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Лабораторная работа №1 по курсу «Операционные системы»

Приобретение практических навыков диагностики работы программного  
обеспечения.

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# 1 Постановка задачи

При выполнении последующих лабораторных работ необходимо продемонстрировать ключевые системные вызовы, которые в них используются.

Используемые утилиты: strace.

## 2 Описание утилит

Strace – это утилита, которая отслеживает системные вызовы, которые представляют собой механизм трансляции, обеспечивающий интерфейс между процессом и операционной системой (ядром). Эти вызовы могут быть перехвачены и прочитаны. Это позволяет лучше понять, что процесс пытается сделать в заданное время.

## 3 Пример использования утилиты

### Лабораторная работа 2

```
dmimalek@mypc:~/labs/OS/build/lab2$ strace ./lab2
execve("./lab2", ["/lab2"], 0x7fff349960f0 /* 103 vars */) = 0
brk(NULL) = 0x55f9a9aac000
arch_prctl(0x3001 /* ARCH_??? */ , 0x7ffdb3d760d0) = -1 EINVAL (Invalid argument)
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7f0340fa5000
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
newfstatat(3, "", st_mode=S_IFREG|0644, st_size=104847, ..., AT_EMPTY_PATH) = 0
mmap(NULL, 104847, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7f0340f8b000
close(3) = 0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
read(3, "77ELF>P37"... , 832) = 832
pread64(3, "000"... , 784, 64) = 784
pread64(3, " GNU00"... , 48, 848) = 48
pread64(3, "4GNU1835HZ27233350s6052,2340"... , 68, 896) = 68
newfstatat(3, "", st_mode=S_IFREG|0644, st_size=2216304, ..., AT_EMPTY_PATH) = 0
pread64(3, "000"... , 784, 64) = 784
mmap(NULL, 2260560, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7f0340c00000
mmap(0x7f0340c28000, 1658880, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x28000) = 0x7f0340c28000
mmap(0x7f0340dbd000, 360448, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1bd000) = 0x7f0340dbd000
mmap(0x7f0340e15000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x214000) = 0x7f0340e15000
mmap(0x7f0340e1b000, 52816, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f0340e1b000
close(3) = 0
mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7f0340f88000
arch_prctl(ARCH_SET_FS, 0x7f0340f88740) = 0
set_tid_address(0x7f0340f88a10) = 277188
set_robust_list(0x7f0340f88a20, 24) = 0
rseq(0x7f0340f890e0, 0x20, 0, 0x53053053) = 0
mprotect(0x7f0340e15000, 16384, PROT_READ) = 0
mprotect(0x55f9a7e7f000, 4096, PROT_READ) = 0
mprotect(0x7f0340fd000, 8192, PROT_READ) = 0
prlimit64(0, RLIMIT_STACK, NULL, rlim_cur=8192*1024, rlim_max=RLIM64_INFINITY) = 0
munmap(0x7f0340f8b000, 104847) = 0
pipe2([3,4], 0) = 0
pipe2([5,6], 0) = 0
clone(child_stack=NULL, flags=CLONE_CHILD_CLEARTID|CLONE_CHILD_SETTID|SIGCHLD, child_tidptr=0x7f0340f88a10) = 277189
close(3) = 0
getrandom("3c358f9f47e30", 8, GRND_NONBLOCK) = 8
brk(NULL) = 0x55f9a9aac000
brk(0x55f9a9acd000) = 0x55f9a9acd000
newfstatat(0, "", st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0x5), ..., AT_EMPTY_PATH) = 0
read(0, HELLO world
HELLO world  ", 1024) = 15
write(4, "HELLO world ", 14) = 14
write(4, "", 1) = 1
```

```

write(4,"1",1) = 1
read(0,heLLdasd 32423
"heLLdasd 32423",1024) = 15
write(4,"heLLdasd 32423",14) = 14
write(4,"",1) = 1
write(4,"1",1) = 1
read(0,sdfdsf fdsfsd ___435
"sdfdsf fdsfsd ___435",1024) = 29
write(4,"sdfdsf fdsfsd ___435",28) = 28
write(4,"",1) = 1
write(4,"1",1) = 1
read(0,fdsfsdfsdf FDSFSDGF
"fdsfsdfsdf FDSFSDGF ",1024) = 26
write(4,"fdsfsdfsdf FDSFSDGF ",25) = 25
write(4,"",1) = 1
write(4,"1",1) = 1
read(0,fdsfsd FDSsdfs
"fdsfsd FDSsdfs",1024) = 17
write(4,"fdsfsd FDSsdfs",16) = 16
write(4,"",1) = 1
write(4,"1",1) = 1
read(0,"",1024) = 0
close(4) = 0
---SIGCHLD si_signo=SIGCHLD,si_code=CLD_EXITED,si_pid=277189,si_uid=1000,si_status=0,si_utime=0,si_stime=0 ---
pipe2([3,4],0) = 0
clone(child_stack=NULL,flags=CLONE_CHILD_CLEARTID|CLONE_CHILD_SETTID|SIGCHLD,child_tidptr=0x7f0340f88a10) = 277630
close(4) = 0
close(5) = 0
close(6) = 0
wait4(-1,NULL,0,NULL) = 277189
read(3,"h",1) = 1
newfstatat(1,"",st_mode=S_IFCHR|0620,st_rdev=makedev(0x88,0x5),...,AT_EMPTY_PATH) = 0
read(3,"e",1) = 1
read(3,"l",1) = 1
read(3,"l",1) = 1
read(3,"o",1) = 1
read(3,"_",1) = 1
read(3,"u",1) = 1
read(3,"o",1) = 1
read(3,"r",1) = 1
read(3,"l",1) = 1
read(3,"d",1) = 1
read(3,"_",1) = 1
read(3,"_",1) = 1
read(3,"_",1) = 1
read(3,"_",1) = 1
write(1,"hello_world___",15hello_world___
) = 15
read(3,"1",1) = 1
read(3,"h",1) = 1
read(3,"e",1) = 1
read(3,"l",1) = 1
read(3,"l",1) = 1
read(3,"d",1) = 1
read(3,"a",1) = 1
read(3,"s",1) = 1
read(3,"d",1) = 1
read(3,"_",1) = 1
read(3,"3",1) = 1
read(3,"2",1) = 1
read(3,"4",1) = 1
read(3,"2",1) = 1
read(3,"3",1) = 1
read(3,"",1) = 1
write(1,"1helldasd_32423",16helldasd_32423
) = 16
read(3,"1",1) = 1
read(3,"s",1) = 1
read(3,"d",1) = 1
read(3,"f",1) = 1
read(3,"d",1) = 1
read(3,"s",1) = 1
read(3,"f",1) = 1
read(3,"_",1) = 1
read(3,"_",1) = 1
read(3,"f",1) = 1
read(3,"d",1) = 1
read(3,"s",1) = 1
read(3,"f",1) = 1
read(3,"s",1) = 1
read(3,"d",1) = 1
read(3,"_",1) = 1
read(3,"_",1) = 1
read(3,"_",1) = 1

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read(3,"_",1)           = 1
read(3,"_",1)           = 1
read(3,"_",1)           = 1
read(3,"_",1)           = 1
read(3,"_",1)           = 1
read(3,"_",1)           = 1
read(3,"_",1)           = 1
read(3,"_",1)           = 1
read(3,"4",1)           = 1
read(3,"3",1)           = 1
read(3,"5",1)           = 1
read(3,"",1)            = 1
write(1,"1sdfsf__fdsfsd_____435",30sdfsf__fdsfsd_____435
) = 30
read(3,"1",1)           = 1
read(3,"f",1)           = 1
read(3,"d",1)           = 1
read(3,"s",1)           = 1
read(3,"f",1)           = 1
read(3,"s",1)           = 1
read(3,"d",1)           = 1
read(3,"f",1)           = 1
read(3,"s",1)           = 1
read(3,"d",1)           = 1
read(3,"f",1)           = 1
read(3,"_",1)           = 1
read(3,"_",1)           = 1
read(3,"_",1)           = 1
read(3,"f",1)           = 1
read(3,"d",1)           = 1
read(3,"s",1)           = 1
read(3,"f",1)           = 1
read(3,"s",1)           = 1
read(3,"d",1)           = 1
read(3,"g",1)           = 1
read(3,"f",1)           = 1
read(3,"_",1)           = 1
read(3,"_",1)           = 1
read(3,"_",1)           = 1
read(3,"_",1)           = 1
read(3,"",1)            = 1
write(1,"1fdfsdfsdf__fdsfsgf____",27fdfsdfsdf__fdsfsgf____
) = 27
read(3,"1",1)           = 1
read(3,"f",1)           = 1
read(3,"s",1)           = 1
read(3,"d",1)           = 1
read(3,"f",1)           = 1
read(3,"s",1)           = 1
read(3,"d",1)           = 1
read(3,"_",1)           = 1
read(3,"_",1)           = 1
read(3,"_",1)           = 1
read(3,"f",1)           = 1
read(3,"d",1)           = 1
read(3,"s",1)           = 1
read(3,"s",1)           = 1
read(3,"d",1)           = 1
read(3,"f",1)           = 1
read(3,"s",1)           = 1
read(3,"",1)            = 1
write(1,"1fdfsfsd__fdssdfs",18fdfsfsd__fdssdfs
) = 18
close(3)                = 0
exit_group(0)            = ?
+++ exited with 0 +++

```

## 4 Вывод

Strace – удобный инструмент для того чтобы понять какие системные вызовы производит программа в ходе своей работы. Утилиту очень удобно использовать для отладки программ