

## Práctica 2

## En qué sistema operativo trabajaron

```
-- Linux (Fedora 27)
```

Qué programa emplearon para obtener la traza

```
-- strace
```

## Qué programa objetivo trazaron

--ls (listar contenidos)

¿Por qué eligieron este programa?

--Curiosidad sobre como trabaja algo tan básico en el sistema

```
Activas [x] Terminal +  
mié 16:16  
edward@localhost:~  
  
Archivo Editar Ver Buscar Terminal Ayuda  
  
[edward@localhost ~]$ strace ls  
execve("/usr/bin/ls", ["ls"], 0x7ffc0a333f00 /* 47 vars */) = 0  
brk(NULL) = 0x55b014228000  
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=103629, ...}) = 0  
mmap(NULL, 103629, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7f934f5aa000  
close(3) = 0  
openat(AT_FDCWD, "/lib64/libselinux.so.1", O_RDONLY|O_CLOEXEC) = 3  
read(3, "\177ELF\211\1\0\0\0\0\0\0\0\0\0\3\0-\0\1\0\0\0\240\1\0\0\0\0\0"... , 832) = 832  
fstat(3, {st_mode=S_IFREG|0755, st_size=162520, ...}) = 0  
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7f934f5a8000  
mmap(NULL, 226512, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7f934f174000  
mprotect(0x7f934f199000, 2097152, PROT_NONE) = 0  
mmap(0x7f934f399000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x25000) = 0x7f934f399000  
mmap(0x7f934f39b000, 5616, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f934f39b000  
close(3) = 0  
openat(AT_FDCWD, "/lib64/libcap.so.2", O_RDONLY|O_CLOEXEC) = 3  
read(3, "\177ELF\211\1\0\0\0\0\0\0\0\0\0\3\0-\0\1\0\0\0\25\0\0\0\0\0\0"... , 832) = 832  
fstat(3, {st_mode=S_IFREG|0755, st_size=19720, ...}) = 0  
mmap(NULL, 2113848, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7f934ef6f000  
mprotect(0x7f934ef73000, 2093056, PROT_NONE) = 0  
mmap(0x7f934f172000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x3000) = 0x7f934f172000  
close(3) = 0  
openat(AT_FDCWD, "/lib64/libc.so.6", O_RDONLY|O_CLOEXEC) = 3  
read(3, "\177ELF\211\1\0\0\0\0\0\0\0\0\0\3\0-\0\1\0\0\0\21\2\0\0\0\0\0"... , 832) = 832  
fstat(3, {st_mode=S_IFREG|0755, st_size=2245984, ...}) = 0  
mmap(NULL, 4074112, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7f934eb8c000  
mprotect(0x7f934e4d6000, 2093056, PROT_NONE) = 0  
mmap(0x7f934ef65000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1d9000) = 0x7f934ef65000  
mmap(0x7f934ef6b000, 14976, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f934ef6b000  
close(3) = 0  
openat(AT_FDCWD, "/lib64/libpcr2-8.so.0", O_RDONLY|O_CLOEXEC) = 3  
read(3, "\177ELF\211\1\0\0\0\0\0\0\0\0\0\3\0-\0\1\0\0\0\1\0\0\0\0\0\0"... , 832) = 832  
fstat(3, {st_mode=S_IFREG|0755, st_size=533864, ...}) = 0  
mmap(NULL, 2626088, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7f934e90a000  
mprotect(0x7f934e98b000, 2093056, PROT_NONE) = 0  
mmap(0x7f934eb8a000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x80000) = 0x7f934eb8a000  
close(3) = 0  
openat(AT_FDCWD, "/lib64/libdl.so.2", O_RDONLY|O_CLOEXEC) = 3  
read(3, "\177ELF\211\1\0\0\0\0\0\0\0\0\0\3\0-\0\1\0\0\0\0P\16\0\0\0\0\0\0"... , 832) = 832  
fstat(3, {st_mode=S_IFREG|0755, st_size=19264, ...}) = 0  
mmap(NULL, 2109680, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7f934e706000  
mprotect(0x7f934e709000, 2093056, PROT_NONE) = 0
```

```
Archivos Editar Ver Buscar Terminal Ayuda
mié 10:16
edward@localhost:~

mprotect(0x7f934f172000, 4096, PROT_READ) = 0
mprotect(0x7f934f399000, 4096, PROT_READ) = 0
mprotect(0x55b014176000, 8192, PROT_READ) = 0
mprotect(0x7f934f5c4000, 4096, PROT_READ) = 0
munmap(0x7f934f5aa000, 103629) = 0
set_tid_address(0x7f934f5a7810) = 4236
set_robust_list(0x7f934f5a7820, 24) = 0
rt_sigaction(SIGRTMIN, {sa_handler=0x7f934e4ecc10, sa_mask=[], sa_flags=SA_RESTORER|SA_SIGINFO, sa_restorer=0x7f934e4f9af0}, NULL, 8) = 0
rt_sigaction(SIGRT_1, {sa_handler=0x7f934e4eccb0, sa_mask=[], sa_flags=SA_RESTORER|SA_RESTART|SA_SIGINFO, sa_restorer=0x7f934e4f9af0}, NULL, 8) = 0
rt_sigprocmask(SIG_UNBLOCK, [RTMIN RT_1], NULL, 0) = 0
prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024, rlim_max=RLIM64_INFINITY}) = 0
statfs("/sys/fs/selinux", {f_type=SELINUX_MAGIC, f_bsize=4096, f_blocks=0, f_bfree=0, f_bavail=0, f_files=0, f_ffree=0, f_fsid={val=[0, 0]}, f_namelen=255, f_frsize=4096, f_flags=ST_VALID|ST_RELATIME}) = 0
statfs("/sys/fs/selinux", {f_type=SELINUX_MAGIC, f_bsize=4096, f_blocks=0, f_bfree=0, f_bavail=0, f_files=0, f_ffree=0, f_fsid={val=[0, 0]}, f_namelen=255, f_frsize=4096, f_flags=ST_VALID|ST_RELATIME}) = 0
brk(NULL) = 0x55b014228000
brk(0x55b014249000) = 0x55b014249000
access("/etc/selinux/config", F_OK) = 0
open("/usr/lib/locale/locale-archive", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=113045344, ...}) = 0
mmap(NULL, 113045344, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7f9347918000
close(3) = 0
ioctl(1, TCGETS, {B38400 oposit isig icanon echo ...}) = 0
ioctl(1, TIOCGWINSZ, {ws_row=24, ws_col=80, ws_xpixel=0, ws_ypixel=0}) = 0
open(".", O_RDONLY|O_NONBLOCK|O_CLOEXEC|O_DIRECTORY) = 3
fstat(3, {st_mode=S_IFDIR|0700, st_size=4096, ...}) = 0
getdents(3, /* 21 entries */, 32768) = 688
open("/usr/lib64/gconv/gconv-modules.cache", O_RDONLY) = 4
fstat(4, {st_mode=S_IFREG|0644, st_size=26370, ...}) = 0
mmap(NULL, 26370, PROT_READ, MAP_SHARED, 4, 0) = 0x7f934f5bd000
close(4) = 0
futex(0x7f934ef6a9e8, FUTEX_WAKE_PRIVATE, 2147483647) = 0
getdents(3, /* 0 entries */, 32768) = 0
close(3) = 0
fstat(1, {st_mode=S_IFCHR|0620, st_rdev=makedev(136, 0), ...}) = 0
write(1, "Descargas Escritorio\\t\\303\\272sica\\t"... 55Descargas EscritorioMúsica Público Vídeos) = 55
write(1, "Documentos Im\\303\\241genes\\tPlantillas"... 48Documentos Imágenes Plantillas sistop-2018-2) = 48
close(1) = 0
close(2) = 0
exit_group(0) = ?
+++ exited with 0 +++
[edward@localhost ~]$
```

## Sus observaciones / resultados

-- Hace uso de “execve” para ejecutar el programa.

-- Usa “access” para comprobar si la llamada al proceso puede acceder al archivo de la ruta.

-- Llama a “fstat” que envía información de estado sobre el archivo asociado con un descriptor de archivo abierto.

-- Usa “openat” la llamada al sistema opera exactamente igual que “open”, con algunas excepciones

Son realmente muchos los procesos que se ejecutan con un programa tan simple, lo que me lleva a reflexionar sobre todo lo que me falta por aprender como programador para realizar programas muy complejos y todo lo que se debe tener en cuenta para evitar errores.