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Лабораторная работа №1 по курсу

«Операционные системы»

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Москва, 2021

Содержание

Репозиторий

https://github.com/Yadroff/OS/tree/master/1_lab

Постановка задачи

Цель работы

Приобретение практических навыков работы с утилитой strace.

Задание

Продемонстрировать работы утилиты strace на примере лабораторной работы №4.

Демонстрация работы программы

```
[yadroff@fedora src]$ cat test.txt
aaaa bbb cdkcdkdkck  cddcdcd
adaa      ddddddggdgdgds
[yadroff@fedora src]$ strace ./a.out < test.txt -o trace
execve("./a.out", ["./a.out", "-o", "trace"], 0x7fff58e55430 /* 47 vars */) = 0
brk(NULL)                               = 0x171f000
arch_prctl(0x3001 /* ARCH_??? */, 0x7ffecb585aa0) = -1 EINVAL (Недопустимый аргумент)
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=60107, ...}, AT_EMPTY_PATH) = 0
mmap(NULL, 60107, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7f32b00f9000
close(3)                                = 0
openat(AT_FDCWD, "/lib64/librt.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\220\20\0\0\0\0\0\0"..., 832) = 832
newfstatat(3, "", {st_mode=S_IFREG|0755, st_size=16360, ...}, AT_EMPTY_PATH) = 0
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7f32b00f7000
mmap(NULL, 16392, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7f32b00f2000
mmap(0x7f32b00f3000, 4096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x1000) = 0x7f32b00f3000
mmap(0x7f32b00f4000, 4096, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x2000) = 0x7f32b00f4000
mmap(0x7f32b00f5000, 4096, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x2000) = 0x7f32b00f5000
mmap(0x7f32b00f6000, 8, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_ANONYMOUS, -1, 0) = 0x7f32b00f6000
close(3)                                = 0
openat(AT_FDCWD, "/lib64/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\0P\20\0\0\0\0\0\0"..., 832) = 832
newfstatat(3, "", {st_mode=S_IFREG|0755, st_size=15712, ...}, AT_EMPTY_PATH) = 0
mmap(NULL, 16392, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7f32b00ed000
mmap(0x7f32b00ee000, 4096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x1000) = 0x7f32b00ee000
mmap(0x7f32b00ef000, 4096, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x2000) = 0x7f32b00ef000
mmap(0x7f32b00f0000, 4096, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x2000) = 0x7f32b00f0000
mmap(0x7f32b00f1000, 8, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_ANONYMOUS, -1, 0) = 0x7f32b00f1000
```

```
close(3)                                = 0
openat(AT_FDCWD, "/lib64/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\240\327\2\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@\0\0\0\5\0\0\0GNU\0\2\0\0\300\4\0\0\0\3\0\0\0\0\0\0\0"..., 80, 848) = 80
pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0dM\254,f\246\340\263&t\360\354q\347C\33"..., 68, 928) = 68
newfstatat(3, "", {st_mode=S_IFREG|0755, st_size=2388088, ...}, AT_EMPTY_PATH) = 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
mmap(NULL, 2136784, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7f32afee3000
mprotect(0x7f32aff0f000, 1880064, PROT_NONE) = 0
mmap(0x7f32aff0f000, 1531904, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x2c000) = 0x7f32aff0f000
mmap(0x7f32b0085000, 344064, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x1a2000) = 0x7f32b0085000
mmap(0x7f32b00da000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x1f6000) = 0x7f32b00da000
mmap(0x7f32b00e0000, 51920, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_ANONYMOUS, -1, 0) = 0x7f32b00e0000
close(3)                                = 0
mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7f32afee0000
arch_prctl(ARCH_SET_FS, 0x7f32afee0740) = 0
set_tid_address(0x7f32afee0a10)         = 3744
set_robust_list(0x7f32afee0a20, 24)     = 0
mprotect(0x7f32b00da000, 12288, PROT_READ) = 0
mprotect(0x7f32b00f0000, 4096, PROT_READ) = 0
mprotect(0x7f32b00f5000, 4096, PROT_READ) = 0
mprotect(0x403000, 4096, PROT_READ)     = 0
mprotect(0x7f32b0139000, 8192, PROT_READ) = 0
prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024, rlim_max=RLIM64_INFINITY}) = 0
munmap(0x7f32b00f9000, 60107)           = 0
getrandom("\xcd\xa7\xde\x8a\xa5\xa4\xcc\x56", 8, GRND_NONBLOCK) = 8
brk(NULL)                               = 0x171f000
brk(0x1740000)                          = 0x1740000
newfstatat(0, "", {st_mode=S_IFREG|0664, st_size=53, ...}, AT_EMPTY_PATH) = 0
read(0, "aaaa bbb cdkcdkdkck  cddcdcd\nada"..., 4096) = 53
read(0, "", 4096)                       = 0
openat(AT_FDCWD, "/dev/shm/os_lab4.back", O_RDWR|O_CREAT|O_NOFOLLOW|O_CLOEXEC,
0644) = 3
openat(AT_FDCWD, "/dev/shm/sem.os_lab4.semaphore", O_RDWR|O_NOFOLLOW) = -1 ENOENT (Нет
такого файла или каталога)
getrandom("\xe9\x4d\xbf\x9f\x5b\x16\x6d\x37", 8, GRND_NONBLOCK) = 8
newfstatat(AT_FDCWD, "/dev/shm/sem.7l7r6u", 0x7ffecb585740, AT_SYMLINK_NOFOLLOW) = -1
ENOENT (Нет такого файла или каталога)
openat(AT_FDCWD, "/dev/shm/sem.7l7r6u", O_RDWR|O_CREAT|O_EXCL, 0644) = 4
write(4, "\2\0\0\0\0\0\0\200\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0", 32) = 32
mmap(NULL, 32, PROT_READ|PROT_WRITE, MAP_SHARED, 4, 0) = 0x7f32b0107000
link("/dev/shm/sem.7l7r6u", "/dev/shm/sem.os_lab4.semaphore") = 0
newfstatat(4, "", {st_mode=S_IFREG|0644, st_size=32, ...}, AT_EMPTY_PATH) = 0
unlink("/dev/shm/sem.7l7r6u")           = 0
close(4)                                = 0
ftruncate(3, 54)                        = 0
mmap(NULL, 54, PROT_READ|PROT_WRITE, MAP_SHARED, 3, 0) = 0x7f32b0106000
clone(child_stack=NULL, flags=CLONE_CHILD_CLEARTID|CLONE_CHILD_SETTID|SIGCHLD,
child_tidptr=0x7f32afee0a10) = 3745
--- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=3745, si_uid=1000, si_status=0,
si_utime=0, si_stime=0} ---
futex(0x7f32b0107000, FUTEX_WAIT_BITSET|FUTEX_CLOCK_REALTIME, 0, NULL,
FUTEX_BITSET_MATCH_ANY) = -1 EAGAIN (Ресурс временно недоступен)
```

```
newfstatat(1, "", {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0), ...}, AT_EMPTY_PATH) = 0
write(1, "AAAA BBB CDKCDKDKCKCDDCDCD\n", 27AAAA BBB CDKCDKDKCKCDDCDCD
) = 27
write(1, "ADAADDDDDGGDGDGDS\n", 18ADAADDDDDGGDGDGDS
)     = 18
exit_group(0)                   = ?
+++ exited with 0 +++
```

Выводы

Проделав работу, я приобрел практические навыки, необходимые для работы с утилитой strace, а также повторил виды системных вызовов.