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Факультет информационных технологий и прикладной математики Кафедра вычислительной математики и программирования

> Лабораторные работы №8 по курсу «Операционные системы»

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Репозиторий

https://github.com/velievrauf/OS/tree/main/lab 8

Постановка задачи

Цель работы

Приобретение практических навыков диагностики работы программного обеспечения.

Задание

При выполнении лабораторных работ по курсу ОС необходимо продемонстрировать ключевые системные вызовы, которые в них используются и то, что их использование соответствует варианту ЛР. По итогам выполнения всех лабораторных работ отчет по данной ЛР должен содержать краткую сводку по исследованию написанных программ.

Демонстрация работы программы

Лабораторная работа №1

Системные вызовы:

- **execve** запуск исполняемого файла.
- mmap выделение памяти.
- **openat** открытие файлов.
- close закрытие файловых дескрипторов.
- read чтение данных.
- write запись данных.

```
execve("./labsf", ["./labsf"], 0x7fff916d7f50 /* 44 vars */) = 0
brk(NULL) = 0x55ab2fadb000
arch_prctl(0x3001 /* ARCH_??? */, 0x7ffe8330b900) = -1 EINVAL (Недопустимый аргумент)
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7c08f245f000
```

```
access("/etc/ld.so.preload", R OK) = -1 ENOENT (Нет такого файла или каталога)
openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=60907, ...}, AT_EMPTY_PATH) = 0
mmap(NULL, 60907, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7c08f2450000
close(3)
openat(AT FDCWD, "/lib/x86 64-linux-gnu/libc.so.6", O RDONLY|O CLOEXEC) = 3
pread64(3, "|4|0|0|0|24|0|0|0|3|0|0|0GNU|0I|17|357|204|3$|f|221|2039x|324|224|323|236S"..., 68, 896) = 68
newfstatat(3, "", {st_mode=S_IFREG|0755, st_size=2220400, ...}, AT_EMPTY_PATH) = 0
mmap(NULL, 2264656, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7c08f2200000
mprotect(0x7c08f2228000, 2023424, PROT NONE) = 0
mmap(0x7c08f2228000, 1658880, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
 0x28000) = 0x7c08f2228000
mmap(0x7c08f23bd000, 360448, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1bd000) =
 0x7c08f23bd000
mmap(0x7c08f2416000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
 0x215000) = 0x7c08f2416000
mmap(0x7c08f241c000, 52816, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) =
 0x7c08f241c000
                   =0
close(3)
mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7c08f244d000
arch_prctl(ARCH_SET_FS, 0x7c08f244d740) = 0
set\_tid\_address(0x7c08f244da10)
                            =4016
set_robust_list(0x7c08f244da20, 24) = 0
rseq(0x7c08f244e0e0, 0x20, 0, 0x53053053) = 0
mprotect(0x7c08f2416000, 16384, PROT_READ) = 0
mprotect(0x55ab2ea63000, 4096, PROT_READ) = 0
mprotect(0x7c08f2499000, 8192, PROT_READ) = 0
prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024, rlim_max=RLIM64_INFINITY}) = 0
munmap(0x7c08f2450000, 60907)
                             =0
pipe2([3, 4], 0)
                     =0
pipe2([5, 6], 0)
                     =0
clone(child_stack=NULL, flags=CLONE_CHILD_CLEARTID|CLONE_CHILD_SETTID|SIGCHLD,
 child tidptr=0x7c08f244da10) = 4017
close(3)
                   =0
```

=0

close(6)

```
newfstatat(1, "", {st mode=S IFCHR|0620, st rdev=makedev(0x88, 0), ...}, AT EMPTY PATH) = 0
getrandom("\x9c\xdc\x5f\x78\xc9\x04\x73\x4f", 8, GRND_NONBLOCK) = 8
brk(NULL)
                           = 0x55ab2fadb000
brk(0x55ab2fafc000)
                              = 0x55ab2fafc000
newfstatat(0, "", {st mode=S IFCHR|0620, st rdev=makedev(0x88, 0), ...}, AT EMPTY PATH) = 0
write(1, "\320\222\320\262\320\265\320\265\320\264\320\270\321\202\320\265\321\207\320\270\321\201\320\270\320\260
 (\321\200\320\260\320"..., 101Введите числа (разделенные пробелами), завершите <endline>: ) = 101
read(0, 0x55ab2fadb6b0, 1024)
                                 = ? ERESTARTSYS (To be restarted if SA_RESTART is set)
--- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
read(0, 0x55ab2fadb6b0, 1024)
                                 = ? ERESTARTSYS (To be restarted if SA_RESTART is set)
--- SIGWINCH {si signo=SIGWINCH, si code=SI KERNEL} ---
read(0, 0x55ab2fadb6b0, 1024)
                                 = ? ERESTARTSYS (To be restarted if SA RESTART is set)
--- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
read(0, 0x55ab2fadb6b0, 1024)
                                 = ? ERESTARTSYS (To be restarted if SA_RESTART is set)
--- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
--- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
                                 = ? ERESTARTSYS (To be restarted if SA_RESTART is set)
read(0, 0x55ab2fadb6b0, 1024)
--- SIGWINCH {si_signo=SIGWINCH, si_code=SI
```

Лабораторная работа №2

Системные вызовы:

- **execve** запуск исполняемого файла.
- ттар выделение памяти.
- openat открытие файлов.
- write вывод на экран.
- exit_group завершение процесса.

```
execve("./lab2", ["./lab2"], 0x7ffda9f13f60 /* 44 vars */) = 0
brk(NULL) = 0x5c0b1d19c000
arch_prctl(0x3001 /* ARCH_??? */, 0x7fffb173de50) = -1 EINVAL (Недопустимый аргумент)
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x701835097000
access("/etc/ld.so.preload", R_OK) = -1 ENOENT (Нет такого файла или каталога)
openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=60907, ...}, AT_EMPTY_PATH) = 0
```

```
mmap(NULL, 60907, PROT READ, MAP PRIVATE, 3, 0) = 0x701835088000
close(3)
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
pread64(3, "|4|0|0|0|24|0|0|0|3|0|0|0GNU|0I|17|357|204|3$|f|221|2039x|324|224|323|236S"..., 68, 896) = 68
newfstatat(3, "", {st mode=S IFREG|0755, st size=2220400, ...}, AT EMPTY PATH) = 0
mmap(NULL, 2264656, PROT READ, MAP PRIVATE|MAP DENYWRITE, 3, 0) = 0x701834e00000
mprotect(0x701834e28000, 2023424, PROT_NONE) = 0
mmap(0x701834e28000, 1658880, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x28000) = 0x701834e28000
mmap(0x701834fbd000, 360448, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1bd000) =
0x701834fbd000
mmap(0x701835016000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x215000) = 0x701835016000
mmap(0x70183501c000, 52816, PROT READ|PROT WRITE, MAP PRIVATE|MAP FIXED|MAP ANONYMOUS, -1, 0)
= 0x70183501c000
close(3)
                    =0
mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x701835085000
arch_prctl(ARCH_SET_FS, 0x701835085740) = 0
set_tid_address(0x701835085a10)
                            =5037
set_robust_list(0x701835085a20, 24)
rseq(0x7018350860e0, 0x20, 0, 0x53053053) = 0
mprotect(0x701835016000, 16384, PROT_READ) = 0
mprotect(0x5c0b1b386000, 4096, PROT_READ) = 0
mprotect(0x7018350d1000, 8192, PROT_READ) = 0
prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024, rlim_max=RLIM64_INFINITY}) = 0
munmap(0x701835088000, 60907)
                              =0
newfstatat(1, "", {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0), ...}, AT_EMPTY_PATH) = 0
getrandom("\xa5\xc5\xc9\xf2\x1d\xa7\xc4\xd8", 8, GRND_NONBLOCK) = 8
brk(NULL)
                      = 0x5c0b1d19c000
brk(0x5c0b1d1bd000)
                         = 0x5c0b1d1bd000
write(1, "Usage: ./lab2 <array size> <numb"..., 47Usage: ./lab2 <array size> <number of threads>
) = 47
                     =?
exit_group(1)
+++ exited with 1 +++
```

Лабораторная работа №3

Системные вызовы:

```
- execve – запуск исполняемого файла.
```

- ттар выделение памяти.
- **openat** открытие библиотек.
- read чтение данных.

0x215000) = 0x74c6e7416000

= 0x74c6e741c000

- write – запись результатов.

```
execve("./lab3", ["./lab3"], 0x7ffd3903d930 /* 44 \text{ vars }*/) = 0
brk(NULL)
                    = 0x5e548060e000
arch_prctl(0x3001 /* ARCH_??? */, 0x7ffe0b670fc0) = -1 EINVAL (Недопустимый аргумент)
mmap(NULL, 8192, PROT READ|PROT WRITE, MAP PRIVATE|MAP ANONYMOUS, -1, 0) = 0x74c6e74e4000
access("/etc/ld.so.preload", R OK) = -1 ENOENT (Нет такого файла или каталога)
openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=60907, ...}, AT_EMPTY_PATH) = 0
mmap(NULL, 60907, PROT_READ, MAP_PRIVATE, 3, 0) = 0x74c6e74d5000
close(3)
                  =0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
pread64(3, "|4|0|0|0|24|0|0|0|3|0|0|0GNU|0I|17|357|204|3$|f|221|2039x|324|224|323|236S"..., 68, 896) = 68
newfstatat(3, "", {st_mode=S_IFREG|0755, st_size=2220400, ...}, AT_EMPTY_PATH) = 0
mmap(NULL, 2264656, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x74c6e7200000
mprotect(0x74c6e7228000, 2023424, PROT NONE) = 0
mmap(0x74c6e7228000, 1658880, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x28000) = 0x74c6e7228000
mmap(0x74c6e73bd000, 360448, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1bd000) =
0x74c6e73bd000
```

mmap(0x74c6e741c000, 52816, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0)

mmap(0x74c6e7416000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,

```
close(3)
mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x74c6e74d2000
arch_prctl(ARCH_SET_FS, 0x74c6e74d2740) = 0
set tid address(0x74c6e74d2a10)
                                 = 5375
set robust list(0x74c6e74d2a20, 24)
rseq(0x74c6e74d30e0, 0x20, 0, 0x53053053) = 0
mprotect(0x74c6e7416000, 16384, PROT_READ) = 0
mprotect(0x5e547fd69000, 4096, PROT READ) = 0
mprotect(0x74c6e751e000, 8192, PROT READ) = 0
prlimit64(0, RLIMIT STACK, NULL, {rlim cur=8192*1024, rlim max=RLIM64 INFINITY}) = 0
munmap(0x74c6e74d5000, 60907)
                                    =0
openat(AT_FDCWD, "/dev/shm/my_shm", O_RDWR|O_CREAT|O_NOFOLLOW|O_CLOEXEC, 0666) = 3
                          =0
ftruncate(3, 664)
mmap(NULL, 664, PROT READ|PROT WRITE, MAP SHARED, 3, 0) = 0x74c6e751d000
clone(child stack=NULL, flags=CLONE CHILD CLEARTID|CLONE CHILD SETTID|SIGCHLD,
child_tidptr=0x74c6e74d2a10) = 5376
                        =0
close(3)
newfstatat(1, "", {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0), ...}, AT_EMPTY_PATH) = 0
getrandom("\x5f\x36\x16\x10\x4c\x37\xcf\x3e", 8, GRND\_NONBLOCK) = 8
                          = 0x5e548060e000
brk(NULL)
brk(0x5e548062f000)
                             = 0x5e548062f000
newfstatat(0, "", {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0), ...}, AT_EMPTY_PATH) = 0
write(1, "\320\222\320\262\320\265\320\265\320\264\320\270\321\202\320\265\321\207\320\270\321\201\320\270\320\260
(\321\200\320\260\320"..., 101Введите числа (разделенные пробелами), завершите <endline>: ) = 101
read(0,
```

Лабораторная работа №4

Системные вызовы:

- execve – запуск исполняемого файла.

=0

- ттар выделение памяти.
- write запись результатов.
- **openat** открытие библиотек.
- read чтение данных.

```
12:26:34,8438792,"lab4_dynamic.exe","10160","QueryNameInformationFile","C:\Windows\System32\rpcrt4.dll","SUCCESS","Name: \Windows\System32\rpcrt4.dll"
12:26:34,8440255,"lab4_dynamic.exe","10160","CreateFile","C:\Windows\System32\rpcrt4.dll","SUCCESS","Desired Access: Generic Read, Disposition: Open, Options: Synchronous IO Non
12:26:34,8578559,"lab4_dynamic.exe","10160","CloseFile","C:\Windows\System32\kernel.appcore.dll","SUCCESS","
12:26:34,8581868,"lab4_dynamic.exe","10160","RegOpenKey","HKLM\SYSTEM\CurrentControlSet\Control\Session Manager","REPARSE","Desired Access: Query Value, Enumerate Sub Key
12:26:34,8582172,"lab4_dynamic.exe","10160","RegOpenKey","HKLM\System\CurrentControlSet\Control\Session Manager","SUCCESS","Desired Access: Query Value, Enumerate Sub Keys
12:26:34,8582385,"lab4_dynamic.exe","10160","RegQueryValue","HKLM\System\CurrentControlSet\Control\Session Manager\ResourcePolicies","NAME NOT FOUND","Length: 24"
12:26:34,8582573,"lab4_dynamic.exe","10160","RegCloseKey","HKLM\System\CurrentControlSet\Control\Session Manager","SUCCESS",
12:26:34,8584014,"lab4 dynamic.exe","10160","ReadFile","C:\Windows\System32\ucrtbased.dll","SUCCESS","Offset: 1 826 816, Length: 16 384, I/O Flags: Non-cached, Paging I/O, Synchror
12:26:34,8605849,"lab4_dynamic.exe","10160","ReadFile","C:\Windows\System32\msvcp140d.dll","SUCCESS","Offset: 603 136, Length: 1 536, I/O Flags: Non-cached, Paging I/O, Synchrono
12:26:34,8605917,"lab4_dynamic.exe","10160","Thread Exit","","SUCCESS","Thread ID: 3372, User Time: 0.0000000, Kernel Time: 0.0000000" 12:26:34,8605959,"lab4_dynamic.exe","10160","Thread Exit","","SUCCESS","Thread ID: 5616, User Time: 0.0000000, Kernel Time: 0.0000000"
12:26:34,8608730,"lab4_dynamic.exe","10160","ReadFile","C:\Windows\System32\msvcp140d.dll","SUCCESS","Offset: 586 752, Length: 17 920, I/O Flags: Non-cached, Paging I/O, Synchron
12:26:34,8612869,"lab4_dynamic.exe","10160","Thread Exit","","SUCCESS","Thread ID: 11412, User Time: 0.0156250, Kernel Time: 0.0156250
12:26:34,8860115, "lab4_dynamic.exe", "10160", "Process Exit", "", "SUCCESS", "Exit Status: 0, User Time: 0.0156250 seconds, Kernel Time: 0.0156250 seconds, Private Bytes: 901 120, Peak Private Private Bytes: 901 120, Peak Private Bytes: 901 120, P
12:26:34,8860346,"lab4_dynamic.exe","10160","RegOpenKey","HKLM\System\CurrentControlSet\Services\bam\State\UserSettings\S-1-5-21-2184589035-3900244206-3554953304-1001",
12:26:34,8860459, "lab4\_dynamic.exe", "10160", "RegQueryValue", "HKLM\System\CurrentControlSet\Services\bam\State\UserSettings\S-1-5-21-2184589035-3900244206-3554953304-1001\]
12:26:34,8860594,"lab4_dynamic.exe","10160","RegCloseKev","HKLM\System\CurrentControlSet\Services\bam\State\UserSettings\S-1-5-21-2184589035-3900244206-3554953304-1001","
12:26:34,8861975,"lab4_dynamic.exe","10160","RegCloseKey","HKLM\System\CurrentControlSet\Control\Session Manager","SUCCESS",""
12:26:34,8862046,"lab4_dynamic.exe","10160","RegCloseKey","HKLM\System\CurrentControlSet\Control\Nls\Sorting\Versions","SUCCESS",""
```

Лабораторные работы №5-7

Системные вызовы:

- execve запуск исполняемого файла.
- ттар выделение памяти.
- close закрытие файловых дескрипторов.
- write запись результатов.
- **openat** открытие библиотек.
- read чтение данных.

```
execve("./client", ["./client"], 0x7fff32d04ef0 /* 45 \text{ vars }*/) = 0
brk(NULL) = 0x5f0f15c8e000
```

,

mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x72b5c069a000

access("/etc/ld.so.preload", R_OK) = -1 ENOENT (Нет такого файла или каталога)

arch prctl(0x3001 /* ARCH ??? */, 0x7fff8e4855c0) = -1 EINVAL (Недопустимый аргумент)

openat(AT_FDCWD, "/opt/homebrew/lib/glibc-hwcaps/x86-64-v2/libzmq.so.5", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/opt/homebrew/lib/glibc-hwcaps/x86-64-v2", 0x7fff8e4847e0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT_FDCWD, "/opt/homebrew/lib/tls/x86_64/x86_64/libzmq.so.5", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/opt/homebrew/lib/tls/x86_64/x86_64", 0x7fff8e4847e0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT_FDCWD, "/opt/homebrew/lib/tls/x86_64/libzmq.so.5", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/opt/homebrew/lib/tls/x86_64", 0x7fff8e4847e0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT_FDCWD, "/opt/homebrew/lib/tls/x86_64/libzmq.so.5", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/opt/homebrew/lib/tls/x86_64", 0x7fff8e4847e0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT_FDCWD, "/opt/homebrew/lib/tls/libzmq.so.5", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/opt/homebrew/lib/tls", 0x7fff8e4847e0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT_FDCWD, "/opt/homebrew/lib/x86_64/x86_64/libzmq.so.5", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/opt/homebrew/lib/x86_64/x86_64", 0x7fff8e4847e0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT_FDCWD, "/opt/homebrew/lib/x86_64/libzmq.so.5", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/opt/homebrew/lib/x86_64", 0x7fff8e4847e0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT_FDCWD, "/opt/homebrew/lib/x86_64/libzmq.so.5", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/opt/homebrew/lib/x86_64", 0x7fff8e4847e0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT_FDCWD, "/opt/homebrew/lib/libzmq.so.5", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/opt/homebrew/lib", 0x7fff8e4847e0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3

newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=60907, ...}, AT_EMPTY_PATH) = 0

mmap(NULL, 60907, PROT_READ, MAP_PRIVATE, 3, 0) = 0x72b5c068b000

close(3) = 0

openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libzmq.so.5", O_RDONLY|O_CLOEXEC) = 3

 $read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\0\0\0\0\0\240\233\1\0\0\0\0\0\0\0..., 832) = 832$

newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=634936, ...}, AT_EMPTY_PATH) = 0

mmap(NULL, 636784, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x72b5c05ef000

 $mmap(0x72b5c0607000, 397312, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x18000) = 0x72b5c0607000$

 $mmap(0x72b5c0668000, 106496, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x79000) = 0x72b5c0668000$

 $mmap(0x72b5c0682000, 36864, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x92000) = 0x72b5c0682000$

close(3) = 0

 $openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libstdc++.so.6", O_RDONLY|O_CLOEXEC) = 3$

newfstatat(3, "", {st mode=S IFREG|0644, st size=2260296, ...}, AT EMPTY PATH) = 0

mprotect(0x72b5c029a000, 1576960, PROT NONE) = 0

 $mmap(0x72b5c029a000, 1118208, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x9a000) = 0x72b5c029a000$

 $mmap(0x72b5c03ab000, 454656, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1ab000) = 0x72b5c03ab000$

 $mmap(0x72b5c041b000, 57344, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x21a000) = 0x72b5c041b000$

 $\begin{aligned} & mmap(0x72b5c0429000,\,10432,\,PROT_READ|PROT_WRITE,\,MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS,\,-1,\,0) \\ &= 0x72b5c0429000 \end{aligned}$

close(3) = 0

openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libgcc_s.so.1", O_RDONLY|O_CLOEXEC) = 3

newfstatat(3, "", {st mode=S IFREG|0644, st size=125488, ...}, AT EMPTY PATH) = 0

mmap(NULL, 127720, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x72b5c05cf000

 $mmap(0x72b5c05d2000, 94208, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x3000) = 0x72b5c05d2000$

mmap(0x72b5c05e9000, 16384, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1a000) = 0x72b5c05e9000

 $mmap(0x72b5c05ed000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1d000) = 0x72b5c05ed000$

close(3) = 0

openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3

pread64(3, "|4|0|0|0|24|0|0|0|3|0|0|0GNU|0I|17|357|204|3\$|f|221|2039x|324|224|323|236S"..., 68, 896) = 68

newfstatat(3, "", {st_mode=S_IFREG|0755, st_size=2220400, ...}, AT_EMPTY_PATH) = 0

mmap(NULL, 2264656, PROT READ, MAP PRIVATE|MAP DENYWRITE, 3, 0) = 0x72b5bfe00000

 $mprotect(0x72b5bfe28000, 2023424, PROT_NONE) = 0$

 $mmap(0x72b5bfe28000,\ 1658880,\ PROT_READ|PROT_EXEC,\ MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,\ 3,\ 0x28000) = 0x72b5bfe28000$

 $mmap(0x72b5bffbd000,\ 360448,\ PROT_READ,\ MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,\ 3,\ 0x1bd000) = 0x72b5bffbd000$

 $mmap(0x72b5c0016000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x215000) = 0x72b5c0016000$

 $mmap(0x72b5c001c000, 52816, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x72b5c001c000$

close(3) = 0

openat(AT FDCWD, "/lib/x86 64-linux-gnu/libbsd.so.0", O RDONLY|O CLOEXEC) = 3

newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=89096, ...}, AT_EMPTY_PATH) = 0

mmap(NULL, 94432, PROT READ, MAP PRIVATE|MAP DENYWRITE, 3, 0) = 0x72b5c05b7000

mprotect(0x72b5c05bb000, 69632, PROT_NONE) = 0

 $mmap(0x72b5c05bb000, 53248, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x4000) = 0x72b5c05bb000$

 $mmap(0x72b5c05c8000,\ 12288,\ PROT_READ,\ MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,\ 3,\ 0x11000) = 0x72b5c05c8000$

 $mmap(0x72b5c05cc000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x14000) = 0x72b5c05cc000$

 $mmap(0x72b5c05ce000, 224, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x72b5c05ce000$

close(3) = 0

openat(AT FDCWD, "/lib/x86 64-linux-gnu/libsodium.so.23", O RDONLY|O CLOEXEC) = 3

newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=355040, ...}, AT_EMPTY_PATH) = 0

mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x72b5c05b5000

mmap(NULL, 357440, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x72b5c055d000

mprotect(0x72b5c0569000, 303104, PROT NONE) = 0

 $mmap(0x72b5c0569000, 229376, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0xc000) = 0x72b5c0569000$

 $mmap(0x72b5c05a1000,\,69632,\,PROT_READ,\,MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,\,3,\,0x44000) = 0x72b5c05a1000$

 $mmap(0x72b5c05b3000,\,8192,\,PROT_READ|PROT_WRITE,\,MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,\,3,\,0x55000) = 0x72b5c05b3000$

close(3) = 0

openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libpgm-5.3.so.0", O_RDONLY|O_CLOEXEC) = 3

 $read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\0\0\340L\0\0\0\0\0\0\0."..., 832) = 832$

newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=310264, ...}, AT_EMPTY_PATH) = 0

mmap(NULL, 329808, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x72b5c050c000

 $mmap(0x72b5c0510000, 172032, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x4000) = 0x72b5c0510000$

 $mmap(0x72b5c053a000, 118784, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2e000) = 0x72b5c053a000$

 $mmap(0x72b5c0557000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x4a000) = 0x72b5c0557000$

 $mmap(0x72b5c0559000, 14416, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x72b5c0559000$

close(3) = 0

openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libnorm.so.1", O_RDONLY|O_CLOEXEC) = 3

newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=497824, ...}, AT_EMPTY_PATH) = 0

mmap(NULL, 1223168, PROT READ, MAP PRIVATE|MAP DENYWRITE, 3, 0) = 0x72b5c00d5000

mprotect(0x72b5c00df000, 446464, PROT NONE) = 0

 $mmap(0x72b5c00df000, 286720, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0xa000) = 0x72b5c00df000$

 $mmap(0x72b5c0125000, 155648, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x50000) = 0x72b5c0125000$

 $mmap(0x72b5c014c000,\ 16384,\ PROT_READ|PROT_WRITE,\ MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,\ 3,\ 0x76000) = 0x72b5c014c000$

 $mmap(0x72b5c0150000, 719360, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x72b5c0150000$

close(3) = 0

 $openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libgssapi_krb5.so.2", O_RDONLY|O_CLOEXEC) = 3$

newfstatat(3, "", {st mode=S IFREG|0644, st size=338648, ...}, AT EMPTY PATH) = 0

mmap(NULL, 340960, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x72b5c04b8000

mprotect(0x72b5c04c3000, 282624, PROT_NONE) = 0

 $mmap(0x72b5c04c3000, 229376, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0xb000) = 0x72b5c04c3000$

 $mmap(0x72b5c04fb000,\,49152,\,PROT_READ,\,MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,\,3,\,0x43000) = 0x72b5c04fb000$

 $mmap(0x72b5c0508000, 16384, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x4f000) = 0x72b5c0508000$

close(3) = 0

openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libm.so.6", O_RDONLY|O_CLOEXEC) = 3

newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=940560, ...}, AT_EMPTY_PATH) = 0

mmap(NULL, 942344, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x72b5bfd19000

 $mmap(0x72b5bfd27000, 507904, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0xe000) = 0x72b5bfd27000$

 $mmap(0x72b5bfda3000,\,372736,\,PROT_READ,\,MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,\,3,\,0x8a000) = 0x72b5bfda3000$

 $mmap(0x72b5bfdfe000,\,8192,\,PROT_READ|PROT_WRITE,\,MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,\,3,\,0xe4000) = 0x72b5bfdfe000$

close(3) = 0

openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libmd.so.0", O_RDONLY|O_CLOEXEC) = 3

newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=47472, ...}, AT_EMPTY_PATH) = 0

mmap(NULL, 49384, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x72b5c04ab000

 $mmap(0x72b5c04ad000, 28672, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000) = 0x72b5c04ad000$

 $mmap(0x72b5c04b4000,\ 8192,\ PROT_READ,\ MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,\ 3,\ 0x9000) = 0x72b5c04b4000$

 $mmap(0x72b5c04b6000,\,8192,\,PROT_READ|PROT_WRITE,\,MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,\,3,\,0xa000) = 0x72b5c04b6000$

close(3) = 0

mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x72b5c04a9000

openat(AT FDCWD, "/lib/x86 64-linux-gnu/libpthread.so.0", O RDONLY|O CLOEXEC) = 3

newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=21448, ...}, AT_EMPTY_PATH) = 0

mmap(NULL, 16424, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x72b5c04a4000

 $mmap(0x72b5c04a5000, 4096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1000) = 0x72b5c04a5000$

 $mmap(0x72b5c04a6000, 4096, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000) = 0x72b5c04a6000$

 $mmap(0x72b5c04a7000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000) = 0x72b5c04a7000$

close(3) = 0

openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libkrb5.so.3", O_RDONLY|O_CLOEXEC) = 3

newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=827936, ...}, AT_EMPTY_PATH) = 0

mmap(NULL, 830576, PROT READ, MAP PRIVATE|MAP DENYWRITE, 3, 0) = 0x72b5bfc4e000

mprotect(0x72b5bfc6f000, 634880, PROT NONE) = 0

 $mmap(0x72b5bfc6f000,\ 380928,\ PROT_READ|PROT_EXEC,\ MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,\ 3,\ 0x21000) = 0x72b5bfc6f000$

 $mmap(0x72b5bfccc000, 249856, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x7e000) = 0x72b5bfccc000$

 $mmap(0x72b5bfd0a000, 61440, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0xbb000) = 0x72b5bfd0a000$

close(3) = 0

openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libk5crypto.so.3", O_RDONLY|O_CLOEXEC) = 3

newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=182864, ...}, AT_EMPTY_PATH) = 0

 $mmap(NULL,\,188472,\,PROT_READ,\,MAP_PRIVATE|MAP_DENYWRITE,\,3,\,0) = 0x72b5c0475000$

mprotect(0x72b5c0479000, 163840, PROT_NONE) = 0

 $mmap(0x72b5c0479000, 110592, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x4000) = 0x72b5c0479000$

 $mmap(0x72b5c0494000, 49152, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1f000) = 0x72b5c0494000$

 $mmap(0x72b5c04a1000,\,8192,\,PROT_READ|PROT_WRITE,\,MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,\,3,\,0x2b000) = 0x72b5c04a1000$

 $mmap(0x72b5c04a3000, 56, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x72b5c04a3000$

close(3) = 0

openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libcom_err.so.2", O_RDONLY|O_CLOEXEC) = 3

newfstatat(3, "", {st mode=S IFREG|0644, st size=18504, ...}, AT EMPTY PATH) = 0

mmap(NULL, 20552, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x72b5c046f000

 $mmap(0x72b5c0471000, 4096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000) = 0x72b5c0471000$

 $mmap(0x72b5c0472000, 4096, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x3000) = 0x72b5c0472000$

 $mmap(0x72b5c0473000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x3000) = 0x72b5c0473000$

close(3) = 0

openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libkrb5support.so.0", O_RDONLY|O_CLOEXEC) = 3

newfstatat(3, "", {st mode=S IFREG|0644, st size=52016, ...}, AT EMPTY PATH) = 0

mmap(NULL, 54224, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x72b5c0461000

mprotect(0x72b5c0464000, 36864, PROT_NONE) = 0

 $mmap(0x72b5c0464000, 24576, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x3000) = 0x72b5c0464000$

 $mmap(0x72b5c046a000,\,8192,\,PROT_READ,\,MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,\,3,\,0x9000) = 0x72b5c046a000$

 $mmap(0x72b5c046d000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0xb000) = 0x72b5c046d000$

close(3) = 0

openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libkeyutils.so.1", O_RDONLY|O_CLOEXEC) = 3

newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=22600, ...}, AT_EMPTY_PATH) = 0

mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x72b5c045f000

mmap(NULL, 24592, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x72b5c0458000

 $mmap(0x72b5c045a000, 8192, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000) = 0x72b5c045a000$

 $mmap(0x72b5c045c000,\,4096,\,PROT_READ,\,MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,\,3,\,0x4000) = 0x72b5c045c000$

 $mmap(0x72b5c045d000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x4000) = 0x72b5c045d000$

close(3) = 0

openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libresolv.so.2", O_RDONLY|O_CLOEXEC) = 3

newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=68552, ...}, AT_EMPTY_PATH) = 0

mmap(NULL, 80456, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x72b5c0444000

mmap(0x72b5c0447000, 40960, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x3000) = 0x72b5c0447000

 $mmap(0x72b5c0451000, 12288, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0xd000) = 0x72b5c0451000$

 $mmap(0x72b5c0454000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0xf000) = 0x72b5c0454000$

```
0x72b5c0456000
close(3)
                       =0
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x72b5c0442000
mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x72b5c043f000
arch prctl(ARCH SET FS, 0x72b5c043f9c0) = 0
set tid address(0x72b5c043fc90)
set_robust_list(0x72b5c043fca0, 24)
rseq(0x72b5c0440360, 0x20, 0, 0x53053053) = 0
mprotect(0x72b5c0016000, 16384, PROT READ) = 0
mprotect(0x72b5c0454000, 4096, PROT READ) = 0
mprotect(0x72b5c045d000, 4096, PROT READ) = 0
mprotect(0x72b5c046d000, 4096, PROT_READ) = 0
mprotect(0x72b5c0473000, 4096, PROT_READ) = 0
mprotect(0x72b5c04a1000, 4096, PROT_READ) = 0
mprotect(0x72b5bfd0a000, 53248, PROT_READ) = 0
mprotect(0x72b5c04a7000, 4096, PROT_READ) = 0
mprotect(0x72b5c04b6000, 4096, PROT_READ) = 0
mprotect(0x72b5bfdfe000, 4096, PROT\_READ) = 0
mprotect(0x72b5c0508000, 8192, PROT_READ) = 0
mprotect(0x72b5c05ed000, 4096, PROT_READ) = 0
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x72b5c043d000
mprotect(0x72b5c041b000, 45056, PROT_READ) = 0
mprotect(0x72b5c014c000, 12288, PROT_READ) = 0
mprotect(0x72b5c0557000, 4096, PROT\_READ) = 0
mprotect(0x72b5c05b3000, 4096, PROT\_READ) = 0
mprotect(0x72b5c05cc000, 4096, PROT_READ) = 0
mprotect(0x72b5c0682000, 32768, PROT_READ) = 0
mprotect(0x5f0f14687000, 4096, PROT_READ) = 0
mprotect(0x72b5c06d4000, 8192, PROT READ) = 0
prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024, rlim_max=RLIM64_INFINITY}) = 0
munmap(0x72b5c068b000, 60907)
                                   =0
getrandom("\x06\x8c\x13\xdb\x9a\x3a\x6c\xcd", 8, GRND_NONBLOCK) = 8
brk(NULL)
                         = 0x5f0f15c8e000
brk(0x5f0f15caf000)
                            = 0x5f0f15caf000
futex(0x72b5c042977c, FUTEX_WAKE_PRIVATE, 2147483647) = 0
openat(AT_FDCWD, "/sys/devices/system/cpu/online", O_RDONLY|O_CLOEXEC) = 3
```

mmap(0x72b5c0456000, 6728, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) =

 $read(3, "0-2\n", 1024) = 4$

close(3) = 0

openat(AT_FDCWD, "/sys/devices/system/cpu", O_RDONLY|O_NONBLOCK|O_CLOEXEC|O_DIRECTORY) = 3

newfstatat(3, "", {st_mode=S_IFDIR|0755, st_size=0, ...}, AT_EMPTY_PATH) = 0

getdents64(3, 0x5f0f15c9fee0 /* 21 entries */, 32768) = 640

getdents64(3, 0x5f0f15c9fee0 /* 0 entries */, 32768) = 0

close(3) = 0

getpid() = 5845

sched_getaffinity(5845, 128, [0, 1, 2]) = 8

newfstatat(AT_FDCWD, "/etc/nsswitch.conf", {st_mode=S_IFREG|0644, st_size=542, ...}, 0) = 0

newfstatat(AT_FDCWD, "/", {st_mode=S_IFDIR|0755, st_size=4096, ...}, 0) = 0

openat(AT_FDCWD, "/etc/nsswitch.conf", O_RDONLY|O_CLOEXEC) = 3

 $newfstatat(3, "", \{st_mode=S_IFREG|0644, st_size=542, ...\}, AT_EMPTY_PATH) = 0$

read(3, "#/etc/nsswitch.conf\n#\n# Example"..., 4096) = 542

read(3, "", 4096) = 0

newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=542, ...}, AT_EMPTY_PATH) = 0

close(3) = 0

openat(AT FDCWD, "/etc/ld.so.cache", O RDONLY|O CLOEXEC) = 3

newfstatat(3, "", {st mode=S IFREG|0644, st size=60907, ...}, AT EMPTY PATH) = 0

mmap(NULL, 60907, PROT_READ, MAP_PRIVATE, 3, 0) = 0x72b5c068b000

close(3) = 0

openat(AT_FDCWD, "/lib/x86_64-linux-gnu/glibc-hwcaps/x86-64-v2/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/lib/x86_64-linux-gnu/glibc-hwcaps/x86-64-v2", 0x7fff8e4823a0, 0) = -1 ENOENT (Heт такого файла или каталога)

openat(AT_FDCWD, "/lib/x86_64-linux-gnu/tls/x86_64/x86_64/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/lib/x86_64-linux-gnu/tls/x86_64/x86_64", 0x7fff8e4823a0, 0) = -1 ENOENT (Heт такого файла или каталога)

openat(AT_FDCWD, "/lib/x86_64-linux-gnu/tls/x86_64/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/lib/x86_64-linux-gnu/tls/x86_64", 0x7fff8e4823a0, 0) = -1 ENOENT (Heт такого файла или каталога)

openat(AT_FDCWD, "/lib/x86_64-linux-gnu/tls/x86_64/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/lib/x86_64-linux-gnu/tls/x86_64", 0x7fff8e4823a0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT_FDCWD, "/lib/x86_64-linux-gnu/tls/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/lib/x86_64-linux-gnu/tls", 0x7fff8e4823a0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT_FDCWD, "/lib/x86_64-linux-gnu/x86_64/x86_64/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/lib/x86_64-linux-gnu/x86_64/x86_64", 0x7fff8e4823a0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT_FDCWD, "/lib/x86_64-linux-gnu/x86_64/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/lib/x86_64-linux-gnu/x86_64", 0x7fff8e4823a0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT_FDCWD, "/lib/x86_64-linux-gnu/x86_64/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/lib/x86_64-linux-gnu/x86_64", 0x7fff8e4823a0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/lib/x86_64-linux-gnu", {st_mode=S_IFDIR|0755, st_size=77824, ...}, 0) = 0

openat(AT_FDCWD, "/usr/lib/x86_64-linux-gnu/glibc-hwcaps/x86-64-v2/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/usr/lib/x86_64-linux-gnu/glibc-hwcaps/x86-64-v2", 0x7fff8e4823a0, 0) = -1 ENOENT (Het такого файла или каталога)

openat(AT_FDCWD, "/usr/lib/x86_64-linux-gnu/tls/x86_64/x86_64/libnss_db.so.2", O_RDONLY $|O_CLOEXEC|$ = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/usr/lib/x86_64-linux-gnu/tls/x86_64/x86_64", 0x7fff8e4823a0, 0) = -1 ENOENT (Het такого файла или каталога)

openat(AT_FDCWD, "/usr/lib/x86_64-linux-gnu/tls/x86_64/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/usr/lib/x86_64-linux-gnu/tls/x86_64", 0x7fff8e4823a0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT_FDCWD, "/usr/lib/x86_64-linux-gnu/tls/x86_64/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/usr/lib/x86_64-linux-gnu/tls/x86_64", 0x7fff8e4823a0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT_FDCWD, "/usr/lib/x86_64-linux-gnu/tls/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/usr/lib/x86_64-linux-gnu/tls", 0x7fff8e4823a0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT_FDCWD, "/usr/lib/x86_64-linux-gnu/x86_64/x86_64/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/usr/lib/x86_64-linux-gnu/x86_64/x86_64", 0x7fff8e4823a0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT_FDCWD, "/usr/lib/x86_64-linux-gnu/x86_64/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/usr/lib/x86_64-linux-gnu/x86_64", 0x7fff8e4823a0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT_FDCWD, "/usr/lib/x86_64-linux-gnu/x86_64/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/usr/lib/x86_64-linux-gnu/x86_64", 0x7fff8e4823a0, 0) = -1 ENOENT (Her такого файла или каталога)

openat(AT_FDCWD, "/usr/lib/x86_64-linux-gnu/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/usr/lib/x86_64-linux-gnu", {st_mode=S_IFDIR|0755, st_size=77824, ...}, 0) = 0

openat(AT_FDCWD, "/lib/glibc-hwcaps/x86-64-v2/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/lib/glibc-hwcaps/x86-64-v2", 0x7fff8e4823a0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT_FDCWD, "/lib/tls/x86_64/x86_64/libnss_db.so.2", O_RDONLY $|O_CLOEXEC| = -1$ ENOENT (Het такого файла или каталога)

newfstatat(AT FDCWD, "/lib/tls/x86 64/x86 64", 0x7fff8e4823a0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT_FDCWD, "/lib/tls/x86_64/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/lib/tls/x86_64", 0x7fff8e4823a0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT_FDCWD, "/lib/tls/x86_64/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/lib/tls/x86_64", 0x7fff8e4823a0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT_FDCWD, "/lib/tls/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/lib/tls", 0x7fff8e4823a0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT_FDCWD, "/lib/x86_64/x86_64/libnss_db.so.2", O_RDONLY $|O_CLOEXEC|$ = -1 ENOENT (Het такого файла или каталога)

newfstatat(AT FDCWD, "/lib/x86 64/x86 64", 0x7fff8e4823a0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT_FDCWD, "/lib/x86_64/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT FDCWD, "/lib/x86 64", 0x7fff8e4823a0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT_FDCWD, "/lib/x86_64/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/lib/x86_64", 0x7fff8e4823a0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT_FDCWD, "/lib/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

 $newfstatat(AT_FDCWD, "/lib", \{st_mode=S_IFDIR|0755, st_size=4096, ...\}, 0) = 0$

openat(AT_FDCWD, "/usr/lib/glibc-hwcaps/x86-64-v2/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/usr/lib/glibc-hwcaps/x86-64-v2", 0x7fff8e4823a0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT_FDCWD, "/usr/lib/tls/x86_64/x86_64/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT_FDCWD, "/usr/lib/tls/x86_64/x86_64", 0x7fff8e4823a0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT_FDCWD, "/usr/lib/tls/x86_64/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT FDCWD, "/usr/lib/tls/x86 64", 0x7fff8e4823a0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT_FDCWD, "/usr/lib/tls/x86_64/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

```
newfstatat(AT FDCWD, "/usr/lib/tls/x86 64", 0x7fff8e4823a0, 0) = -1 ENOENT (Нет такого файла или каталога)
openat(AT_FDCWD, "/usr/lib/tls/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или
каталога)
newfstatat(AT_FDCWD, "/usr/lib/tls", 0x7fff8e4823a0, 0) = -1 ENOENT (Нет такого файла или каталога)
openat(AT_FDCWD, "/usr/lib/x86_64/x86_64/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого
файла или каталога)
newfstatat(AT_FDCWD, "/usr/lib/x86_64/x86_64", 0x7fff8e4823a0, 0) = -1 ENOENT (Нет такого файла или каталога)
openat(AT_FDCWD, "/usr/lib/x86_64/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или
каталога)
newfstatat(AT_FDCWD, "/usr/lib/x86_64", 0x7fff8e4823a0, 0) = -1 ENOENT (Нет такого файла или каталога)
openat(AT_FDCWD, "/usr/lib/x86_64/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или
каталога)
newfstatat(AT_FDCWD, "/usr/lib/x86_64", 0x7fff8e4823a0, 0) = -1 ENOENT (Нет такого файла или каталога)
openat(AT_FDCWD, "/usr/lib/libnss_db.so.2", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или
каталога)
newfstatat(AT_FDCWD, "/usr/lib", {st_mode=S_IFDIR|0755, st_size=4096, ...}, 0) = 0
munmap(0x72b5c068b000, 60907)
                                    =0
openat(AT FDCWD, "/etc/ld.so.cache", O RDONLY|O CLOEXEC) = 3
newfstatat(3, "", {st mode=S IFREG|0644, st size=60907, ...}, AT EMPTY PATH) = 0
mmap(NULL, 60907, PROT READ, MAP PRIVATE, 3, 0) = 0x72b5c068b000
close(3)
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libnss_db-2.35.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого
файла или каталога)
openat(AT FDCWD, "/usr/lib/x86 64-linux-gnu/libnss db-2.35.so", O RDONLY|O CLOEXEC) = -1 ENOENT (Her
такого файла или каталога)
openat(AT_FDCWD, "/lib/libnss_db-2.35.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)
openat(AT_FDCWD, "/usr/lib/libnss_db-2.35.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого файла или
каталога)
munmap(0x72b5c068b000, 60907)
openat(AT FDCWD, "/etc/protocols", O RDONLY|O CLOEXEC) = 3
newfstatat(3, "", {st mode=S IFREG|0644, st size=2932, ...}, AT EMPTY PATH) = 0
lseek(3, 0, SEEK SET)
read(3, "# Internet (IP) protocols\n\#\n\#\ Up"..., 4096) = 2932
read(3, "", 4096)
                           = 0
close(3)
                        = 0
eventfd2(0, EFD_CLOEXEC)
                                   =3
```

= 0x802 (flags O RDWR|O NONBLOCK)

= 0x2 (flags O RDWR)

fcntl(3, F GETFL)

fcntl(3, F GETFL)

fcntl(3, F SETFL, O RDWR|O NONBLOCK) = 0

 $fentl(3, F_SETFL, O_RDWR|O_NONBLOCK) = 0$

```
= 5845
getpid()
getpid()
                                            = 5845
getrandom("\xe8\x56\x65\x1d\x62\x4b\xc0\x99\xc5\xf4\xcc\xd2\xa7\xd1\xfb\xbb", 16, 0) = 16
getrandom("x21xe7xecx3ax50xb2x27x0bx58x88xe0x08xf9x51xc9x90", 16, 0) = 16
eventfd2(0, EFD CLOEXEC)
                                                                =4
fcntl(4, F GETFL)
                                                     = 0x2 (flags O RDWR)
fcntl(4, F SETFL, O RDWR|O NONBLOCK) = 0
fcntl(4, F GETFL)
                                                     = 0x802 (flags O RDWR|O NONBLOCK)
fcntl(4, F SETFL, O RDWR|O NONBLOCK) = 0
getpid()
                                            = 5845
epoll_create1(EPOLL_CLOEXEC)
                                                                    = 5
epoll_ctl(5, EPOLL_CTL_ADD, 4, {events=0, data={u32=365560416, u64=104518394708576}}) = 0
epoll_ctl(5, EPOLL_CTL_MOD, 4, {events=EPOLLIN, data={u32=365560416, u64=104518394708576}}) = 0
                                            = 5845
getpid()
rt sigaction(SIGRT 1, {sa handler=0x72b5bfe91870, sa mask=[],
sa_flags=SA_RESTORER|SA_ONSTACK|SA_RESTART|SA_SIGINFO, sa_restorer=0x72b5bfe42520}, NULL, 8) = 0
rt_sigprocmask(SIG_UNBLOCK, [RTMIN RT_1], NULL, 8) = 0
mmap(NULL, 8392704, PROT_NONE, MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0) = 0x72b5bf400000
mprotect(0x72b5bf401000, 8388608, PROT_READ|PROT_WRITE) = 0
rt\_sigprocmask(SIG\_BLOCK, \sim [], [], 8) = 0
clone 3 (\{flags = CLONE\_VM | CLONE\_FS | CLONE\_FILES | CLONE\_SIGHAND | CLONE\_THREAD | CLONE\_SYSVSEM | CLONE\_S
NE SETTLS|CLONE PARENT SETTID|CLONE CHILD CLEARTID, child tid=0x72b5bfc00910,
parent_tid=0x72b5bfc00910, exit_signal=0, stack=0x72b5bf400000, stack_size=0x7ffc80, tls=0x72b5bfc00640} =>
\{parent\_tid=[5847]\}, 88\} = 5847
rt_sigprocmask(SIG_SETMASK, [], NULL, 8) = 0
eventfd2(0, EFD_CLOEXEC)
                                                                =6
fcntl(6, F_GETFL)
                                                     = 0x2 (flags O_RDWR)
fcntl(6, F_SETFL, O_RDWR|O_NONBLOCK) = 0
fcntl(6, F_GETFL)
                                                     = 0x802 (flags O_RDWR|O_NONBLOCK)
fcntl(6, F_SETFL, O_RDWR|O_NONBLOCK) = 0
                                            = 5845
getpid()
epoll_create1(EPOLL_CLOEXEC)
                                                                    = 7
epoll_ctl(7, EPOLL_CTL_ADD, 6, {events=0, data={u32=365581472, u64=104518394729632}}) = 0
epoll ctl(7, EPOLL CTL MOD, 6, {events=EPOLLIN, data={u32=365581472, u64=104518394729632}}) = 0
mmap(NULL, 8392704, PROT_NONE, MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0) = 0x72b5bea00000
mprotect(0x72b5bea01000, 8388608, PROT_READ|PROT_WRITE) = 0
rt sigprocmask(SIG BLOCK, \sim [], [], 8) = 0
clone3({flags=CLONE VM|CLONE FS|CLONE FILES|CLONE SIGHAND|CLONE THREAD|CLONE SYSVSEM|CLO
NE SETTLS|CLONE PARENT SETTID|CLONE CHILD CLEARTID, child tid=0x72b5bf200910,
```

```
parent_tid=0x72b5bf200910, exit_signal=0, stack=0x72b5bea00000, stack_size=0x7ffc80, tls=0x72b5bf200640} =>>
{parent\_tid=[5848]}, 88) = 5848
rt_sigprocmask(SIG_SETMASK, [], NULL, 8) = 0
eventfd2(0, EFD_CLOEXEC)
                                  =8
fcntl(8, F_GETFL)
                            = 0x2 (flags O_RDWR)
fcntl(8, F_SETFL, O_RDWR|O_NONBLOCK) = 0
fcntl(8, F GETFL)
                            = 0x802 (flags O RDWR|O NONBLOCK)
fentl(8, F\_SETFL, O\_RDWR|O\_NONBLOCK) = 0
getpid()
                        = 5845
newfstatat(0, "", {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0), ...}, AT_EMPTY_PATH) = 0
read(0, 0x5f0f15ca6980, 1024)
                                = ? ERESTARTSYS (To be restarted if SA_RESTART is set)
--- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
read(0, 0x5f0f15ca6980, 1024)
                                = ? ERESTARTSYS (To be restarted if SA_RESTART is set)
--- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---
read(0,
```

Выводы

В ходе выполнения работы с утилитой strace я освоил ее использование для отслеживания системных вызовов и анализа поведения процессов, углубил понимание работы операционной системы на низком уровне. Это позволило мне лучше понять внутренние механизмы работы операционной системы и научиться эффективно отслеживать и диагностировать ошибки и проблемы в процессе выполнения программ.