
# Software Lab

## The proc filesystem

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# Summary


- The proc filesystem
- Information about processes
- Information about the system
  - Hardware components
  - Kernel
  - Memory
  - Statistics

 

# The proc filesystem


- `mount` output: none on /proc type proc (rw)
- `proc` is a virtual filesystem
  - Not associated to any phisical device (none)
  - It exists only in memory
- Abstraction that lets the user
  - Access information about the kernel/system
  - Configure the kernel
- `/proc/sys` are sysctl files
  - They don't belong to procfs
  - Handled with a completely different API

 

# procfs details


- Every files has no dimension
- They are generated by the kernel upon read requests
  - Callbacks to read from and to write to
    - `linux/proc_fs.h`
- Modification date is equal to the current date
- Most of the files has a human readable format but it can be easily parsed
- File names and formats can change with versions
- `man 5 proc`
- `/usr/src/linux/fs/proc`

 

# Information about processes


- A subdirectory for every process in the system
  - PID as the name
  - Dynamic as processes
- Structure
  - `cmdline` : NUL separated argument list
  - `cwd` : current working directory (symbolic link)
  - `environ` : process environment
  - `exe` : executable image (symbolic link)
  - `fd` : subdirectory with entries for file descriptors opened by the process
  - `maps` : mapped files in the address space

 

# Information about processes


- Structure (continues)
  - `root` : usually /, if no chroot
  - `stat` : status information and statistics (same as info in status but here they are not formatted)
  - `statm` : memory information
  - `status` : status information and statistics (same as info in stat but here they are formatted)
  - `cpu` : in SMP systems contains information about the CPU time (user and system)
- `/proc/self` is a symbolic link to the directory of the current process (in the procfs)

 

# Information about hardware


- `/proc/cpuinfo` for information about the CPU
- `/proc/devices` for information about devices
- `/proc/pci` for information on devices attached on PCI bus, AGP boards, motherboard on-board devices
  - `lspci` command
- `/proc/tty/driver/serial` for information on serial ports

 

# Information about kernel


- `/proc/version` for information about the kernel version actually being executed
  - `/proc/sys/kernel/ostype`
  - `/proc/sys/kernel/osrelease`
  - `/proc/sys/kernel/version`
- `/proc/sys/kernel/hostname` for the host name
- `/proc/sys/kernel/domainname` for the domain name
- `/proc/meminfo` for information about the memory usage in the system

 

# Information about drives


- `/proc/filesystems` for information about filesystems the kernel recognizes
  - Useless since modules can be loaded
- `/proc/ide/ide0/hda` for information about the master device on the first IDE channel
  - `model` contains the id string
  - `media` contains the type (cdrom, disk, tape, floppy, UNKNOWN)
  - `capacity` contains the capacity in 512 byte blocks
- `/proc/scsi/scsi` for information about devices on the SCSI bus

 

# Information about drives


- `/proc/sys/dev/cdrom/info` per detailed information on the cdrom
- `/proc/mounts` for information about mounted filesystems
  - Identical to `/etc/mtab`
- `/proc/locks` for information about system file locks
  - Every row is a lock
    - POSIX, ADVISORY for locks created with `fcntl`
    - Process that owns the lock
    - Lock type (READ, WRITE)

 

# Statistics


- `/proc/loadavg` for information about the loadof the system
  - Average of running processes in the last 1, 5, 15 minutes
  - Number of actually runnable processes divided by the total number of processes
  - PID of the last executed process
- `/proc/uptime` for information about the system activity time and the system idle time
  - Same information using the `uptime` command

 