

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

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Цели и задачи работы

Цель лабораторной работы

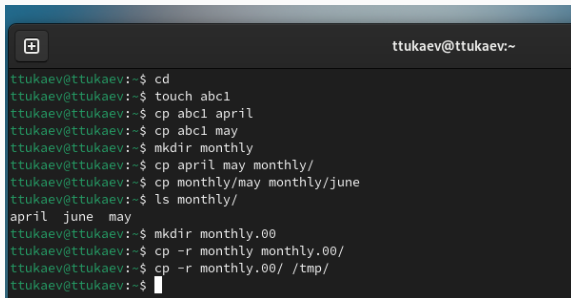
Ознакомление с файловой системой Linux, её структурой, именами и содержанием каталогов. Приобретение практических навыков по применению команд для работы с файлами и каталогами, по управлению процессами, по проверке использования диска и обслуживанию файловой системы.

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



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

Рис. 1: Выполнение примеров

Выполнение примеров

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

Рис. 2: Выполнение примеров

Выполнение примеров

```
ttukaev@ttukaev:~$  
ttukaev@ttukaev:~$ cd  
ttukaev@ttukaev:~$ touch may  
ttukaev@ttukaev:~$ ls -l may  
-rw-r--r--. 1 ttukaev ttukaev 0 мар 12 16:24 may  
ttukaev@ttukaev:~$ chmod u+x may  
ttukaev@ttukaev:~$ ls -l may  
-rwxr--r--. 1 ttukaev ttukaev 0 мар 12 16:24 may  
ttukaev@ttukaev:~$ chmod u-x may  
ttukaev@ttukaev:~$ ls -l  
итого 0  
-rw-r--r--. 1 ttukaev ttukaev 0 мар 12 16:21 abc1  
drwxr-xr-x. 1 ttukaev ttukaev 74 мар 1 14:25 git-extended  
-rw-r--r--. 1 ttukaev ttukaev 0 мар 12 16:24 may  
drwxr-xr-x. 1 ttukaev ttukaev 24 мар 12 16:22 monthly  
drwxr-xr-x. 1 ttukaev ttukaev 14 мар 12 16:24 reports  
drwxr-xr-x. 1 ttukaev ttukaev 10 фев 9 17:34 work  
drwxr-xr-x. 1 ttukaev ttukaev 0 фев 9 14:43 Видео  
drwxr-xr-x. 1 ttukaev ttukaev 0 фев 9 14:43 Документы  
drwxr-xr-x. 1 ttukaev ttukaev 0 фев 9 14:43 Загрузки  
drwxr-xr-x. 1 ttukaev ttukaev 0 фев 9 14:43 Изображения  
drwxr-xr-x. 1 ttukaev ttukaev 0 фев 9 14:43 Музыка  
drwxr-xr-x. 1 ttukaev ttukaev 0 фев 9 14:43 Общедоступные  
drwxr-xr-x. 1 ttukaev ttukaev 0 фев 9 14:43 'Рабочий стол'  
drwxr-xr-x. 1 ttukaev ttukaev 0 фев 9 14:43 Шаблоны  
ttukaev@ttukaev:~$ cd  
ttukaev@ttukaev:~$ chmod g-r,o-r monthly/  
ttukaev@ttukaev:~$ touch abc1  
ttukaev@ttukaev:~$ chmod g+w abc1  
ttukaev@ttukaev:~$
```

Рис. 3: Выполнение примеров

Создание директорий и копирование файлов

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

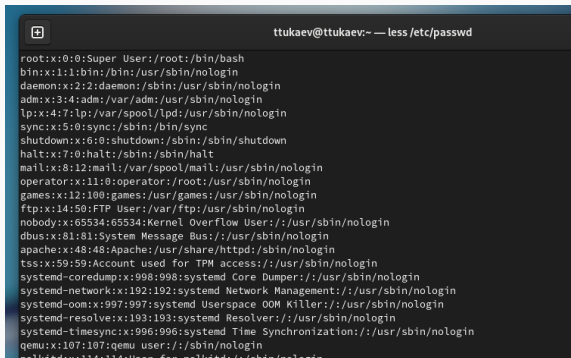
Рис. 4: Работа с каталогами

Работа с командой chmod

```
ttukaev@ttukaev:~$  
ttukaev@ttukaev:~$ mkdir australia  
ttukaev@ttukaev:~$ mkdir play  
ttukaev@ttukaev:~$ touch my_os fethers  
ttukaev@ttukaev:~$ chmod 744 australia/  
ttukaev@ttukaev:~$ chmod 711 play/  
ttukaev@ttukaev:~$ chmod 544 my_os  
ttukaev@ttukaev:~$ chmod 664 fethers  
ttukaev@ttukaev:~$ ls -l  
итого 0  
-rw-rw-r--. 1 ttukaev ttukaev 0 мар 12 16:26 abc1  
drwxr--r--. 1 ttukaev ttukaev 0 мар 12 16:27 australia  
-rw-rw-r--. 1 ttukaev ttukaev 0 мар 12 16:28 fethers  
drwxr-xr-x. 1 ttukaev ttukaev 74 мар 1 14:25 git-extended  
-rw-r--r--. 1 ttukaev ttukaev 0 мар 12 16:24 may  
drwx--x--x. 1 ttukaev ttukaev 24 мар 12 16:22 monthly  
-r-xr--r--. 1 ttukaev ttukaev 0 мар 12 16:28 my_os  
drwx--x--x. 1 ttukaev ttukaev 0 мар 12 16:28 play  
drwxr-xr-x. 1 ttukaev ttukaev 14 мар 12 16:24 reports  
drwxr-xr-x. 1 ttukaev ttukaev 28 мар 12 16:27 ski.plases  
drwxr-xr-x. 1 ttukaev ttukaev 10 фев 9 17:34 work  
drwxr-xr-x. 1 ttukaev ttukaev 0 фев 9 14:43 Видео  
drwxr-xr-x. 1 ttukaev ttukaev 0 фев 9 14:43 Документы  
drwxr-xr-x. 1 ttukaev ttukaev 0 фев 9 14:43 Загрузки  
drwxr-xr-x. 1 ttukaev ttukaev 0 фев 9 14:43 Изображения  
drwxr-xr-x. 1 ttukaev ttukaev 0 фев 9 14:43 Музыка  
drwxr-xr-x. 1 ttukaev ttukaev 0 фев 9 14:43 Общедоступные  
drwxr-xr-x. 1 ttukaev ttukaev 0 фев 9 14:43 'Рабочий стол'  
drwxr-xr-x. 1 ttukaev ttukaev 0 фев 9 14:43 Шаблоны  
ttukaev@ttukaev:~$
```

Рис. 5: Настройка прав доступа

Файл /etc/passwd



The screenshot shows a terminal window with the title bar "ttukaev@ttukaev:~ — less /etc/passwd". The terminal displays the contents of the /etc/passwd file, which lists system and regular users. Each line represents a user entry in the format: username:x:UID:GID:gecos:home_directory:shell. The users listed include root, bin, daemon, adm, lp, sync, shutdown, halt, mail, operator, games, ftp, nobody, dbus, apache, tss, systemd-coredump, systemd-network, systemd-oom, systemd-resolve, systemd-timesync, qemu, and polkitd.

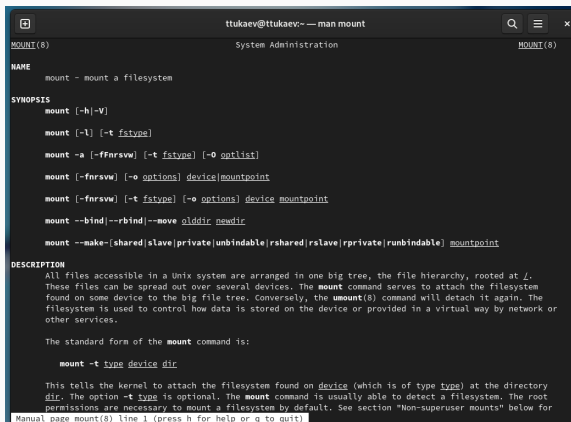
```
root:x:0:0:Super User:/root:/bin/bash
bin:x:1:1:bin:/bin:/usr/sbin/nologin
daemon:x:2:2:daemon:/sbin:/usr/sbin/nologin
adm:x:3:4:adm:/var/adm:/usr/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/usr/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
halt:x:7:0:halt:/sbin:/sbin/halt
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:/usr/sbin/nologin
```

Рис. 6: Файл /etc/passwd

Работа с файлами и правами доступа

```
ttukaev@ttukaev:~$  
ttukaev@ttukaev:~$ cp fethers file.old  
ttukaev@ttukaev:~$ mv file.old play  
ttukaev@ttukaev:~$ mkdir fun  
ttukaev@ttukaev:~$ cp -R play/ fun  
ttukaev@ttukaev:~$ mv fun play/games  
ttukaev@ttukaev:~$ chmod u-r fethers  
ttukaev@ttukaev:~$ cat fethers  
cat: fethers: Отказано в доступе  
ttukaev@ttukaev:~$ cp fethers fethers2  
cp: невозможно открыть 'fethers' для чтения: Отказано в доступе  
ttukaev@ttukaev:~$ chmod u+r fethers  
ttukaev@ttukaev:~$ chmod u-x play/  
ttukaev@ttukaev:~$ cd play/  
bash: cd: play/: Отказано в доступе  
ttukaev@ttukaev:~$ chmod u+x play/  
ttukaev@ttukaev:~$
```

Рис. 7: Работа с файлами и правами доступа



```
ttukaev@ttukaev:~ — 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

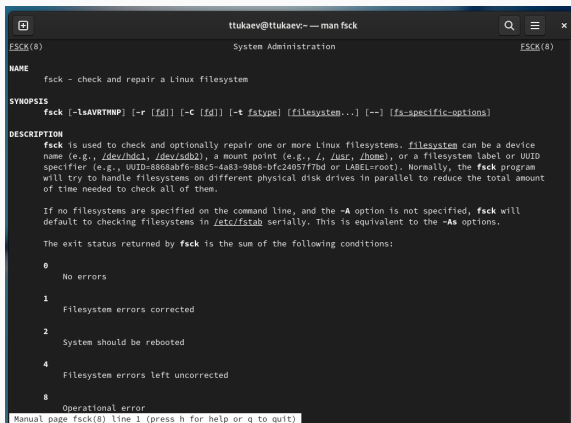
DESCRIPTION
    All files accessible in a Unix system are arranged in one big tree, the file hierarchy, rooted at /.
    These files can be spread out over several devices. The mount command serves to attach the filesystem
    found on some device to the big file tree. Conversely, the umount(8) command 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
    Manual page mount(8) line 1 (press h for help or q to quit)
```

Рис. 8: Команда mount



```
ttukaev@ttukaev:~ -- man fsck
FSCK(8)                               System Administration          FSCK(8)

NAME
    fsck - check and repair a Linux filesystem

SYNOPSIS
    fsck [-lsAVRTNMP] [-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

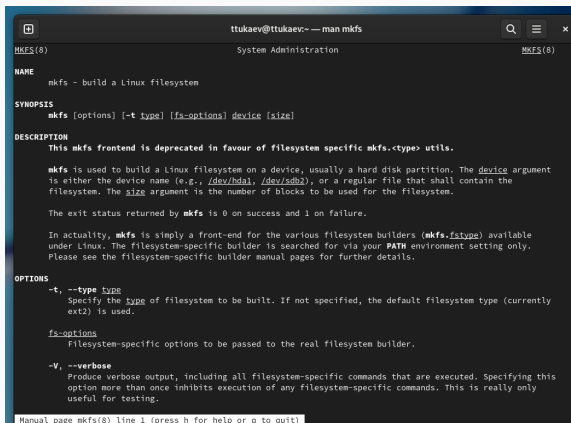
    2      System should be rebooted

    4      Filesystem errors left uncorrected

    8      Operational error

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

Рис. 9: Команда fsck



```
ttukaev@ttukaev:~ -- 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.

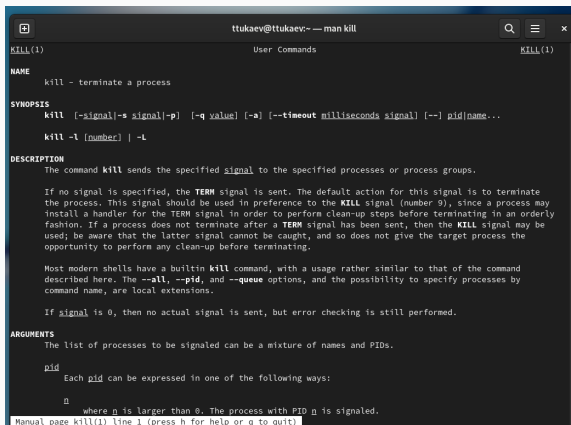
OPTIONS
    -t, --type type
        Specify the type of filesystem to be built. If not specified, the default filesystem type (currently
        ext2) is used.

    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)
```

Рис. 10: Команда mkfs



```
ttukaev@ttukaev:~ -- 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.

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.