

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

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Цели и задачи работы

Цель лабораторной работы

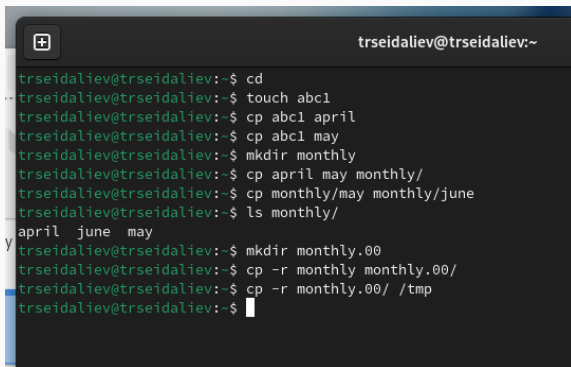
Ознакомление с файловой системой Linux, её структурой, именами и содержанием каталогов. Приобретение практических навыков по применению команд для работы с файлами и каталогами, по управлению процессами, по проверке использования диска и обслуживанию файловой системы.

Задачи лабораторной работы

- 1 Выполнить примеры
- 2 Выполнить действия 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



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

Рис. 1: Выполнение примеров

Выполнение примеров

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

Рис. 2: Выполнение примеров

Выполнение примеров

```
trseidaliev@trseidaliev:~$  
ЖЖ trseidaliev@trseidaliev:~$ touch may  
trseidaliev@trseidaliev:~$ ls -l may  
-rw-r--r--. 1 trseidaliev trseidaliev 0 сен  2 09:22 may  
trseidaliev@trseidaliev:~$ chmod +x may  
trseidaliev@trseidaliev:~$ ls -l may  
-rwxr-xr-x. 1 trseidaliev trseidaliev 0 сен  2 09:22 may  
trseidaliev@trseidaliev:~$ chmod -x may  
trseidaliev@trseidaliev:~$ ls -l may  
-rw-r--r--. 1 trseidaliev trseidaliev 0 сен  2 09:22 may  
trseidaliev@trseidaliev:~$ chmod g-r,o-r monthly/  
trseidaliev@trseidaliev:~$ chmod g+w abc1  
trseidaliev@trseidaliev:~$
```

Рис. 3: Выполнение примеров

Создание директорий и копирование файлов

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

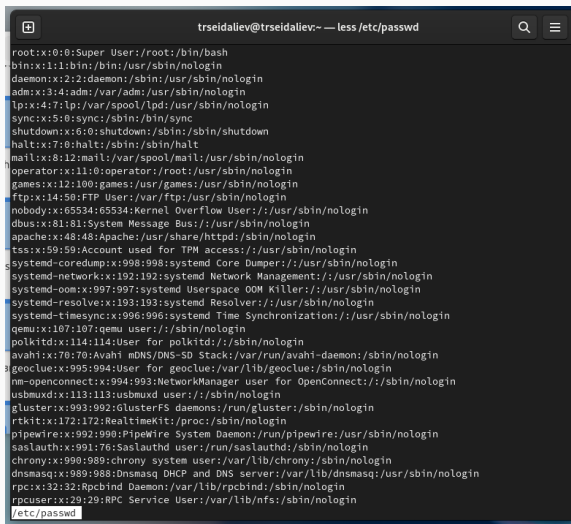
Рис. 4: Работа с каталогами

Работа с командой chmod

```
trseidaliev@trseidaliev:~$  
trseidaliev@trseidaliev:~$ mkdir australia play  
trseidaliev@trseidaliev:~$ touch my_os feathers  
trseidaliev@trseidaliev:~$ chmod 744 australia/  
trseidaliev@trseidaliev:~$ chmod 711 play/  
trseidaliev@trseidaliev:~$ chmod 544 my_os  
trseidaliev@trseidaliev:~$ chmod 664 feathers  
trseidaliev@trseidaliev:~$ ls -l  
итого 0  
-rw-rw-r--. 1 trseidaliev trseidaliev 0 сен 2 09:24 abc1  
drwxr--r--. 1 trseidaliev trseidaliev 0 сен 2 09:26 australia  
-rw-rw-r--. 1 trseidaliev trseidaliev 0 сен 2 09:26 feathers  
drwxr-xr-x. 1 trseidaliev trseidaliev 74 сен 1 20:07 git-extended  
drwxr-xr-x. 1 trseidaliev trseidaliev 0 сен 1 20:27 letters  
-rw-r--r--. 1 trseidaliev trseidaliev 0 сен 2 09:22 may  
drwxr-xr-x. 1 trseidaliev trseidaliev 0 сен 1 20:27 memos  
drwxr-xr-x. 1 trseidaliev trseidaliev 0 сен 1 20:27 misk  
drwx--x--x. 1 trseidaliev trseidaliev 24 сен 2 09:17 monthly  
-r-xr--r--. 1 trseidaliev trseidaliev 0 сен 2 09:26 my_os  
drwx--x--x. 1 trseidaliev trseidaliev 0 сен 2 09:26 play  
drwxr-xr-x. 1 trseidaliev trseidaliev 14 сен 2 09:21 reports  
drwxr-xr-x. 1 trseidaliev trseidaliev 28 сен 2 09:25 ski.places  
drwxr-xr-x. 1 trseidaliev trseidaliev 10 сен 1 19:37 work  
drwxr-xr-x. 1 trseidaliev trseidaliev 0 сен 1 19:27 Видео  
drwxr-xr-x. 1 trseidaliev trseidaliev 0 сен 1 19:27 Документы  
drwxr-xr-x. 1 trseidaliev trseidaliev 0 сен 1 19:27 Загрузки  
drwxr-xr-x. 1 trseidaliev trseidaliev 0 сен 1 19:27 Изображения  
drwxr-xr-x. 1 trseidaliev trseidaliev 0 сен 1 19:27 Музыка  
drwxr-xr-x. 1 trseidaliev trseidaliev 0 сен 1 19:27 Общедоступные  
drwxr-xr-x. 1 trseidaliev trseidaliev 0 сен 1 19:27 'Рабочий стол'  
drwxr-xr-x. 1 trseidaliev trseidaliev 0 сен 1 19:27 Шаблоны  
trseidaliev@trseidaliev:~$
```

Рис. 5: Настройка прав доступа


Файл /etc/passwd



```
trseidaliev@trseidaliev:~ — 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
sasauth:x:991:76:Sasauthd user:/run/sasauthd:/sbin/nologin
chrony:x:990:989:chrony system user:/var/lib/chrony:/sbin/nologin
dnsmasq:x:989:988:Dnsmasq DHCP and DNS server:/var/lib/dnsmasq:/usr/sbin/nologin
rpc:x:32:32:Rpcbind Daemon:/var/lib/rpcbind:/sbin/nologin
rpcuser:x:29:29:RPC Service User:/var/lib/nfs:/sbin/nologin
/etc/passwd
```

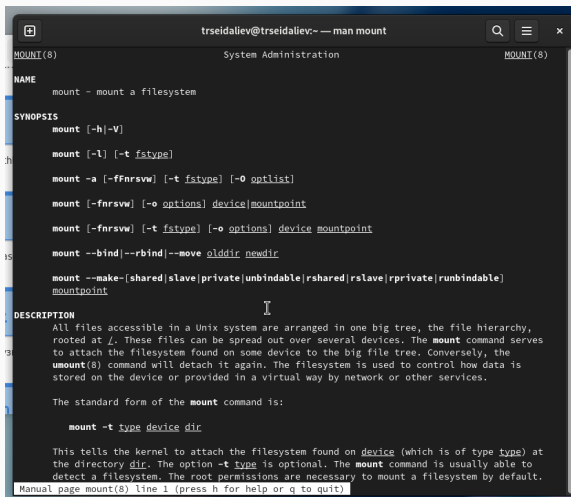
Рис. 6: Файл /etc/passwd

Работа с файлами и правами доступа

A terminal window with a dark background and light blue text. The prompt is 'trseidaliev@trseidaliev:~\$'. The user enters several commands: 'cp feathers file.old', 'mv file.old play/', 'mkdir fun', 'cp -R play/ fun/', 'mv fun/ play/games', 'chmod u-r feathers', and 'cp feathers feathers2'. After the last command, a message appears: 'cp: невозможно открыть 'feathers' для чтения: Отказано в доступе'. The user then enters 'cat feathers', which results in 'cat: feathers: Отказано в доступе'. Next, the user enters 'chmod u+r feathers', followed by 'chmod u-x play/'. Then 'cd play/' is entered, resulting in 'bash: cd: play/: Отказано в доступе'. Finally, 'chmod u+x play/' is entered. The prompt returns to 'trseidaliev@trseidaliev:~\$'.

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

Рис. 7: Работа с файлами и правами доступа



```
trseidaliev@trseidaliev:~ -- 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.

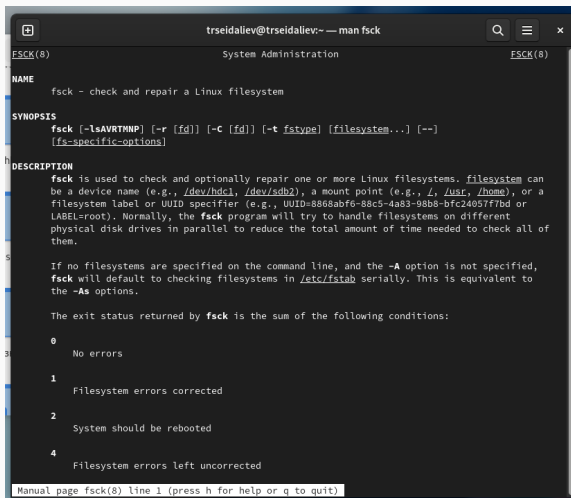
    The standard form of the mount command is:

        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.

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

Рис. 8: Команда mount



```
trseidaliev@trseidaliev:~ — 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

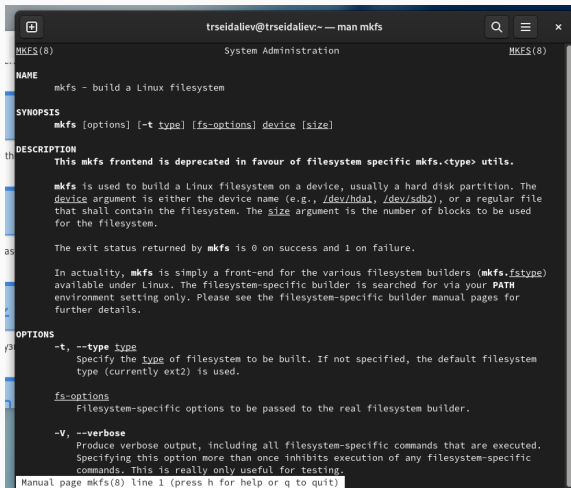
    1      Filesystem errors corrected

    2      System should be rebooted

    4      Filesystem errors left uncorrected

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

Рис. 9: Команда fsck



```
trseidaliev@trseidaliev:~ -- 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/hdal, /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.

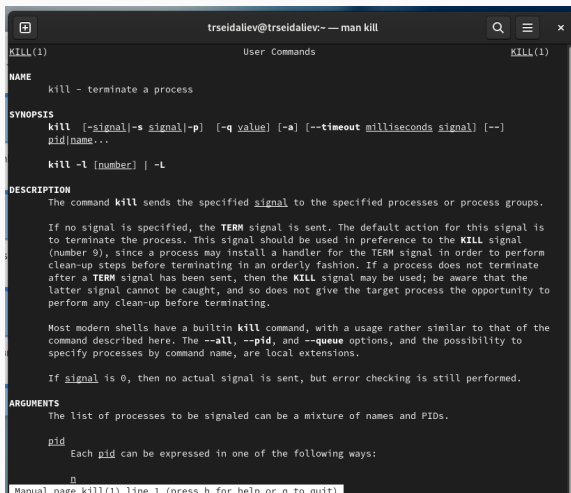
    fs-options
        Filesystem-specific options to be passed to the real filesystem builder.

    -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)
```

Рис. 10: Команда mkfs

Справка по командам



```
trseidaliev@trseidaliev:~ — 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.