

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

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Цели и задачи работы

Цель лабораторной работы

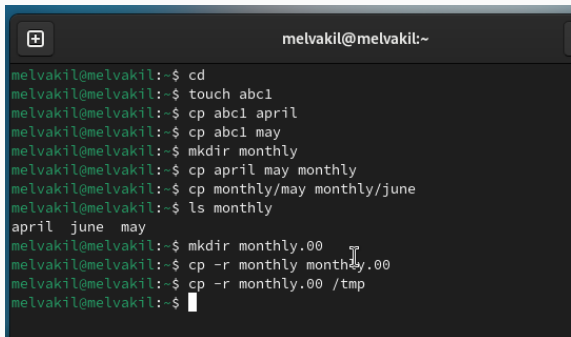
Ознакомление с файловой системой Linux, её структурой, именами и содержанием каталогов. Приобретение практических навыков по применению команд для работы с файлами и каталогами, по управлению процессами, по проверке использования диска и обслуживанию файловой системы.

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



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

Рис. 1: Выполнение примеров

Выполнение примеров

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

Рис. 2: Выполнение примеров

Выполнение примеров

```
melvakil@melvakil:~$ cd
melvakil@melvakil:~$ touch may
melvakil@melvakil:~$ ls -l may
-rw-r--r--. 1 melvakil melvakil 0 map 12 14:27 may
melvakil@melvakil:~$ chmod u+x may
melvakil@melvakil:~$ ls -l may
-rwxr--r--. 1 melvakil melvakil 0 map 12 14:27 may
melvakil@melvakil:~$ chmod u-x may
melvakil@melvakil:~$ ls -l may
-rw-r--r--. 1 melvakil melvakil 0 map 12 14:27 may
melvakil@melvakil:~$ cd
melvakil@melvakil:~$ mkdir monthly
mkdir: невозможно создать каталог «monthly»: Файл существует
melvakil@melvakil:~$ chmod g-r,o-r monthly
melvakil@melvakil:~$ cd
melvakil@melvakil:~$ touch abc1
melvakil@melvakil:~$ chmod g+w abc1
melvakil@melvakil:~$
```

Рис. 3: Выполнение примеров

Создание директорий и копирование файлов

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

Рис. 4: Работа с каталогами

Работа с командой chmod

```
melvakil@melvakil:~$  
melvakil@melvakil:~$ mkdir australia play  
melvakil@melvakil:~$ touch my_os feathers  
melvakil@melvakil:~$ chmod 744 australia/  
melvakil@melvakil:~$ chmod 711 play/  
melvakil@melvakil:~$ chmod 544 my_os  
melvakil@melvakil:~$ chmod 664 feathers  
melvakil@melvakil:~$ ls -l  
итого 0  
-rw-rw-r--. 1 melvakil melvakil 0 map 12 14:32 abc1  
drwxr--r--. 1 melvakil melvakil 0 map 12 14:33 australia  
-rw-rw-r--. 1 melvakil melvakil 0 map 12 14:33 feathers  
-rw-r--r--. 1 melvakil melvakil 0 map 12 14:27 may  
drwx--x--x. 1 melvakil melvakil 24 map 12 14:26 monthly  
-r-xr--r--. 1 melvakil melvakil 0 map 12 14:33 my_os  
drwx--x--x. 1 melvakil melvakil 0 map 12 14:33 play  
drwxr-xr-x. 1 melvakil melvakil 14 map 12 14:27 reports  
drwxr-xr-x. 1 melvakil melvakil 28 map 12 14:33 ski.places  
drwxr-xr-x. 1 melvakil melvakil 10 фев 20 17:34 work  
drwxr-xr-x. 1 melvakil melvakil 0 фев 20 17:27 Видео  
drwxr-xr-x. 1 melvakil melvakil 0 фев 20 17:27 Документы  
drwxr-xr-x. 1 melvakil melvakil 34 мар 7 09:56 Загрузки  
drwxr-xr-x. 1 melvakil melvakil 0 фев 20 17:27 Изображения  
drwxr-xr-x. 1 melvakil melvakil 0 фев 20 17:27 Музыка  
drwxr-xr-x. 1 melvakil melvakil 0 фев 20 17:27 Общедоступные  
drwxr-xr-x. 1 melvakil melvakil 0 фев 20 17:27 'Рабочий стол'  
drwxr-xr-x. 1 melvakil melvakil 0 фев 20 17:27 Шаблоны  
melvakil@melvakil:~$
```

Рис. 5: Настройка прав доступа

Файл /etc/passwd

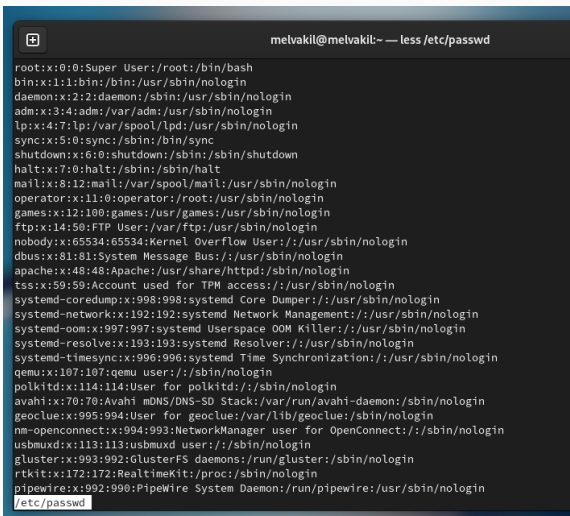
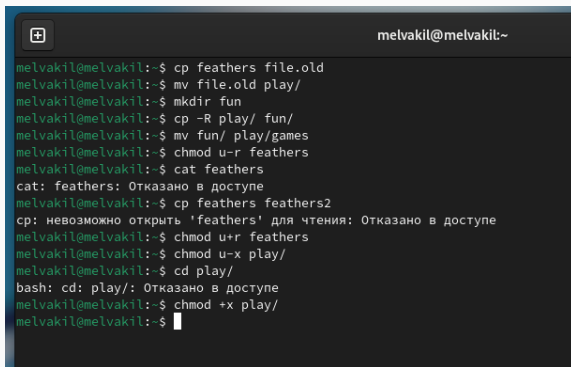
A terminal window with a dark background and light blue text. The title bar at the top reads "melvakil@melvakil:~ — less /etc/passwd". The terminal displays the contents of the /etc/passwd file, showing system users and regular users. The entries are: root:x:0:0:Super User:/root:/bin/bash; bin:x:1:1:bin:/bin:/usr/sbin/nologin; 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. The last line is the filename /etc/passwd.

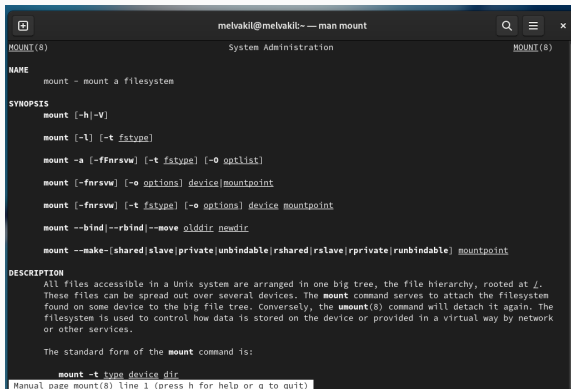
Рис. 6: Файл /etc/passwd

Работа с файлами и правами доступа



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

Рис. 7: Работа с файлами и правами доступа



```
melvikil@melvikil:~ — 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

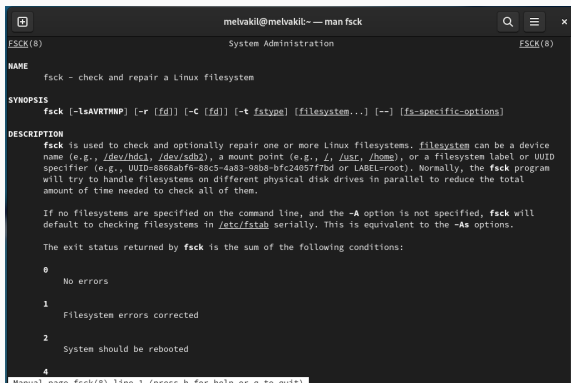
DESCRIPTION
    All files accessible in a Unix system are arranged in one big tree, the file hierarchy, rooted at /.
    These files can be spread out over several devices. The mount command serves to attach the filesystem
    found on some device to the big file tree. Conversely, the umount(8) command 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

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

Рис. 8: Команда mount



```
melvakil@melvakil:~ — 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

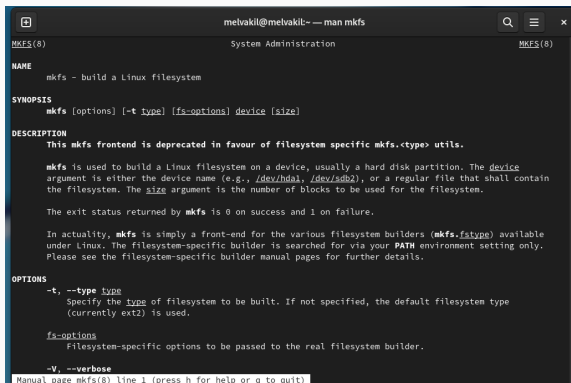
    1
        Filesystem errors corrected

    2
        System should be rebooted

    4

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

Рис. 9: Команда fsck



```
melvakil@melvakil:~ -- 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.

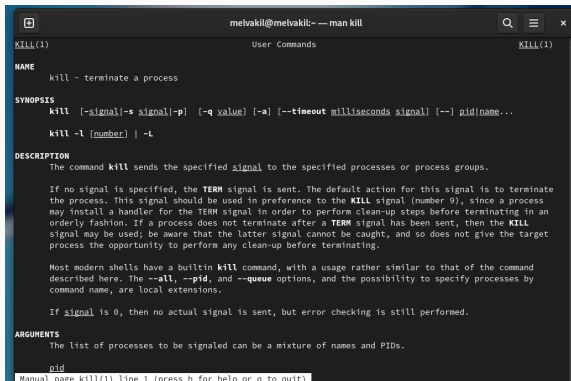
OPTIONS
  -t, --type type
    Specify the type of filesystem to be built. If not specified, the default filesystem type (currently ext2) is used.

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

  -v, --verbose

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

Рис. 10: Команда mkfs



```
metvakil@metvakil:~$ 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] [-- pidname...
    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
    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.