

廈門大學



软件学院

《实用操作系统》实验报告

题 目 鸿蒙 LiteOS-a 内核移植——内存移植

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1 实验目的

实现鸿蒙 LiteOS-a 内核移植中的内存移植

2 实验步骤

1. 修改内存基地址和大小

打开 vendor\democop\demochip\board\include\board.h

找到

```
/* physical memory base and size */
#define DDR_MEM_ADDR      0xC0000000
#define DDR_MEM_SIZE      0x1C000000 /* 448M for os, reserved (512-448) for
ramfs and framebuffer */
```

改为

```
/* physical memory base and size */
#define DDR_MEM_ADDR      0x80000000
#define DDR_MEM_SIZE      0x20000000 /* 448M for os, reserved (512-448) for
ramfs and framebuffer */

#define DDR_RAMFS_ADDR (DDR_MEM_ADDR + DDR_MEM_SIZE)
```

2. 修改设备地址范围

打开 vendor\democom\demochip\board\include\board.h

找到

```
/* Peripheral register address base and size */
#define PERIPH_PMM_BASE    0x40000000
#define PERIPH_PMM_SIZE    0x20000000
```

改为

```

/* Peripheral register address base and size */
#define PERIPH_PMM_BASE      0x00a00000
#define PERIPH_PMM_SIZE     0x02300000

```

3. 重新编译

```

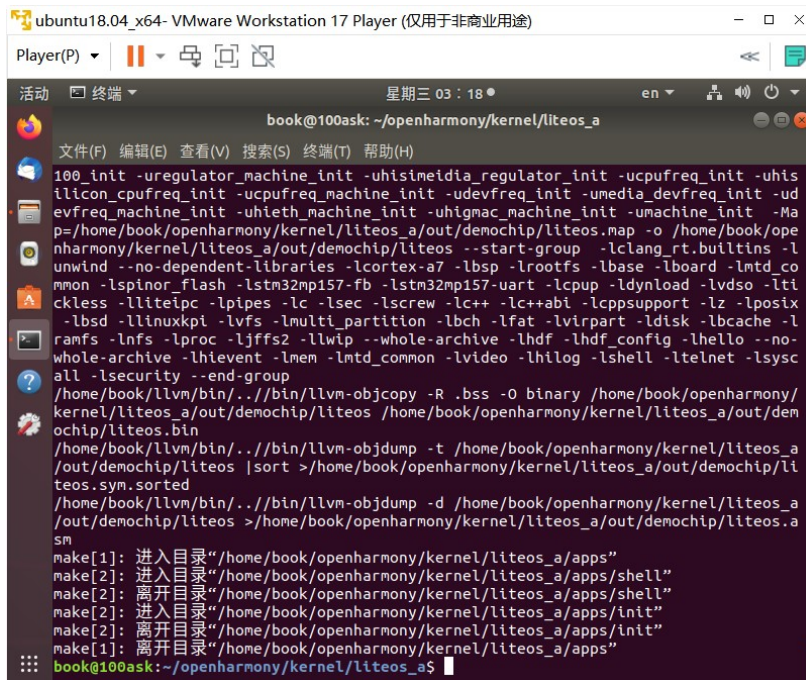
book@100ask: ~/openharmy/kernel/liteos_a
book@100ask:~/openharmy/kernel/liteos_a$ make clean
make[1]: 进入目录"/home/book/openharmony/kernel/liteos_a/arch/arm/arm"
make[1]: 离开目录"/home/book/openharmony/kernel/liteos_a/arch/arm/arm"
make[1]: 进入目录"/home/book/openharmony/kernel/liteos_a/platform"
make[1]: 离开目录"/home/book/openharmony/kernel/liteos_a/platform"
make[1]: 进入目录"/home/book/openharmony/kernel/liteos_a/kernel/common"
make[1]: 离开目录"/home/book/openharmony/kernel/liteos_a/kernel/common"
make[1]: 进入目录"/home/book/openharmony/kernel/liteos_a/kernel/base"
make[1]: 离开目录"/home/book/openharmony/kernel/liteos_a/kernel/base"
make[1]: 进入目录"/home/book/openharmony/vendor/democom/demochip/board"
make[1]: 离开目录"/home/book/openharmony/vendor/democom/demochip/board"
make[1]: 进入目录"/home/book/openharmony/vendor/democom/demochip/driver/mtdd/common"
make[1]: 离开目录"/home/book/openharmony/vendor/democom/demochip/driver/mtdd/common"
make[1]: 进入目录"/home/book/openharmony/vendor/democom/demochip/driver/mtdd/spi_no"
make[1]: 离开目录"/home/book/openharmony/vendor/democom/demochip/driver/mtdd/spi_no"
make[1]: 进入目录"/home/book/openharmony/vendor/democom/demochip/driver/stm32mp157-fb"
make[1]: 离开目录"/home/book/openharmony/vendor/democom/demochip/driver/stm32mp157-fb"
make[1]: 进入目录"/home/book/openharmony/vendor/democom/demochip/driver/stm32mp157-uart"
make[1]: 离开目录"/home/book/openharmony/vendor/democom/demochip/driver/stm32mp157-uart"
make[1]: 进入目录"/home/book/openharmony/kernel/liteos_a/kernel/extended/cup"
make[1]: 离开目录"/home/book/openharmony/kernel/liteos_a/kernel/extended/cup"

```

```

book@100ask: ~/openharmy/kernel/liteos_a
book@100ask:~/openharmy/kernel/liteos_a$ make -j 8
make[1]: 进入目录"/home/book/openharmony/kernel/liteos_a"
make[1]: 进入目录"/home/book/openharmony/kernel/liteos_a/tools/menuconfig/conf --silentoldconfig /home/book/openharmony/kernel/liteos_a/Kconfig"
mv -f /home/book/openharmony/kernel/liteos_a/include/generated/autoconf.h /home/book/openharmony/kernel/liteos_a/platform/include/menuconfig.h
make[1]: 离开目录"/home/book/openharmony/kernel/liteos_a"
make[1]: 进入目录"/home/book/openharmony/kernel/liteos_a/arch/arm/arm"
src/startup/reset_vector_up.S:138:2: warning: deprecated since v7, use 'dsb'
mcr p15, 0, r0, c7, c10, 4 @ DSB
src/startup/reset_vector_up.S:139:2: warning: deprecated since v7, use 'isb'
mcr p15, 0, r0, c7, c5, 4 @ ISB
make[1]: 离开目录"/home/book/openharmony/kernel/liteos_a/arch/arm/arm"
make[1]: 进入目录"/home/book/openharmony/kernel/liteos_a/platform"
make[1]: 离开目录"/home/book/openharmony/kernel/liteos_a/platform"
make[1]: 进入目录"/home/book/openharmony/kernel/liteos_a/kernel/common"
make[1]: 离开目录"/home/book/openharmony/kernel/liteos_a/kernel/common"
make[1]: 进入目录"/home/book/openharmony/kernel/liteos_a/kernel/base"
make[1]: 离开目录"/home/book/openharmony/kernel/liteos_a/kernel/base"
make[1]: 进入目录"/home/book/openharmony/vendor/democom/demochip/board"
make[1]: 离开目录"/home/book/openharmony/vendor/democom/demochip/board"
make[1]: 进入目录"/home/book/openharmony/vendor/democom/demochip/driver/mtdd/common"
make[1]: 离开目录"/home/book/openharmony/vendor/democom/demochip/driver/mtdd/common"
make[1]: 进入目录"/home/book/openharmony/vendor/democom/demochip/driver/mtdd/spi_no"

```



```
ubuntu18.04_x64- VMware Workstation 17 Player (仅用于非商业用途)
Player(P)
活动 终端
book@100ask: ~/openharmony/kernel/liteos_a
文件(F) 编辑(E) 查看(V) 搜索(S) 终端(T) 帮助(H)
100_init -uregulator_machine_init -uhisimeidia_regulator_init -ucpufreq_init -uhis
illicon_cpufreq_init -ucpufreq_machine_init -udevfreq_init -umedia_devfreq_init -ud
evfreq_machine_init -uhieth_machine_init -uhigmac_machine_init -umachine_init -Ma
p=/home/book/openharmony/kernel/liteos_a/out/demochip/liteos.map -o /home/book/ope
nharmony/kernel/liteos_a/out/demochip/liteos --start-group -lclang_rt.builtins -l
unwind --no-dependent-libraries -lcortex-a7 -lbsp -lrootfs -lbase -lboard -lmtl_co
mmon -lspinor_flash -lstm32mp157-fb -lstm32mp157-uart -lcup -ldynload -lvdso -lti
ckless -lliteipc -lpipes -lc -lsec -lscrew -lc++ -lc++abi -lcppsupport -lz -lposix
-lbsd -llinuxkpi -lvfs -lmulti_partition -lbch -lfat -lvirpart -ldisk -lbcache -l
ramfs -lnfs -lproc -ljffs2 -llwip --whole-archive -lhdf -lhdf_config -lhello --no-
whole-archive -lhievent -lmem -lmtl_common -lvideo -lhilog -lshell -ltelnet -lsysc
all -lsecurity --end-group
/home/book/llvm/bin/./bin/llvm-objcopy -R .bss -O binary /home/book/openharmony/
kernel/liteos_a/out/demochip/liteos /home/book/openharmony/kernel/liteos_a/out/dem
ochip/liteos.bin
/home/book/llvm/bin/./bin/llvm-objdump -t /home/book/openharmony/kernel/liteos_a
/out/demochip/liteos |sort >/home/book/openharmony/kernel/liteos_a/out/demochip/li
teos.sym.sorted
/home/book/llvm/bin/./bin/llvm-objdump -d /home/book/openharmony/kernel/liteos_a
/out/demochip/liteos >/home/book/openharmony/kernel/liteos_a/out/demochip/liteos.a
sm
make[1]: 进入目录"/home/book/openharmony/kernel/liteos_a/apps"
make[2]: 进入目录"/home/book/openharmony/kernel/liteos_a/apps/shell"
make[2]: 离开目录"/home/book/openharmony/kernel/liteos_a/apps/shell"
make[2]: 进入目录"/home/book/openharmony/kernel/liteos_a/apps/init"
make[2]: 离开目录"/home/book/openharmony/kernel/liteos_a/apps/init"
make[1]: 离开目录"/home/book/openharmony/kernel/liteos_a/apps"
book@100ask:~/openharmony/kernel/liteos_a$
```

3 实验遇到的问题及其解决方法

无

4 我的体会

在这个实验中，我学习了鸿蒙 liteos 内核移植的一部分内容，即内存移植，掌握了 ARM 架构中一级页表映射和二级页表映射的原理，一级 cache 和 buffer 的实现原理、应用和作用。通过本次实验，我更好的理解了操作系统的内存管理原理。