

M1522.000800 System Programming
Fall 2018

System Programming Buflab Report

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1. <lab> Kernel Lab

The goal of the kernel lab is to Linux Kernel Module Programming based on Debug File System interface. There are two assignment, the one is tracing process tree from specific process id which is process now, and the other is finding physical address using virtual address.

2. Implementation

2.1 Tracing process tree

This assignment is to tracing specific process which we have pid we enter. For this, we have to know file_operations and kernel module. We use write file operations and init kernel module. We use debugfs create blob to make output file and debugfs_create_file under ptree direction to create input file. First, fill arguments each methods and fill write_pid_to_input method. We get input_pid by user_buffer and use this we find pid_task and store it in string buffer. Then using while sentence we trace parent task struct to concat it in string buffer. Lastly, make myblob->data point string buffer and size to string buffer size.

2.2 Virtual address to Physical address

This assignment is to print virtual address to physical address. First, we have to fill argument to make output file under paddr direction. We use two argument pid, virtual address. Pid to find mm struct and virtual address to trace pte and find exact physical address. For this, we use read instruction and read_output method. We use user_buffer which contain pid, virtualaddress and have same struct with pkt. From user_buffer we know pid, virtual address and make virtual to physical method using this. We use pgd_offset, pud_offset, pmd_offset, pte_offset_map, pte_page, page_to_phys command sequentially. And then make pkt->paddr = physical address. Pkt have same point with user buffer so it is now finish.

3. Conclusion

From this lab, I could know what is kernel module and how to trace process tree, how to trace physical address from virtual address. More fundamentally, I could know what is process tree and what task struct contains, and what is virtual address and how to map it in real OS. During this lab, the hardest thing is find what command we have to use, and how to use that. There is no enough

example to use command and confused what argument I have to enter. For this reason, I also learn how to find solution to unknown problem and can have good skill to search google!.

Tips:

- do not copy-paste screenshots of your code. Format it properly as text*
- length: do not exceed 5 pages. There is no lower limit, but one page is probably not detailed enough.*

