAGS += -L$(LOCAL_PATH)/../prebuilts -ldemo
LOCAL_SRC_FILES := hello.c
LOCAL_MODULE := hello
include $(BUILD_EXECUTABLE)
```

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5. 常见错误

5.1 -lpthread 找不到库

Android 编译环境集成线程库至 libc 中，从 libc 包含 pthread.h 可以看出，仅需要链接-lc 即可。

5.2 __exidx_start、__exidx_end 错误 (Android4.2 ndk8 bug)

应用编译完成，执行阶段报类似下面的错误信息

```
Cannot load library:      soinfo_relocate(linker.cpp:975): cannot locate symbol "__exidx_end" referenced by
```

找不到这个符号，解决方法，在所编译的库中任一 c 文件中加入：

```
void __exidx_start() {}
void __exidx_end() {}
```

Tips:

编译时，很多时候报 undefined function_xxx 之类找不到函数的错误。此时需要找到在 NDK 编译环境对应的库。

解决方法是利用 grep 和 find 命令。用 grep -rns "function_xxx" xxx/cdr/命令查找包含这个函数定义的 .h 文件或 .so 文件。分析最有可能包含这个函数的对应 ndk 版本下的库。编译时链接这个库就可以。

如找 time.h

```
find xxx/cdr/prebuilts/ndk/8/platforms/android-14/ -name "time.h"
```

```
xxx/cdr/prebuilts/ndk/8/platforms/android-14/arch-x86/usr/include/sys/time.h
xxx/cdr/prebuilts/ndk/8/platforms/android-14/arch-x86/usr/include/linux/time.h
xxx/cdr/prebuilts/ndk/8/platforms/android-14/arch-x86/usr/include/time.h
xxx/cdr/prebuilts/ndk/8/platforms/android-14/arch-arm/usr/include/sys/time.h
xxx/cdr/prebuilts/ndk/8/platforms/android-14/arch-arm/usr/include/linux/time.h
xxx/cdr/prebuilts/ndk/8/platforms/android-14/arch-arm/usr/include/time.h
xxx/cdr/prebuilts/ndk/8/platforms/android-14/arch-mips/usr/include/sys/time.h
xxx/cdr/prebuilts/ndk/8/platforms/android-14/arch-mips/usr/include/linux/time.h
xxx/cdr/prebuilts/ndk/8/platforms/android-14/arch-mips/usr/include/time.h
```

如找 pthread_create

```
grep -rns "pthread_create" xxx/cdr/prebuilts/ndk/8/platforms/android-14/
xxx/cdr/prebuilts/ndk/8/platforms/android-14/arch-x86/usr/include/pthread.h:139:int
pthread_create(pthread_t *thread, pthread_attr_t const * attr,
匹配到二进制文件 xxx/cdr/prebuilts/ndk/8/platforms/android-14/arch-x86/usr/lib/libc.a
匹配到二进制文件 xxx/cdr/prebuilts/ndk/8/platforms/android-14/arch-x86/usr/lib/libc.so
xxx/cdr/prebuilts/ndk/8/platforms/android-14/arch-arm/usr/include/pthread.h:139:int
pthread_create(pthread_t *thread, pthread_attr_t const * attr,
匹配到二进制文件 xxx/cdr/prebuilts/ndk/8/platforms/android-14/arch-arm/usr/lib/libc.a
匹配到二进制文件 xxx/cdr/prebuilts/ndk/8/platforms/android-14/arch-arm/usr/lib/libc.so
```



```
xxx/cdr/prebuilts/ndk/8/platforms/android-14/arch-mips/usr/include/pthread.h:139:int  
pthread_create(pthread_t *thread, pthread_attr_t const * attr,  
匹配到二进制文件 xxx/cdr/prebuilts/ndk/8/platforms/android-14/arch-mips/usr/lib/libc.a  
匹配到二进制文件 xxx/cdr/prebuilts/ndk/8/platforms/android-14/arch-mips/usr/lib/libc.so
```

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