

Yuvan Rengifo

I pledge my honor that I have abided by the Stevens honor System.

```
yrengifo@debian: ~  
yrengifo@debian:~$ uname -a  
Linux debian 6.1.76-yrengifo-pa2 #1 SMP PREEMPT_DYNAMIC Sat Feb 17 22:56:47 EST 2024 x86_64 GNU/Linux  
yrengifo@debian:~$ id  
uid=1000(yrengifo) gid=1000(yrengifo) groups=1000(yrengifo),27(sudo),100(users),995(vboxsf)  
yrengifo@debian:~$
```

“Working” kernel (Section 3) ^^^

```
yrengifo@debian: ~/yrengifo-pa2/module  
yrengifo@debian:~/yrengifo-pa2/module$ sudo insmod ./yrengifo.ko  
yrengifo@debian:~/yrengifo-pa2/module$ sudo rmmod yrengifo  
yrengifo@debian:~/yrengifo-pa2/module$ sudo insmod ./yrengifo.ko  
yrengifo@debian:~/yrengifo-pa2/module$ sudo rmmod yrengifo  
yrengifo@debian:~/yrengifo-pa2/module$ uname -a  
Linux debian 6.1.76-yrengifo-pa2 #1 SMP PREEMPT_DYNAMIC Sat Feb 17 22:56:47 EST 2024 x86_64 GNU/Linux  
yrengifo@debian:~/yrengifo-pa2/module$
```

```
yrengifo@debian: ~/yrengifo-pa2/module  
4,571,57304915,-;22:25:35.655227 main VBoxService 7.0.10 r158379 (verbosity: 0) linux.amd64 (35.655231 main Log opened 2024-02-21T22:25:35.655217000Z  
4,572,57307008,-;22:25:35.656419 main OS Product: Linux  
4,573,57308463,-;22:25:35.658499 main OS Release: 6.1.76-yrengifo-pa2  
4,574,57309799,-;22:25:35.659940 main OS Version: #1 SMP PREEMPT_DYNAMIC Sat Feb 17 22:56:47  
4,575,57311059,-;22:25:35.661267 main Executable: /opt/VBoxGuestAdditions-7.0.10/sbin/VBoxSe  
: 812x0a22:25:35.661270 main Package type: LINUX_64BITS_GENERIC  
4,576,57643541,-;22:25:35.993583 main 7.0.10 r158379 started. Verbose level = 0  
4,577,57734028,-;22:25:36.083916 main vbglR3GuestCtrlDetectPeekGetCancelSupport: Supported (#  
4,578,59162349,-;vboxsf: g_fHostFeatures=0x8000000f g_fsFeatures=0x1 g_uSfLastFunction=29  
6,579,59192438,-;vboxsf: Successfully loaded version 7.0.10 r158379  
4,580,59193131,-;vboxsf: Successfully loaded version 7.0.10 r158379 on 6.1.76-yrengifo-pa2 (LINUX  
4,581,59324922,-;22:25:37.676047 automount vbsvcAutomounterMountIt: Successfully mounted 'shared'  
4,582,62269873,-;kauditd_printk_skb: 14 callbacks suppressed  
5,583,62269878,-;audit: type=1400 audit(1708554340.593:26): apparmor="DENIED" operation="capable"  
psd" capability=12 capname="net_admin"  
6,584,65676411,-;e1000: enp0s3 NIC Link is Up 1000 Mbps Full Duplex, Flow Control: RX  
6,585,66016766,-;NET: Registered PF_QIPCRTR protocol family  
6,586,66699403,-;IPv6: ADDRCONF(NETDEV_CHANGE): enp0s3: link becomes ready  
7,587,106072363,-;rfkill: input handler disabled  
7,588,139207046,-;rfkill: input handler enabled  
7,589,158891492,-;rfkill: input handler disabled  
4,590,857212814,-;sched: RT throttling activated  
1,591,7064453929,-;  
1,592,7159062219,-;  
1,593,7275734636,-;  
1,594,7318596431,-;  
1,595,8003074993,-;Hello World from YUVAN RENGIFO(yrengifo)  
1,596,8026171230,-;PID is 126123520 and program name is (null)  
1,597,8706338691,-;Hello World from YUVAN RENGIFO(yrengifo)  
6,598,9417809719,-;PID is 10360 and program name is rmmod  
1,599,9444747428,-;Hello World from YUVAN RENGIFO(yrengifo)  
6,600,9452383434,-;PID is 10371 and program name is rmmod  
1,601,9468022945,-;Hello World from YUVAN RENGIFO(yrengifo)  
6,602,9473125261,-;PID is 10381 and program name is rmmod
```

Kernel module works (Section 4) ^^^ Right panel output: Correct output (fixed) after [null]

```
yrengifo@debian: ~/yrengifo-pa2
yrengifo@debian:~/yrengifo-pa2$ uname -a
Linux debian 6.1.76-yrengifo-pa2 #7 SMP PREEMPT_DYNAMIC Thu Feb 22 19:56:21 EST 2024 x86_64 GNU/Linux
yrengifo@debian:~/yrengifo-pa2$ ./syscall
STR1 before: The quick brown fox jumps over the lazy dog
syscall result: -1
STR1 after: The quick brown fox jumps over the lazy dog
STR2 before: hequicrofoxjumoverhelazydog
syscall result: 12
STR2 after: hYqYYcrYfYxjYmYvYrhYlYzYdYg
yrengifo@debian:~/yrengifo-pa2$
```

```
yrengifo@debian: ~/pa2/my_syscall
0f bc c2 c3 66 0f 1f 84 00 00 00 00 00 48 83 e0 c0 <66> 0f 74 00 66 0f 74 48 10 66 0f 74 50 20 66
0f 74 58 30 66 0f d7
6,614,2533842900,-;before: hequicrofoxjumoverhelazydog\x0a
6,615,2533842904,-;after: hYqYYcrYfYxjYmYvYrhYlYzYdYg\x0a
6,616,2597916042,-;before: hequicrofoxjumoverhelazydog\x0a
6,617,2597916047,-;after: hYqYYcrYfYxjYmYvYrhYlYzYdYg\x0a
6,618,3034143858,-;before: hequicrofoxjumoverhelazydog\x0a
6,619,3034143865,-;after: hYqYYcrYfYxjYmYvYrhYlYzYdYg\x0a
6,620,3368340453,-;before: hequicrofoxjumoverhelazydog
6,621,3368340459,-;after: hYqYYcrYfYxjYmYvYrhYlYzYdYg
6,622,3441329852,-;before: hequicrofoxjumoverhelazydog
6,623,3441329857,-;after: hYqYYcrYfYxjYmYvYrhYlYzYdYg
6,624,3829259364,-;syscall[4556]: segfault at ffffffffcc0 ip 00007fb5b5a42d24 sp 00007ffdb2b6
798 error 5 in libc.so.6[7fb5b59bf000+155000] likely on CPU 2 (core 2, socket 0)
6,625,3829259380,-;Code: 09 ca 48 89 f9 48 31 c1 48 83 e0 c0 48 d3 fa 48 85 d2 0f 84 7e 00 00 00 48
0f bc c2 c3 66 0f 1f 84 00 00 00 00 00 48 83 e0 c0 <66> 0f 74 00 66 0f 74 48 10 66 0f 74 50 20 66
0f 74 58 30 66 0f d7
6,626,4444933930,-;syscall[4603]: segfault at fffffffc0 ip 00007f43e7a5ed24 sp 00007ffc75639c98 erro
r 4 in libc.so.6[7f43e79db000+155000] likely on CPU 2 (core 2, socket 0)
6,627,4444933943,-;Code: 09 ca 48 89 f9 48 31 c1 48 83 e0 c0 48 d3 fa 48 85 d2 0f 84 7e 00 00 00 48
0f bc c2 c3 66 0f 1f 84 00 00 00 00 00 48 83 e0 c0 <66> 0f 74 00 66 0f 74 48 10 66 0f 74 50 20 66
0f 74 58 30 66 0f d7
6,628,4973359626,-;before: hequicrofoxjumoverhelazydog
6,629,4973359630,-;after: hYqYYcrYfYxjYmYvYrhYlYzYdYg
6,630,5000056229,-;before: hequicrofoxjumoverhelazydog
6,631,5000056234,-;after: hYqYYcrYfYxjYmYvYrhYlYzYdYg
```

The system call and user space test program are working. (Section 5.2) ^^^