System Programming
Linux command line manual: lab 4
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Bachelor Electronics/ICT

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Lab targets: obtain system call traces and info on files or the file system

Tracing system calls

The ′strace' command prints a trace of all system calls invoked by a running program which is quite interesting for diagnostics, debugging and hacking; also – as an experiment - try to compile a program with '-static' to avoid the shared library related output and obtain a cleaner tracer; 'strace' has some interesting options, of which some are illustrated in the following examples:

- strace -e <syscall> <program> : trace the specified system call <syscall>;
- strace -e trace=process <program> : trace all syscalls related to process management; besides 'process' also 'network', 'ipc', 'file', … can be used to trace a specific set of syscalls;
- strace -r <program> : add relative timing to the syscall trace;
- strace -c <program> : generates a statistical report for the syscall trace containing number of calls, timing, errors, …;

Time command

There exist two 'time' commands: one is the Bash built-in shell command and the other is the external Linux command. Both have some interesting applications.

- time <program> : run the Bash 'time' command which measure user/system/real time needed to execute <program>;
- /usr/bin/time -f <format expression> <program> : run the non-Bash 'time' command on <program> which can collect system resource statistics such as number of signals delivered to the program, number of context-switches, memory related data, timing, …

File info

- stat : return detailed info on a file (size, I-node, links, modification timestamps, etc.);
- du : estimate disk usage (which is typically different from the file size) of files or directories; use 'du' with the '-h' option to produce human readable size in KB, MB, etc.
- df : reports available disk space usage; use 'df' with the '-h' option to produce human readable size in KB, MB, etc.;
- fdisk : list or change (be careful!) the partition table of a disk;
- /etc/fstab : file containing static info about the file system; see also ‘man fstab’;

Summary: list of commands

- df
- du
- fdisk
- stat
- strace
- time
- /usr/bin/time