Московский авиационный институт

(Национальный исследовательский университет)

Институт: №8 «Информационные технологии и прикладная математика»

Кафедра: 806 «Вычислительная математика и программирование»

Дисциплина: «Операционные системы»

Лабораторная работа № 1
Тема: Диагностика работы ПО

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Постановка задачи

При выполнении последующих лабораторных работ 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 должен содержать краткую сводку по исследованию последующих ЛР.

Протокол исполнения

В качестве средства диагностики выбран strace.

Лабораторная работа № 2

Программа активно использует системные вызовы *write* и *read*, как для получения пользовательского ввода, так и для взаимодействия с каналами, которые в свою очередь создаются вызовом *pipe*. Также можно увидеть момент создания дочерних процессов, во время которых вызывается *clone*.

```
execve("./main", ["./main"], 0x7ffd8620e4c0 /* 60 vars */) = 0
brk(NULL)                               = 0x558067dc6000
arch_prctl(0x3001 /* ARCH_??? */, 0x7ffc56de1830) = -1 EINVAL (Invalid argument)
access("/etc/ld.so.preload", R_OK)      = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=63465, ...}) = 0
mmap(NULL, 63465, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7ff02eac5000
close(3)                                = 0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\360q\2\0\0\0\0\0"..., 832) =
832
pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784,
64) = 784
pread64(3, "\4\0\0\0\20\0\0\0\5\0\0\0GNU\0\2\0\0\300\4\0\0\0\3\0\0\0\0\0\0\0", 32,
848) = 32
pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\363\377?\332\200\270\27\304d\245n\355Y\
377\t\334"..., 68, 880) = 68
fstat(3, {st_mode=S_IFREG|0755, st_size=2029224, ...}) = 0
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7ff02eac3000
pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784,
64) = 784
pread64(3, "\4\0\0\0\20\0\0\0\5\0\0\0GNU\0\2\0\0\300\4\0\0\0\3\0\0\0\0\0\0\0", 32,
848) = 32
pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\363\377?\332\200\270\27\304d\245n\355Y\
377\t\334"..., 68, 880) = 68
mmap(NULL, 2036952, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7ff02e8d1000
mprotect(0x7ff02e8f6000, 1847296, PROT_NONE) = 0
mmap(0x7ff02e8f6000, 1540096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x25000) = 0x7ff02e8f6000
mmap(0x7ff02ea6e000, 303104, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x19d000) = 0x7ff02ea6e000
mmap(0x7ff02eab9000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x1e7000) = 0x7ff02eab9000
mmap(0x7ff02eabf000, 13528, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_ANONYMOUS, -1, 0) = 0x7ff02eabf000
close(3)                                = 0
arch_prctl(ARCH_SET_FS, 0x7ff02eac4540) = 0
mprotect(0x7ff02eab9000, 12288, PROT_READ) = 0
mprotect(0x5580669d8000, 4096, PROT_READ) = 0
```

```
mprotect(0x7ff02eb02000, 4096, PROT_READ) = 0
munmap(0x7ff02eac5000, 63465)           = 0
fstat(0, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0), ...}) = 0
brk(NULL)                               = 0x558067dc6000
brk(0x558067de7000)                     = 0x558067de7000
read(0, 1.txt
"1.txt\n", 1024)                = 6
read(0, 2.txt
"2.txt\n", 1024)                = 6
openat(AT_FDCWD, "1.txt", O_WRONLY|O_CREAT|O_TRUNC, 0666) = 3
openat(AT_FDCWD, "2.txt", O_WRONLY|O_CREAT|O_TRUNC, 0666) = 4
pipe([5, 6])                            = 0
pipe([7, 8])                            = 0
clone(child_stack=NULL, flags=CLONE_CHILD_CLEARTID|CLONE_CHILD_SETTID|SIGCHLD,
child_tidptr=0x7ff02eac4810) = 6594
clone(child_stack=NULL, flags=CLONE_CHILD_CLEARTID|CLONE_CHILD_SETTID|SIGCHLD,
child_tidptr=0x7ff02eac4810) = 6595
close(5)                                = 0
close(7)                                = 0
close(3)                                = 0
close(4)                                = 0
write(8, "\n", 1)                       = 1
read(0, 12345678990
"12345678990\n", 1024)          = 12
write(8, "1", 1)                        = 1
write(8, "2", 1)                        = 1
write(8, "3", 1)                        = 1
write(8, "4", 1)                        = 1
write(8, "5", 1)                        = 1
write(8, "6", 1)                        = 1
write(8, "7", 1)                        = 1
write(8, "8", 1)                        = 1
write(8, "9", 1)                        = 1
write(8, "9", 1)                        = 1
write(8, "0", 1)                        = 1
write(8, "\n", 1)                       = 1
read(0, 12345
"12345\n", 1024)                = 6
write(6, "1", 1)                        = 1
write(6, "2", 1)                        = 1
write(6, "3", 1)                        = 1
write(6, "4", 1)                        = 1
write(6, "5", 1)                        = 1
write(6, "\n", 1)                       = 1
read(0, "", 1024)                       = 0
close(6)                                = 0
close(8)                                = 0
--- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=6594, si_uid=1000,
si_status=0, si_utime=0, si_stime=0} ---
exit_group(0)                           = ?
+++ exited with 0 +++
```

Лабораторная работа № 3

В программе происходит создание 10 потоков, что 10 раз порождает вызов
clone. Для измерения времени работы используется функция *clock*, которая вызывает *clock_gettime*.

```
execve("./main", ["./main", "10"], 0x7ffdad42a428 /* 60 vars */) = 0
brk(NULL)                               = 0x5629a953f000
arch_prctl(0x3001 /* ARCH_??? */, 0x7fff82c7e9f0) = -1 EINVAL (Invalid argument)
access("/etc/ld.so.preload", R_OK)      = -1 ENOENT (No such file or directory)
```

```
openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=63465, ...}) = 0
mmap(NULL, 63465, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7f88099ee000
close(3)                                = 0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libpthread.so.0", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\220\201\0\0\0\0\0\0"..., 832)
= 832
pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0O\305\3743\364B\2216\244\224\306@\
261\23\327o"..., 68, 824) = 68
fstat(3, {st_mode=S_IFREG|0755, st_size=157224, ...}) = 0
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7f88099ec000
pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0O\305\3743\364B\2216\244\224\306@\
261\23\327o"..., 68, 824) = 68
mmap(NULL, 140408, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7f88099c9000
mmap(0x7f88099d0000, 69632, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,
3, 0x7000) = 0x7f88099d0000
mmap(0x7f88099e1000, 20480, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x18000) = 0x7f88099e1000
mmap(0x7f88099e6000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,
3, 0x1c000) = 0x7f88099e6000
mmap(0x7f88099e8000, 13432, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_ANONYMOUS, -1, 0) = 0x7f88099e8000
close(3)                                = 0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\360q\2\0\0\0\0\0"..., 832) =
832
pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784,
64) = 784
pread64(3, "\4\0\0\0\20\0\0\0\5\0\0\0GNU\0\2\0\0\300\4\0\0\0\3\0\0\0\0\0\0\0", 32,
848) = 32
pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\363\377?\332\200\270\27\304d\245n\355Y\
377\t\334"..., 68, 880) = 68
fstat(3, {st_mode=S_IFREG|0755, st_size=2029224, ...}) = 0
pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784,
64) = 784
pread64(3, "\4\0\0\0\20\0\0\0\5\0\0\0GNU\0\2\0\0\300\4\0\0\0\3\0\0\0\0\0\0\0", 32,
848) = 32
pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\363\377?\332\200\270\27\304d\245n\355Y\
377\t\334"..., 68, 880) = 68
mmap(NULL, 2036952, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7f88097d7000
mprotect(0x7f88097fc000, 1847296, PROT_NONE) = 0
mmap(0x7f88097fc000, 1540096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x25000) = 0x7f88097fc000
mmap(0x7f8809974000, 303104, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x19d000) = 0x7f8809974000
mmap(0x7f88099bf000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x1e7000) = 0x7f88099bf000
mmap(0x7f88099c5000, 13528, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_ANONYMOUS, -1, 0) = 0x7f88099c5000
close(3)                                = 0
mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7f88097d4000
arch_prctl(ARCH_SET_FS, 0x7f88097d4740) = 0
mprotect(0x7f88099bf000, 12288, PROT_READ) = 0
mprotect(0x7f88099e6000, 4096, PROT_READ) = 0
mprotect(0x5629a7997000, 4096, PROT_READ) = 0
mprotect(0x7f8809a2b000, 4096, PROT_READ) = 0
munmap(0x7f88099ee000, 63465)           = 0
set_tid_address(0x7f88097d4a10)         = 7116
set_robust_list(0x7f88097d4a20, 24)     = 0
rt_sigaction(SIGRTMIN, {sa_handler=0x7f88099d0bf0, sa_mask=[], sa_flags=SA_RESTORER|
SA_SIGINFO, sa_restorer=0x7f88099de3c0}, NULL, 8) = 0
rt_sigaction(SIGRT_1, {sa_handler=0x7f88099d0c90, sa_mask=[], sa_flags=SA_RESTORER|
```

```
SA_RESTART|SA_SIGINFO, sa_restorer=0x7f88099de3c0}, NULL, 8) = 0
rt_sigprocmask(SIG_UNBLOCK, [RTMIN RT_1], NULL, 8) = 0
prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024, rlim_max=RLIM64_INFINITY}) = 0
fstat(0, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0), ...}) = 0
brk(NULL)                                = 0x5629a953f000
brk(0x5629a9560000)                      = 0x5629a9560000
read(0, 10 0 0 0 100
"10 0 0 0 100\n", 1024)        = 13
clock_gettime(CLOCK_PROCESS_CPUTIME_ID, {tv_sec=0, tv_nsec=1341226}) = 0
mmap(NULL, 8392704, PROT_NONE, MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0) =
0x7f8808fd3000
mprotect(0x7f8808fd4000, 8388608, PROT_READ|PROT_WRITE) = 0
clone(child_stack=0x7f88097d2fb0, flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|
CLONE_THREAD|CLONE_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|CLONE_CHILD_CLEARTID,
parent_tid=[7156], tls=0x7f88097d3700, child_tidptr=0x7f88097d39d0) = 7156
mmap(NULL, 8392704, PROT_NONE, MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0) =
0x7f88087d2000
mprotect(0x7f88087d3000, 8388608, PROT_READ|PROT_WRITE) = 0
clone(child_stack=0x7f8808fd1fb0, flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|
CLONE_THREAD|CLONE_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|CLONE_CHILD_CLEARTID,
parent_tid=[7157], tls=0x7f8808fd2700, child_tidptr=0x7f8808fd29d0) = 7157
mmap(NULL, 8392704, PROT_NONE, MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0) =
0x7f8807fd1000
mprotect(0x7f8807fd2000, 8388608, PROT_READ|PROT_WRITE) = 0
clone(child_stack=0x7f88087d0fb0, flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|
CLONE_THREAD|CLONE_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|CLONE_CHILD_CLEARTID,
parent_tid=[7158], tls=0x7f88087d1700, child_tidptr=0x7f88087d19d0) = 7158
mmap(NULL, 8392704, PROT_NONE, MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0) =
0x7f88077d0000
mprotect(0x7f88077d1000, 8388608, PROT_READ|PROT_WRITE) = 0
clone(child_stack=0x7f8807fcffb0, flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|
CLONE_THREAD|CLONE_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|CLONE_CHILD_CLEARTID,
parent_tid=[7159], tls=0x7f8807fd0700, child_tidptr=0x7f8807fd09d0) = 7159
mmap(NULL, 8392704, PROT_NONE, MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0) =
0x7f8806fcf000
mprotect(0x7f8806fd0000, 8388608, PROT_READ|PROT_WRITE) = 0
clone(child_stack=0x7f88077cefb0, flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|
CLONE_THREAD|CLONE_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|CLONE_CHILD_CLEARTID,
parent_tid=[7160], tls=0x7f88077cf700, child_tidptr=0x7f88077cf9d0) = 7160
mmap(NULL, 8392704, PROT_NONE, MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0) =
0x7f88067ce000
mprotect(0x7f88067cf000, 8388608, PROT_READ|PROT_WRITE) = 0
clone(child_stack=0x7f8806fcdfb0, flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|
CLONE_THREAD|CLONE_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|CLONE_CHILD_CLEARTID,
parent_tid=[7161], tls=0x7f8806fce700, child_tidptr=0x7f8806fce9d0) = 7161
mmap(NULL, 8392704, PROT_NONE, MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0) =
0x7f8805fcd000
mprotect(0x7f8805fce000, 8388608, PROT_READ|PROT_WRITE) = 0
clone(child_stack=0x7f88067ccfb0, flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|
CLONE_THREAD|CLONE_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|CLONE_CHILD_CLEARTID,
parent_tid=[7162], tls=0x7f88067cd700, child_tidptr=0x7f88067cd9d0) = 7162
mmap(NULL, 8392704, PROT_NONE, MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0) =
0x7f88057cc000
mprotect(0x7f88057cd000, 8388608, PROT_READ|PROT_WRITE) = 0
clone(child_stack=0x7f8805fcbfb0, flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|
CLONE_THREAD|CLONE_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|CLONE_CHILD_CLEARTID,
parent_tid=[7163], tls=0x7f8805fcc700, child_tidptr=0x7f8805fcc9d0) = 7163
mmap(NULL, 8392704, PROT_NONE, MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0) =
0x7f8804fcb000
mprotect(0x7f8804fcc000, 8388608, PROT_READ|PROT_WRITE) = 0
clone(child_stack=0x7f88057cafb0, flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|
CLONE_THREAD|CLONE_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|CLONE_CHILD_CLEARTID,
parent_tid=[7164], tls=0x7f88057cb700, child_tidptr=0x7f88057cb9d0) = 7164
mmap(NULL, 8392704, PROT_NONE, MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0) =
```

```
0x7f88047ca000
mprotect(0x7f88047cb000, 8388608, PROT_READ|PROT_WRITE) = 0
clone(child_stack=0x7f8804fc9fb0, flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|
CLONE_THREAD|CLONE_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|CLONE_CHILD_CLEARTID,
parent_tid=[7165], tls=0x7f8804fca700, child_tidptr=0x7f8804fca9d0) = 7165
futex(0x7f88097d39d0, FUTEX_WAIT, 7156, NULL) = 0
munmap(0x7f8808fd3000, 8392704)         = 0
munmap(0x7f88087d2000, 8392704)         = 0
munmap(0x7f8807fd1000, 8392704)         = 0
munmap(0x7f88077d0000, 8392704)         = 0
munmap(0x7f8806fcf000, 8392704)         = 0
munmap(0x7f88067ce000, 8392704)         = 0
fstat(1, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0), ...}) = 0
clock_gettime(CLOCK_PROCESS_CPUTIME_ID, {tv_sec=0, tv_nsec=2208825}) = 0
write(1, "0.49 0.50\n", 100.49 0.50
)           = 10
write(1, "10 threads: 867 ms\n", 1910 threads: 867 ms
)       = 19
lseek(0, -1, SEEK_CUR)                  = -1 ESPIPE (Illegal seek)
exit_group(0)                           = ?
+++ exited with 0 +++
```

Лабораторная работа № 4

Все используемые файлы открываются вызовом *openat*. Увеличение размера общих файлов использует *ftruncate*. Создание дочерних процессов происходит при помощи *clone*. Отображение файла в память – *mmap, munmap*. Сигналы, использующиеся для синхронизации, посылаются системным вызовом *kill* и ожидаются *rt_sigtimedwait*.

```
execve("./main", ["./main"], 0x7ffe3e6088f0 /* 60 vars */) = 0
brk(NULL)                               = 0x556a6afbf000
arch_prctl(0x3001 /* ARCH_??? */, 0x7ffc83d07160) = -1 EINVAL (Invalid argument)
access("/etc/ld.so.preload", R_OK)      = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=63465, ...}) = 0
mmap(NULL, 63465, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7f5dc5461000
close(3)                                = 0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\360q\2\0\0\0\0\0"..., 832) =
832
pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784,
64) = 784
pread64(3, "\4\0\0\0\20\0\0\0\5\0\0\0GNU\0\2\0\0\300\4\0\0\0\3\0\0\0\0\0\0\0", 32,
848) = 32
pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\363\377?\332\200\270\27\304d\245n\355Y\
377\t\334"..., 68, 880) = 68
fstat(3, {st_mode=S_IFREG|0755, st_size=2029224, ...}) = 0
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7f5dc545f000
pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784,
64) = 784
pread64(3, "\4\0\0\0\20\0\0\0\5\0\0\0GNU\0\2\0\0\300\4\0\0\0\3\0\0\0\0\0\0\0", 32,
848) = 32
pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\363\377?\332\200\270\27\304d\245n\355Y\
377\t\334"..., 68, 880) = 68
mmap(NULL, 2036952, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7f5dc526d000
mprotect(0x7f5dc5292000, 1847296, PROT_NONE) = 0
mmap(0x7f5dc5292000, 1540096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x25000) = 0x7f5dc5292000
mmap(0x7f5dc540a000, 303104, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x19d000) = 0x7f5dc540a000
```

```
mmap(0x7f5dc5455000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x1e7000) = 0x7f5dc5455000
mmap(0x7f5dc545b000, 13528, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_ANONYMOUS, -1, 0) = 0x7f5dc545b000
close(3)                                 = 0
arch_prctl(ARCH_SET_FS, 0x7f5dc5460540) = 0
mprotect(0x7f5dc5455000, 12288, PROT_READ) = 0
mprotect(0x556a69700000, 4096, PROT_READ) = 0
mprotect(0x7f5dc549e000, 4096, PROT_READ) = 0
munmap(0x7f5dc5461000, 63465)            = 0
getpid()                                 = 7314
fstat(0, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0), ...}) = 0
brk(NULL)                                = 0x556a6afbf000
brk(0x556a6afe0000)                       = 0x556a6afe0000
read(0, 1.txt
"1.txt\n", 1024)                  = 6
read(0, 2.txt
"2.txt\n", 1024)                  = 6
openat(AT_FDCWD, "1.txt", O_WRONLY|O_CREAT|O_TRUNC, 0666) = 3
openat(AT_FDCWD, "2.txt", O_WRONLY|O_CREAT|O_TRUNC, 0666) = 4
openat(AT_FDCWD, "mmap1", O_RDWR|O_CREAT, 000) = 5
openat(AT_FDCWD, "mmap2", O_RDWR|O_CREAT, 0102) = 6
ftruncate(5, 4096)                       = 0
ftruncate(6, 4096)                       = 0
clone(child_stack=NULL, flags=CLONE_CHILD_CLEARTID|CLONE_CHILD_SETTID|SIGCHLD,
child_tidptr=0x7f5dc5460810) = 7315
clone(child_stack=NULL, flags=CLONE_CHILD_CLEARTID|CLONE_CHILD_SETTID|SIGCHLD,
child_tidptr=0x7f5dc5460810) = 7316
close(3)                                 = 0
close(4)                                 = 0
mmap(NULL, 4096, PROT_READ|PROT_WRITE, MAP_SHARED, 5, 0) = 0x7f5dc549d000
mmap(NULL, 4096, PROT_READ|PROT_WRITE, MAP_SHARED, 6, 0) = 0x7f5dc5470000
rt_sigprocmask(SIG_BLOCK, [USR1], NULL, 8) = 0
read(0, 12345678990
"12345678990\n", 1024)           = 12
kill(7316, SIGUSR1)                      = 0
rt_sigtimedwait([USR1], {si_signo=SIGUSR1, si_code=SI_USER, si_pid=7316,
si_uid=1000}, NULL, 8) = 10 (SIGUSR1)
read(0, 1234567
"1234567\n", 1024)               = 8
kill(7315, SIGUSR1)                      = 0
rt_sigtimedwait([USR1], {si_signo=SIGUSR1, si_code=SI_USER, si_pid=7315,
si_uid=1000}, NULL, 8) = 10 (SIGUSR1)
read(0, "", 1024)                        = 0
kill(7315, SIGUSR1)                      = 0
kill(7316, SIGUSR1)                      = 0
--- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=7316, si_uid=1000,
si_status=0, si_utime=0, si_stime=0} ---
munmap(0x7f5dc549d000, 4096)             = 0
munmap(0x7f5dc5470000, 4096)             = 0
close(5)                                 = 0
close(6)                                 = 0
exit_group(0)                            = ?
+++ exited with 0 +++
```

Лабораторная работа № 5

Для динамической работы с библиотеками используются *dlopen, dlsym, dlclose*. При этом сами библиотеки загружаются в память при помощи *mmap*. Также можно заметить, что при «статическом» использовании библиотека была найдена не сразу.

```
// static.c
execve("./static", ["./static"], 0x7ffde4029dc0 /* 60 vars */) = 0
brk(NULL)                               = 0x55a7085dd000
arch_prctl(0x3001 /* ARCH_??? */, 0x7ffccf024fc0) = -1 EINVAL (Invalid argument)
access("/etc/ld.so.preload", R_OK)      = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "./tls/x86_64/x86_64/libfunctions2.so", O_RDONLY|O_CLOEXEC) = -1
ENOENT (No such file or directory)
openat(AT_FDCWD, "./tls/x86_64/libfunctions2.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No
such file or directory)
openat(AT_FDCWD, "./tls/x86_64/libfunctions2.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No
such file or directory)
openat(AT_FDCWD, "./tls/libfunctions2.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such
file or directory)
openat(AT_FDCWD, "./x86_64/x86_64/libfunctions2.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT
(No such file or directory)
openat(AT_FDCWD, "./x86_64/libfunctions2.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No
such file or directory)
openat(AT_FDCWD, "./x86_64/libfunctions2.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No
such file or directory)
openat(AT_FDCWD, "./libfunctions2.so", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\300\20\0\0\0\0\0\0"..., 832)
= 832
fstat(3, {st_mode=S_IFREG|0775, st_size=16384, ...}) = 0
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7f81d21c8000
getcwd("/home/iktovr/Documents/OS/lab5", 128) = 31
mmap(NULL, 16456, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7f81d21c3000
mmap(0x7f81d21c4000, 4096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,
3, 0x1000) = 0x7f81d21c4000
mmap(0x7f81d21c5000, 4096, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000)
= 0x7f81d21c5000
mmap(0x7f81d21c6000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,
3, 0x2000) = 0x7f81d21c6000
close(3)                                = 0
openat(AT_FDCWD, "./tls/x86_64/x86_64/libc.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No
such file or directory)
openat(AT_FDCWD, "./tls/x86_64/libc.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such
file or directory)
openat(AT_FDCWD, "./tls/x86_64/libc.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such
file or directory)
openat(AT_FDCWD, "./tls/libc.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or
directory)
openat(AT_FDCWD, "./x86_64/x86_64/libc.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No
such file or directory)
openat(AT_FDCWD, "./x86_64/libc.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file
or directory)
openat(AT_FDCWD, "./x86_64/libc.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file
or directory)
openat(AT_FDCWD, "./libc.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or
directory)
openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=63465, ...}) = 0
mmap(NULL, 63465, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7f81d21b3000
close(3)                                = 0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\360q\2\0\0\0\0\0"..., 832) =
832
pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784,
64) = 784
pread64(3, "\4\0\0\0\20\0\0\0\5\0\0\0GNU\0\2\0\0\300\4\0\0\0\3\0\0\0\0\0\0\0", 32,
848) = 32
pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\363\377?\332\200\270\27\304d\245n\355Y\
377\t\334"..., 68, 880) = 68
fstat(3, {st_mode=S_IFREG|0755, st_size=2029224, ...}) = 0
```

```
pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784,
64) = 784
pread64(3, "\4\0\0\0\20\0\0\0\5\0\0\0GNU\0\2\0\0\300\4\0\0\0\3\0\0\0\0\0\0\0", 32,
848) = 32
pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\363\377?\332\200\270\27\304d\245n\355Y\
377\t\334"..., 68, 880) = 68
mmap(NULL, 2036952, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7f81d1fc1000
mprotect(0x7f81d1fe6000, 1847296, PROT_NONE) = 0
mmap(0x7f81d1fe6000, 1540096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x25000) = 0x7f81d1fe6000
mmap(0x7f81d215e000, 303104, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x19d000) = 0x7f81d215e000
mmap(0x7f81d21a9000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x1e7000) = 0x7f81d21a9000
mmap(0x7f81d21af000, 13528, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_ANONYMOUS, -1, 0) = 0x7f81d21af000
close(3)                                = 0
mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7f81d1fbe000
arch_prctl(ARCH_SET_FS, 0x7f81d1fbe740) = 0
mprotect(0x7f81d21a9000, 12288, PROT_READ) = 0
mprotect(0x7f81d21c6000, 4096, PROT_READ) = 0
mprotect(0x55a708187000, 4096, PROT_READ) = 0
mprotect(0x7f81d21f7000, 4096, PROT_READ) = 0
munmap(0x7f81d21b3000, 63465)           = 0
fstat(0, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0), ...}) = 0
brk(NULL)                               = 0x55a7085dd000
brk(0x55a7085fe000)                     = 0x55a7085fe000
read(0, 1 100 199
"1 100 199\n", 1024)            = 10
fstat(1, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0), ...}) = 0
write(1, "Prime numbers: 21\n", 18Prime numbers: 21
)       = 18
read(0, 2 20
"2 20\n", 1024)                 = 5
write(1, "e = 2.718282\n", 13e = 2.718282
)           = 13
read(0, "", 1024)                       = 0
exit_group(0)                           = ?
+++ exited with 0 +++

// dynamic.c
execve("./dynamic", ["./dynamic"], 0x7ffd8cde2d90 /* 60 vars */) = 0
brk(NULL)                               = 0x55de34ca0000
arch_prctl(0x3001 /* ARCH_??? */, 0x7fff0c27db20) = -1 EINVAL (Invalid argument)
access("/etc/ld.so.preload", R_OK)      = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=63465, ...}) = 0
mmap(NULL, 63465, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7fda448f9000
close(3)                                = 0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libdl.so.2", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0 \22\0\0\0\0\0\0"..., 832) =
832
fstat(3, {st_mode=S_IFREG|0644, st_size=18816, ...}) = 0
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7fda448f7000
mmap(NULL, 20752, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7fda448f1000
mmap(0x7fda448f2000, 8192, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,
3, 0x1000) = 0x7fda448f2000
mmap(0x7fda448f4000, 4096, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x3000)
= 0x7fda448f4000
mmap(0x7fda448f5000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,
3, 0x3000) = 0x7fda448f5000
close(3)                                = 0
```

```
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\360q\2\0\0\0\0\0"..., 832) =
832
pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784,
64) = 784
pread64(3, "\4\0\0\0\20\0\0\0\5\0\0\0GNU\0\2\0\0\300\4\0\0\0\3\0\0\0\0\0\0\0"..., 32,
848) = 32
pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\363\377?\332\200\270\27\304d\245n\355Y\
377\t\334"..., 68, 880) = 68
fstat(3, {st_mode=S_IFREG|0755, st_size=2029224, ...}) = 0
pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784,
64) = 784
pread64(3, "\4\0\0\0\20\0\0\0\5\0\0\0GNU\0\2\0\0\300\4\0\0\0\3\0\0\0\0\0\0\0"..., 32,
848) = 32
pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\363\377?\332\200\270\27\304d\245n\355Y\
377\t\334"..., 68, 880) = 68
mmap(NULL, 2036952, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7fda446ff000
mprotect(0x7fda44724000, 1847296, PROT_NONE) = 0
mmap(0x7fda44724000, 1540096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x25000) = 0x7fda44724000
mmap(0x7fda4489c000, 303104, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x19d000) = 0x7fda4489c000
mmap(0x7fda448e7000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x1e7000) = 0x7fda448e7000
mmap(0x7fda448ed000, 13528, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_ANONYMOUS, -1, 0) = 0x7fda448ed000
close(3)                                = 0
mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7fda446fc000
arch_prctl(ARCH_SET_FS, 0x7fda446fc740) = 0
mprotect(0x7fda448e7000, 12288, PROT_READ) = 0
mprotect(0x7fda448f5000, 4096, PROT_READ) = 0
mprotect(0x55de336ba000, 4096, PROT_READ) = 0
mprotect(0x7fda44936000, 4096, PROT_READ) = 0
munmap(0x7fda448f9000, 63465)           = 0
brk(NULL)                               = 0x55de34ca0000
brk(0x55de34cc1000)                     = 0x55de34cc1000
openat(AT_FDCWD, "./libfunctions1.so", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0`\20\0\0\0\0\0\0"..., 832) =
832
fstat(3, {st_mode=S_IFREG|0775, st_size=16224, ...}) = 0
getcwd("/home/iktovr/Documents/OS/lab5", 128) = 31
mmap(NULL, 16432, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7fda44904000
mmap(0x7fda44905000, 4096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,
3, 0x1000) = 0x7fda44905000
mmap(0x7fda44906000, 4096, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000)
= 0x7fda44906000
mmap(0x7fda44907000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,
3, 0x2000) = 0x7fda44907000
close(3)                                = 0
openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=63465, ...}) = 0
mmap(NULL, 63465, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7fda446ec000
close(3)                                = 0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libm.so.6", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\300\363\0\0\0\0\0"..., 832)
= 832
fstat(3, {st_mode=S_IFREG|0644, st_size=1369352, ...}) = 0
mmap(NULL, 1368336, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7fda4459d000
mmap(0x7fda445ac000, 684032, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0xf000) = 0x7fda445ac000
mmap(0x7fda44653000, 618496, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0xb6000) = 0x7fda44653000
mmap(0x7fda446ea000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,
```

```
                   3, 0x14c000) = 0x7fda446ea000
close(3)                                        = 0
mprotect(0x7fda446ea000, 4096, PROT_READ) = 0
mprotect(0x7fda44907000, 4096, PROT_READ) = 0
munmap(0x7fda446ec000, 63465)              = 0
fstat(0, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0), ...}) = 0
read(0, 1 100 199
"1 100 199\n", 1024)              = 10
fstat(1, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0), ...}) = 0
write(1, "Prime numbers: 21\n", 18Prime numbers: 21
)      = 18
read(0, 2 20
"2 20\n", 1024)                   = 5
write(1, "e = 2.653295\n", 13e = 2.653295
)         = 13
read(0, 0
"0\n", 1024)                      = 2
munmap(0x7fda44904000, 16432)         = 0
munmap(0x7fda4459d000, 1368336)       = 0
openat(AT_FDCWD, "./libfunctions2.so", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\300\20\0\0\0\0\0\0"..., 832)
= 832
fstat(3, {st_mode=S_IFREG|0775, st_size=16384, ...}) = 0
getcwd("/home/iktovr/Documents/OS/lab5", 128) = 31
mmap(NULL, 16456, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7fda44904000
mmap(0x7fda44905000, 4096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,
3, 0x1000) = 0x7fda44905000
mmap(0x7fda44906000, 4096, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000)
= 0x7fda44906000
mmap(0x7fda44907000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,
3, 0x2000) = 0x7fda44907000
close(3)                                        = 0
mprotect(0x7fda44907000, 4096, PROT_READ) = 0
read(0, 1 100 199
"1 100 199\n", 1024)              = 10
write(1, "Prime numbers: 21\n", 18Prime numbers: 21
)      = 18
read(0, 2 20
"2 20\n", 1024)                   = 5
write(1, "e = 2.718282\n", 13e = 2.718282
)         = 13
read(0, 0
"0\n", 1024)                      = 2
munmap(0x7fda44904000, 16456)         = 0
openat(AT_FDCWD, "./libfunctions1.so", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0`\20\0\0\0\0\0\0"..., 832) =
832
fstat(3, {st_mode=S_IFREG|0775, st_size=16224, ...}) = 0
getcwd("/home/iktovr/Documents/OS/lab5", 128) = 31
mmap(NULL, 16432, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7fda44904000
mmap(0x7fda44905000, 4096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,
3, 0x1000) = 0x7fda44905000
mmap(0x7fda44906000, 4096, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000)
= 0x7fda44906000
mmap(0x7fda44907000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,
3, 0x2000) = 0x7fda44907000
close(3)                                        = 0
openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=63465, ...}) = 0
mmap(NULL, 63465, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7fda446ec000
close(3)                                        = 0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libm.so.6", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\300\363\0\0\0\0\0\0"..., 832)
= 832
```

```
fstat(3, {st_mode=S_IFREG|0644, st_size=1369352, ...}) = 0
mmap(NULL, 1368336, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7fda4459d000
mmap(0x7fda445ac000, 684032, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0xf000) = 0x7fda445ac000
mmap(0x7fda44653000, 618496, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0xb6000) = 0x7fda44653000
mmap(0x7fda446ea000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,
3, 0x14c000) = 0x7fda446ea000
close(3)                                = 0
mprotect(0x7fda446ea000, 4096, PROT_READ) = 0
mprotect(0x7fda44907000, 4096, PROT_READ) = 0
munmap(0x7fda446ec000, 63465)           = 0
read(0, "", 1024)                       = 0
munmap(0x7fda44904000, 16432)           = 0
munmap(0x7fda4459d000, 1368336)         = 0
exit_group(0)                           = ?
+++ exited with 0 +++
```

Лабораторные работы № 6-8

Программа использует сокеты из библиотеки ZMQ, которые в свою очередь используют системные вызовы для работы с сокетами – *socket, getsockname, sendto, recvmsg, bind, listen, poll. Poll* в некоторых случаях вызывается с аргументом 1000, что соответствует времени ожидания 1 секунда, заданном для сокетов, проверяющих доступность узлов.

```
execve("./main", ["./main"], 0x7fff471830e0 /* 60 vars */) = 0
brk(NULL)                               = 0x559f0617d000
arch_prctl(0x3001 /* ARCH_??? */, 0x7ffc4bd2c7b0) = -1 EINVAL (Invalid argument)
access("/etc/ld.so.preload", R_OK)      = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=63465, ...}) = 0
mmap(NULL, 63465, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7fb9424b6000
close(3)                                = 0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libpthread.so.0", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\220\201\0\0\0\0\0\0"..., 832)
= 832
pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0O\305\3743\364B\2216\244\224\306@\
261\23\327o"..., 68, 824) = 68
fstat(3, {st_mode=S_IFREG|0755, st_size=157224, ...}) = 0
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7fb9424b4000
pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0O\305\3743\364B\2216\244\224\306@\
261\23\327o"..., 68, 824) = 68
mmap(NULL, 140408, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7fb942491000
mmap(0x7fb942498000, 69632, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,
3, 0x7000) = 0x7fb942498000
mmap(0x7fb9424a9000, 20480, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x18000) = 0x7fb9424a9000
mmap(0x7fb9424ae000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,
3, 0x1c000) = 0x7fb9424ae000
mmap(0x7fb9424b0000, 13432, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_ANONYMOUS, -1, 0) = 0x7fb9424b0000
close(3)                                = 0
openat(AT_FDCWD, "/usr/local/lib/libzmqpp.so.4", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\240\334\0\0\0\0\0\0"..., 832)
= 832
fstat(3, {st_mode=S_IFREG|0755, st_size=235272, ...}) = 0
mmap(NULL, 190632, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7fb942462000
mmap(0x7fb94246e000, 102400, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0xc000) = 0x7fb94246e000
mmap(0x7fb942487000, 32768, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
```

```
0x25000) = 0x7fb942487000
mmap(0x7fb94248f000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,
3, 0x2c000) = 0x7fb94248f000
close(3)                                = 0
openat(AT_FDCWD, "/usr/local/lib/libzmq.so.5", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0`\210\1\0\0\0\0\0"..., 832) =
832
fstat(3, {st_mode=S_IFREG|0755, st_size=16799592, ...}) = 0
mmap(NULL, 681592, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7fb9423bb000
mmap(0x7fb9423d2000, 425984, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x17000) = 0x7fb9423d2000
mmap(0x7fb94243a000, 126976, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x7f000) = 0x7fb94243a000
mmap(0x7fb942459000, 36864, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x9d000) = 0x7fb942459000
close(3)                                = 0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libstdc++.so.6", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\240\341\t\0\0\0\0\0"..., 832)
= 832
fstat(3, {st_mode=S_IFREG|0644, st_size=1952928, ...}) = 0
mmap(NULL, 1968128, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7fb9421da000
mprotect(0x7fb942270000, 1286144, PROT_NONE) = 0
mmap(0x7fb942270000, 983040, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x96000) = 0x7fb942270000
mmap(0x7fb942360000, 299008, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x186000) = 0x7fb942360000
mmap(0x7fb9423aa000, 57344, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x1cf000) = 0x7fb9423aa000
mmap(0x7fb9423b8000, 10240, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_ANONYMOUS, -1, 0) = 0x7fb9423b8000
close(3)                                = 0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libgcc_s.so.1", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\3405\0\0\0\0\0\0"..., 832) =
832
fstat(3, {st_mode=S_IFREG|0644, st_size=104984, ...}) = 0
mmap(NULL, 107592, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7fb9421bf000
mmap(0x7fb9421c2000, 73728, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,
3, 0x3000) = 0x7fb9421c2000
mmap(0x7fb9421d4000, 16384, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x15000) = 0x7fb9421d4000
mmap(0x7fb9421d8000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,
3, 0x18000) = 0x7fb9421d8000
close(3)                                = 0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0360q\2\0\0\0\0\0"..., 832) =
832
pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784,
64) = 784
pread64(3, "\4\0\0\0\20\0\0\0\5\0\0\0GNU\0\2\0\0\300\4\0\0\0\3\0\0\0\0\0\0\0", 32,
848) = 32
pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\363\377?\332\200\270\27\304d\245n\355Y\
377\t\334"..., 68, 880) = 68
fstat(3, {st_mode=S_IFREG|0755, st_size=2029224, ...}) = 0
pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784,
64) = 784
pread64(3, "\4\0\0\0\20\0\0\0\5\0\0\0GNU\0\2\0\0\300\4\0\0\0\3\0\0\0\0\0\0\0", 32,
848) = 32
pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\363\377?\332\200\270\27\304d\245n\355Y\
377\t\334"..., 68, 880) = 68
mmap(NULL, 2036952, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7fb941fcd000
mprotect(0x7fb941ff2000, 1847296, PROT_NONE) = 0
mmap(0x7fb941ff2000, 1540096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x25000) = 0x7fb941ff2000
mmap(0x7fb94216a000, 303104, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
```

```
0x19d000) = 0x7fb94216a000
mmap(0x7fb9421b5000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x1e7000) = 0x7fb9421b5000
mmap(0x7fb9421bb000, 13528, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_ANONYMOUS, -1, 0) = 0x7fb9421bb000
close(3)                                = 0
openat(AT_FDCWD, "/usr/local/lib/libsodium.so.23", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0 \314\0\0\0\0\0\0"..., 832) =
832
fstat(3, {st_mode=S_IFREG|0755, st_size=3635240, ...}) = 0
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7fb941fcb000
mmap(NULL, 353280, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7fb941f74000
mmap(0x7fb941f80000, 225280, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0xc000) = 0x7fb941f80000
mmap(0x7fb941fb7000, 73728, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x43000) = 0x7fb941fb7000
mmap(0x7fb941fc9000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,
3, 0x54000) = 0x7fb941fc9000
close(3)                                = 0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libm.so.6", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\300\363\0\0\0\0\0\0"..., 832)
= 832
fstat(3, {st_mode=S_IFREG|0644, st_size=1369352, ...}) = 0
mmap(NULL, 1368336, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7fb941e25000
mmap(0x7fb941e34000, 684032, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0xf000) = 0x7fb941e34000
mmap(0x7fb941edb000, 618496, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0xb6000) = 0x7fb941edb000
mmap(0x7fb941f72000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE,
3, 0x14c000) = 0x7fb941f72000
close(3)                                = 0
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7fb941e23000
arch_prctl(ARCH_SET_FS, 0x7fb941e24040) = 0
mprotect(0x7fb9421b5000, 12288, PROT_READ) = 0
mprotect(0x7fb941f72000, 4096, PROT_READ) = 0
mprotect(0x7fb9424ae000, 4096, PROT_READ) = 0
mprotect(0x7fb941fc9000, 4096, PROT_READ) = 0
mprotect(0x7fb9421d8000, 4096, PROT_READ) = 0
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7fb941e21000
mprotect(0x7fb9423aa000, 45056, PROT_READ) = 0
mprotect(0x7fb942459000, 32768, PROT_READ) = 0
mprotect(0x7fb94248f000, 4096, PROT_READ) = 0
mprotect(0x559f05aaa000, 4096, PROT_READ) = 0
mprotect(0x7fb9424f3000, 4096, PROT_READ) = 0
munmap(0x7fb9424b6000, 63465)           = 0
set_tid_address(0x7fb941e24310)         = 7464
set_robust_list(0x7fb941e24320, 24)     = 0
rt_sigaction(SIGRTMIN, {sa_handler=0x7fb942498bf0, sa_mask=[], sa_flags=SA_RESTORER|
SA_SIGINFO, sa_restorer=0x7fb9424a63c0}, NULL, 8) = 0
rt_sigaction(SIGRT_1, {sa_handler=0x7fb942498c90, sa_mask=[], sa_flags=SA_RESTORER|
SA_RESTART|SA_SIGINFO, sa_restorer=0x7fb9424a63c0}, NULL, 8) = 0
rt_sigprocmask(SIG_UNBLOCK, [RTMIN RT_1], NULL, 8) = 0
prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024, rlim_max=RLIM64_INFINITY}) = 0
brk(NULL)                               = 0x559f0617d000
brk(0x559f0619e000)                     = 0x559f0619e000
futex(0x7fb9423b86bc, FUTEX_WAKE_PRIVATE, 2147483647) = 0
futex(0x7fb9423b86c8, FUTEX_WAKE_PRIVATE, 2147483647) = 0
eventfd2(0, EFD_CLOEXEC)                 = 3
fcntl(3, F_GETFL)                        = 0x2 (flags O_RDWR)
fcntl(3, F_SETFL, O_RDWR|O_NONBLOCK)     = 0
fcntl(3, F_GETFL)                        = 0x802 (flags O_RDWR|O_NONBLOCK)
```

```
fcntl(3, F_SETFL, O_RDWR|O_NONBLOCK)      = 0
getrandom("\x80\xc4\xc6\xba\x3f\x67\x20\x95\x32\xdb\x93\xb8\x85\xe2\x55\xb6", 16, 0)
= 16
getrandom("\x58\xf8\x11\xee\xd4\x70\x4f\x0f\x2a\xa9\x5b\xba\x9a\x48\x4c\xfd", 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
eventfd2(0, EFD_CLOEXEC)                   = 5
fcntl(5, F_GETFL)                         = 0x2 (flags O_RDWR)
fcntl(5, F_SETFL, O_RDWR|O_NONBLOCK)      = 0
fcntl(5, F_GETFL)                         = 0x802 (flags O_RDWR|O_NONBLOCK)
fcntl(5, F_SETFL, O_RDWR|O_NONBLOCK)      = 0
epoll_create1(EPOLL_CLOEXEC)
            = 6
epoll_ctl(6, EPOLL_CTL_ADD, 5, {0, {u32=102315040, u64=94141490476064}}) = 0
epoll_ctl(6, EPOLL_CTL_MOD, 5, {EPOLLIN, {u32=102315040, u64=94141490476064}}) = 0
mmap(NULL, 8392704, PROT_NONE, MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0) =
0x7fb941620000
mprotect(0x7fb941621000, 8388608, PROT_READ|PROT_WRITE) = 0
clone(child_stack=0x7fb941e1fd70, flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|
CLONE_THREAD|CLONE_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|CLONE_CHILD_CLEARTID,
parent_tid=[7465], tls=0x7fb941e20700, child_tidptr=0x7fb941e209d0) = 7465
eventfd2(0, EFD_CLOEXEC)                   = 7
fcntl(7, F_GETFL)                         = 0x2 (flags O_RDWR)
fcntl(7, F_SETFL, O_RDWR|O_NONBLOCK)      = 0
fcntl(7, F_GETFL)                         = 0x802 (flags O_RDWR|O_NONBLOCK)
fcntl(7, F_SETFL, O_RDWR|O_NONBLOCK)      = 0
epoll_create1(EPOLL_CLOEXEC)              = 8
epoll_ctl(8, EPOLL_CTL_ADD, 7, {0, {u32=102315616, u64=94141490476640}}) = 0
epoll_ctl(8, EPOLL_CTL_MOD, 7, {EPOLLIN, {u32=102315616, u64=94141490476640}}) = 0
mmap(NULL, 8392704, PROT_NONE, MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0) =
0x7fb940e1f000
mprotect(0x7fb940e20000, 8388608, PROT_READ|PROT_WRITE) = 0
clone(child_stack=0x7fb94161ed70, flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|
CLONE_THREAD|CLONE_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|CLONE_CHILD_CLEARTID,
parent_tid=[7466], tls=0x7fb94161f700, child_tidptr=0x7fb94161f9d0) = 7466
eventfd2(0, EFD_CLOEXEC)                   = 9
fcntl(9, F_GETFL)                         = 0x2 (flags O_RDWR)
fcntl(9, F_SETFL, O_RDWR|O_NONBLOCK)      = 0
fcntl(9, F_GETFL)                         = 0x802 (flags O_RDWR|O_NONBLOCK)
fcntl(9, F_SETFL, O_RDWR|O_NONBLOCK)      = 0
poll([{fd=9, events=POLLIN}], 1, 0)       = 0 (Timeout)
socket(AF_NETLINK, SOCK_RAW|SOCK_CLOEXEC, NETLINK_ROUTE) = 10
bind(10, {sa_family=AF_NETLINK, nl_pid=0, nl_groups=00000000}, 12) = 0
getsockname(10, {sa_family=AF_NETLINK, nl_pid=7464, nl_groups=00000000}, [12]) = 0
sendto(10, {{len=20, type=RTM_GETLINK, flags=NLM_F_REQUEST|NLM_F_DUMP, seq=1609494196, pid=0},
{ifi_family=AF_UNSPEC, ...}}, 20, 0, {sa_family=AF_NETLINK, nl_pid=0, nl_groups=00000000}, 12) = 20
recvmsg(10, {msg_name={sa_family=AF_NETLINK, nl_pid=0, nl_groups=00000000}, msg_namelen=12,
msg_iov=[{iov_base=[{{len=1316, type=RTM_NEWLINK, flags=NLM_F_MULTI, seq=1609494196, pid=7464}, {ifi_family=AF_UNSPEC,
ifi_type=ARPHRD_LOOPBACK, ifi_index=if_nametoindex("lo"), ifi_flags=IFF_UP|IFF_LOOPBACK|IFF_RUNNING|IFF_LOWER_UP,
ifi_change=0}, [{{nla_len=7, nla_type=IFLA_IFNAME}, "lo"}, {{nla_len=8, nla_type=IFLA_TXQLEN}, 1000}, {{nla_len=5,
nla_type=IFLA_OPERSTATE}, 0}, {{nla_len=5, nla_type=IFLA_LINKMODE}, 0}, {{nla_len=8, nla_type=IFLA_MTU}, 65536},
{{nla_len=8, nla_type=IFLA_MIN_MTU}, 0}, {{nla_len=8, nla_type=IFLA_MAX_MTU}, 0}, {{nla_len=8, nla_type=IFLA_GROUP}, 0},
{{nla_len=8, nla_type=IFLA_PROMISCUITY}, 0}, {{nla_len=8, nla_type=IFLA_NUM_TX_QUEUES}, 1}, {{nla_len=8,
nla_type=IFLA_GSO_MAX_SEGS}, 65535}, {{nla_len=8, nla_type=IFLA_GSO_MAX_SIZE}, 65536}, {{nla_len=8,
nla_type=IFLA_NUM_RX_QUEUES}, 1}, {{nla_len=5, nla_type=IFLA_CARRIER}, 1}, {{nla_len=12, nla_type=IFLA_QDISC},
"noqueue"}, {{nla_len=8, nla_type=IFLA_CARRIER_CHANGES}, 0}, {{nla_len=5, nla_type=IFLA_PROTO_DOWN}, 0}, {{nla_len=8,
nla_type=IFLA_CARRIER_UP_COUNT}, 0}, {{nla_len=8, nla_type=IFLA_CARRIER_DOWN_COUNT}, 0}, {{nla_len=36,
nla_type=IFLA_MAP}, {mem_start=0, mem_end=0, base_addr=0, irq=0, dma=0, port=0}}, {{nla_len=10, nla_type=IFLA_ADDRESS},
"\x00\x00\x00\x00\x00\x00"}, {{nla_len=10, nla_type=IFLA_BROADCAST}, "\x00\x00\x00\x00\x00\x00"}, {{nla_len=196,
nla_type=IFLA_STATS64}, {rx_packets=365049, tx_packets=365049, rx_bytes=18340954, tx_bytes=18340954, rx_errors=0,
tx_errors=0, rx_dropped=0, tx_dropped=0, multicast=0, collisions=0, rx_length_errors=0, rx_over_errors=0,
rx_crc_errors=0, rx_frame_errors=0, rx_fifo_errors=0, rx_missed_errors=0, tx_aborted_errors=0, tx_carrier_errors=0,
tx_fifo_errors=0, tx_heartbeat_errors=0, tx_window_errors=0, rx_compressed=0, tx_compressed=0, rx_nohandler=0}},
{{nla_len=100, nla_type=IFLA_STATS}, {rx_packets=365049, tx_packets=365049, rx_bytes=18340954, tx_bytes=18340954,
rx_errors=0, tx_errors=0, rx_dropped=0, tx_dropped=0, multicast=0, collisions=0, rx_length_errors=0, rx_over_errors=0,
rx_crc_errors=0, rx_frame_errors=0, rx_fifo_errors=0, rx_missed_errors=0, tx_aborted_errors=0, tx_carrier_errors=0,
tx_fifo_errors=0, tx_heartbeat_errors=0, tx_window_errors=0, rx_compressed=0, tx_compressed=0, rx_nohandler=0}},
{{nla_len=12, nla_type=IFLA_XDP}, {{nla_len=5, nla_type=IFLA_XDP_ATTACHED}, XDP_ATTACHED_NONE}}, {{nla_len=760,
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nla_type=IFLA_AF_SPEC}, [{{nla_len=136, nla_type=AF_INET}, {{nla_len=132, nla_type=IFLA_INET_CONF},
[[IPV4_DEVCONF_FORWARDING-1] = 0, [IPV4_DEVCONF_MC_FORWARDING-1] = 0, [IPV4_DEVCONF_PROXY_ARP-1] = 0,
[IPV4_DEVCONF_ACCEPT_REDIRECTS-1] = 1, [IPV4_DEVCONF_SECURE_REDIRECTS-1] = 1, [IPV4_DEVCONF_SEND_REDIRECTS-1] = 1,
[IPV4_DEVCONF_SHARED_MEDIA-1] = 1, [IPV4_DEVCONF_RP_FILTER-1] = 0, [IPV4_DEVCONF_ACCEPT_SOURCE_ROUTE-1] = 1,
[IPV4_DEVCONF_BOOTP_RELAY-1] = 0, [IPV4_DEVCONF_LOG_MARTIANS-1] = 0, [IPV4_DEVCONF_TAG-1] = 0, [IPV4_DEVCONF_ARPFILTER-1]
= 0, [IPV4_DEVCONF_MEDIUM_ID-1] = 0, [IPV4_DEVCONF_NOXFRM-1] = 1, [IPV4_DEVCONF_NOPOLICY-1] = 1,
[IPV4_DEVCONF_FORCE_IGMP_VERSION-1] = 0, [IPV4_DEVCONF_ARP_ANNOUNCE-1] = 0, [IPV4_DEVCONF_ARP_IGNORE-1] = 0,
[IPV4_DEVCONF_PROMOTE_SECONDARIES-1] = 1, [IPV4_DEVCONF_ARP_ACCEPT-1] = 0, [IPV4_DEVCONF_ARP_NOTIFY-1] = 0,
[IPV4_DEVCONF_ACCEPT_LOCAL-1] = 0, [IPV4_DEVCONF_SRC_VMARK-1] = 0, [IPV4_DEVCONF_PROXY_ARP_PVLAN-1] = 0,
[IPV4_DEVCONF_ROUTE_LOCALNET-1] = 0, [IPV4_DEVCONF_IGMPV2_UNSOLICITED_REPORT_INTERVAL-1] = 10000,
[IPV4_DEVCONF_IGMPV3_UNSOLICITED_REPORT_INTERVAL-1] = 1000, [IPV4_DEVCONF_IGNORE_ROUTES_WITH_LINKDOWN-1] = 0,
[IPV4_DEVCONF_DROP_UNICAST_IN_L2_MULTICAST-1] = 0, [IPV4_DEVCONF_DROP_GRATUITOUS_ARP-1] = 0, [IPV4_DEVCONF_BC_FORWARDING-
1] = 0]}}, {{nla_len=620, nla_type=AF_INET6}, [{{nla_len=8, nla_type=IFLA_INET6_FLAGS}, IF_READY}, {{nla_len=20,
nla_type=IFLA_INET6_CACHEINFO}, {max_reasm_len=65535, tstamp=798, reachable_time=16180, retrans_time=1000}},
{{nla_len=208, nla_type=IFLA_INET6_CONF}, [[DEVCONF_FORWARDING] = 0, [DEVCONF_HOPLIMIT] = 64, [DEVCONF_MTU6] = 65536,
[DEVCONF_ACCEPT_RA] = 1, [DEVCONF_ACCEPT_REDIRECTS] = 1, [DEVCONF_AUTOCONF] = 1, [DEVCONF_DAD_TRANSMITS] = 1,
[DEVCONF_RTR_SOLICITS] = -1, [DEVCONF_RTR_SOLICIT_INTERVAL] = 4000, [DEVCONF_RTR_SOLICIT_DELAY] = 1000,
[DEVCONF_USE_TEMPADDR] = -1, [DEVCONF_TEMP_VALID_LFT] = 604800, [DEVCONF_TEMP_PREFERED_LFT] = 86400,
[DEVCONF_REGEN_MAX_RETRY] = 3, [DEVCONF_MAX_DESYNC_FACTOR] = 600, [DEVCONF_MAX_ADDRESSES] = 16,
[DEVCONF_FORCE_MLD_VERSION] = 0, [DEVCONF_ACCEPT_RA_DEFRTR] = 1, [DEVCONF_ACCEPT_RA_PINFO] = 1,
[DEVCONF_ACCEPT_RA_RTR_PREF] = 1, [DEVCONF_RTR_PROBE_INTERVAL] = 60000, [DEVCONF_ACCEPT_RA_RT_INFO_MAX_PLEN] = 0,
[DEVCONF_PROXY_NDP] = 0, [DEVCONF_OPTIMISTIC_DAD] = 0, [DEVCONF_ACCEPT_SOURCE_ROUTE] = 0, [DEVCONF_MC_FORWARDING] = 0,
[DEVCONF_DISABLE_IPV6] = 0, [DEVCONF_ACCEPT_DAD] = -1, [DEVCONF_FORCE_TLLAO] = 0, [DEVCONF_NDISC_NOTIFY] = 0,
[DEVCONF_MLDV1_UNSOLICITED_REPORT_INTERVAL] = 10000, [DEVCONF_MLDV2_UNSOLICITED_REPORT_INTERVAL] = 1000, ...]},
{{nla_len=300, nla_type=IFLA_INET6_STATS}, [[IPSTATS_MIB_NUM] = 37, [IPSTATS_MIB_INPKTS] = 4, [IPSTATS_MIB_INOCTETS] =
292, [IPSTATS_MIB_INDELIVERS] = 4, [IPSTATS_MIB_OUTFORWDATAGRAMS] = 0, [IPSTATS_MIB_OUTPKTS] = 4, [IPSTATS_MIB_OUTOCTETS]
= 292, [IPSTATS_MIB_INHDRERRORS] = 0, [IPSTATS_MIB_INTOOBIGERRORS] = 0, [IPSTATS_MIB_INNOROUTES] = 0,
[IPSTATS_MIB_INADDRERRORS] = 0, [IPSTATS_MIB_INUNKNOWNPROTOS] = 0, [IPSTATS_MIB_INTRUNCATEDPKTS] = 0,
[IPSTATS_MIB_INDISCARDS] = 0, [IPSTATS_MIB_OUTDISCARDS] = 0, [IPSTATS_MIB_OUTNOROUTES] = 0, [IPSTATS_MIB_REASMTIMEOUT] =
0, [IPSTATS_MIB_REASMREQDS] = 0, [IPSTATS_MIB_REASMOKS] = 0, [IPSTATS_MIB_REASMFAILS] = 0, [IPSTATS_MIB_FRAGOKS] = 0,
[IPSTATS_MIB_FRAGFAILS] = 0, [IPSTATS_MIB_FRAGCREATES] = 0, [IPSTATS_MIB_INMCASTPKTS] = 0, [IPSTATS_MIB_OUTMCASTPKTS] =
2, [IPSTATS_MIB_INBCASTPKTS] = 0, [IPSTATS_MIB_OUTBCASTPKTS] = 0, [IPSTATS_MIB_INMCASTOCTETS] = 0,
[IPSTATS_MIB_OUTMCASTOCTETS] = 152, [IPSTATS_MIB_INBCASTOCTETS] = 0, [IPSTATS_MIB_OUTBCASTOCTETS] = 0,
[IPSTATS_MIB_CSUMERRORS] = 0, ...]}, {{nla_len=52, nla_type=IFLA_INET6_ICMP6STATS}, [[ICMP6_MIB_NUM] = 6,
[ICMP6_MIB_INMSGS] = 2, [ICMP6_MIB_INERRORS] = 0, [ICMP6_MIB_OUTMSGS] = 2, [ICMP6_MIB_OUTERRORS] = 0,
[ICMP6_MIB_CSUMERRORS] = 0]}, {{nla_len=20, nla_type=IFLA_INET6_ADDR_GEN_TOKEN}, inet_pton(AF_INET6, "::")}, {{nla_len=5,
nla_type=IFLA_INET6_ADDR_GEN_MODE}, IN6_ADDR_GEN_MODE_EUI64]}]}]}, {{len=1324, type=RTM_NEWLINK, flags=NLM_F_MULTI,
seq=1609494196, pid=7464}, {ifi_family=AF_UNSPEC, ifi_type=ARPHRD_ETHER, ifi_index=if_nametoindex("enp0s3"),
ifi_flags=IFF_UP|IFF_BROADCAST|IFF_RUNNING|IFF_MULTICAST|IFF_LOWER_UP, ifi_change=0}, [{{nla_len=11,
nla_type=IFLA_IFNAME}, "enp0s3"}, {{nla_len=8, nla_type=IFLA_TXQLEN}, 1000}, {{nla_len=5, nla_type=IFLA_OPERSTATE}, 6},
{{nla_len=5, nla_type=IFLA_LINKMODE}, 0}, {{nla_len=8, nla_type=IFLA_MTU}, 1500}, {{nla_len=8, nla_type=IFLA_MIN_MTU},
46}, {{nla_len=8, nla_type=IFLA_MAX_MTU}, 16110}, {{nla_len=8, nla_type=IFLA_GROUP}, 0}, {{nla_len=8,
nla_type=IFLA_PROMISCUITY}, 0}, {{nla_len=8, nla_type=IFLA_NUM_TX_QUEUES}, 1}, {{nla_len=8, nla_type=IFLA_GSO_MAX_SEGS},
65535}, {{nla_len=8, nla_type=IFLA_GSO_MAX_SIZE}, 65536}, {{nla_len=8, nla_type=IFLA_NUM_RX_QUEUES}, 1}, {{nla_len=5,
nla_type=IFLA_CARRIER}, 1}, {{nla_len=13, nla_type=IFLA_QDISC}, "fq_codel"}, {{nla_len=8, nla_type=IFLA_CARRIER_CHANGES},
6}, {{nla_len=5, nla_type=IFLA_PROTO_DOWN}, 0}, {{nla_len=8, nla_type=IFLA_CARRIER_UP_COUNT}, 3}, {{nla_len=8,
nla_type=IFLA_CARRIER_DOWN_COUNT}, 3}, {{nla_len=36, nla_type=IFLA_MAP}, {mem_start=0, mem_end=0, base_addr=0, irq=0,
dma=0, port=0}}, {{nla_len=10, nla_type=IFLA_ADDRESS}, "\x08\x00\x27\x46\xb1\x50"}, {{nla_len=10,
 nla_type=IFLA_BROADCAST}, "\xff\xff\xff\xff\xff\xff"}, {{nla_len=196, nla_type=IFLA_STATS64}, {rx_packets=18262,
tx_packets=11128, rx_bytes=13104170, tx_bytes=1000233, rx_errors=0, tx_errors=0, rx_dropped=0, tx_dropped=0, multicast=0,
collisions=0, rx_length_errors=0, rx_over_errors=0, rx_crc_errors=0, rx_frame_errors=0, rx_fifo_errors=0,
rx_missed_errors=0, tx_aborted_errors=0, tx_carrier_errors=0, tx_fifo_errors=0, tx_heartbeat_errors=0,
tx_window_errors=0, rx_compressed=0, tx_compressed=0, rx_nohandler=0}}, {{nla_len=100, nla_type=IFLA_STATS},
{rx_packets=18262, tx_packets=11128, rx_bytes=13104170, tx_bytes=1000233, rx_errors=0, tx_errors=0, rx_dropped=0,
tx_dropped=0, multicast=0, collisions=0, rx_length_errors=0, rx_over_errors=0, rx_crc_errors=0, rx_frame_errors=0,
rx_fifo_errors=0, rx_missed_errors=0, tx_aborted_errors=0, tx_carrier_errors=0, tx_fifo_errors=0, tx_heartbeat_errors=0,
tx_window_errors=0, rx_compressed=0, tx_compressed=0, rx_nohandler=0}}, {{nla_len=12, nla_type=IFLA_XDP}, {{nla_len=5,
nla_type=IFLA_XDP_ATTACHED}, XDP_ATTACHED_NONE}}, {{nla_len=760, nla_type=IFLA_AF_SPEC}, [{{nla_len=136,
nla_type=AF_INET}, {{nla_len=132, nla_type=IFLA_INET_CONF}, [[IPV4_DEVCONF_FORWARDING-1] = 0,
[IPV4_DEVCONF_MC_FORWARDING-1] = 0, [IPV4_DEVCONF_PROXY_ARP-1] = 0, [IPV4_DEVCONF_ACCEPT_REDIRECTS-1] = 1,
[IPV4_DEVCONF_SECURE_REDIRECTS-1] = 1, [IPV4_DEVCONF_SEND_REDIRECTS-1] = 1, [IPV4_DEVCONF_SHARED_MEDIA-1] = 1,
[IPV4_DEVCONF_RP_FILTER-1] = 2, [IPV4_DEVCONF_ACCEPT_SOURCE_ROUTE-1] = 1, [IPV4_DEVCONF_BOOTP_RELAY-1] = 0,
[IPV4_DEVCONF_LOG_MARTIANS-1] = 0, [IPV4_DEVCONF_TAG-1] = 0, [IPV4_DEVCONF_ARPFILTER-1] = 0, [IPV4_DEVCONF_MEDIUM_ID-1] =
0, [IPV4_DEVCONF_NOXFRM-1] = 0, [IPV4_DEVCONF_NOPOLICY-1] = 0, [IPV4_DEVCONF_FORCE_IGMP_VERSION-1] = 0,
[IPV4_DEVCONF_ARP_ANNOUNCE-1] = 0, [IPV4_DEVCONF_ARP_IGNORE-1] = 0, [IPV4_DEVCONF_PROMOTE_SECONDARIES-1] = 1,
[IPV4_DEVCONF_ARP_ACCEPT-1] = 0, [IPV4_DEVCONF_ARP_NOTIFY-1] = 0, [IPV4_DEVCONF_ACCEPT_LOCAL-1] = 0,
[IPV4_DEVCONF_SRC_VMARK-1] = 0, [IPV4_DEVCONF_PROXY_ARP_PVLAN-1] = 0, [IPV4_DEVCONF_ROUTE_LOCALNET-1] = 0,
[IPV4_DEVCONF_IGMPV2_UNSOLICITED_REPORT_INTERVAL-1] = 10000, [IPV4_DEVCONF_IGMPV3_UNSOLICITED_REPORT_INTERVAL-1] = 1000,
[IPV4_DEVCONF_IGNORE_ROUTES_WITH_LINKDOWN-1] = 0, [IPV4_DEVCONF_DROP_UNICAST_IN_L2_MULTICAST-1] = 0,
[IPV4_DEVCONF_DROP_GRATUITOUS_ARP-1] = 0, [IPV4_DEVCONF_BC_FORWARDING-1] = 0]}}, {{nla_len=620, nla_type=AF_INET6},
[{{nla_len=8, nla_type=IFLA_INET6_FLAGS}, IF_READY}, {{nla_len=20, nla_type=IFLA_INET6_CACHEINFO}, {max_reasm_len=65535,
tstamp=1573, reachable_time=41400, retrans_time=1000}}, {{nla_len=208, nla_type=IFLA_INET6_CONF}, [[DEVCONF_FORWARDING] =
0, [DEVCONF_HOPLIMIT] = 64, [DEVCONF_MTU6] = 1500, [DEVCONF_ACCEPT_RA] = 0, [DEVCONF_ACCEPT_REDIRECTS] = 1,
[DEVCONF_AUTOCONF] = 1, [DEVCONF_DAD_TRANSMITS] = 1, [DEVCONF_RTR_SOLICITS] = -1, [DEVCONF_RTR_SOLICIT_INTERVAL] = 4000,
[DEVCONF_RTR_SOLICIT_DELAY] = 1000, [DEVCONF_USE_TEMPADDR] = 2, [DEVCONF_TEMP_VALID_LFT] = 604800,
[DEVCONF_TEMP_PREFERED_LFT] = 86400, [DEVCONF_REGEN_MAX_RETRY] = 3, [DEVCONF_MAX_DESYNC_FACTOR] = 600,
[DEVCONF_MAX_ADDRESSES] = 16, [DEVCONF_FORCE_MLD_VERSION] = 0, [DEVCONF_ACCEPT_RA_DEFRTR] = 1, [DEVCONF_ACCEPT_RA_PINFO]
= 1, [DEVCONF_ACCEPT_RA_RTR_PREF] = 1, [DEVCONF_RTR_PROBE_INTERVAL] = 60000, [DEVCONF_ACCEPT_RA_RT_INFO_MAX_PLEN] = 0,
[DEVCONF_PROXY_NDP] = 0, [DEVCONF_OPTIMISTIC_DAD] = 0, [DEVCONF_ACCEPT_SOURCE_ROUTE] = 0, [DEVCONF_MC_FORWARDING] = 0,
[DEVCONF_DISABLE_IPV6] = 0, [DEVCONF_ACCEPT_DAD] = 1, [DEVCONF_FORCE_TLLAO] = 0, [DEVCONF_NDISC_NOTIFY] = 0,
[DEVCONF_MLDV1_UNSOLICITED_REPORT_INTERVAL] = 10000, [DEVCONF_MLDV2_UNSOLICITED_REPORT_INTERVAL] = 1000, ...]},
{{nla_len=300, nla_type=IFLA_INET6_STATS}, [[IPSTATS_MIB_NUM] = 37, [IPSTATS_MIB_INPKTS] = 25, [IPSTATS_MIB_INOCTETS] =
2488, [IPSTATS_MIB_INDELIVERS] = 25, [IPSTATS_MIB_OUTFORWDATAGRAMS] = 0, [IPSTATS_MIB_OUTPKTS] = 39,
[IPSTATS_MIB_OUTOCTETS] = 3664, [IPSTATS_MIB_INHDRERRORS] = 0, [IPSTATS_MIB_INTOOBIGERRORS] = 0, [IPSTATS_MIB_INNOROUTES]
= 0, [IPSTATS_MIB_INADDRERRORS] = 0, [IPSTATS_MIB_INUNKNOWNPROTOS] = 0, [IPSTATS_MIB_INTRUNCATEDPKTS] = 0,
[IPSTATS_MIB_INDISCARDS] = 0, [IPSTATS_MIB_OUTDISCARDS] = 4, [IPSTATS_MIB_OUTNOROUTES] = 0, [IPSTATS_MIB_REASMTIMEOUT] =
0, [IPSTATS_MIB_REASMREQDS] = 0, [IPSTATS_MIB_REASMOKS] = 0, [IPSTATS_MIB_REASMFAILS] = 0, [IPSTATS_MIB_FRAGOKS] = 0,
[IPSTATS_MIB_FRAGFAILS] = 0, [IPSTATS_MIB_FRAGCREATES] = 0, [IPSTATS_MIB_INMCASTPKTS] = 25, [IPSTATS_MIB_OUTMCASTPKTS] =
39, [IPSTATS_MIB_INBCASTPKTS] = 0, [IPSTATS_MIB_OUTBCASTPKTS] = 0, [IPSTATS_MIB_INMCASTOCTETS] = 2488,
[IPSTATS_MIB_OUTMCASTOCTETS] = 3664, [IPSTATS_MIB_INBCASTOCTETS] = 0, [IPSTATS_MIB_OUTBCASTOCTETS] = 0,
[IPSTATS_MIB_CSUMERRORS] = 0, ...]}, {{nla_len=52, nla_type=IFLA_INET6_ICMP6STATS}, [[ICMP6_MIB_NUM] = 6,

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[ICMP6_MIB_INMSGS] = 0, [ICMP6_MIB_INERRORS] = 0, [ICMP6_MIB_OUTMSGS] = 14, [ICMP6_MIB_OUTERRORS] = 0,
[ICMP6_MIB_CSUMERRORS] = 0]}, {{nla_len=20, nla_type=IFLA_INET6_TOKEN}, inet_pton(AF_INET6, "::")}, {{nla_len=5,
nla_type=IFLA_INET6_ADDR_GEN_MODE}, IN6_ADDR_GEN_MODE_NONE]}]}]}]}], iov_len=4096]], msg_iovlen=1, msg_controllen=0,
msg_flags=0}, 0) = 2640
recvmsg(10, {msg_name={sa_family=AF_NETLINK, nl_pid=0, nl_groups=00000000}, msg_namelen=12, msg_iov=[{iov_base={{len=20,
type=NLMSG_DONE, flags=NLM_F_MULTI, seq=1609494196, pid=7464}, 0}, iov_len=4096]], msg_iovlen=1, msg_controllen=0,
msg_flags=0}, 0) = 20
sendto(10, {{len=20, type=RTM_GETADDR, flags=NLM_F_REQUEST|NLM_F_DUMP, seq=1609494197, pid=0},
{ifa_family=AF_UNSPEC, ...}}, 20, 0, {sa_family=AF_NETLINK, nl_pid=0, nl_groups=00000000}, 12) = 20
recvmsg(10, {msg_name={sa_family=AF_NETLINK, nl_pid=0, nl_groups=00000000}, msg_namelen=12, msg_iov=[{iov_base=[{{len=76,
type=RTM_NEWADDR, flags=NLM_F_MULTI, seq=1609494197, pid=7464}, {ifa_family=AF_INET, ifa_prefixlen=8,
ifa_flags=IFA_F_PERMANENT, ifa_scope=RT_SCOPE_HOST, ifa_index=if_nametoindex("lo")}, [{{nla_len=8, nla_type=IFA_ADDRESS},
inet_addr("127.0.0.1")}, {{nla_len=8, nla_type=IFA_LOCAL}, inet_addr("127.0.0.1")}, {{nla_len=7, nla_type=IFA_LABEL},
"lo"}, {{nla_len=8, nla_type=IFA_FLAGS}, IFA_F_PERMANENT}, {{nla_len=20, nla_type=IFA_CACHEINFO},
{ifa_prefered=4294967295, ifa_valid=4294967295, cstamp=798, tstamp=798}}]}, {{len=88, type=RTM_NEWADDR,
flags=NLM_F_MULTI, seq=1609494197, pid=7464}, {ifa_family=AF_INET, ifa_prefixlen=24, ifa_flags=0,
ifa_scope=RT_SCOPE_UNIVERSE, ifa_index=if_nametoindex("enp0s3")}, [{{nla_len=8, nla_type=IFA_ADDRESS},
inet_addr("10.0.2.15")}, {{nla_len=8, nla_type=IFA_LOCAL}, inet_addr("10.0.2.15")}, {{nla_len=8, nla_type=IFA_BROADCAST},
inet_addr("10.0.2.255")}, {{nla_len=11, nla_type=IFA_LABEL}, "enp0s3"}, {{nla_len=8, nla_type=IFA_FLAGS},
IFA_F_NOPREFIXROUTE}, {{nla_len=20, nla_type=IFA_CACHEINFO}, {ifa_prefered=81637, ifa_valid=81637, cstamp=1576,
tstamp=664728}}]}]], iov_len=4096]], msg_iovlen=1, msg_controllen=0, msg_flags=0}, 0) = 164
recvmsg(10, {msg_name={sa_family=AF_NETLINK, nl_pid=0, nl_groups=00000000}, msg_namelen=12, msg_iov=[{iov_base=[{{len=72,
type=RTM_NEWADDR, flags=NLM_F_MULTI, seq=1609494197, pid=7464}, {ifa_family=AF_INET6, ifa_prefixlen=128,
ifa_flags=IFA_F_PERMANENT, ifa_scope=RT_SCOPE_HOST, ifa_index=if_nametoindex("lo")}, [{{nla_len=20,
nla_type=IFA_ADDRESS}, inet_pton(AF_INET6, "::1")}, {{nla_len=20, nla_type=IFA_CACHEINFO}, {ifa_prefered=4294967295,
ifa_valid=4294967295, cstamp=798, tstamp=798}}, {{nla_len=8, nla_type=IFA_FLAGS}, IFA_F_PERMANENT}]}, {{len=72,
type=RTM_NEWADDR, flags=NLM_F_MULTI, seq=1609494197, pid=7464}, {ifa_family=AF_INET6, ifa_prefixlen=64,
ifa_flags=IFA_F_PERMANENT, ifa_scope=RT_SCOPE_LINK, ifa_index=if_nametoindex("enp0s3")}, [{{nla_len=20,
nla_type=IFA_ADDRESS}, inet_pton(AF_INET6, "fe80::4942:92a6:5eb4:8302")}, {{nla_len=20, nla_type=IFA_CACHEINFO},
{ifa_prefered=4294967295, ifa_valid=4294967295, cstamp=1574, tstamp=1696}}, {{nla_len=8, nla_type=IFA_FLAGS},
IFA_F_PERMANENT|IFA_F_NOPREFIXROUTE}]}]], iov_len=4096]], msg_iovlen=1, msg_controllen=0, msg_flags=0}, 0) = 144
recvmsg(10, {msg_name={sa_family=AF_NETLINK, nl_pid=0, nl_groups=00000000}, msg_namelen=12, msg_iov=[{iov_base={{len=20,
type=NLMSG_DONE, flags=NLM_F_MULTI, seq=1609494197, pid=7464}, 0}, iov_len=4096]], msg_iovlen=1, msg_controllen=0,
msg_flags=0}, 0) = 20
close(10)                          = 0
socket(AF_INET, SOCK_STREAM|SOCK_CLOEXEC, IPPROTO_TCP) = 10
setsockopt(10, SOL_SOCKET, SO_REUSEADDR, [1], 4) = 0
bind(10, {sa_family=AF_INET, sin_port=htons(49152), sin_addr=inet_addr("127.0.0.1")}, 16) = 0
listen(10, 100)                    = 0
getsockname(10, {sa_family=AF_INET, sin_port=htons(49152), sin_addr=inet_addr("127.0.0.1")}, [128->16]) = 0
getsockname(10, {sa_family=AF_INET, sin_port=htons(49152), sin_addr=inet_addr("127.0.0.1")}, [128->16]) = 0
write(7, "\1\0\0\0\0\0\0\0", 8)        = 8
write(9, "\1\0\0\0\0\0\0\0", 8)        = 8
eventfd2(0, EFD_CLOEXEC)           = 11
fcntl(11, F_GETFL)                 = 0x2 (flags O_RDWR)
fcntl(11, F_SETFL, O_RDWR|O_NONBLOCK)  = 0
fcntl(11, F_GETFL)                 = 0x802 (flags O_RDWR|O_NONBLOCK)
fcntl(11, F_SETFL, O_RDWR|O_NONBLOCK)  = 0
poll([{fd=11, events=POLLIN}], 1, 0)   = 0 (Timeout)
socket(AF_NETLINK, SOCK_RAW|SOCK_CLOEXEC, NETLINK_ROUTE) = 12
bind(12, {sa_family=AF_NETLINK, nl_pid=0, nl_groups=00000000}, 12) = 0
getsockname(12, {sa_family=AF_NETLINK, nl_pid=7464, nl_groups=00000000}, [12]) = 0
sendto(12, {{len=20, type=RTM_GETLINK, flags=NLM_F_REQUEST|NLM_F_DUMP, seq=1609494196, pid=0},
{ifi_family=AF_UNSPEC, ...}}, 20, 0, {sa_family=AF_NETLINK, nl_pid=0, nl_groups=00000000}, 12) = 20
recvmsg(12, {msg_name={sa_family=AF_NETLINK, nl_pid=0, nl_groups=00000000}, msg_namelen=12,
msg_iov=[{iov_base=[{{len=1316, type=RTM_NEWLINK, flags=NLM_F_MULTI, seq=1609494196, pid=7464}, {ifi_family=AF_UNSPEC,
ifi_type=ARPHRD_LOOPBACK, ifi_index=if_nametoindex("lo"), ifi_flags=IFF_UP|IFF_LOOPBACK|IFF_RUNNING|IFF_LOWER_UP,
 ifi_change=0}, [{{nla_len=7, nla_type=IFLA_IFNAME}, "lo"}, {{nla_len=8, nla_type=IFLA_TXQLEN}, 1000}, {{nla_len=5,
nla_type=IFLA_OPERSTATE}, 0}, {{nla_len=5, nla_type=IFLA_LINKMODE}, 0}, {{nla_len=8, nla_type=IFLA_MTU}, 65536},
{{nla_len=8, nla_type=IFLA_MIN_MTU}, 0}, {{nla_len=8, nla_type=IFLA_MAX_MTU}, 0}, {{nla_len=8, nla_type=IFLA_GROUP}, 0},
{{nla_len=8, nla_type=IFLA_PROMISCUITY}, 0}, {{nla_len=8, nla_type=IFLA_NUM_TX_QUEUES}, 1}, {{nla_len=8,
nla_type=IFLA_GSO_MAX_SEGS}, 65535}, {{nla_len=8, nla_type=IFLA_GSO_MAX_SIZE}, 65536}, {{nla_len=8,
nla_type=IFLA_NUM_RX_QUEUES}, 1}, {{nla_len=5, nla_type=IFLA_CARRIER}, 1}, {{nla_len=12, nla_type=IFLA_QDISC},
"noqueue"}, {{nla_len=8, nla_type=IFLA_CARRIER_CHANGES}, 0}, {{nla_len=5, nla_type=IFLA_PROTO_DOWN}, 0}, {{nla_len=8,
nla_type=IFLA_CARRIER_UP_COUNT}, 0}, {{nla_len=8, nla_type=IFLA_CARRIER_DOWN_COUNT}, 0}, {{nla_len=36,
nla_type=IFLA_MAP}, {mem_start=0, mem_end=0, base_addr=0, irq=0, dma=0, port=0}}, {{nla_len=10, nla_type=IFLA_ADDRESS},
"\x00\x00\x00\x00\x00\x00"}, {{nla_len=10, nla_type=IFLA_BROADCAST}, "\x00\x00\x00\x00\x00\x00"}, {{nla_len=196,
nla_type=IFLA_STATS64}, {rx_packets=365049, tx_packets=365049, rx_bytes=18340954, tx_bytes=18340954, rx_errors=0,
tx_errors=0, rx_dropped=0, tx_dropped=0, multicast=0, collisions=0, rx_length_errors=0, rx_over_errors=0,
rx_crc_errors=0, rx_frame_errors=0, rx_fifo_errors=0, rx_missed_errors=0, tx_aborted_errors=0, tx_carrier_errors=0,
tx_fifo_errors=0, tx_heartbeat_errors=0, tx_window_errors=0, rx_compressed=0, tx_compressed=0, rx_nohandler=0}},
{{nla_len=100, nla_type=IFLA_STATS}, {rx_packets=365049, tx_packets=365049, rx_bytes=18340954, tx_bytes=18340954,
rx_errors=0, tx_errors=0, rx_dropped=0, tx_dropped=0, multicast=0, collisions=0, rx_length_errors=0, rx_over_errors=0,
rx_crc_errors=0, rx_frame_errors=0, rx_fifo_errors=0, rx_missed_errors=0, tx_aborted_errors=0, tx_carrier_errors=0,
tx_fifo_errors=0, tx_heartbeat_errors=0, tx_window_errors=0, rx_compressed=0, tx_compressed=0, rx_nohandler=0}},
{{nla_len=12, nla_type=IFLA_XDP}, {{nla_len=5, nla_type=IFLA_XDP_ATTACHED}, XDP_ATTACHED_NONE}}, {{nla_len=760,
nla_type=IFLA_AF_SPEC}, [{{nla_len=136, nla_type=AF_INET}, {{nla_len=132, nla_type=IFLA_INET_CONF},
[[IPV4_DEVCONF_FORWARDING-1] = 0, [IPV4_DEVCONF_MC_FORWARDING-1] = 0, [IPV4_DEVCONF_PROXY_ARP-1] = 0,
[IPV4_DEVCONF_ACCEPT_REDIRECTS-1] = 1, [IPV4_DEVCONF_SECURE_REDIRECTS-1] = 1, [IPV4_DEVCONF_SEND_REDIRECTS-1] = 1,
[IPV4_DEVCONF_SHARED_MEDIA-1] = 1, [IPV4_DEVCONF_RP_FILTER-1] = 0, [IPV4_DEVCONF_ACCEPT_SOURCE_ROUTE-1] = 1,
[IPV4_DEVCONF_BOOTP_RELAY-1] = 0, [IPV4_DEVCONF_LOG_MARTIANS-1] = 0, [IPV4_DEVCONF_TAG-1] = 0, [IPV4_DEVCONF_ARPFILTER-1]
= 0, [IPV4_DEVCONF_MEDIUM_ID-1] = 0, [IPV4_DEVCONF_NOXFRM-1] = 1, [IPV4_DEVCONF_NOPOLICY-1] = 1,
[IPV4_DEVCONF_FORCE_IGMP_VERSION-1] = 0, [IPV4_DEVCONF_ARP_ANNOUNCE-1] = 0, [IPV4_DEVCONF_ARP_IGNORE-1] = 0,
[IPV4_DEVCONF_PROMOTE_SECONDARIES-1] = 1, [IPV4_DEVCONF_ARP_ACCEPT-1] = 0, [IPV4_DEVCONF_ARP_NOTIFY-1] = 0,
[IPV4_DEVCONF_ACCEPT_LOCAL-1] = 0, [IPV4_DEVCONF_SRC_VMARK-1] = 0, [IPV4_DEVCONF_PROXY_ARP_PVLAN-1] = 0,
[IPV4_DEVCONF_ROUTE_LOCALNET-1] = 0, [IPV4_DEVCONF_IGMPV2_UNSOLICITED_REPORT_INTERVAL-1] = 10000,
[IPV4_DEVCONF_IGMPV3_UNSOLICITED_REPORT_INTERVAL-1] = 1000, [IPV4_DEVCONF_IGNORE_ROUTES_WITH_LINKDOWN-1] = 0,
[IPV4_DEVCONF_DROP_UNICAST_IN_L2_MULTICAST-1] = 0, [IPV4_DEVCONF_DROP_GRATUITOUS_ARP-1] = 0, [IPV4_DEVCONF_BC_FORWARDING-
1] = 0]}}, {{nla_len=620, nla_type=AF_INET6}, [{{nla_len=8, nla_type=IFLA_INET6_FLAGS}, IF_READY}, {{nla_len=20,
nla_type=IFLA_INET6_CACHEINFO}, {max_reasm_len=65535, tstamp=798, reachable_time=16180, retrans_time=1000}},
{{nla_len=208, nla_type=IFLA_INET6_CONF}, [[DEVCONF_FORWARDING] = 0, [DEVCONF_HOPLIMIT] = 64, [DEVCONF_MTU6] = 65536,
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[DEVCONF_ACCEPT_RA] = 1, [DEVCONF_ACCEPT_REDIRECTS] = 1, [DEVCONF_AUTOCONF] = 1, [DEVCONF_DAD_TRANSMITS] = 1,
[DEVCONF_RTR_SOLICITS] = -1, [DEVCONF_RTR_SOLICIT_INTERVAL] = 4000, [DEVCONF_RTR_SOLICIT_DELAY] = 1000,
[DEVCONF_USE_TEMPADDR] = -1, [DEVCONF_TEMP_VALID_LFT] = 604800, [DEVCONF_TEMP_PREFERED_LFT] = 86400,
[DEVCONF_REGEN_MAX_RETRY] = 3, [DEVCONF_MAX_DESYNC_FACTOR] = 600, [DEVCONF_MAX_ADDRESSES] = 16,
[DEVCONF_FORCE_MLD_VERSION] = 0, [DEVCONF_ACCEPT_RA_DEFRTR] = 1, [DEVCONF_ACCEPT_RA_PINFO] = 1,
[DEVCONF_ACCEPT_RA_RTR_PREF] = 1, [DEVCONF_RTR_PROBE_INTERVAL] = 60000, [DEVCONF_ACCEPT_RA_RT_INFO_MAX_PLEN] = 0,
[DEVCONF_PROXY_NDP] = 0, [DEVCONF_OPTIMISTIC_DAD] = 0, [DEVCONF_ACCEPT_SOURCE_ROUTE] = 0, [DEVCONF_MC_FORWARDING] = 0,
[DEVCONF_DISABLE_IPV6] = 0, [DEVCONF_ACCEPT_DAD] = -1, [DEVCONF_FORCE_TLLAO] = 0, [DEVCONF_NDISC_NOTIFY] = 0,
[DEVCONF_MLDV1_UNSOLICITED_REPORT_INTERVAL] = 10000, [DEVCONF_MLDV2_UNSOLICITED_REPORT_INTERVAL] = 1000, ...]},
{{nla_len=300, nla_type=IFLA_INET6_STATS}, [[IPSTATS_MIB_NUM] = 37, [IPSTATS_MIB_INPKTS] = 4, [IPSTATS_MIB_INOCTETS] =
292, [IPSTATS_MIB_INDELIVERS] = 4, [IPSTATS_MIB_OUTFORWDATAGRAMS] = 0, [IPSTATS_MIB_OUTPKTS] = 4, [IPSTATS_MIB_OUTOCTETS]
= 292, [IPSTATS_MIB_INHDRERRORS] = 0, [IPSTATS_MIB_INTOOBIGERRORS] = 0, [IPSTATS_MIB_INNOROUTES] = 0,
[IPSTATS_MIB_INADDRERRORS] = 0, [IPSTATS_MIB_INUNKNOWNPROTOS] = 0, [IPSTATS_MIB_INTRUNCATEDPKTS] = 0,
[IPSTATS_MIB_INDISCARDS] = 0, [IPSTATS_MIB_OUTDISCARDS] = 0, [IPSTATS_MIB_OUTNOROUTES] = 0, [IPSTATS_MIB_REASMTIMEOUT] =
0, [IPSTATS_MIB_REASMREQDS] = 0, [IPSTATS_MIB_REASMOKS] = 0, [IPSTATS_MIB_REASMFAILS] = 0, [IPSTATS_MIB_FRAGOKS] = 0,
[IPSTATS_MIB_FRAGFAILS] = 0, [IPSTATS_MIB_FRAGCREATES] = 0, [IPSTATS_MIB_INMCASTPKTS] = 0, [IPSTATS_MIB_OUTMCASTPKTS] =
2, [IPSTATS_MIB_INBCASTPKTS] = 0, [IPSTATS_MIB_OUTBCASTPKTS] = 0, [IPSTATS_MIB_INMCASTOCTETS] = 0,
[IPSTATS_MIB_OUTMCASTOCTETS] = 152, [IPSTATS_MIB_INBCASTOCTETS] = 0, [IPSTATS_MIB_OUTBCASTOCTETS] = 0,
[IPSTATS_MIB_CSUMERRORS] = 0, ...]}, {{nla_len=52, nla_type=IFLA_INET6_ICMP6STATS}, [[ICMP6_MIB_NUM] = 6,
[ICMP6_MIB_INMSGS] = 2, [ICMP6_MIB_INERRORS] = 0, [ICMP6_MIB_OUTMSGS] = 2, [ICMP6_MIB_OUTERRORS] = 0,
[ICMP6_MIB_CSUMERRORS] = 0]}, {{nla_len=20, nla_type=IFLA_INET6_TOKEN}, inet_pton(AF_INET6, "::")}, {{nla_len=5,
nla_type=IFLA_INET6_ADDR_GEN_MODE}, IN6_ADDR_GEN_MODE_EUI64]}]}]}, {{len=1324, type=RTM_NEWLINK, flags=NLM_F_MULTI,
seq=1609494196, pid=7464}, {ifi_family=AF_UNSPEC, ifi_type=ARPHRD_ETHER, ifi_index=if_nametoindex("enp0s3"),
ifi_flags=IFF_UP|IFF_BROADCAST|IFF_RUNNING|IFF_MULTICAST|IFF_LOWER_UP, ifi_change=0}, [{{nla_len=11,
nla_type=IFLA_IFNAME}, "enp0s3"}, {{nla_len=8, nla_type=IFLA_TXQLEN}, 1000}, {{nla_len=5, nla_type=IFLA_OPERSTATE}, 6},
{{nla_len=5, nla_type=IFLA_LINKMODE}, 0}, {{nla_len=8, nla_type=IFLA_MTU}, 1500}, {{nla_len=8, nla_type=IFLA_MIN_MTU},
46}, {{nla_len=8, nla_type=IFLA_MAX_MTU}, 16110}, {{nla_len=8, nla_type=IFLA_GROUP}, 0}, {{nla_len=8,
nla_type=IFLA_PROMISCUITY}, 0}, {{nla_len=8, nla_type=IFLA_NUM_TX_QUEUES}, 1}, {{nla_len=8, nla_type=IFLA_GSO_MAX_SEGS},
65535}, {{nla_len=8, nla_type=IFLA_GSO_MAX_SIZE}, 65536}, {{nla_len=8, nla_type=IFLA_NUM_RX_QUEUES}, 1}, {{nla_len=5,
nla_type=IFLA_CARRIER}, 1}, {{nla_len=13, nla_type=IFLA_QDISC}, "fq_codel"}, {{nla_len=8, nla_type=IFLA_CARRIER_CHANGES},
6}, {{nla_len=5, nla_type=IFLA_PROTO_DOWN}, 0}, {{nla_len=8, nla_type=IFLA_CARRIER_UP_COUNT}, 3}, {{nla_len=8,
nla_type=IFLA_CARRIER_DOWN_COUNT}, 3}, {{nla_len=36, nla_type=IFLA_MAP}, {mem_start=0, mem_end=0, base_addr=0, irq=0,
dma=0, port=0}}, {{nla_len=10, nla_type=IFLA_ADDRESS}, "\x08\x00\x27\x46\xb1\x50"}, {{nla_len=10,
nla_type=IFLA_BROADCAST}, "\xff\xff\xff\xff\xff\xff"}, {{nla_len=196, nla_type=IFLA_STATS64}, {rx_packets=18262,
tx_packets=11128, rx_bytes=13104170, tx_bytes=1000233, rx_errors=0, tx_errors=0, rx_dropped=0, tx_dropped=0, multicast=0,
collisions=0, rx_length_errors=0, rx_over_errors=0, rx_crc_errors=0, rx_frame_errors=0, rx_fifo_errors=0,
rx_missed_errors=0, tx_aborted_errors=0, tx_carrier_errors=0, tx_fifo_errors=0, tx_heartbeat_errors=0,
tx_window_errors=0, rx_compressed=0, tx_compressed=0, rx_nohandler=0}}, {{nla_len=100, nla_type=IFLA_STATS},
{rx_packets=18262, tx_packets=11128, rx_bytes=13104170, tx_bytes=1000233, rx_errors=0, tx_errors=0, rx_dropped=0,
tx_dropped=0, multicast=0, collisions=0, rx_length_errors=0, rx_over_errors=0, rx_crc_errors=0, rx_frame_errors=0,
rx_fifo_errors=0, rx_missed_errors=0, tx_aborted_errors=0, tx_carrier_errors=0, tx_fifo_errors=0, tx_heartbeat_errors=0,
tx_window_errors=0, rx_compressed=0, tx_compressed=0, rx_nohandler=0}}, {{nla_len=12, nla_type=IFLA_XDP}, {{nla_len=5,
nla_type=IFLA_XDP_ATTACHED}, XDP_ATTACHED_NONE}}, {{nla_len=760, nla_type=IFLA_AF_SPEC}, [{{nla_len=136,
nla_type=AF_INET}, {{nla_len=132, nla_type=IFLA_INET_CONF}, [[IPV4_DEVCONF_FORWARDING-1] = 0,
[IPV4_DEVCONF_MC_FORWARDING-1] = 0, [IPV4_DEVCONF_PROXY_ARP-1] = 0, [IPV4_DEVCONF_ACCEPT_REDIRECTS-1] = 1,
[IPV4_DEVCONF_SECURE_REDIRECTS-1] = 1, [IPV4_DEVCONF_SEND_REDIRECTS-1] = 1, [IPV4_DEVCONF_SHARED_MEDIA-1] = 1,
[IPV4_DEVCONF_RP_FILTER-1] = 2, [IPV4_DEVCONF_ACCEPT_SOURCE_ROUTE-1] = 1, [IPV4_DEVCONF_BOOTP_RELAY-1] = 0,
[IPV4_DEVCONF_LOG_MARTIANS-1] = 0, [IPV4_DEVCONF_TAG-1] = 0, [IPV4_DEVCONF_ARPFILTER-1] = 0, [IPV4_DEVCONF_MEDIUM_ID-1] =
0, [IPV4_DEVCONF_NOXFRM-1] = 0, [IPV4_DEVCONF_NOPOLICY-1] = 0, [IPV4_DEVCONF_FORCE_IGMP_VERSION-1] = 0,
[IPV4_DEVCONF_ARP_ANNOUNCE-1] = 0, [IPV4_DEVCONF_ARP_IGNORE-1] = 0, [IPV4_DEVCONF_PROMOTE_SECONDARIES-1] = 1,
[IPV4_DEVCONF_ARP_ACCEPT-1] = 0, [IPV4_DEVCONF_ARP_NOTIFY-1] = 0, [IPV4_DEVCONF_ACCEPT_LOCAL-1] = 0,
[IPV4_DEVCONF_SRC_VMARK-1] = 0, [IPV4_DEVCONF_PROXY_ARP_PVLAN-1] = 0, [IPV4_DEVCONF_ROUTE_LOCALNET-1] = 0,
[IPV4_DEVCONF_IGMPV2_UNSOLICITED_REPORT_INTERVAL-1] = 10000, [IPV4_DEVCONF_IGMPV3_UNSOLICITED_REPORT_INTERVAL-1] = 1000,
[IPV4_DEVCONF_IGNORE_ROUTES_WITH_LINKDOWN-1] = 0, [IPV4_DEVCONF_DROP_UNICAST_IN_L2_MULTICAST-1] = 0,
[IPV4_DEVCONF_DROP_GRATUITOUS_ARP-1] = 0, [IPV4_DEVCONF_BC_FORWARDING-1] = 0]}}, {{nla_len=620, nla_type=AF_INET6},
[{{nla_len=8, nla_type=IFLA_INET6_FLAGS}, IF_READY},
 {{nla_len=20, nla_type=IFLA_INET6_CACHEINFO}, {max_reasm_len=65535, tstamp=1573, reachable_time=41400,
retrans_time=1000}}, {{nla_len=208, nla_type=IFLA_INET6_CONF}, [[DEVCONF_FORWARDING] = 0, [DEVCONF_HOPLIMIT] = 64,
[DEVCONF_MTU6] = 1500, [DEVCONF_ACCEPT_RA] = 0, [DEVCONF_ACCEPT_REDIRECTS] = 1, [DEVCONF_AUTOCONF] = 1,
[DEVCONF_DAD_TRANSMITS] = 1, [DEVCONF_RTR_SOLICITS] = -1, [DEVCONF_RTR_SOLICIT_INTERVAL] = 4000,
[DEVCONF_RTR_SOLICIT_DELAY] = 1000, [DEVCONF_USE_TEMPADDR] = 2, [DEVCONF_TEMP_VALID_LFT] = 604800,
[DEVCONF_TEMP_PREFERED_LFT] = 86400, [DEVCONF_REGEN_MAX_RETRY] = 3, [DEVCONF_MAX_DESYNC_FACTOR] = 600,
[DEVCONF_MAX_ADDRESSES] = 16, [DEVCONF_FORCE_MLD_VERSION] = 0, [DEVCONF_ACCEPT_RA_DEFRTR] = 1, [DEVCONF_ACCEPT_RA_PINFO]
= 1, [DEVCONF_ACCEPT_RA_RTR_PREF] = 1, [DEVCONF_RTR_PROBE_INTERVAL] = 60000, [DEVCONF_ACCEPT_RA_RT_INFO_MAX_PLEN] = 0,
[DEVCONF_PROXY_NDP] = 0, [DEVCONF_OPTIMISTIC_DAD] = 0, [DEVCONF_ACCEPT_SOURCE_ROUTE] = 0, [DEVCONF_MC_FORWARDING] = 0,
[DEVCONF_DISABLE_IPV6] = 0, [DEVCONF_ACCEPT_DAD] = 1, [DEVCONF_FORCE_TLLAO] = 0, [DEVCONF_NDISC_NOTIFY] = 0,
[DEVCONF_MLDV1_UNSOLICITED_REPORT_INTERVAL] = 10000, [DEVCONF_MLDV2_UNSOLICITED_REPORT_INTERVAL] = 1000, ...]},
{{nla_len=300, nla_type=IFLA_INET6_STATS}, [[IPSTATS_MIB_NUM] = 37, [IPSTATS_MIB_INPKTS] = 25, [IPSTATS_MIB_INOCTETS] =
2488, [IPSTATS_MIB_INDELIVERS] = 25, [IPSTATS_MIB_OUTFORWDATAGRAMS] = 0, [IPSTATS_MIB_OUTPKTS] = 39,
[IPSTATS_MIB_OUTOCTETS] = 3664, [IPSTATS_MIB_INHDRERRORS] = 0, [IPSTATS_MIB_INTOOBIGERRORS] = 0, [IPSTATS_MIB_INNOROUTES]
= 0, [IPSTATS_MIB_INADDRERRORS] = 0, [IPSTATS_MIB_INUNKNOWNPROTOS] = 0, [IPSTATS_MIB_INTRUNCATEDPKTS] = 0,
[IPSTATS_MIB_INDISCARDS] = 0, [IPSTATS_MIB_OUTDISCARDS] = 4, [IPSTATS_MIB_OUTNOROUTES] = 0, [IPSTATS_MIB_REASMTIMEOUT] =
0, [IPSTATS_MIB_REASMREQDS] = 0, [IPSTATS_MIB_REASMOKS] = 0, [IPSTATS_MIB_REASMFAILS] = 0, [IPSTATS_MIB_FRAGOKS] = 0,
[IPSTATS_MIB_FRAGFAILS] = 0, [IPSTATS_MIB_FRAGCREATES] = 0, [IPSTATS_MIB_INMCASTPKTS] = 25, [IPSTATS_MIB_OUTMCASTPKTS] =
39, [IPSTATS_MIB_INBCASTPKTS] = 0, [IPSTATS_MIB_OUTBCASTPKTS] = 0, [IPSTATS_MIB_INMCASTOCTETS] = 2488,
[IPSTATS_MIB_OUTMCASTOCTETS] = 3664, [IPSTATS_MIB_INBCASTOCTETS] = 0, [IPSTATS_MIB_OUTBCASTOCTETS] = 0,
[IPSTATS_MIB_CSUMERRORS] = 0, ...]}, {{nla_len=52, nla_type=IFLA_INET6_ICMP6STATS}, [[ICMP6_MIB_NUM] = 6,
[ICMP6_MIB_INMSGS] = 0, [ICMP6_MIB_INERRORS] = 0, [ICMP6_MIB_OUTMSGS] = 14, [ICMP6_MIB_OUTERRORS] = 0,
[ICMP6_MIB_CSUMERRORS] = 0]}, {{nla_len=20, nla_type=IFLA_INET6_TOKEN}, inet_pton(AF_INET6, "::")}, {{nla_len=5,
nla_type=IFLA_INET6_ADDR_GEN_MODE}, IN6_ADDR_GEN_MODE_NONE}]}]}]}], iov_len=4096], msg_iovlen=1, msg_controllen=0,
msg_flags=0}, 0) = 2640
recvmsg(12, {msg_name={sa_family=AF_NETLINK, nl_pid=0, nl_groups=00000000}, msg_namelen=12, msg_iov=[{iov_base={{len=20,
type=NLMSG_DONE, flags=NLM_F_MULTI, seq=1609494196, pid=7464}, 0}, iov_len=4096], msg_iovlen=1, msg_controllen=0,
msg_flags=0}, 0) = 20
sendto(12, {{len=20, type=RTM_GETADDR, flags=NLM_F_REQUEST|NLM_F_DUMP, seq=1609494197, pid=0},
{ifa_family=AF_UNSPEC, ...}}, 20, 0, {sa_family=AF_NETLINK, nl_pid=0, nl_groups=00000000}, 12) = 20
recvmsg(12, {msg_name={sa_family=AF_NETLINK, nl_pid=0, nl_groups=00000000}, msg_namelen=12, msg_iov=[{iov_base=[{{len=76,
type=RTM_NEWADDR, flags=NLM_F_MULTI, seq=1609494197, pid=7464}, {ifa_family=AF_INET, ifa_prefixlen=8,
ifa_flags=IFA_F_PERMANENT, ifa_scope=RT_SCOPE_HOST, ifa_index=if_nametoindex("lo")}, [{{nla_len=8, nla_type=IFA_ADDRESS},
inet_addr("127.0.0.1")}, {{nla_len=8, nla_type=IFA_LOCAL}, inet_addr("127.0.0.1")}, {{nla_len=7, nla_type=IFA_LABEL},
"lo"}, {{nla_len=8, nla_type=IFA_FLAGS}, IFA_F_PERMANENT}, {{nla_len=20, nla_type=IFA_CACHEINFO},

{ifa_prefered=4294967295, ifa_valid=4294967295, cstamp=798, tstamp=798}}]}, {{len=88, type=RTM_NEWADDR,
flags=NLM_F_MULTI, seq=1609494197, pid=7464}, {ifa_family=AF_INET, ifa_prefixlen=24, ifa_flags=0,
ifa_scope=RT_SCOPE_UNIVERSE, ifa_index=if_nametoindex("enp0s3")}, [{{nla_len=8, nla_type=IFA_ADDRESS},
inet_addr("10.0.2.15")}, {{nla_len=8, nla_type=IFA_LOCAL}, inet_addr("10.0.2.15")}, {{nla_len=8, nla_type=IFA_BROADCAST},
inet_addr("10.0.2.255")}, {{nla_len=11, nla_type=IFA_LABEL}, "enp0s3"}, {{nla_len=8, nla_type=IFA_FLAGS},
IFA_F_NOPREFIXROUTE}, {{nla_len=20, nla_type=IFA_CACHEINFO}, {ifa_prefered=81637, ifa_valid=81637, cstamp=1576,
tstamp=664728}}]}], iov_len=4096}], msg_iovlen=1, msg_controllen=0, msg_flags=0}, 0) = 164
recvmsg(12, {msg_name={sa_family=AF_NETLINK, nl_pid=0, nl_groups=00000000}, msg_namelen=12, msg_iov=[{iov_base=[{{len=72,
type=RTM_NEWADDR, flags=NLM_F_MULTI, seq=1609494197, pid=7464}, {ifa_family=AF_INET6, ifa_prefixlen=128,
ifa_flags=IFA_F_PERMANENT, ifa_scope=RT_SCOPE_HOST, ifa_index=if_nametoindex("lo")}, [{{nla_len=20,
nla_type=IFA_ADDRESS}, inet_pton(AF_INET6, "::1")}, {{nla_len=20, nla_type=IFA_CACHEINFO}, {ifa_prefered=4294967295,
ifa_valid=4294967295, cstamp=798, tstamp=798}}, {{nla_len=8, nla_type=IFA_FLAGS}, IFA_F_PERMANENT}]}, {{len=72,
type=RTM_NEWADDR, flags=NLM_F_MULTI, seq=1609494197, pid=7464}, {ifa_family=AF_INET6, ifa_prefixlen=64,
ifa_flags=IFA_F_PERMANENT, ifa_scope=RT_SCOPE_LINK, ifa_index=if_nametoindex("enp0s3")}, [{{nla_len=20,
nla_type=IFA_ADDRESS}, inet_pton(AF_INET6, "fe80::4942:92a6:5eb4:8302")}, {{nla_len=20, nla_type=IFA_CACHEINFO},
{ifa_prefered=4294967295, ifa_valid=4294967295, cstamp=1574, tstamp=1696}}, {{nla_len=8, nla_type=IFA_FLAGS},
IFA_F_PERMANENT|IFA_F_NOPREFIXROUTE}]}], iov_len=4096}], msg_iovlen=1, msg_controllen=0, msg_flags=0}, 0) = 144
recvmsg(12, {msg_name={sa_family=AF_NETLINK, nl_pid=0, nl_groups=00000000}, msg_namelen=12, msg_iov=[{iov_base={{len=20,
type=NLMSG_DONE, flags=NLM_F_MULTI, seq=1609494197, pid=7464}, 0}, iov_len=4096}], msg_iovlen=1, msg_controllen=0,
msg_flags=0}, 0) = 20
close(12)   = 0
socket(AF_INET, SOCK_STREAM|SOCK_CLOEXEC, IPPROTO_TCP) = 12
setsockopt(12, SOL_SOCKET, SO_REUSEADDR, [1], 4) = 0
bind(12, {sa_family=AF_INET, sin_port=htons(49153), sin_addr=inet_addr("127.0.0.1")}, 16) = 0
listen(12, 100)   = 0
getsockname(12, {sa_family=AF_INET, sin_port=htons(49153), sin_addr=inet_addr("127.0.0.1")}, [128->16]) = 0
getsockname(12, {sa_family=AF_INET, sin_port=htons(49153), sin_addr=inet_addr("127.0.0.1")}, [128-
>16]) = 0
write(11, "\1\0\0\0\0\0\0\0", 8)   = 8
mmap(NULL, 8392704, PROT_NONE, MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0) =
0x7fb94061e000
mprotect(0x7fb94061f000, 8388608, PROT_READ|PROT_WRITE) = 0
clone(child_stack=0x7fb940e1dd70, flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|
CLONE_THREAD|CLONE_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|CLONE_CHILD_CLEARTID,
parent_tid=[7467], tls=0x7fb940e1e700, child_tidptr=0x7fb940e1e9d0) = 7467
fstat(1, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0), ...}) = 0
write(1, "> ", 2>)   = 2
fstat(0, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0), ...}) = 0
read(0, create 1 -1
"create 1 -1\n", 1024)   = 12
eventfd2(0, EFD_CLOEXEC)   = 13
fcntl(13, F_GETFL)   = 0x2 (flags O_RDWR)
fcntl(13, F_SETFL, O_RDWR|O_NONBLOCK)   = 0
fcntl(13, F_GETFL)   = 0x802 (flags O_RDWR|O_NONBLOCK)
fcntl(13, F_SETFL, O_RDWR|O_NONBLOCK)   = 0
eventfd2(0, EFD_CLOEXEC)   = 14
fcntl(14, F_GETFL)   = 0x2 (flags O_RDWR)
fcntl(14, F_SETFL, O_RDWR|O_NONBLOCK)   = 0
fcntl(14, F_GETFL)   = 0x802 (flags O_RDWR|O_NONBLOCK)
fcntl(14, F_SETFL, O_RDWR|O_NONBLOCK)   = 0
clone(child_stack=NULL, flags=CLONE_CHILD_CLEARTID|CLONE_CHILD_SETTID|SIGCHLD,
child_tidptr=0x7fb941e24310) = 7470
poll([{fd=11, events=POLLIN}], 1, -1) = 1 ([{fd=11, revents=POLLIN}])
read(11, "\1\0\0\0\0\0\0\0", 8)   = 8
poll([{fd=11, events=POLLIN}], 1, 0)   = 0 (Timeout)
poll([{fd=11, events=POLLIN}], 1, -1) = 1 ([{fd=11, revents=POLLIN}])
read(11, "\1\0\0\0\0\0\0\0", 8)   = 8
write(7, "\1\0\0\0\0\0\0\0", 8)   = 8
poll([{fd=11, events=POLLIN}], 1, 0)   = 0 (Timeout)
poll([{fd=11, events=POLLIN}], 1, -1) = 1 ([{fd=11, revents=POLLIN}])
read(11, "\1\0\0\0\0\0\0\0", 8)   = 8
poll([{fd=11, events=POLLIN}], 1, 0)   = 0 (Timeout)
write(7, "\1\0\0\0\0\0\0\0", 8)   = 8
write(7, "\1\0\0\0\0\0\0\0", 8)   = 8
poll([{fd=14, events=POLLIN}], 1, 0)   = 0 (Timeout)
brk(0x559f061c2000)   = 0x559f061c2000
write(7, "\1\0\0\0\0\0\0\0", 8)   = 8
write(14, "\1\0\0\0\0\0\0\0", 8)   = 8
poll([{fd=13, events=POLLIN}], 1, 0)   = 0 (Timeout)
write(7, "\1\0\0\0\0\0\0\0", 8)   = 8
write(13, "\1\0\0\0\0\0\0\0", 8)   = 8

```
poll([{fd=11, events=POLLIN}], 1, 0)     = 0 (Timeout)
write(7, "\1\0\0\0\0\0\0\0", 8)          = 8
write(1, "> ", 2> )                       = 2
read(0, OK: 7470
pingall
"pingall\n", 1024)              = 8
poll([{fd=13, events=POLLIN}], 1, 0)     = 1 ([{fd=13, revents=POLLIN}])
read(13, "\1\0\0\0\0\0\0\0", 8)          = 8
poll([{fd=13, events=POLLIN}], 1, 0)     = 0 (Timeout)
write(7, "\1\0\0\0\0\0\0\0", 8)          = 8
poll([{fd=13, events=POLLIN}], 1, 1000) = 1 ([{fd=13, revents=POLLIN}])
read(13, "\1\0\0\0\0\0\0\0", 8)          = 8
poll([{fd=13, events=POLLIN}], 1, 0)     = 0 (Timeout)
write(7, "\1\0\0\0\0\0\0\0", 8)          = 8
write(1, "OK: -1\n", 7OK: -1
)               = 7
write(1, "> ", 2> )                         = 2
read(0, exec 1 a 5
"exec 1 a 5\n", 1024)          = 11
poll([{fd=13, events=POLLIN}], 1, 0)     = 0 (Timeout)
write(7, "\1\0\0\0\0\0\0\0", 8)          = 8
poll([{fd=13, events=POLLIN}], 1, 1000) = 1 ([{fd=13, revents=POLLIN}])
read(13, "\1\0\0\0\0\0\0\0", 8)          = 8
poll([{fd=13, events=POLLIN}], 1, 0)     = 0 (Timeout)
poll([{fd=14, events=POLLIN}], 1, 0)     = 1 ([{fd=14, revents=POLLIN}])
read(14, "\1\0\0\0\0\0\0\0", 8)          = 8
poll([{fd=14, events=POLLIN}], 1, 0)     = 0 (Timeout)
write(7, "\1\0\0\0\0\0\0\0", 8OK:1
)        = 8
write(1, "> ", 2>
 )                      = 2
read(0, create 2 1
"create 2 1\n", 1024)          = 11
poll([{fd=13, events=POLLIN}], 1, 0)     = 0 (Timeout)
write(7, "\1\0\0\0\0\0\0\0", 8)          = 8
poll([{fd=13, events=POLLIN}], 1, 1000) = 1 ([{fd=13, revents=POLLIN}])
read(13, "\1\0\0\0\0\0\0\0", 8)          = 8
poll([{fd=13, events=POLLIN}], 1, 0)     = 0 (Timeout)
poll([{fd=14, events=POLLIN}], 1, 0)     = 1 ([{fd=14, revents=POLLIN}])
read(14, "\1\0\0\0\0\0\0\0", 8)          = 8
poll([{fd=14, events=POLLIN}], 1, 0)     = 0 (Timeout)
write(7, "\1\0\0\0\0\0\0\0", 8)          = 8
write(1, "> ", 2> )                       = 2
read(0, OK: 7478
pingall
"pingall\n", 1024)             = 8
poll([{fd=13, events=POLLIN}], 1, 0)     = 0 (Timeout)
write(7, "\1\0\0\0\0\0\0\0", 8)          = 8
poll([{fd=13, events=POLLIN}], 1, 1000) = 1 ([{fd=13, revents=POLLIN}])
read(13, "\1\0\0\0\0\0\0\0", 8)          = 8
poll([{fd=13, events=POLLIN}], 1, 0)     = 0 (Timeout)
write(7, "\1\0\0\0\0\0\0\0", 8)          = 8
poll([{fd=13, events=POLLIN}], 1, 1000) = 1 ([{fd=13, revents=POLLIN}])
read(13, "\1\0\0\0\0\0\0\0", 8)          = 8
poll([{fd=13, events=POLLIN}], 1, 0)     = 0 (Timeout)
write(1, "OK: -1\n", 7OK: -1
)               = 7
write(1, "> ", 2> )                         = 2
read(0, exit
"exit\n", 1024)                = 5
write(5, "\1\0\0\0\0\0\0\0", 8)          = 8
write(5, "\1\0\0\0\0\0\0\0", 8Bad address (src/fq.cpp:87)
)        = ?
+++ killed by SIGABRT (core dumped) +++
```

```
Aborted (core dumped)
```

Выводы

В ходе выполнения лабораторной работы я познакомился с диагностической утилитой strace. Вывод всех системных вызовов может помочь при отладке программы. Также изучение вывода strace показывает различное использование системных вызовов. Например можно узнать, что создание процесса и потока происходит одним и тем же системным вызовов clone. Или что все программы используют mmap для загрузки динамических библиотек.

Список литературы

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