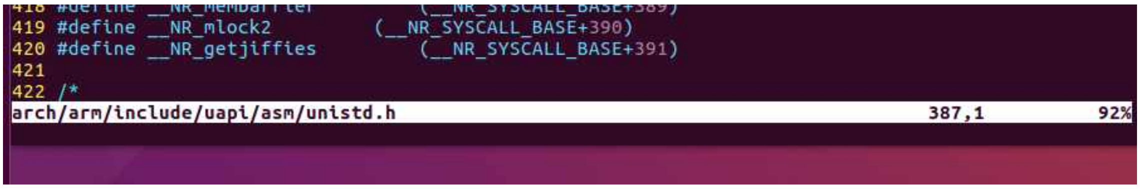
1) 새로운 system call 추가 :

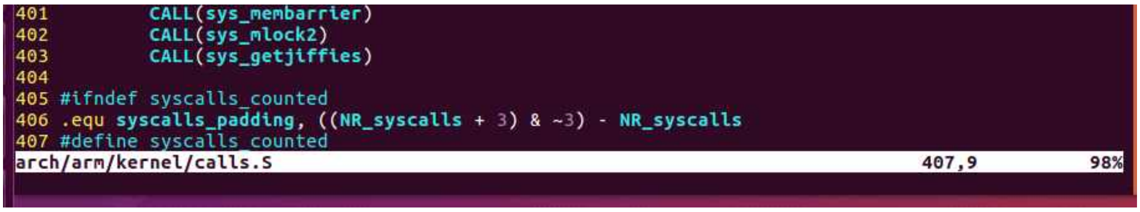
int getjiffies(unsigned long *p_jiffies) : Linux kernel이 관리하는 jiffies 값을 전달

- Add System call number



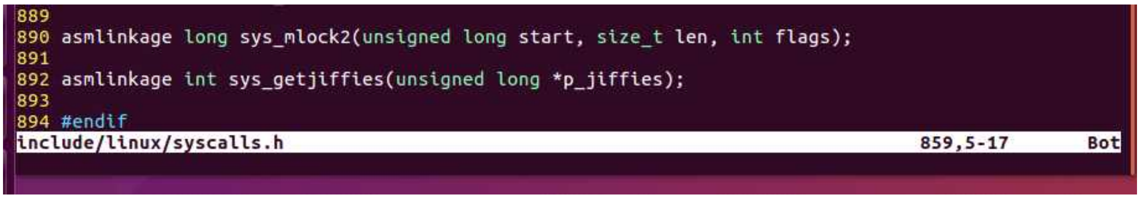
```
#define __NR_membarrier          (__NR_SYSCALL_BASE+389)
#define __NR_mlock2         (__NR_SYSCALL_BASE+390)
#define __NR_getjiffies          (__NR_SYSCALL_BASE+391)

/*
arch/arm/include/uapi/asm/unistd.h                                 387,1          92%
```

- Register System call function



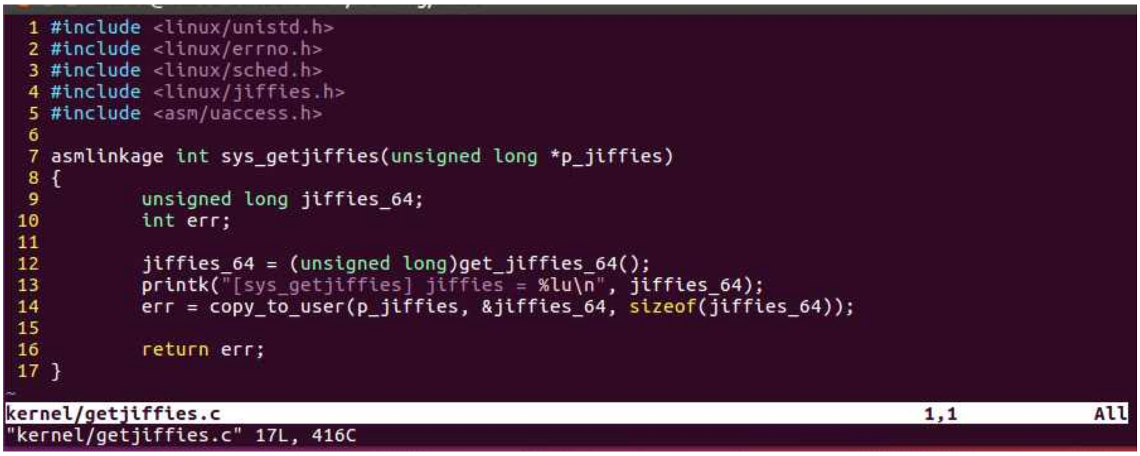
```
                CALL(sys_membarrier)
                CALL(sys_mlock2)
                CALL(sys_getjiffies)

#ifndef syscalls_counted
.equ syscalls_padding, ((NR_syscalls + 3) & ~3) - NR_syscalls
#define syscalls_counted
arch/arm/kernel/calls.S                                            407,9          98%
```

- Register System call function



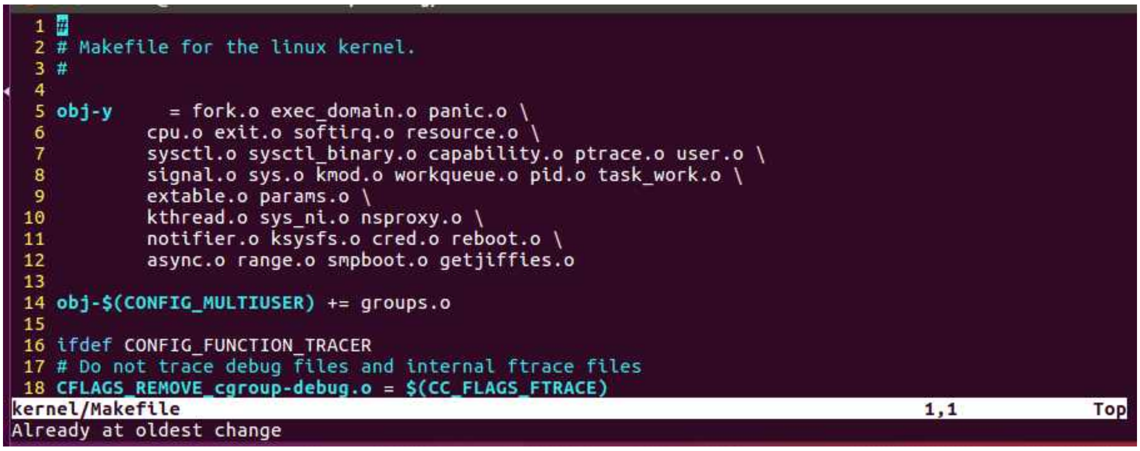
```

asmlinkage long sys_mlock2(unsigned long start, size_t len, int flags);

asmlinkage int sys_getjiffies(unsigned long *p_jiffies);

#endif
include/linux/syscalls.h                                           859,5-17       Bot
```

- System call code



```
#include <linux/unistd.h>
#include <linux/errno.h>
#include <linux/sched.h>
#include <linux/jiffies.h>
#include <asm/uaccess.h>

asmlinkage int sys_getjiffies(unsigned long *p_jiffies)
{
        unsigned long jiffies_64;
        int err;

        jiffies_64 = (unsigned long)get_jiffies_64();
        printk("[sys_getjiffies] jiffies = %lu\n", jiffies_64);
        err = copy_to_user(p_jiffies, &jiffies_64, sizeof(jiffies_64));

        return err;
}
~
kernel/getjiffies.c                                                1,1            All
"kernel/getjiffies.c" 17L, 416C
```

- Makefile code

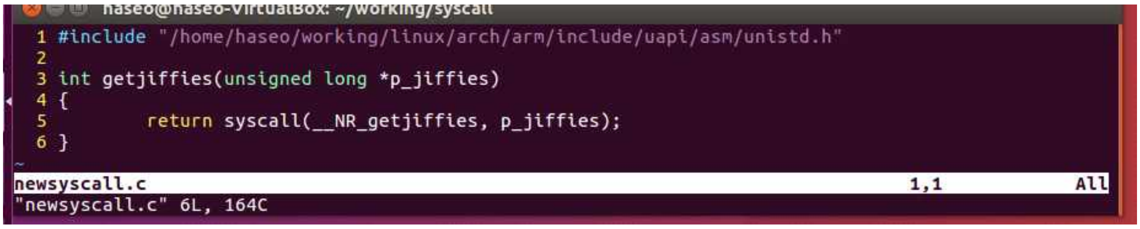


```
#
# Makefile for the linux kernel.
#

obj-y     = fork.o exec_domain.o panic.o \
	    cpu.o exit.o softirq.o resource.o \
	    sysctl.o sysctl_binary.o capability.o ptrace.o user.o \
	    signal.o sys.o kmod.o workqueue.o pid.o task_work.o \
	    extable.o params.o \
	    kthread.o sys_ni.o nsproxy.o \
	    notifier.o ksysfs.o cred.o reboot.o \
	    async.o range.o smpboot.o getjiffies.o

obj-$(CONFIG_MULTIUSER) += groups.o

ifdef CONFIG_FUNCTION_TRACER
# Do not trace debug files and internal ftrace files
CFLAGS_REMOVE_cgroup-debug.o = $(CC_FLAGS_FTRACE)
kernel/Makefile                                                    1,1           Top
Already at oldest change
```

- Kernel compile

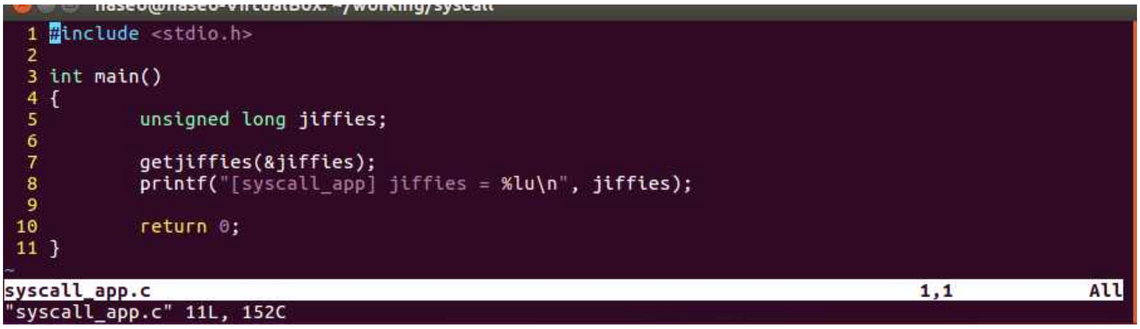
2) 1)을 테스트하기 위한 application program 작성

- System call library



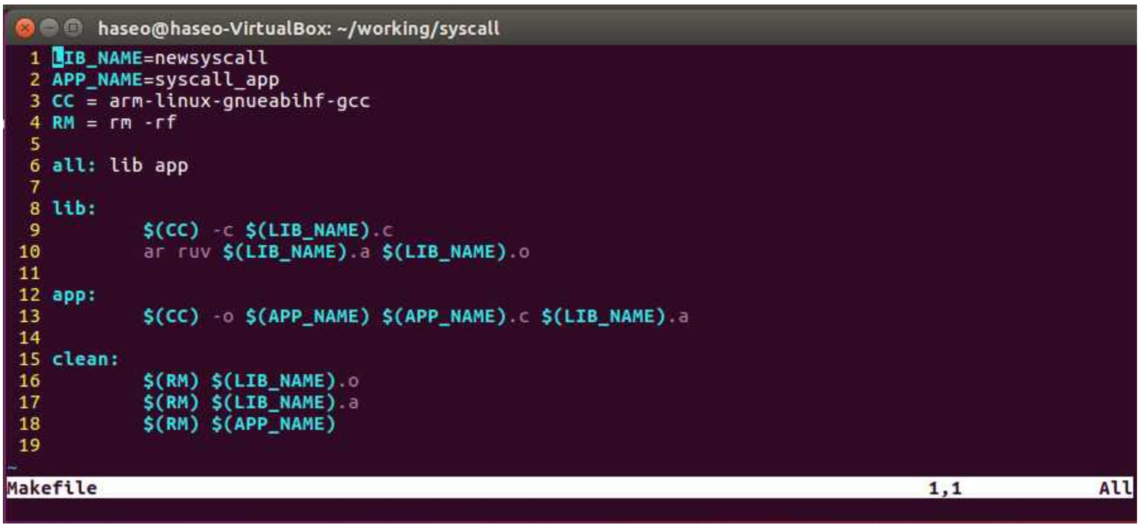
```c
#include "/home/haseo/working/linux/arch/arm/include/uapi/asm/unistd.h"

int getjiffies(unsigned long *p_jiffies)
{
        return syscall(__NR_getjiffies, p_jiffies);
}
~
newsyscall.c                                                    1,1            All
"newsyscall.c" 6L, 164C
```

- System call application



```c
#include <stdio.h>

int main()
{
        unsigned long jiffies;

        getjiffies(&jiffies);
        printf("[syscall_app] jiffies = %lu\n", jiffies);

        return 0;
}
~
syscall_app.c                                                   1,1            All
"syscall_app.c" 11L, 152C
```

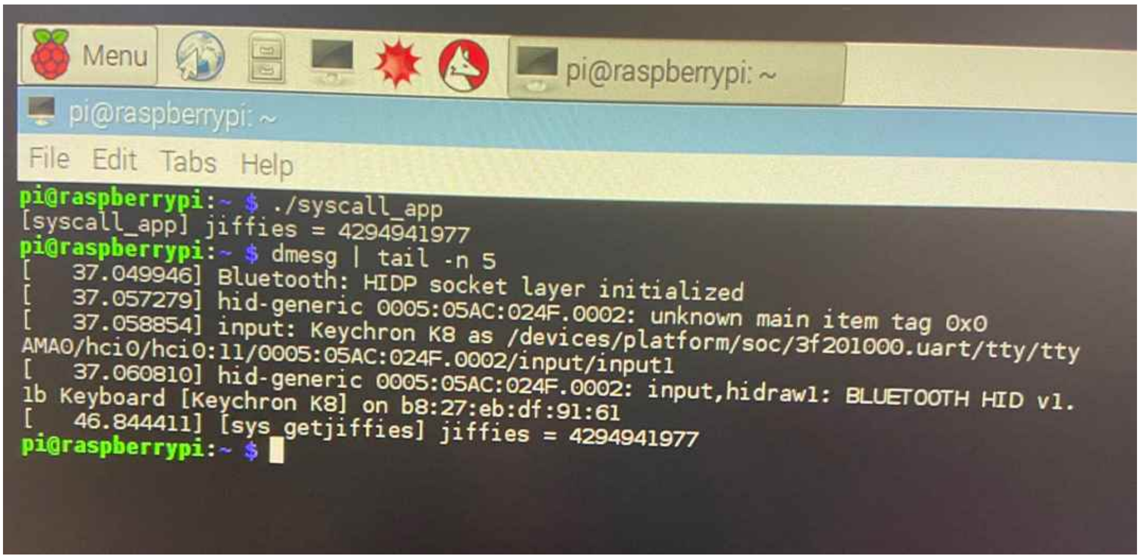
- Makefile



```makefile
LIB_NAME=newsyscall
APP_NAME=syscall_app
CC = arm-linux-gnueabihf-gcc
RM = rm -rf

all: lib app

lib:
        $(CC) -c $(LIB_NAME).c
        ar ruv $(LIB_NAME).a $(LIB_NAME).o

app:
        $(CC) -o $(APP_NAME) $(APP_NAME).c $(LIB_NAME).a

clean:
        $(RM) $(LIB_NAME).o
        $(RM) $(LIB_NAME).a
        $(RM) $(APP_NAME)

~
Makefile                                                        1,1            All
```

- Transmit kernel image & system call application

- Execute system call application



```
pi@raspberrypi:~ $ ./syscall_app
[syscall_app] jiffies = 4294941977
pi@raspberrypi:~ $ dmesg | tail -n 5
[   37.049946] Bluetooth: HIDP socket layer initialized
[   37.057279] hid-generic 0005:05AC:024F.0002: unknown main item tag 0x0
[   37.058854] input: Keychron K8 as /devices/platform/soc/3f201000.uart/tty/tty
AMA0/hci0/hci0:11/0005:05AC:024F.0002/input/input1
[   37.060810] hid-generic 0005:05AC:024F.0002: input,hidraw1: BLUETOOTH HID v1.
1b Keyboard [Keychron K8] on b8:27:eb:df:91:61
[   46.844411] [sys_getjiffies] jiffies = 4294941977
pi@raspberrypi:~ $ 
```