

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

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Цели и задачи работы

Цель лабораторной работы

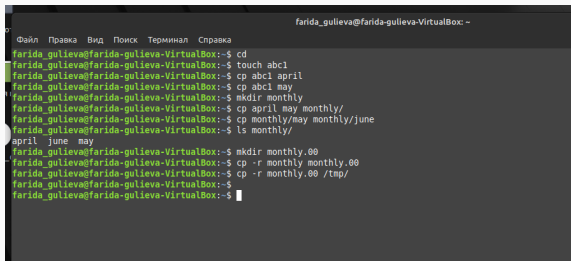
Ознакомление с файловой системой Linux, её структурой, именами и содержанием каталогов. Приобретение практических навыков по применению команд для работы с файлами и каталогами, по управлению процессами, по проверке использования диска и обслуживанию файловой системы.

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



```
farida_gulieva@farida-gulieva-VirtualBox: ~  
Файл Правка Вид Поиск Терминал Справка  
farida_gulieva@farida-gulieva-VirtualBox:~$ cd  
farida_gulieva@farida-gulieva-VirtualBox:~$ touch abcl  
farida_gulieva@farida-gulieva-VirtualBox:~$ cp abcl april  
farida_gulieva@farida-gulieva-VirtualBox:~$ cp abcl may  
farida_gulieva@farida-gulieva-VirtualBox:~$ mkdir monthly  
farida_gulieva@farida-gulieva-VirtualBox:~$ cp april may monthly/  
farida_gulieva@farida-gulieva-VirtualBox:~$ cp monthly/may monthly/june  
farida_gulieva@farida-gulieva-VirtualBox:~$ ls monthly/  
april  june  may  
farida_gulieva@farida-gulieva-VirtualBox:~$ mkdir monthly.00  
farida_gulieva@farida-gulieva-VirtualBox:~$ cp -r monthly monthly.00  
farida_gulieva@farida-gulieva-VirtualBox:~$ cp -r monthly.00 /tmp/  
farida_gulieva@farida-gulieva-VirtualBox:~$  
farida_gulieva@farida-gulieva-VirtualBox:~$
```

Figure 1: Выполнение примеров

Выполнение примеров

```
farida_gulieva@farida-gulieva-VirtualBox:~$  
farida_gulieva@farida-gulieva-VirtualBox:~$  
farida_gulieva@farida-gulieva-VirtualBox:~$ cd  
farida_gulieva@farida-gulieva-VirtualBox:~$ mv april july  
farida_gulieva@farida-gulieva-VirtualBox:~$ mv july monthly.00  
farida_gulieva@farida-gulieva-VirtualBox:~$ ls monthly.00/  
july  monthly  
farida_gulieva@farida-gulieva-VirtualBox:~$ mv monthly.00/ monthly.01  
farida_gulieva@farida-gulieva-VirtualBox:~$ mkdir reports  
farida_gulieva@farida-gulieva-VirtualBox:~$ mv monthly.01 reports/  
farida_gulieva@farida-gulieva-VirtualBox:~$ mv reports/monthly.01/ reports/monthly  
farida_gulieva@farida-gulieva-VirtualBox:~$
```

Figure 2: Выполнение примеров

Выполнение примеров

```
farida_gulieva@farida-gulieva-VirtualBox:~$  
farida_gulieva@farida-gulieva-VirtualBox:~$  
farida_gulieva@farida-gulieva-VirtualBox:~$ cd  
farida_gulieva@farida-gulieva-VirtualBox:~$ touch may  
farida_gulieva@farida-gulieva-VirtualBox:~$ ls -l may  
-rw-rw-r-- 1 farida gulieva farida gulieva 0 сен  5 15:44 may  
farida_gulieva@farida-gulieva-VirtualBox:~$ chmod u+x may  
farida_gulieva@farida-gulieva-VirtualBox:~$ ls -l may  
-rwxrwxr-- 1 farida gulieva farida gulieva 0 сен  5 15:44 may  
farida_gulieva@farida-gulieva-VirtualBox:~$ chmod u-x may  
farida_gulieva@farida-gulieva-VirtualBox:~$ cd  
farida_gulieva@farida-gulieva-VirtualBox:~$ mkdir monthly/  
mkdir: невозможно создать каталог «monthly/»: Файл существует  
farida_gulieva@farida-gulieva-VirtualBox:~$ chmod g-r,o-r monthly/  
farida_gulieva@farida-gulieva-VirtualBox:~$ cd  
farida_gulieva@farida-gulieva-VirtualBox:~$ touch abc1  
farida_gulieva@farida-gulieva-VirtualBox:~$ chmod g+2 abc1  
chmod: неверный режим: «g+2»  
По команде «chmod --help» можно получить дополнительную информацию.  
farida_gulieva@farida-gulieva-VirtualBox:~$ chmod g+w abc1  
farida_gulieva@farida-gulieva-VirtualBox:~$
```

Figure 3: Выполнение примеров

Создание директорий и копирование файлов

```
farida_gulieva@farida-gulieva-VirtualBox:~$  
farida_gulieva@farida-gulieva-VirtualBox:~$  
farida_gulieva@farida-gulieva-VirtualBox:~$  
farida_gulieva@farida-gulieva-VirtualBox:~$ cp /usr/include/linux/sysinfo.h ~  
farida_gulieva@farida-gulieva-VirtualBox:~$ mv sysinfo.h equipment  
farida_gulieva@farida-gulieva-VirtualBox:~$ mkdir ski.plases  
farida_gulieva@farida-gulieva-VirtualBox:~$ mv equipment ski.plases/  
farida_gulieva@farida-gulieva-VirtualBox:~$ mv ski.plases/equipment ski.plases/equiplist  
farida_gulieva@farida-gulieva-VirtualBox:~$ touch abc1  
farida_gulieva@farida-gulieva-VirtualBox:~$ cp abc1 ski.plases/equiplist2  
farida_gulieva@farida-gulieva-VirtualBox:~$ cd ski.plases/  
farida_gulieva@farida-gulieva-VirtualBox:~/ski.plases$ mkdir equipment  
farida_gulieva@farida-gulieva-VirtualBox:~/ski.plases$ cp equiplist equipment/  
farida_gulieva@farida-gulieva-VirtualBox:~/ski.plases$ cp equiplist1 equipment/  
cp: не удалось выполнить stat для 'equiplist1': Нет такого файла или каталога  
farida_gulieva@farida-gulieva-VirtualBox:~/ski.plases$ cp equiplist2 equipment/  
farida_gulieva@farida-gulieva-VirtualBox:~/ski.plases$ cd  
farida_gulieva@farida-gulieva-VirtualBox:~$ mkdir newdir  
farida_gulieva@farida-gulieva-VirtualBox:~$ mv newdir/ ski.plases/  
farida_gulieva@farida-gulieva-VirtualBox:~$ mv ski.plases/newdir/ ski.plases/plans  
farida_gulieva@farida-gulieva-VirtualBox:~$
```

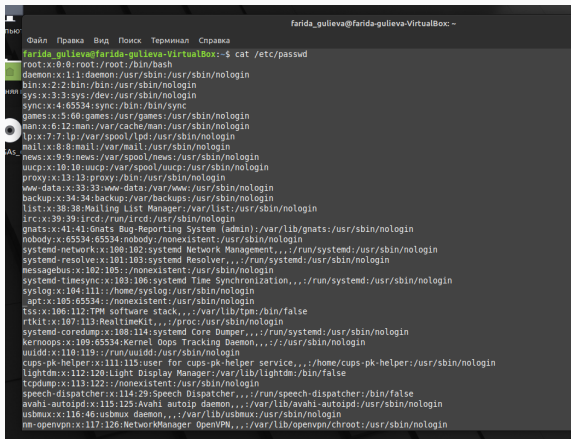
Figure 4: Работа с каталогами

Работа с командой chmod

```
farida_gulieva@farida-gulieva-VirtualBox:~$  
farida_gulieva@farida-gulieva-VirtualBox:~$  
farida_gulieva@farida-gulieva-VirtualBox:~$ mkdir australia play  
farida_gulieva@farida-gulieva-VirtualBox:~$ touch my_os feathers  
farida_gulieva@farida-gulieva-VirtualBox:~$ chmod 744 australia/  
farida_gulieva@farida-gulieva-VirtualBox:~$ chmod 711 play/  
farida_gulieva@farida-gulieva-VirtualBox:~$ chmod 544 my_os  
farida_gulieva@farida-gulieva-VirtualBox:~$ chmod 664 feathers  
farida_gulieva@farida-gulieva-VirtualBox:~$ ls -l  
итого 56  
-rw-rw-r-- 1 farida_gulieva farida_gulieva 0 сен 5 15:46 abcl  
drwxr--r-- 2 farida_gulieva farida_gulieva 4096 сен 5 15:49 australia  
-rw-rw-r-- 1 farida_gulieva farida_gulieva 0 сен 5 15:49 feathers  
-rw-rw-r-- 1 farida_gulieva farida_gulieva 0 сен 5 15:44 may  
drwx-wx-x 2 farida_gulieva farida_gulieva 4096 сен 5 15:42 monthly  
-r-xr--r-- 1 farida_gulieva farida_gulieva 0 сен 5 15:49 my_os  
drwx--x-x 2 farida_gulieva farida_gulieva 4096 сен 5 15:49 play  
drwxrwxr-x 3 farida_gulieva farida_gulieva 4096 сен 5 15:44 reports  
drwxrwxr-x 4 farida_gulieva farida_gulieva 4096 сен 5 15:48 ski.places  
drwxrwxr-x 3 farida_gulieva farida_gulieva 4096 сен 5 14:31 work  
drwxr-xr-x 2 farida_gulieva farida_gulieva 4096 сен 5 13:04 Видео  
drwxr-xr-x 2 farida_gulieva farida_gulieva 4096 сен 5 13:04 Документы  
drwxr-xr-x 2 farida_gulieva farida_gulieva 4096 сен 5 13:04 Загрузки  
drwxr-xr-x 2 farida_gulieva farida_gulieva 4096 сен 5 13:04 Изображения  
drwxr-xr-x 2 farida_gulieva farida_gulieva 4096 сен 5 13:04 Музыка  
drwxr-xr-x 2 farida_gulieva farida_gulieva 4096 сен 5 13:04 Общедоступные  
drwxr-xr-x 2 farida_gulieva farida_gulieva 4096 сен 5 13:04 'Рабочий стол'  
drwxr-xr-x 2 farida_gulieva farida_gulieva 4096 сен 5 13:04 Шаблоны  
farida_gulieva@farida-gulieva-VirtualBox:~$
```

Figure 5: Настройка прав доступа

Файл /etc/passwd



```
farida_gulieva@farida-gulieva-VirtualBox:~$ cat /etc/passwd
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:Mail List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/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
messagebus:x:102:105:/:nonexistent:/usr/sbin/nologin
systemd-timesync:x:103:106:systemd Time Synchronization,,,:/run/systemd:/usr/sbin/nologin
syslog:x:104:111:/:home/syslog:/usr/sbin/nologin
apt:x:105:65534:/:nonexistent:/usr/sbin/nologin
tss:x:106:112:TPM software stack,,,:/var/lib/tpm:/bin/false
rtkit:x:107:113:RealtimeKit,,,:/proc:/usr/sbin/nologin
systemd-coredump:x:108:114:systemd Core Dumper,,,:/run/systemd:/usr/sbin/nologin
kernoops:x:109:65534:Kernel Oops Tracking Daemon,,,:/usr/sbin/nologin
uidd:x:110:119:/:run/uidd:/usr/sbin/nologin
cups-pk-helper:x:111:115:user for cups-pk-helper service,,,:/home/cups-pk-helper:/usr/sbin/nologin
lightdm:x:112:120:Light Display Manager:/var/lib/lightdm:/bin/false
tcpdump:x:113:122:/:nonexistent:/usr/sbin/nologin
speech-dispatcher:x:114:29:Speech Dispatcher,,,:/run/speech-dispatcher:/bin/false
avahi-autoipd:x:115:125:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/usr/sbin/nologin
usbmuxd:x:116:46:usbmux daemon,,,:/var/lib/usbmux:/usr/sbin/nologin
nm-openvpn:x:117:126:NetworkManager OpenVPN,,,:/var/lib/openvpn/chroot:/usr/sbin/nologin
```

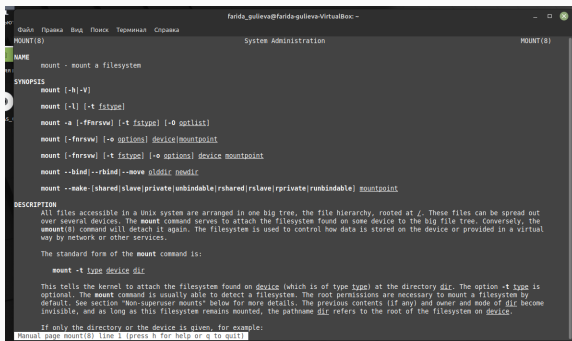
Figure 6: Файл /etc/passwd

Работа с файлами и правами доступа

```
farida_gulieva@farida-gulieva-VirtualBox:~$  
farida_gulieva@farida-gulieva-VirtualBox:~$  
farida_gulieva@farida-gulieva-VirtualBox:~$ cp feathers file.old  
farida_gulieva@farida-gulieva-VirtualBox:~$ mv file.old play/  
farida_gulieva@farida-gulieva-VirtualBox:~$ mkdir fun  
farida_gulieva@farida-gulieva-VirtualBox:~$ cp -R play/ fun/  
farida_gulieva@farida-gulieva-VirtualBox:~$ mv fun/ play/games  
farida_gulieva@farida-gulieva-VirtualBox:~$ chmod u-r feathers  
farida_gulieva@farida-gulieva-VirtualBox:~$ cat feathers  
cat: feathers: Отказано в доступе  
farida_gulieva@farida-gulieva-VirtualBox:~$ cp feathers feathers1  
cp: невозможно открыть 'feathers' для чтения: Отказано в доступе  
farida_gulieva@farida-gulieva-VirtualBox:~$ chmod u+r feathers  
farida_gulieva@farida-gulieva-VirtualBox:~$ chmod u-x play/  
farida_gulieva@farida-gulieva-VirtualBox:~$ cd pla  
bash: cd: pla: Нет такого файла или каталога  
farida_gulieva@farida-gulieva-VirtualBox:~$ chmod u+x pla  
chmod: невозможно получить доступ к 'pla': Нет такого файла или каталога  
farida_gulieva@farida-gulieva-VirtualBox:~$ chmod u+x play/  
farida_gulieva@farida-gulieva-VirtualBox:~$
```

Figure 7: Работа с файлами и правами доступа

Справка по командам



```
farida_gulieva@farida-gulieva-VirtualBox -
Файл Правка Вид Поиск Терминал Справка
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:

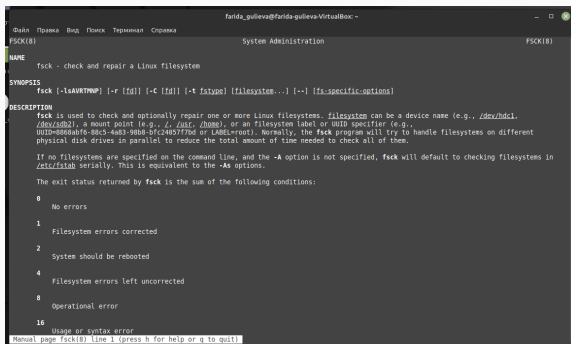
      mount -t type device dir

  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 more details. The previous contents (if any) and owner and mode of dir become
  invisible, and as long as this filesystem remains mounted, the pathname dir refers to the root of the filesystem on device.

  If only the directory or the device is given, for example:

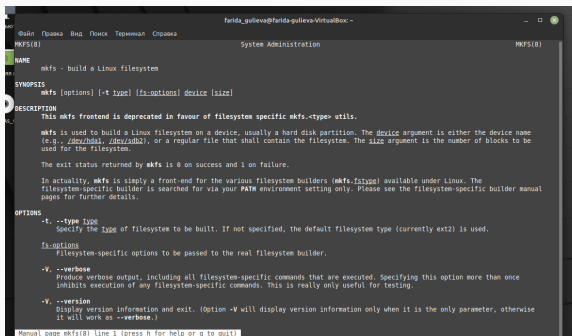
Manual page mount(8) line 1 (press h for help or q to quit)
```

Figure 8: Команда mount



```
farida_gulieva@farida-gulieva-VirtualBox -  
Файл Правка Вид Поиск Терминал Справка  
fsck(8) System Administration fsck(8)  
  
NAME  
    fsck - check and repair a Linux filesystem  
  
SYNOPSIS  
    fsck [-lsAVRTWMP] [-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 an filesystem label or UUID specifier (e.g.,  
    UUID=8808a1fe-88c5-4a43-9808-bfc2405177ed 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  
  
    16     Usage or syntax error  
  
Manual page fsck(8) line 1 (press h for help or q to quit)
```

Figure 9: Команда fsck



```
farida_gulieva@farida-gulieva-VirtualBox: -
Файл  Проакк  Вид  Поиск  Терминал  Справка
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-ftype) 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.

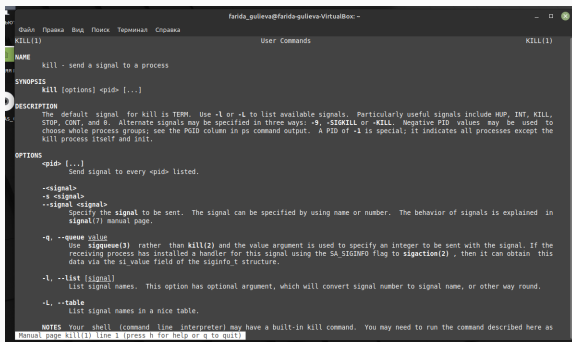
  fs-options
    Filesystem-specific options to be passed to the real filesystem builder.

  -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.

  -V, --version
    Display version information and exit. (Option -V will display version information only when it is the only parameter, otherwise
    it will work as --verbose.)

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

Figure 10: Команда mkfs



```
farida_gulleeva@farida-gulleeva-VirtualBox: ~
File  Правка  Вид  Поиск  Терминал  Справка
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: -s, -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 <pid> [...]
    Send signal to every <pid> listed.

  -s <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.

  -q, --queue <value>
    Use sigqueue(3) rather than kill(2) and the value argument is used to specify an integer to be sent with the signal. If the
    receiving process has installed a handler for this signal using the SA_SIGINFO flag to sigaction(2), then it can obtain this
    data via the si_value field of the siginfo_t structure.

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

  -L, --table
    List signal names in a nice table.

NOTES
  Your shell (command line interpreter) may have a built-in kill command. You may need to run the command described here as
  manual page kill(1) line 1 (press h for help or q to quit)
```

Figure 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.