

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

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Цели и задачи работы

Цель лабораторной работы

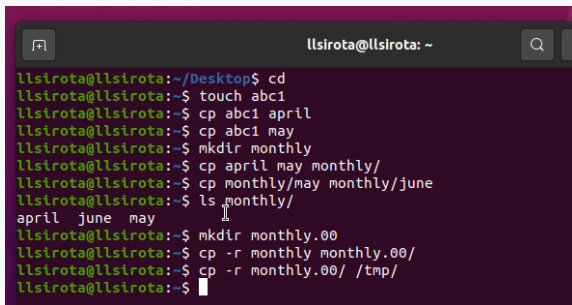
Ознакомление с файловой системой Linux, её структурой, именами и содержанием каталогов. Приобретение практических навыков по применению команд для работы с файлами и каталогами, по управлению процессами, по проверке использования диска и обслуживанию файловой системы.

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



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

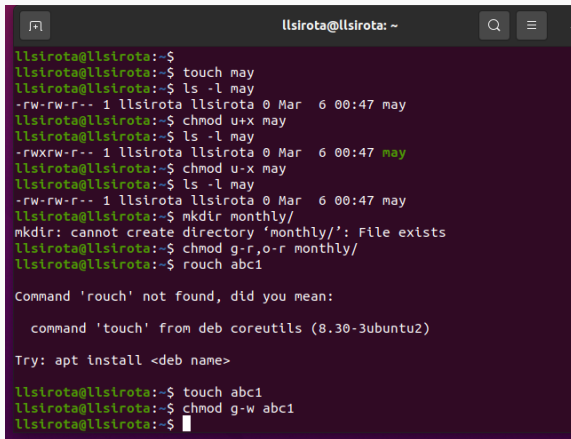
Рис. 1: Выполнение примеров

Выполнение примеров

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

Рис. 2: Выполнение примеров

Выполнение примеров



```
llsirota@llsirota:~$  
llsirota@llsirota:~$ touch may  
llsirota@llsirota:~$ ls -l may  
-rw-rw-r-- 1 llsirote llsirote 0 Mar  6 00:47 may  
llsirota@llsirota:~$ chmod u+x may  
llsirota@llsirota:~$ ls -l may  
-rwxrw-r-- 1 llsirote llsirote 0 Mar  6 00:47 may  
llsirota@llsirota:~$ chmod u-x may  
llsirota@llsirota:~$ ls -l may  
-rw-rw-r-- 1 llsirote llsirote 0 Mar  6 00:47 may  
llsirota@llsirota:~$ mkdir monthly/  
mkdir: cannot create directory 'monthly/': File exists  
llsirota@llsirota:~$ chmod g-r,o-r monthly/  
llsirota@llsirota:~$ ouch abc1  
  
Command 'ouch' not found, did you mean:  
  
  command 'touch' from deb coreutils (8.30-3ubuntu2)  
  
Try: apt install <deb name>  
  
llsirota@llsirota:~$ touch abc1  
llsirota@llsirota:~$ chmod g-w abc1  
llsirota@llsirota:~$
```

Рис. 3: Выполнение примеров

Создание директорий и копирование файлов

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

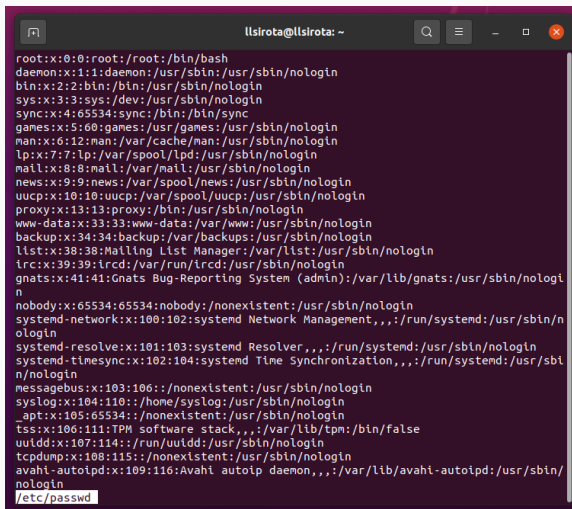
Рис. 4: Работа с каталогами

Работа с командой chmod

```
llsirota@llsirota:~$  
llsirota@llsirota:~$ mkdir australia play  
llsirota@llsirota:~$ touch my_os feathers  
llsirota@llsirota:~$ chmod 744 australia/  
llsirota@llsirota:~$ chmod 711 play/  
llsirota@llsirota:~$ chmod 544 my_os  
llsirota@llsirota:~$ chmod 664 feathers  
llsirota@llsirota:~$ ls -l  
total 60  
-rw-r--r-- 1 llsirote llsirote 0 Mar 6 00:50 abc1  
drwxr--r-- 2 llsirote llsirote 4096 Mar 6 00:54 australia  
drwxr-xr-x 2 llsirote llsirote 4096 Feb 10 02:30 Desktop  
drwxr-xr-x 2 llsirote llsirote 4096 Feb 10 02:30 Documents  
drwxr-xr-x 2 llsirote llsirote 4096 Feb 27 03:24 Downloads  
-rw-rw-r-- 1 llsirote llsirote 0 Mar 6 00:54 feathers  
-rw-rw-r-- 1 llsirote llsirote 0 Mar 6 00:47 may  
drwx-wx--x 2 llsirote llsirote 4096 Mar 6 00:43 monthly  
drwxr-xr-x 2 llsirote llsirote 4096 Feb 10 02:30 Music  
-r-xr--r-- 1 llsirote llsirote 0 Mar 6 00:54 my_os  
drwxr-xr-x 2 llsirote llsirote 4096 Feb 10 02:30 Pictures  
drwx--x--x 2 llsirote llsirote 4096 Mar 6 00:54 play  
drwxr-xr-x 2 llsirote llsirote 4096 Feb 10 02:30 Public  
drwxrwxr-x 3 llsirote llsirote 4096 Mar 6 00:45 reports  
drwxrwxr-x 4 llsirote llsirote 4096 Mar 6 00:51 ski.places  
drwxr-xr-x 2 llsirote llsirote 4096 Feb 10 02:30 Templates  
drwxr-xr-x 2 llsirote llsirote 4096 Feb 10 02:30 Videos  
drwxrwxr-x 3 llsirote llsirote 4096 Feb 10 02:51 work  
drwxrwxr-x 2 llsirote llsirote 4096 Feb 27 03:37 work2  
llsirota@llsirota:~$
```

Рис. 5: Настройка прав доступа

Файл /etc/passwd

A terminal window with a dark purple background and white text. The window title is 'l1s1rota@l1s1rota: ~'. The terminal displays the contents of the /etc/passwd file, showing system users and regular users. The text is as follows:

```
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailng List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:100:102:systemd Network Management,,,:/run/systemd:/usr/sbin/nologin
systemd-resolve:x:101:103:systemd Resolver,,,:/run/systemd:/usr/sbin/nologin
systemd-timesync:x:102:104:systemd Time Synchronization,,,:/run/systemd:/usr/sbin/nologin
messagebus:x:103:106:,:/nonexistent:/usr/sbin/nologin
syslog:x:104:110::/home/syslog:/usr/sbin/nologin
_apt:x:105:65534:,:/nonexistent:/usr/sbin/nologin
tss:x:106:111:TPM software stack,,,:/var/lib/tpm:/bin/false
uuidd:x:107:114:,:/run/uuidd:/usr/sbin/nologin
tcpdump:x:108:115:,:/nonexistent:/usr/sbin/nologin
avahi-autoipd:x:109:116:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/usr/sbin/nologin
```

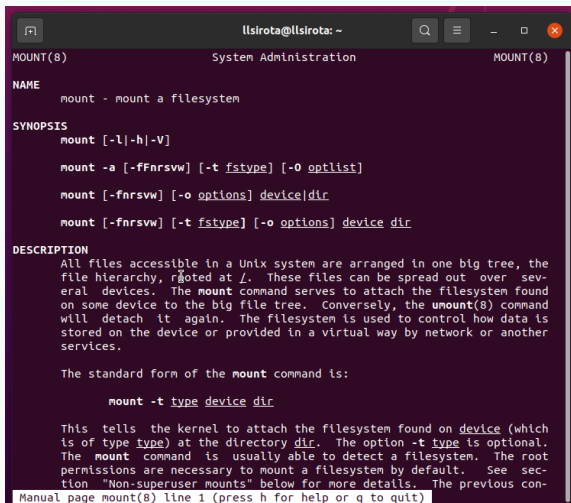
The file path `/etc/passwd` is highlighted in a light blue box at the bottom left of the terminal window.

Рис. 6: Файл /etc/passwd

Работа с файлами и правами доступа

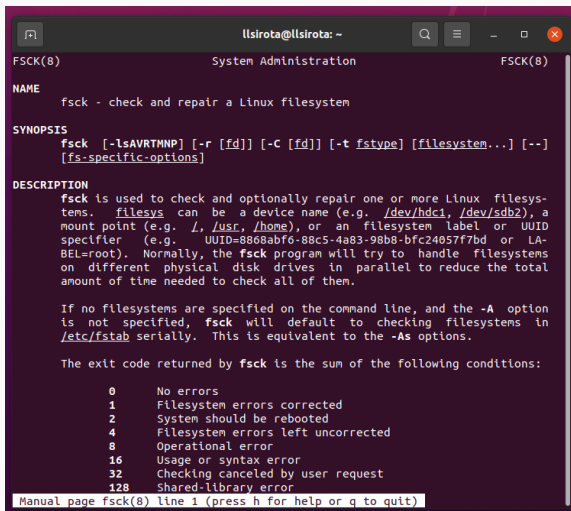
```
llsirota@llsirota:~$  
llsirota@llsirota:~$ cp feathers file.old  
llsirota@llsirota:~$ mv file.old play/  
llsirota@llsirota:~$ mkdir fun  
llsirota@llsirota:~$ cp -R play/ fun/  
llsirota@llsirota:~$ mv fun/ play/games  
llsirota@llsirota:~$ chmod u-r feathers  
llsirota@llsirota:~$ cat feathers  
cat: feathers: Permission denied  
llsirota@llsirota:~$ cp feathers feathers2  
cp: cannot open 'feathers' for reading: Permission denied  
llsirota@llsirota:~$ chmod u+r feathers  
llsirota@llsirota:~$ chmod u-x play/  
llsirota@llsirota:~$ cd play/  
bash: cd: play/: Permission denied  
llsirota@llsirota:~$ chmod u+x play/  
llsirota@llsirota:~$
```

Рис. 7: Работа с файлами и правами доступа



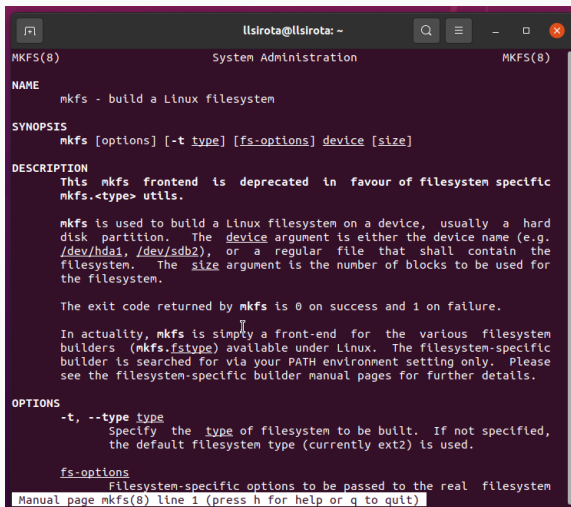
```
llsirota@llsirota: ~  
MOUNT(8) System Administration MOUNT(8)  
  
NAME  
    mount - mount a filesystem  
  
SYNOPSIS  
    mount [-l|-h|-V]  
  
    mount -a [-fFnrsvw] [-t fstype] [-O optlist]  
  
    mount [-fnrsvw] [-o options] device|dir  
  
    mount [-fnrsvw] [-t fstype] [-o options] device dir  
  
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 sev-  
    eral 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 another  
    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 sec-  
    tion "Non-superuser mounts" below for more details. The previous con-  
    Manual page mount(8) line 1 (press h for help or q to quit)
```

Рис. 8: Команда mount



```
lsirota@lsirota: ~  
FSCK(8) System Administration FSCK(8)  
  
NAME  
    fsck - check and repair a Linux filesystem  
  
SYNOPSIS  
    fsck [-lsvrtnmp] [-r [fd]] [-C [fd]] [-t fstype] [filesystem...] [--]  
    [fs-specific-options]  
  
DESCRIPTION  
    fsck is used to check and optionally repair one or more Linux filesys-  
    tems. 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 LA-  
    BEL=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 code 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    Shared-library error  
  
Manual page fsck(8) line 1 (press h for help or q to quit)
```

Рис. 9: Команда fsck



```
l1sirota@l1sirota: ~
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 code 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

```
KILL(1)                                User Commands                                KILL(1)

NAME
    kill - send a signal to a process

SYNOPSIS
    kill [options] <pid> [...]

DESCRIPTION
    The default signal for kill is TERM. Use -l or -L to list available
    signals. Particularly useful signals include HUP, INT, KILL, STOP,
    CONT, and 0. Alternate signals may be specified in three ways: -9,
    -SIGKILL or -KILL. Negative PID values may be used to choose whole
    process groups; see the PGID column in ps command output. A PID of -1
    is special; it indicates all processes except the kill process itself
    and init.

OPTIONS
    <pid> [...]
        Send signal to every <pid> listed.

    -<signal>
    -s <signal>
    --signal <signal>
        Specify the signal to be sent. The signal can be specified by
        using name or number. The behavior of signals is explained in
        signal(7) manual page.

    -l, --list [signal]
        List signal names. This option has optional argument, which
        will convert signal number to signal name, or other way round.

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.