

# Операционные системы

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

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18 сентября 2025

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## Цели и задачи работы

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

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```
[rodvish@vbox ~]$ cd
[rodvish@vbox ~]$ touch abc1
[rodvish@vbox ~]$ cp abc1 april
[rodvish@vbox ~]$ cp abc1 may
[rodvish@vbox ~]$ mkdir monthly
[rodvish@vbox ~]$ cp abc1 april
[rodvish@vbox ~]$ cp abc1 may
[rodvish@vbox ~]$ cp april may monthly
[rodvish@vbox ~]$ ls monthly
ls: невозможно получить доступ к 'monthly': Нет такого файла или каталога
[rodvish@vbox ~]$ ls monthly
april may
[rodvish@vbox ~]$ cp monthly/may monthly/june
[rodvish@vbox ~]$ ls monthly
april june may
[rodvish@vbox ~]$ mkdir monthly.00
[rodvish@vbox ~]$ cp -r monthly monthly.00
[rodvish@vbox ~]$ cp -r monthly.00 /tmp
[rodvish@vbox ~]$
```

Рис. 1:Выполнение примеров

```
[rodvish@vbox ~]$ mv april july
[rodvish@vbox ~]$ mv july monthly.00
[rodvish@vbox ~]$ ls monthly.00
july  monthly
[rodvish@vbox ~]$ mv monthly.00 monthly.01
[rodvish@vbox ~]$ mkdir reports
[rodvish@vbox ~]$ mv monthly.01 reports
[rodvish@vbox ~]$ mv reports/monthly.01 reports/monthly
[rodvish@vbox ~]$
```

Рис. 2:Выполнение примеров

```
[rodvish@vbox ~]$ touch may
[rodvish@vbox ~]$ ls -l may
-rw-r--r--. 1 rodvish rodvish 0 сен 17 11:46 may
[rodvish@vbox ~]$ chmod u+x may
[rodvish@vbox ~]$ ls -l may
-rwxr--r--. 1 rodvish rodvish 0 сен 17 11:46 may
[rodvish@vbox ~]$ chmod u-x may
[rodvish@vbox ~]$ ls -l may
-rw-r--r--. 1 rodvish rodvish 0 сен 17 11:46 may
[rodvish@vbox ~]$ mkdir monthly
mkdir: невозможно создать каталог «monthly»: Файл существует
[rodvish@vbox ~]$ chmod g-r, o-r monthly
chmod: неверный режим: «g-r,»
По команде «chmod --help» можно получить дополнительную информацию.
[rodvish@vbox ~]$ chmod g-r o-r monthly
chmod: невозможно получить доступ к 'o-r': Нет такого файла или каталога
chmod: невозможно получить доступ к 'monthly': Нет такого файла или каталога
[rodvish@vbox ~]$ chmod g-r o-r monthly
chmod: невозможно получить доступ к 'o-r': Нет такого файла или каталога
[rodvish@vbox ~]$ chmod 600 monthly
[rodvish@vbox ~]$ chmod g+w abcl
[rodvish@vbox ~]$
```

Рис. 3:Выполнение примеров



## Создание директорий и копирование файлов

```
[rodvish@vbox ~]$ cp /usr/include/linux/sysinfo.h .
[rodvish@vbox ~]$ ls -la sysinfo.h
-rw-r--r--. 1 rodvish rodvish 1049 сен 17 12:03 sysinfo.h
[rodvish@vbox ~]$ mv sysinfo.h equipment
[rodvish@vbox ~]$ mkdir ski.places
[rodvish@vbox ~]$ mv equipment ski.places/
[rodvish@vbox ~]$ mv ski.places/equipment ski.places/equiplist
[rodvish@vbox ~]$ touch abc1
[rodvish@vbox ~]$ cp abc1 ski.places/equiplist2
[rodvish@vbox ~]$ cd ski.places/
[rodvish@vbox ski.places]$ mkdir equipment
[rodvish@vbox ski.places]$ mv equiplist equipment/
[rodvish@vbox ski.places]$ mv equiplist2 equipment/
[rodvish@vbox ski.places]$ cd
[rodvish@vbox ~]$ mkdir newdir
[rodvish@vbox ~]$ mv newdir ski.places/
[rodvish@vbox ~]$ mv ski.places/newdir/ ski.places/plans
[rodvish@vbox ~]$
```

Рис. 4: Работа с каталогами

# Работа с командой chmod

```
[rodvish@vbox ~]$  
[rodvish@vbox ~]$ mkdir australia play  
[rodvish@vbox ~]$ touch my_os feathers  
[rodvish@vbox ~]$ chmod 744 australia/  
[rodvish@vbox ~]$ chmod 711 play/  
[rodvish@vbox ~]$ chmod 544 my_os  
[rodvish@vbox ~]$ chmod 664 feathers  
[rodvish@vbox ~]$ ls -l  
итого 4324  
-rw-r--r--. 1 rodvish rodvish 5086 сен 17 12:02 -  
-rw-rw-r--. 1 rodvish rodvish 0 сен 17 12:06 abcl  
drwxr--r--. 1 rodvish rodvish 0 сен 17 12:13 australia  
drwxr-xr-x. 1 rodvish rodvish 14 сен 17 00:11 bin  
drwxr-xr-x. 1 rodvish rodvish 200 сен 17 00:05 browserpass-linux64-3.0.8  
-rw-r--r--. 1 rodvish rodvish 2197571 фев 8 2022 browserpass-linux64-3.0.8.tar.gz  
-rw-r--r--. 1 rodvish rodvish 2197571 фев 8 2022 browserpass-linux64-3.0.8.tar.gz.1  
drwxr-xr-x. 1 rodvish rodvish 72 сен 17 11:34 Downloads  
-rw-rw-r--. 1 rodvish rodvish 0 сен 17 12:13 feathers  
drwxrwxr-x. 1 rodvish rodvish 74 сен 16 20:34 git-extended  
-rw-r--r--. 1 rodvish rodvish 18657 сен 17 00:17 LICENSE  
-rw-r--r--. 1 rodvish rodvish 0 сен 17 11:46 may  
drw-----. 1 rodvish rodvish 24 сен 17 11:39 monthly  
-r-xr--r--. 1 rodvish rodvish 0 сен 17 12:13 my_os  
drwxr-xr-x. 1 rodvish rodvish 50 сен 17 10:58 Pictures  
drwx--x--x. 1 rodvish rodvish 0 сен 17 12:13 play  
drwxr-xr-x. 1 rodvish rodvish 14 сен 17 11:44 reports  
drwxr-xr-x. 1 rodvish rodvish 28 сен 17 12:11 ski.plases  
drwxrwxr-x. 1 rodvish rodvish 10 сен 15 21:57 work  
drwxr-xr-x. 1 rodvish rodvish 0 сен 15 20:39 Видео  
drwxr-xr-x. 1 rodvish rodvish 0 сен 15 20:39 Документы  
drwxr-xr-x. 1 rodvish rodvish 688 сен 16 20:54 Загрузки  
drwxr-xr-x. 1 rodvish rodvish 50 сен 15 22:31 Изображения  
drwxr-xr-x. 1 rodvish rodvish 0 сен 15 20:39 Музыка  
drwxr-xr-x. 1 rodvish rodvish 0 сен 15 20:39 Общедоступные  
drwxr-xr-x. 1 rodvish rodvish 0 сен 15 20:39 'Рабочий стол'  
drwxr-xr-x. 1 rodvish rodvish 0 сен 15 20:39 Шаблоны  
[rodvish@vbox ~]$
```

```
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/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:/sbin/nologin
operator:x:11:0:operator:/root:/sbin/nologin
games:x:12:100:games:/usr/games:/sbin/nologin
ftp:x:14:50:FTP User:/var/ftp:/sbin/nologin
nobody:x:65534:65534:Kernel Overflow User:/:/sbin/nologin
dbus:x:81:81:System message bus:/:/sbin/nologin
apache:x:48:48:Apache:/usr/share/httpd:/sbin/nologin
tss:x:59:59:Account used for TPM access:/dev/null:/sbin/nologin
systemd-network:x:192:192:systemd Network Management:/:/usr/sbin/nologin
systemd-oom:x:999:999:systemd Userspace OOM Killer:/:/usr/sbin/nologin
systemd-resolve:x:193:193:systemd Resolver:/:/usr/sbin/nologin
qemu:x:107:107:qemu user:/:/sbin/nologin
polkitd:x:998:997:User for polkitd:/:/sbin/nologin
avahi:x:70:70:Avahi mDNS/DNS-SD Stack:/var/run/avahi-daemon:/sbin/nologin
unbound:x:997:995:Unbound DNS resolver:/etc/unbound:/sbin/nologin
nm-openconnect:x:996:994:NetworkManager user for OpenConnect:/:/sbin/nologin
geoclue:x:995:993:User for geoclue:/var/lib/geoclue:/sbin/nologin
usbmuxd:x:113:113:usbmuxd user:/:/sbin/nologin
gluster:x:994:992:GlusterFS daemons:/run/gluster:/sbin/nologin
rtkit:x:172:172:RealtimeKit:/proc:/sbin/nologin
chrony:x:993:990:/:/var/lib/chrony:/sbin/nologin
saslauthd:x:992:76:Saslauthd user:/run/saslauthd:/sbin/nologin
/etc/passwd
```

## Работа с файлами и правами доступа

```
[rodvish@vbox ~]$ less /etc/passwd

[2]+  Остановлен      less /etc/passwd
[rodvish@vbox ~]$ cp feathers file.old
[rodvish@vbox ~]$ mv file.old play/
[rodvish@vbox ~]$ mkdir fun
[rodvish@vbox ~]$ cp -R play/ fun/
[rodvish@vbox ~]$ mv fun/ play/games
[rodvish@vbox ~]$ chmod u-r feathers
[rodvish@vbox ~]$ cat feathers
cat: feathers: Отказано в доступе
[rodvish@vbox ~]$ cp feathers feathers2
cp: невозможно открыть 'feathers' для чтения: Отказано в доступе
[rodvish@vbox ~]$ chmod u+r feathers
[rodvish@vbox ~]$ chmod u-x play/
[rodvish@vbox ~]$ cd play/
bash: cd: play/: Отказано в доступе
[rodvish@vbox ~]$ chmod +x play/
[rodvish@vbox ~]$
```

Рис. 7: Работа с файлами и правами доступа

```
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:

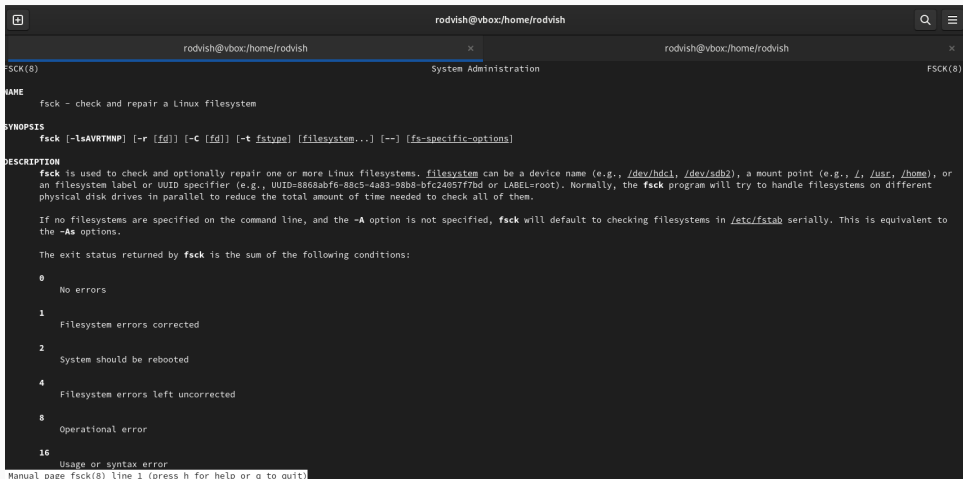
        mount -t type device dir

    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 permissions are necessary to mount a filesystem by default. See section "Non-superuser mounts" below for more details. The previous contents (if any) and owner and mode of dir become invisible, and as long as this filesystem remains mounted, the pathname dir refers to the root of the filesystem on device.

    If only the directory or the device is given, for example:

        mount /dir

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



```
rodvish@vbox:/home/rodvish
rodvish@vbox:/home/rodvish
FCK(8) System Administration FCK(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 an 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

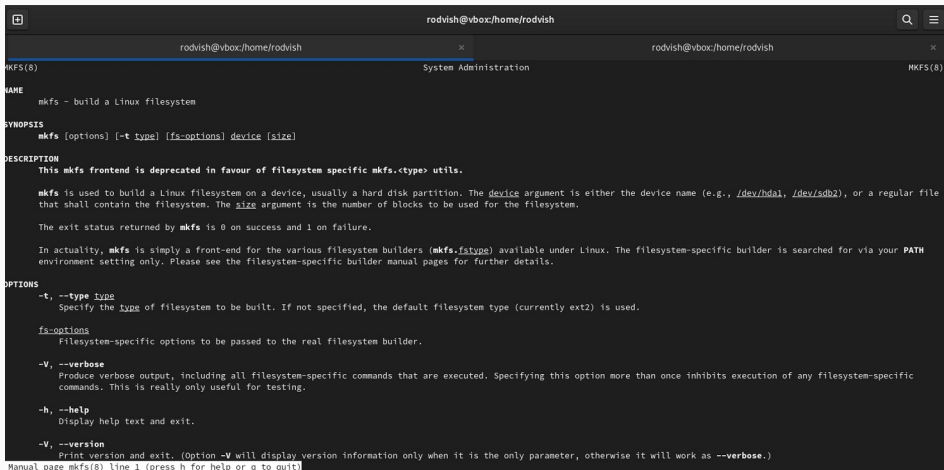
    2
        System should be rebooted

    4
        Filesystem errors left uncorrected

    8
        Operational error

    16
        Usage or syntax error

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



```
rodvish@vbox:/home/rodvish
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.

  -h, --help
    Display help text and exit.

  -v, --version
    Print version and exit. (Option -V will display version information only when it is the only parameter, otherwise it will work as --verbose.)

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

```
rsvishnyakov@rsvishnyakov:~ — 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.

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



## Выводы по проделанной работе

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В ходе данной работы мы ознакомились с файловой системой Linux 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.