

Операционные системы

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

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12 августа 2025

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Цели и задачи 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.

- 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

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

Рис. 1: Выполнение примеров

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

Рис. 2: Выполнение примеров

Выполнение примеров

```
zasharofiddinov@zasharofiddinov:~$  
zasharofiddinov@zasharofiddinov:~$ touch may  
zasharofiddinov@zasharofiddinov:~$ ls -l may  
-rw-r--r--. 1 zasharofiddinov zasharofiddinov 0 авг 12 10:58 may  
zasharofiddinov@zasharofiddinov:~$ chmod u+x may  
zasharofiddinov@zasharofiddinov:~$ ls -l may  
-rwxr--r--. 1 zasharofiddinov zasharofiddinov 0 авг 12 10:58 may  
zasharofiddinov@zasharofiddinov:~$ chmod u-x may  
zasharofiddinov@zasharofiddinov:~$ ls -l may  
-rw-r--r--. 1 zasharofiddinov zasharofiddinov 0 авг 12 10:58 may  
zasharofiddinov@zasharofiddinov:~$ cd  
zasharofiddinov@zasharofiddinov:~$ mkdir monthly  
mkdir: невозможно создать каталог «monthly»: Файл существует  
zasharofiddinov@zasharofiddinov:~$ chmod g-r,o-r monthly  
zasharofiddinov@zasharofiddinov:~$ chmod g+w abc1  
zasharofiddinov@zasharofiddinov:~$
```

Рис. 3: Выполнение примеров

Создание директорий и копирование файлов

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

Рис. 4: Работа с каталогами

Работа с командой chmod

```
zasharofiddinov@zasharofiddinov:~$  
zasharofiddinov@zasharofiddinov:~$ mkdir australia play  
zasharofiddinov@zasharofiddinov:~$ touch my_os feathers  
zasharofiddinov@zasharofiddinov:~$ chmod 744 australia/  
zasharofiddinov@zasharofiddinov:~$ chmod 711 play/  
zasharofiddinov@zasharofiddinov:~$ chmod 544 my_os  
zasharofiddinov@zasharofiddinov:~$ chmod 664 feathers  
zasharofiddinov@zasharofiddinov:~$ ls -l  
итого 0  
-rw-rw-r--. 1 zasharofiddinov zasharofiddinov 0 авг 12 10:59 abc1  
drwxr--r--. 1 zasharofiddinov zasharofiddinov 0 авг 12 11:01 australia  
-rw-rw-r--. 1 zasharofiddinov zasharofiddinov 0 авг 12 11:01 feathers  
drwxr-xr-x. 1 zasharofiddinov zasharofiddinov 74 авг 11 19:21 git-extended  
-rw-r--r--. 1 zasharofiddinov zasharofiddinov 0 авг 12 10:58 may  
drwx--x--x. 1 zasharofiddinov zasharofiddinov 24 авг 12 10:50 monthly  
-r-xr--r--. 1 zasharofiddinov zasharofiddinov 0 авг 12 11:01 my_os  
drwx--x--x. 1 zasharofiddinov zasharofiddinov 0 авг 12 11:01 play  
drwxr-xr-x. 1 zasharofiddinov zasharofiddinov 14 авг 12 10:54 reports  
drwxr-xr-x. 1 zasharofiddinov zasharofiddinov 28 авг 12 10:59 ski.places  
drwxr-xr-x. 1 zasharofiddinov zasharofiddinov 10 авг 11 18:54 work  
drwxr-xr-x. 1 zasharofiddinov zasharofiddinov 0 авг 11 18:23 Видео  
drwxr-xr-x. 1 zasharofiddinov zasharofiddinov 0 авг 11 18:23 Документы  
drwxr-xr-x. 1 zasharofiddinov zasharofiddinov 0 авг 11 18:58 Загрузки  
drwxr-xr-x. 1 zasharofiddinov zasharofiddinov 0 авг 11 18:23 Изображения  
drwxr-xr-x. 1 zasharofiddinov zasharofiddinov 0 авг 11 18:23 Музыка  
drwxr-xr-x. 1 zasharofiddinov zasharofiddinov 0 авг 11 18:23 Общедоступные  
drwxr-xr-x. 1 zasharofiddinov zasharofiddinov 0 авг 11 18:23 'Рабочий стол'  
drwxr-xr-x. 1 zasharofiddinov zasharofiddinov 0 авг 11 18:23 Шаблоны  
zasharofiddinov@zasharofiddinov:~$
```

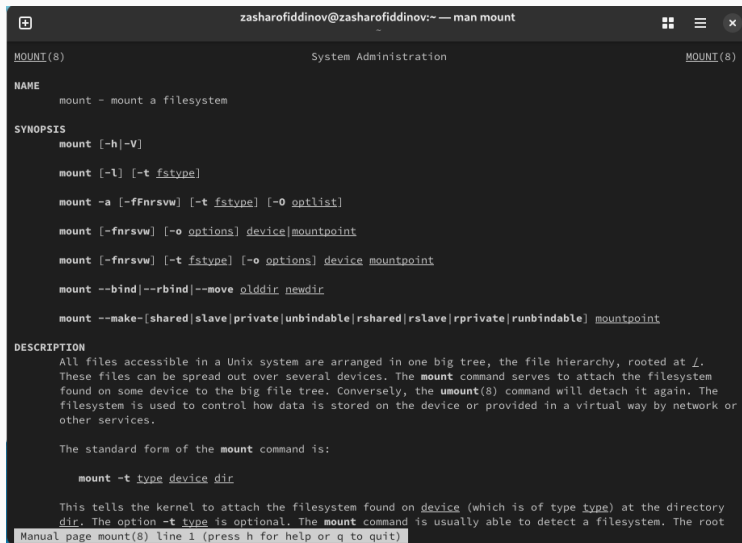


```
root:x:0:0:Super User:/root:/bin/bash
bin:x:1:1:bin:/bin:/usr/sbin/nologin
daemon:x:2:2:daemon:/sbin:/usr/sbin/nologin
adm:x:3:4:adm:/var/adm:/usr/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/usr/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
halt:x:7:0:halt:/sbin:/sbin/halt
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
avahi:x:70:70:Avahi mDNS/DNS-SD Stack:/var/run/avahi-daemon:/sbin/nologin
geoclue:x:999:999>User for geoclue:/var/lib/geoclue:/sbin/nologin
usbmuxd:x:113:113:usbmuxd user:/:/sbin/nologin
systemd-oom:x:998:998:systemd Userspace OOM Killer:/:/usr/sbin/nologin
qemu:x:107:107:qemu user:/:/sbin/nologin
polkitd:x:114:114>User for polkitd:/:/sbin/nologin
rtkit:x:172:172:RealtimeKit:/:/sbin/nologin
chrony:x:997:994:chrony system user:/var/lib/chrony:/sbin/nologin
dnsmasq:x:996:993:Dnsmasq DHCP and DNS server:/var/lib/dnsmasq:/usr/sbin/nologin
gluster:x:995:992:GlusterFS daemons:/run/gluster:/sbin/nologin
rpc:x:32:32:Rpcbind Daemon:/var/lib/rpcbind:/sbin/nologin
pipewire:x:994:991:PipeWire System Daemon:/run/pipewire:/usr/sbin/nologin
unbound:x:993:990:Unbound DNS resolver:/var/lib/unbound:/sbin/nologin
nm-openconnect:x:992:989:NetworkManager user for OpenConnect:/:/sbin/nologin
rpcuser:x:29:29:RPC Service User:/var/lib/nfs:/sbin/nologin
wsdd:x:991:988:Web Services Dynamic Discovery host daemon:/:/sbin/nologin
sssd:x:990:986>User for sssd:/run/sss:/sbin/nologin
```

Работа с файлами и правами доступа

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

Рис. 7: Работа с файлами и правами доступа



```
zasharofiddinov@zasharofiddinov:~ — 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

    This tells the kernel to attach the filesystem found on device (which is of type type) at the directory
    dir. The option -t type is optional. The mount command is usually able to detect a filesystem. The root
    Manual page mount(8) line 1 (press h for help or q to quit)
```

```
zasharofiddinov@zasharofiddinov:~ — man fsck

FSCK(8)                                     System Administration      FSCK(8)

NAME
    fsck - check and repair a Linux filesystem

SYNOPSIS
    fsck [-lsAVRTMNP] [-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=8868abf6-88c5-4a83-98b8-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
        Filesystem errors left uncorrected

    8

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

```
zasharofiddinov@zasharofiddinov:~ — 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/sdb2), 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.

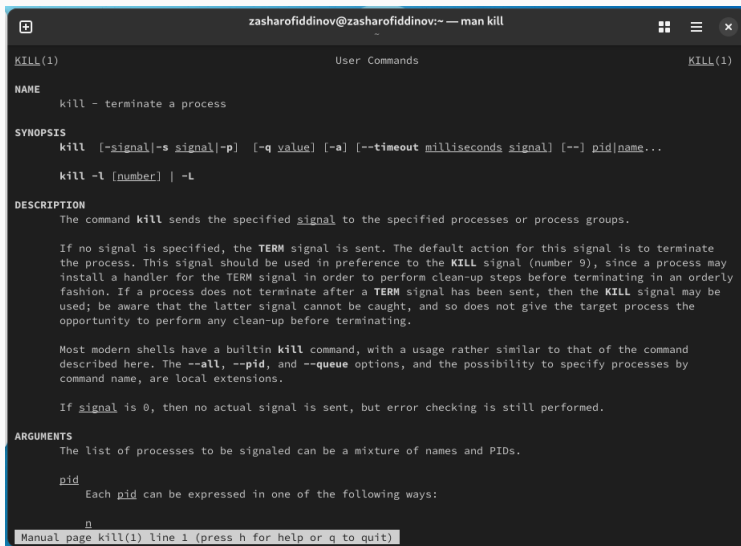
    In actuality, mkfs is simply a front-end for the various filesystem builders (mkfs.fstype) available under Linux. The filesystem-specific builder is searched for via your PATH environment setting only. Please see the filesystem-specific builder manual pages for further details.

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
        Produce verbose output, including all filesystem-specific commands that are executed. Specifying this option more than once inhibits execution of any filesystem-specific commands. This is really only useful for testing.

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



```
zasharofiddinov@zasharofiddinov:~ — 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:

    n

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.