

Анализ файловой структуры UNIX. Команды для работы с файлами и каталогами

Сотникова Виолетта Алексеевна¹

28 августа, 2024, Москва, Россия

¹Российский Университет Дружбы Народов

Цели и задачи работы

Цель лабораторной работы

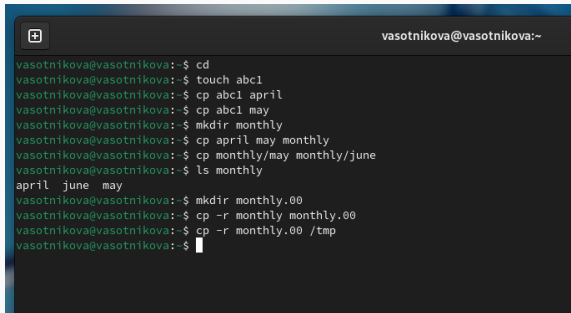
Ознакомление с файловой системой Linux, её структурой, именами и содержанием каталогов. Приобретение практических навыков по применению команд для работы с файлами и каталогами, по управлению процессами, по проверке использования диска и обслуживанию файловой системы.

Задачи лабораторной работы

- 1 Выполнить приимеры
- 2 Выполнить дествия по работе с каталогами и файлами
- 3 Выполнить действия с правами доступа
- 4 Получить дополнительные сведения при помощи справки по командам.

Процесс выполнения лабораторной работы

Выполнение примеров



```
vasotnikova@vasotnikova:~  
vasotnikova@vasotnikova:~$ cd  
vasotnikova@vasotnikova:~$ touch abc1  
vasotnikova@vasotnikova:~$ cp abc1 april  
vasotnikova@vasotnikova:~$ cp abc1 may  
vasotnikova@vasotnikova:~$ mkdir monthly  
vasotnikova@vasotnikova:~$ cp april may monthly  
vasotnikova@vasotnikova:~$ cp monthly/may monthly/june  
vasotnikova@vasotnikova:~$ ls monthly  
april  june  may  
vasotnikova@vasotnikova:~$ mkdir monthly.00  
vasotnikova@vasotnikova:~$ cp -r monthly monthly.00  
vasotnikova@vasotnikova:~$ cp -r monthly.00 /tmp  
vasotnikova@vasotnikova:~$
```

Рис. 1: Выполнение примеров

Выполнение примеров

```
vasotnikova@vasotnikova:~$ cd
vasotnikova@vasotnikova:~$ mv april july
vasotnikova@vasotnikova:~$ mv july monthly.00
vasotnikova@vasotnikova:~$ ls monthly.00
july  monthly
vasotnikova@vasotnikova:~$ mv monthly.00 monthly.01
vasotnikova@vasotnikova:~$ mkdir reports
vasotnikova@vasotnikova:~$ mv monthly.01 reports
vasotnikova@vasotnikova:~$ mv reports/monthly.01 reports/monthly
vasotnikova@vasotnikova:~$
```

Рис. 2: Выполнение примеров

Выполнение примеров

```
vasotnikova@vasotnikova:~$  
vasotnikova@vasotnikova:~$ cd  
vasotnikova@vasotnikova:~$ touch may  
vasotnikova@vasotnikova:~$ ls -l may  
-rw-r--r--. 1 vasotnikova vasotnikova 0 apr 28 16:26 may  
vasotnikova@vasotnikova:~$ chmod u+x may  
vasotnikova@vasotnikova:~$ ls -l may  
-rwxr--r--. 1 vasotnikova vasotnikova 0 apr 28 16:26 may  
vasotnikova@vasotnikova:~$ chmod u-x may  
vasotnikova@vasotnikova:~$ ls -l may  
-rw-r--r--. 1 vasotnikova vasotnikova 0 apr 28 16:26 may  
vasotnikova@vasotnikova:~$ cd  
vasotnikova@vasotnikova:~$ mkdir monthly  
mkdir: невозможно создать каталог «monthly»: Файл существует  
vasotnikova@vasotnikova:~$ chmod g-r,o-r monthly  
vasotnikova@vasotnikova:~$ cd  
vasotnikova@vasotnikova:~$ touch abc1  
vasotnikova@vasotnikova:~$ chmod g+w abc1  
vasotnikova@vasotnikova:~$
```

Рис. 3: Выполнение примеров

Создание директорий и копирование файлов

```
vasotnikova@vasotnikova:~$ cp /usr/include/linux/sysinfo.h -
vasotnikova@vasotnikova:~$ mv sysinfo.h equipment
vasotnikova@vasotnikova:~$ mkdir ski.plases
vasotnikova@vasotnikova:~$ mv equipment ski.plases/
vasotnikova@vasotnikova:~$ mv ski.plases/equipment ski.plases/equiplist
vasotnikova@vasotnikova:~$ touch abc1
vasotnikova@vasotnikova:~$ cp abc1 ski.plases/equiplist2
vasotnikova@vasotnikova:~$ cd ski.plases/
vasotnikova@vasotnikova:~/ski.plases$ mkdir equipment
vasotnikova@vasotnikova:~/ski.plases$ mv equiplist equipment/
vasotnikova@vasotnikova:~/ski.plases$ mv equiplist2 equipment/
vasotnikova@vasotnikova:~/ski.plases$ cd
vasotnikova@vasotnikova:~$ mkdir newdir
vasotnikova@vasotnikova:~$ mv newdir ski.plases/
vasotnikova@vasotnikova:~$ mv ski.plases/newdir/ ski.plases/plans
vasotnikova@vasotnikova:~$
```

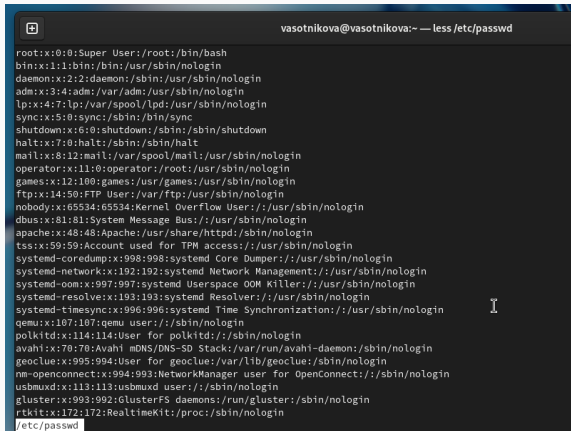
Рис. 4: Работа с каталогами

Работа с командой chmod

```
vasotnikova@vasotnikova:~$  
vasotnikova@vasotnikova:~$ mkdir australia play  
vasotnikova@vasotnikova:~$ touch my_os feathers  
vasotnikova@vasotnikova:~$ chmod 744 australia/  
vasotnikova@vasotnikova:~$ chmod 711 play/  
vasotnikova@vasotnikova:~$ chmod 544 my_os  
vasotnikova@vasotnikova:~$ chmod 664 feathers  
vasotnikova@vasotnikova:~$ ls -l  
итого 0  
-rw-rw-r--. 1 vasotnikova vasotnikova 0 авг 28 16:27 abc1  
drwxr--r--. 1 vasotnikova vasotnikova 0 авг 28 16:28 australia  
-rw-rw-r--. 1 vasotnikova vasotnikova 0 авг 28 16:28 feathers  
-rw-r--r--. 1 vasotnikova vasotnikova 0 авг 28 16:26 may  
drwx--x--x. 1 vasotnikova vasotnikova 24 авг 28 16:25 monthly  
-r-xr--r--. 1 vasotnikova vasotnikova 0 авг 28 16:28 my_os  
drwx--x--x. 1 vasotnikova vasotnikova 0 авг 28 16:28 play  
drwxr-xr-x. 1 vasotnikova vasotnikova 14 авг 28 16:25 reports  
drwxr-xr-x. 1 vasotnikova vasotnikova 28 авг 28 16:28 ski.places  
drwxr-xr-x. 1 vasotnikova vasotnikova 0 авг 28 16:09 Видео  
drwxr-xr-x. 1 vasotnikova vasotnikova 0 авг 28 16:09 Документы  
drwxr-xr-x. 1 vasotnikova vasotnikova 0 авг 28 16:09 Загрузки  
drwxr-xr-x. 1 vasotnikova vasotnikova 0 авг 28 16:09 Изображения  
drwxr-xr-x. 1 vasotnikova vasotnikova 0 авг 28 16:09 Музыка  
drwxr-xr-x. 1 vasotnikova vasotnikova 0 авг 28 16:09 Общедоступные  
drwxr-xr-x. 1 vasotnikova vasotnikova 0 авг 28 16:09 'Рабочий стол'  
drwxr-xr-x. 1 vasotnikova vasotnikova 0 авг 28 16:09 Шаблоны  
vasotnikova@vasotnikova:~$
```

Рис. 5: Настройка прав доступа

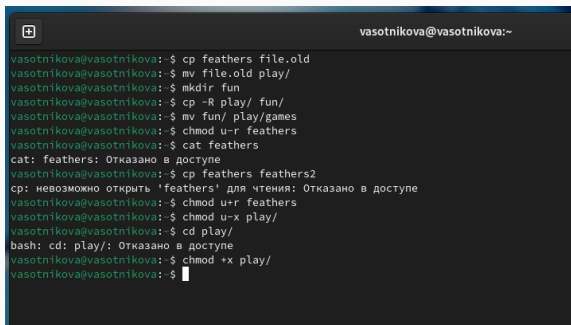
Файл /etc/passwd

A terminal window with a dark background. The title bar shows a window icon and the text 'vasotnikova@vasotnikova:~ — less /etc/passwd'. The terminal displays the contents of the /etc/passwd file, listing system and regular users with their IDs, names, shells, and home directories. The output is truncated by the 'less' command, with a vertical bar cursor visible on the right side of the terminal window.

```
root:x:0:0:Super User:/root:/bin/bash
bin:x:1:1:bin:/bin:/usr/sbin/nologin
daemon:x:2:2:daemon:/sbin:/usr/sbin/nologin
adm:x:3:4:adm:/var/adm:/usr/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/usr/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
halt:x:7:0:halt:/sbin:/sbin/halt
mail:x:8:12:mail:/var/spool/mail:/usr/sbin/nologin
operator:x:11:0:operator:/root:/usr/sbin/nologin
games:x:12:100:games:/usr/games:/usr/sbin/nologin
ftp:x:14:50:FTP User:/var/ftp:/usr/sbin/nologin
nobody:x:65534:65534:Kernel Overflow User:/usr/sbin/nologin
dbus:x:81:81:System Message Bus:/usr/sbin/nologin
apache:x:48:48:Apache:/usr/share/httpd:/sbin/nologin
tss:x:59:59:Account used for TPM access:/usr/sbin/nologin
systemd-coredump:x:998:998:systemd Core Dumper:/usr/sbin/nologin
systemd-network:x:192:192:systemd Network Management:/usr/sbin/nologin
systemd-oom:x:997:997:systemd Userspace OOM Killer:/usr/sbin/nologin
systemd-resolve:x:193:193:systemd Resolver:/usr/sbin/nologin
systemd-timesync:x:996:996:systemd Time Synchronization:/usr/sbin/nologin
qemu:x:107:107:qemu user:/usr/sbin/nologin
polkitd:x:114:114>User for polkitd:/usr/sbin/nologin
avahi:x:70:70:Avahi mDNS/DNS-SD Stack:/var/run/avahi-daemon:/sbin/nologin
geoclue:x:995:994>User for geoclue:/var/lib/geoclue:/sbin/nologin
nm-openconnect:x:994:993:NetworkManager user for OpenConnect:/usr/sbin/nologin
usbmuxd:x:113:113:usbmuxd user:/usr/sbin/nologin
gluster:x:993:992:GlusterFS daemons:/run/gluster:/sbin/nologin
rtkit:x:172:172:RealtimeKit:/proc:/sbin/nologin
```

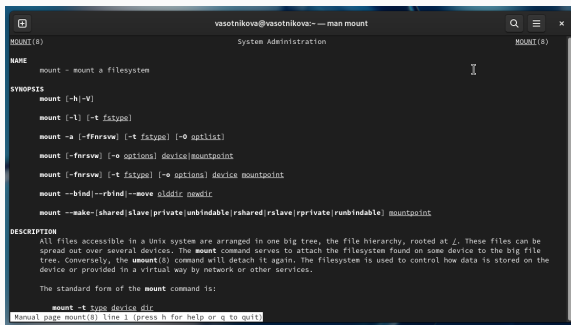
Рис. 6: Файл /etc/passwd

Работа с файлами и правами доступа



```
vasotnikova@vasotnikova:~$ cp feathers file.old
vasotnikova@vasotnikova:~$ mv file.old play/
vasotnikova@vasotnikova:~$ mkdir fun
vasotnikova@vasotnikova:~$ cp -R play/ fun/
vasotnikova@vasotnikova:~$ mv fun/ play/games
vasotnikova@vasotnikova:~$ chmod u-r feathers
vasotnikova@vasotnikova:~$ cat feathers
cat: feathers: Отказано в доступе
vasotnikova@vasotnikova:~$ cp feathers feathers2
cp: невозможно открыть 'feathers' для чтения: Отказано в доступе
vasotnikova@vasotnikova:~$ chmod u+r feathers
vasotnikova@vasotnikova:~$ chmod u-x play/
vasotnikova@vasotnikova:~$ cd play/
bash: cd: play/: Отказано в доступе
vasotnikova@vasotnikova:~$ chmod +x play/
vasotnikova@vasotnikova:~$
```

Рис. 7: Работа с файлами и правами доступа



```
vasotnikova@vasotnikova:~ — man mount
MOUNT(8)                                     System Administration                                MOUNT(8)

NAME
  mount - mount a filesystem

SYNOPSIS
  mount [-h|-V]

  mount [-l] [-t fstype]

  mount -a [-ffnrsvw] [-t fstype] [-O optlist]

  mount [-fnrsvw] [-o options] device|mountpoint

  mount [-fnrsvw] [-t fstype] [-o options] device mountpoint

  mount --bind|--rbind|--move olddir newdir

  mount --make-[shared|slave|private|unbindable|rshared|rslave|rprivate|runbindable] mountpoint

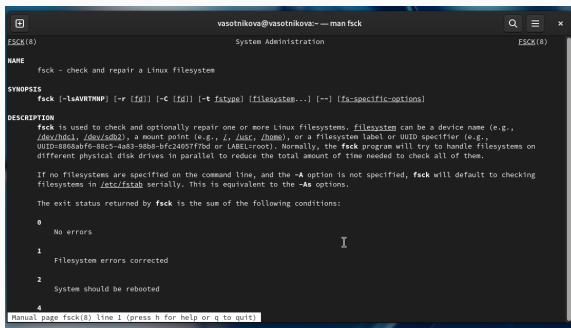
DESCRIPTION
  All files accessible in a Unix system are arranged in one big tree, the file hierarchy, rooted at /. These files can be spread out over several devices. The mount command serves to attach the filesystem found on some device to the big file tree. Conversely, the umount(8) command will detach it again. The filesystem is used to control how data is stored on the device or provided in a virtual way by network or other services.

  The standard form of the mount command is:

  mount -t type device dir

  Manual page mount(8) line 1 (press h for help or q to quit)
```

Рис. 8: Команда mount



```
vasotnikova@vasotnikova:~$ man fsck

fsck(8)                                System Administration                                fsck(8)

NAME
    fsck - check and repair a Linux filesystem

SYNOPSIS
    fsck [-lsAVRTnmp] [-r [fd]] [-C [fd]] [-t fstype] [filesystem...] [--] [fs-specific-options]

DESCRIPTION
    fsck is used to check and optionally repair one or more Linux filesystems. filesystem can be a device name (e.g.,
    /dev/hdc1, /dev/sdb2), a mount point (e.g., /, /usr, /home), or a filesystem label or UUID specifier (e.g.,
    UUID=886sabf0-88c5-4a83-98b8-bfc24057f7bd or LABEL=root). Normally, the fsck program will try to handle filesystems on
    different physical disk drives in parallel to reduce the total amount of time needed to check all of them.

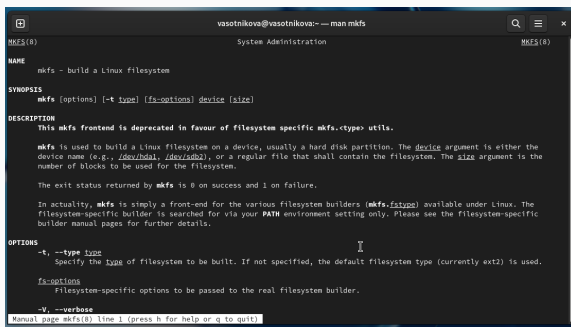
    If no filesystems are specified on the command line, and the -A option is not specified, fsck will default to checking
    filesystems in /etc/fstab serially. This is equivalent to the -As options.

    The exit status returned by fsck is the sum of the following conditions:

    0      No errors
    1      Filesystem errors corrected
    2      System should be rebooted
    4

Manual page fsck(8) line 1 (press h for help or q to quit)
```

Рис. 9: Команда fsck



```
vasotnikova@vasotnikova:~ -- man mkfs
MKFS(8)                                     System Administration      MKFS(8)

NAME
  mkfs - build a Linux filesystem

SYNOPSIS
  mkfs [options] [-t type] [fs-options] device [size]

DESCRIPTION
  This mkfs frontend is deprecated in favour of filesystem specific mkfs.<type> utils.

  mkfs is used to build a Linux filesystem on a device, usually a hard disk partition. The device argument is either the device name (e.g., /dev/hda1, /dev/sdb1), or a regular file that shall contain the filesystem. The size argument is the number of blocks to be used for the filesystem.

  The exit status returned by mkfs is 0 on success and 1 on failure.

  In actuality, mkfs is simply a front-end for the various filesystem builders (mkfs.fstype) available under Linux. The filesystem-specific builder is searched for via your PATH environment setting only. Please see the filesystem-specific builder manual pages for further details.

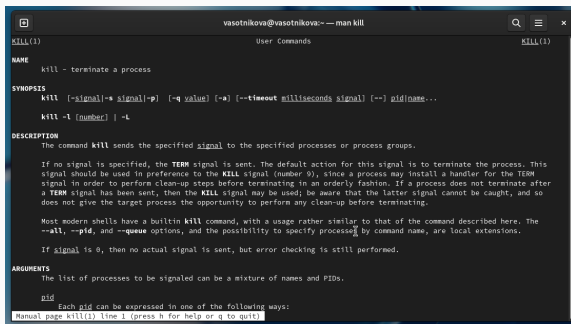
OPTIONS
  -t, --type type
    Specify the type of filesystem to be built. If not specified, the default filesystem type (currently ext2) is used.

  fs-options
    Filesystem-specific options to be passed to the real filesystem builder.

  -V, --verbose

Manual page mkfs(8) line 1 (press h for help or q to quit)
```

Рис. 10: Команда mkfs



```
vasotnikova@vasotnikova:~$ man kill
kill(1)                                User Commands                                kill(1)

NAME
  kill - terminate a process

SYNOPSIS
  kill [-signal|-s signal|-p] [-q value] [-a] [--timeout milliseconds signal] [-- pid|name...
  kill -l [number] | -L

DESCRIPTION
  The command kill sends the specified signal to the specified processes or process groups.

  If no signal is specified, the TERM signal is sent. The default action for this signal is to terminate the process. This
  signal should be used in preference to the KILL signal (number 9), since a process may install a handler for the TERM
  signal in order to perform clean-up steps before terminating in an orderly fashion. If a process does not terminate after
  a TERM signal has been sent, then the KILL signal may be used; be aware that the latter signal cannot be caught, and so
  does not give the target process the opportunity to perform any clean-up before terminating.

  Most modern shells have a builtin kill command, with a usage rather similar to that of the command described here. The
  --all, --pid, and --queue options, and the possibility to specify processes by command name, are local extensions.

  If signal is 0, then no actual signal is sent, but error checking is still performed.

ARGUMENTS
  The list of processes to be signaled can be a mixture of names and PIDs.

  pid
    Each pid can be expressed in one of the following ways:
    Manual page kill(1) line 1 (press h for help or q to quit)
```

Рис. 11: Команда kill

Выводы по проделанной работе

В ходе данной работы мы ознакомились с файловой системой Linux, её структурой, именами и содержанием каталогов. Научились совершать базовые операции с файлами, управлять правами их доступа для пользователя и групп. Ознакомились с Анализом файловой системы. А также получили базовые навыки по проверке использования диска и обслуживанию файловой системы.