

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

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Цели и задачи работы

Цель лабораторной работы

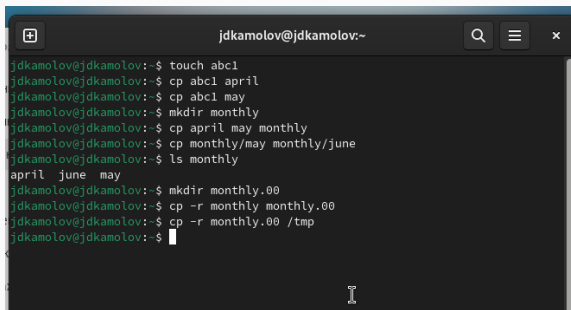
Ознакомление с файловой системой Linux, её структурой, именами и содержанием каталогов. Приобретение практических навыков по применению команд для работы с файлами и каталогами, по управлению процессами, по проверке использования диска и обслуживанию файловой системы.

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



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

Рис. 1: Выполнение примеров

Выполнение примеров

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

Рис. 2: Выполнение примеров

Выполнение примеров

```
jdkamolov@jdkamolov:~$  
jdkamolov@jdkamolov:~$ touch may  
jdkamolov@jdkamolov:~$ ls -l may  
-rw-r--r--. 1 jdkamolov jdkamolov 0 апр 10 16:01 may  
jdkamolov@jdkamolov:~$ chmod u+x may  
jdkamolov@jdkamolov:~$ ls -l may  
-rwxr--r--. 1 jdkamolov jdkamolov 0 апр 10 16:01 may  
jdkamolov@jdkamolov:~$ chmod u-x may  
jdkamolov@jdkamolov:~$ ls -l may  
-rw-r--r--. 1 jdkamolov jdkamolov 0 апр 10 16:01 may  
jdkamolov@jdkamolov:~$ chmod g-r,o-r monthly  
jdkamolov@jdkamolov:~$ chmod g+w abcl  
jdkamolov@jdkamolov:~$
```

Рис. 3: Выполнение примеров

Создание директорий и копирование файлов

```
jdkamolv@jdkamolv:~$  
jdkamolv@jdkamolv:~$ cp /usr/include/linux/sysinfo.h ~  
jdkamolv@jdkamolv:~$ mv sysinfo.h equipment  
jdkamolv@jdkamolv:~$ mkdir ski.places  
jdkamolv@jdkamolv:~$ mv equipment ski.places/  
jdkamolv@jdkamolv:~$ mv ski.places/equipment ski.places/equiplist  
jdkamolv@jdkamolv:~$ touch abc1  
jdkamolv@jdkamolv:~$ cp abc1 ski.places/equiplist2  
jdkamolv@jdkamolv:~$ cd ski.places/  
jdkamolv@jdkamolv:~/ski.places$ mkdir equipment  
jdkamolv@jdkamolv:~/ski.places$ mv equiplist equipment/  
jdkamolv@jdkamolv:~/ski.places$ mv equiplist2 equipment/  
jdkamolv@jdkamolv:~/ski.places$ mkdir newdir  
jdkamolv@jdkamolv:~/ski.places$ mv newdir ski.places/  
jdkamolv@jdkamolv:~/ski.places$ mv ski.places/newdir/ ski.places/plans  
mv: не удалось выполнить stat для 'ski.places/newdir/': Нет такого файла или каталога  
jdkamolv@jdkamolv:~/ski.places$
```

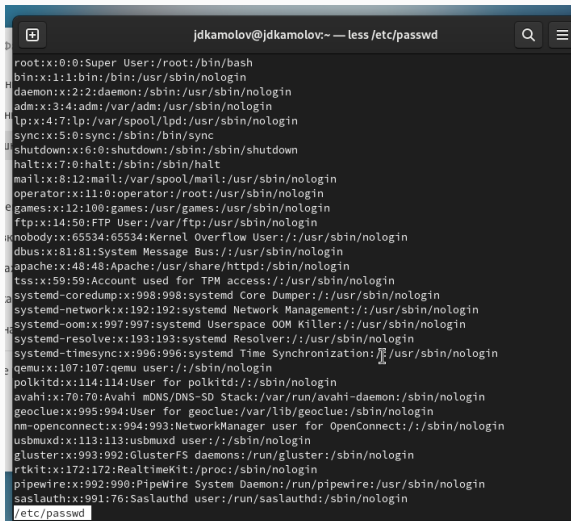
Рис. 4: Работа с каталогами

Работа с командой chmod

```
jdkamolv@jdkamolv:~/ski.places$ cd
jdkamolv@jdkamolv:~$ chmod 744 australia/
chmod: невозможно получить доступ к 'australia/': Нет такого файла или каталога
jdkamolv@jdkamolv:~$ mkdir my_os play
jdkamolv@jdkamolv:~$ touch my_os feathers
jdkamolv@jdkamolv:~$ chmod 744 australia/
jdkamolv@jdkamolv:~$ chmod 711 play/
jdkamolv@jdkamolv:~$ chmod 544 my_os
jdkamolv@jdkamolv:~$ chmod 664 feathers
jdkamolv@jdkamolv:~$ ls -l
итого 0
-rw-rw-r--. 1 jdkamolv jdkamolv 0 апр 10 16:02 abc1
drwxr--r--. 1 jdkamolv jdkamolv 0 апр 10 16:03 australia
-rw-rw-r--. 1 jdkamolv jdkamolv 0 апр 10 16:03 feathers
-rw-r--r--. 1 jdkamolv jdkamolv 0 апр 10 16:01 may
drwx--x--x. 1 jdkamolv jdkamolv 24 апр 10 16:00 monthly
-r-xr--r--. 1 jdkamolv jdkamolv 0 апр 10 16:03 my_os
drwx--x--x. 1 jdkamolv jdkamolv 0 апр 10 16:03 play
drwxr-xr-x. 1 jdkamolv jdkamolv 14 апр 10 16:01 reports
drwxr-xr-x. 1 jdkamolv jdkamolv 38 апр 10 16:02 ski.places
drwxr-xr-x. 1 jdkamolv jdkamolv 10 мар 24 10:12 work
drwxr-xr-x. 1 jdkamolv jdkamolv 0 мар 24 10:04 Видео
drwxr-xr-x. 1 jdkamolv jdkamolv 0 мар 24 10:04 Документы
drwxr-xr-x. 1 jdkamolv jdkamolv 0 мар 24 10:04 Загрузки
drwxr-xr-x. 1 jdkamolv jdkamolv 0 мар 24 10:04 Изображения
drwxr-xr-x. 1 jdkamolv jdkamolv 0 мар 24 10:04 Музыка
drwxr-xr-x. 1 jdkamolv jdkamolv 0 мар 24 10:04 Общедоступные
drwxr-xr-x. 1 jdkamolv jdkamolv 0 мар 24 10:04 'Рабочий стол'
drwxr-xr-x. 1 jdkamolv jdkamolv 0 мар 24 10:04 Шаблоны
jdkamolv@jdkamolv:~$
```

Рис. 5: Настройка прав доступа

Файл /etc/passwd



```
jdkamolov@jdkamolov:~ — 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:/sbin/nologin
polkitd:x:114:114:User for polkitd:/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:/sbin/nologin
usbmuxd:x:113:113:usbmuxd user:/sbin/nologin
gluster:x:993:992:GlusterFS daemons:/run/gluster:/sbin/nologin
rtkit:x:172:172:RealtimeKit:/proc:/sbin/nologin
pipewire:x:992:990:PipeWire System Daemon:/run/pipewire:/usr/sbin/nologin
saslauth:x:991:76:Saslauthd user:/run/saslauthd:/sbin/nologin
/etc/passwd
```

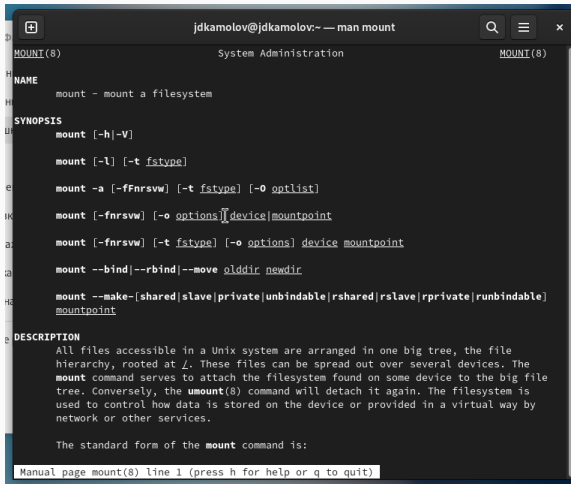
Рис. 6: Файл /etc/passwd

Работа с файлами и правами доступа

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

Рис. 7: Работа с файлами и правами доступа

Справка по командам



The screenshot shows a terminal window with the title bar "jdkamolov@jdkamolov:~ — man mount". The window displays the manual page for the `mount` command. The page is titled "MOUNT(8) System Administration MOUNT(8)". It includes sections for NAME, SYNOPSIS, and DESCRIPTION. The SYNOPSIS section lists various options and their syntax. The DESCRIPTION section explains the purpose of the `mount` command and its relationship to the file hierarchy. At the bottom, a status bar indicates "Manual page mount(8) line 1 (press h for help or q to quit)".

```
jdkamolov@jdkamolov:~ — 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

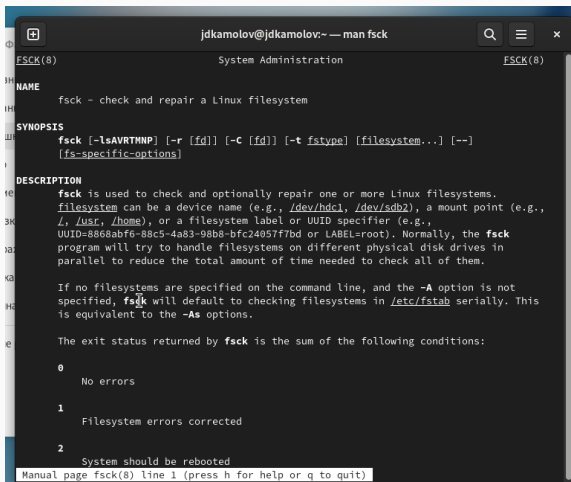
    mount --make-[shared|slave|private|unbindable|rshared|rslave|rprivate|runbindable]
    mountpoint

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:

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

Рис. 8: Команда mount



```
jdkamolov@jdkamolov:~ — 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:

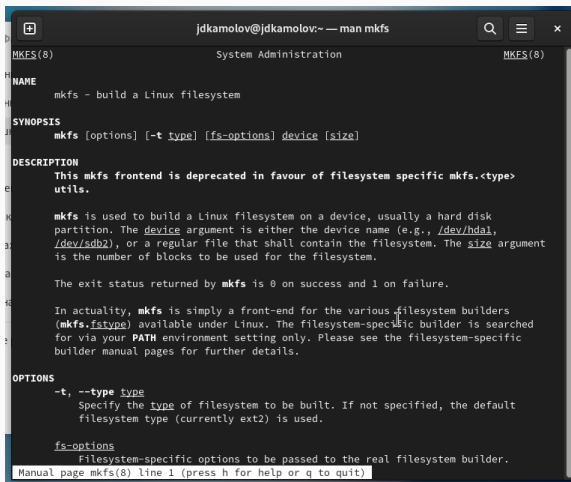
    0
        No errors

    1
        Filesystem errors corrected

    2
        System should be rebooted

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

Рис. 9: Команда fsck



```
jdkamolov@jdkamolov:~$ 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.

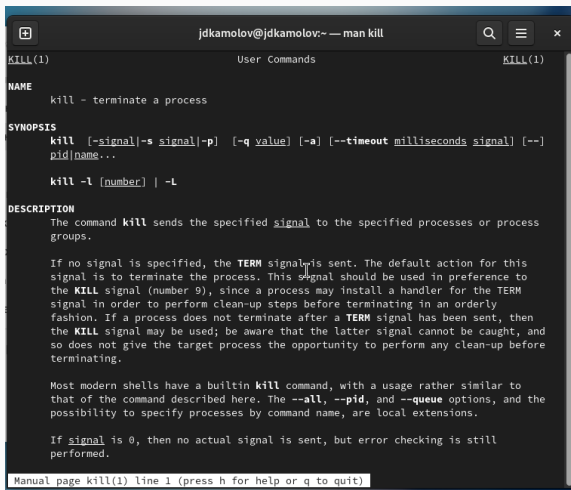
    In actuality, mkfs is simply a front-end for the various filesystem builders
    (mkfs.<fstype>) available under Linux. The filesystem-specific builder is
    searched for via your PATH environment setting only. Please see the
    filesystem-specific builder manual pages for further details.

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.

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

Рис. 10: Команда mkfs



```
jdkamolov@jdkamolov:~ — 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)
```

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.