

Operating system experiment report

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2. **Working target:** Adding a system-call into a open source kernel and change it into Ubuntu system. After that, write a program to call the kernel.

Working environment: Window10 as basic operating system with “virtual box” virtual machine and Ubuntu18.04 running on it. The kernel I use is linux_5.02.

3. **Steps:**

1. Write a system-call function into the sys.c file, which is in the folder /linux_5.02./kernel/

```
asmlinkage long sys_hello(void){  
    printk("Hello Ubuntu");  
    return 71117408;  
}
```

2. Add a statement into the system-call registry syscall_64.tbl, which is in the folder/linux_5.02./arch/x86/entry/. In the kernel I use, the registry number is 548 since there already have 547 entry. Because I use a 64bit machine, so the registry is:

```
548 64 hello sys_hello
```

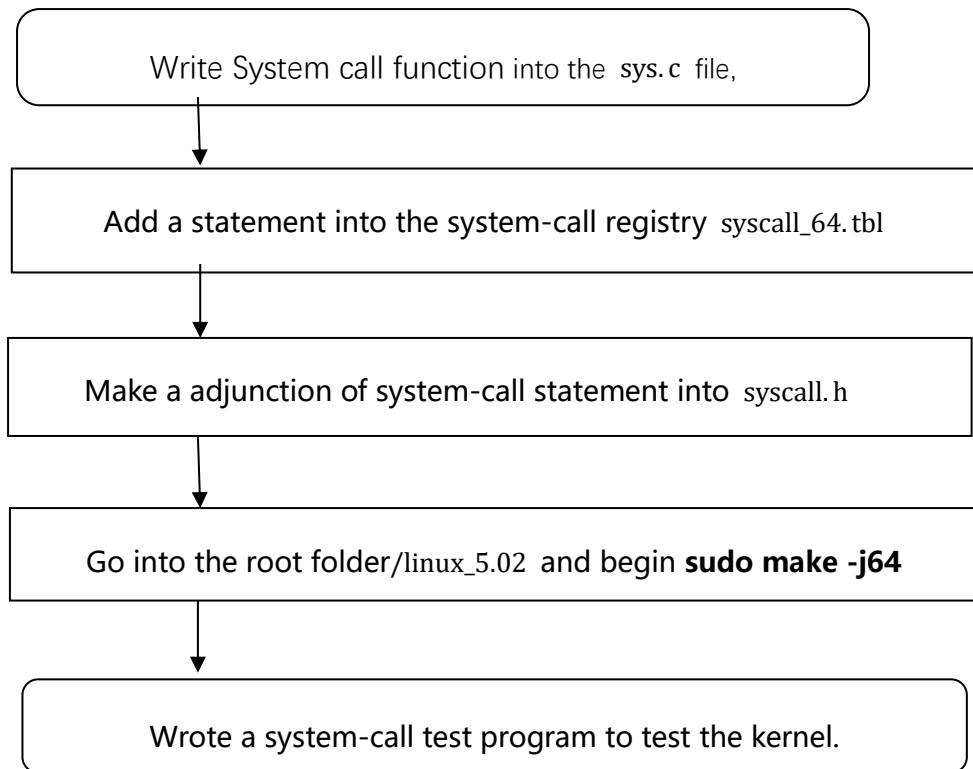
3. Make a adjunction of system-call statement into syscall.h, which is in the folder /linux_5.02./include/linux/

```
asmlinkage long sys_hello(void);
```

4. After that, I go into the root folder/linux_5.02 and begin **sudo make -j64**, I used 64 threads to make the compile faster.
5. After the compiling and new kernel installing, I got a new system which have a system-call interface I had just written. Then I wrote a system-call test program to test it.

```
#include<studio>  
#include<sys/syscall.h>  
#include<linux/kernel.h>  
#include<unistd.h>  
int main(){  
    long use = syscall(548);  
    printf("System call, ly: %ld\n",use);  
    return 0;  
}
```

4. **Flow chart:**



5. Main data structure:

As a result of using Linux kernel, I only need to use long as a representation of the return value of my function. I make my function code return school number 7117408.

6. Experiment result:

The kernel successfully returned my school number: 7117408.

```
ly@ly-VirtualBox: ~  
File Edit View Search Terminal Help  
ly@ly-VirtualBox:~$ ./test  
System call, ly:7117408  
ly@ly-VirtualBox:~$
```

7. Filling of experiment:

To achieve in adding system call function, I need to write a function into the system main file, and make sure I remember the number of it. Then I add the number into system call registry. Then I also add a statement into system call header file. After doing all of this, I began running the kernel to replace my old one. Use multi thread in code running make it faster, however it took more main memory to remember threads.