

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

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Цели и задачи работы

Цель лабораторной работы

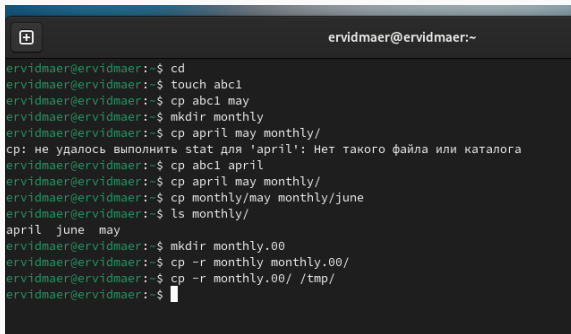
Ознакомление с файловой системой Linux, её структурой, именами и содержанием каталогов. Приобретение практических навыков по применению команд для работы с файлами и каталогами, по управлению процессами, по проверке использования диска и обслуживанию файловой системы.

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



```
eravidmaer@eravidmaer:~  
eravidmaer@eravidmaer:~$ cd  
eravidmaer@eravidmaer:~$ touch abcl  
eravidmaer@eravidmaer:~$ cp abcl may  
eravidmaer@eravidmaer:~$ mkdir monthly  
eravidmaer@eravidmaer:~$ cp april may monthly/  
cp: не удалось выполнить stat для 'april': Нет такого файла или каталога  
eravidmaer@eravidmaer:~$ cp abcl april  
eravidmaer@eravidmaer:~$ cp april may monthly/  
eravidmaer@eravidmaer:~$ cp monthly/may monthly/june  
eravidmaer@eravidmaer:~$ ls monthly/  
april  june  may  
eravidmaer@eravidmaer:~$ mkdir monthly.00  
eravidmaer@eravidmaer:~$ cp -r monthly monthly.00/  
eravidmaer@eravidmaer:~$ cp -r monthly.00/ /tmp/  
eravidmaer@eravidmaer:~$
```

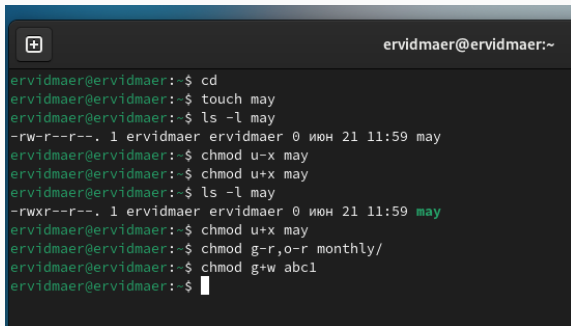
Рис. 1: Выполнение примеров

Выполнение примеров

```
ervidmaer@ervidmaer:~$  
ervidmaer@ervidmaer:~$  
ervidmaer@ervidmaer:~$ cd  
ervidmaer@ervidmaer:~$ mv april july  
ervidmaer@ervidmaer:~$ mv july monthly.00/  
ervidmaer@ervidmaer:~$ ls monthly.00/  
july  monthly  
ervidmaer@ervidmaer:~$ mv monthly.01 reports  
mv: не удалось выполнить stat для 'monthly.01': Нет такого файла или каталога  
ervidmaer@ervidmaer:~$ mv monthly.00/ monthly.01  
ervidmaer@ervidmaer:~$ mv monthly.01 reports  
ervidmaer@ervidmaer:~$ mv reports/monthly/  
april  june  may  
ervidmaer@ervidmaer:~$ mv reports/  
july    monthly/  
ervidmaer@ervidmaer:~$ mv reports/
```

Рис. 2: Выполнение примеров

Выполнение примеров



```
eravidmaer@eravidmaer:~  
eravidmaer@eravidmaer:~$ cd  
eravidmaer@eravidmaer:~$ touch may  
eravidmaer@eravidmaer:~$ ls -l may  
-rw-r--r--. 1 eravidmaer eravidmaer 0 июн 21 11:59 may  
eravidmaer@eravidmaer:~$ chmod u-x may  
eravidmaer@eravidmaer:~$ chmod u+x may  
eravidmaer@eravidmaer:~$ ls -l may  
-rwxr--r--. 1 eravidmaer eravidmaer 0 июн 21 11:59 may  
eravidmaer@eravidmaer:~$ chmod u+x may  
eravidmaer@eravidmaer:~$ chmod g-r,o-r monthly/  
eravidmaer@eravidmaer:~$ chmod g+w abc1  
eravidmaer@eravidmaer:~$
```

Рис. 3: Выполнение примеров

Создание директорий и копирование файлов

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

Рис. 4: Работа с каталогами

Работа с командой chmod

```
ervidmaer@ervidmaer:~$  
ervidmaer@ervidmaer:~$ mkdir australian play  
ervidmaer@ervidmaer:~$ touch my_os feathers  
ervidmaer@ervidmaer:~$ chmod 744 australian/ chmod 711 play/  
chmod: невозможно получить доступ к 'chmod': Нет такого файла или каталога  
chmod: невозможно получить доступ к '711': Нет такого файла или каталога  
ervidmaer@ervidmaer:~$ chmod 744 australian/  
ervidmaer@ervidmaer:~$ chmod 711 play/  
ervidmaer@ervidmaer:~$ chmod 544 my_os  
ervidmaer@ervidmaer:~$ chmod 664 feathers  
ervidmaer@ervidmaer:~$ ls -l  
итого 0  
-rw-rw-r--. 1 ervidmaer ervidmaer 0 июн 21 12:03 abc1  
drwxr--r--. 1 ervidmaer ervidmaer 0 июн 21 12:06 australian  
-rw-rw-r--. 1 ervidmaer ervidmaer 0 июн 21 12:06 feathers  
drwxr-xr-x. 1 ervidmaer ervidmaer 74 июн 21 10:21 git-extended  
-rwxr--r--. 1 ervidmaer ervidmaer 0 июн 21 11:59 may  
drwx--x--x. 1 ervidmaer ervidmaer 24 июн 21 11:49 monthly  
-r-xr--r--. 1 ervidmaer ervidmaer 0 июн 21 12:06 my_os  
drwx--x--x. 1 ervidmaer ervidmaer 0 июн 21 12:06 play  
drwxr-xr-x. 1 ervidmaer ervidmaer 22 июн 21 11:56 reports  
drwxr-xr-x. 1 ervidmaer ervidmaer 28 июн 21 12:04 ski.places  
drwxr-xr-x. 1 ervidmaer ervidmaer 10 июн 21 09:23 work  
drwxr-xr-x. 1 ervidmaer ervidmaer 0 июн 21 08:59 Видео  
drwxr-xr-x. 1 ervidmaer ervidmaer 0 июн 21 08:59 Документы  
drwxr-xr-x. 1 ervidmaer ervidmaer 0 июн 21 08:59 Загрузки  
drwxr-xr-x. 1 ervidmaer ervidmaer 0 июн 21 08:59 Изображения  
drwxr-xr-x. 1 ervidmaer ervidmaer 0 июн 21 08:59 Музыка  
drwxr-xr-x. 1 ervidmaer ervidmaer 0 июн 21 08:59 Общедоступные  
drwxr-xr-x. 1 ervidmaer ervidmaer 0 июн 21 08:59 'Рабочий стол'  
drwxr-xr-x. 1 ervidmaer ervidmaer 0 июн 21 08:59 Шаблоны  
ervidmaer@ervidmaer:~$
```

Рис. 5: Настройка прав доступа

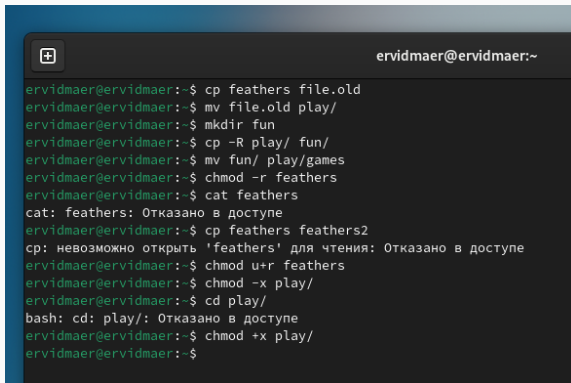
Файл /etc/passwd

```
ervidmaer@ervidmaer:~ — less /etc/passwd

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:/usr/sbin/nologin
geoclue:x:995:994>User for geoclue:/var/lib/geoclue:/usr/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:/usr/sbin/nologin
rtkit:x:172:172:RealtimeKit:/proc:/usr/sbin/nologin
```

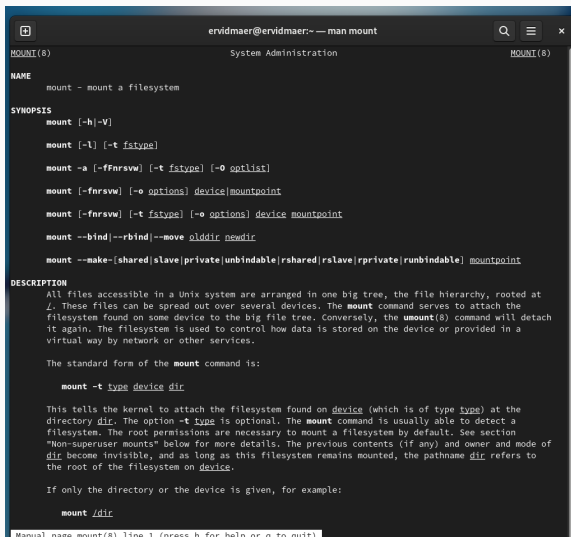
Рис. 6: Файл /etc/passwd

Работа с файлами и правами доступа



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

Рис. 7: Работа с файлами и правами доступа



```
ervidmaer@ervidmaer:~ — 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

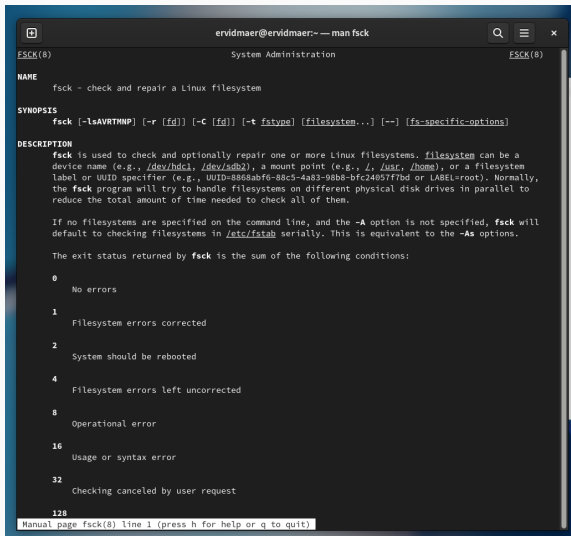
    This tells the kernel to attach the filesystem found on device (which is of type type) at the directory dir. The option -t type is optional. The mount command is usually able to detect a filesystem. The root permissions are necessary to mount a filesystem by default. See section "Non-superuser mounts" 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)

Рис. 8: Команда mount



```
ervidmaer@ervidmaer:~ -- 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      Operational error

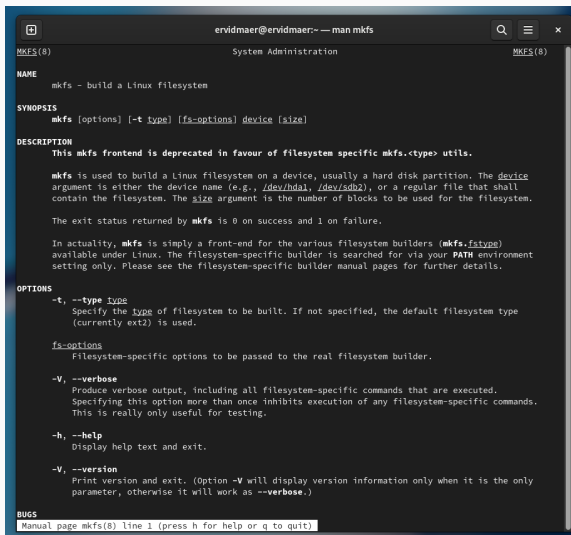
    16     Usage or syntax error

    32     Checking canceled by user request

    128

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

Рис. 9: Команда fsck



```
ervidmaer@ervidmaer:~ -- 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.

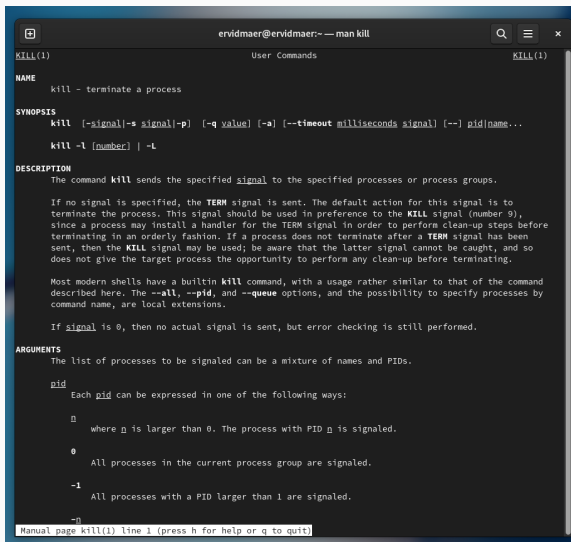
    -V, --verbose
        Produce verbose output, including all filesystem-specific commands that are executed.
        Specifying this option more than once inhibits execution of any filesystem-specific commands.
        This is really only useful for testing.

    -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.)

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

Рис. 10: Команда mkfs



```
ervidmaer@ervidmaer:~ — 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
            where n is larger than 0. The process with PID n is signaled.

        0
            All processes in the current process group are signaled.

        -1
            All processes with a PID larger than 1 are signaled.

        -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.