

Операционные системы

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

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Цели и задачи 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.

- 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

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

Рис. 1: Выполнение примеров

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

Рис. 2: Выполнение примеров

```
rkurbanov@rahmankurbanov:~$  
rkurbanov@rahmankurbanov:~$ touch may  
rkurbanov@rahmankurbanov:~$ ls -l may  
-rw-r--r--. 1 rkurbanov rkurbanov 0 июн 17 11:39 may  
rkurbanov@rahmankurbanov:~$ chmod u+x may  
rkurbanov@rahmankurbanov:~$ ls -l may  
-rwxr--r--. 1 rkurbanov rkurbanov 0 июн 17 11:39 may  
rkurbanov@rahmankurbanov:~$ chmod u-x may  
rkurbanov@rahmankurbanov:~$ ls -l may  
-rw-r--r--. 1 rkurbanov rkurbanov 0 июн 17 11:39 may  
rkurbanov@rahmankurbanov:~$ chmod g-r,o-r monthly  
rkurbanov@rahmankurbanov:~$ chmod g+w abc1  
rkurbanov@rahmankurbanov:~$
```

Рис. 3: Выполнение примеров

Создание директорий и копирование файлов

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

Рис. 4: Работа с каталогами

Работа с командой chmod

```
rkurbanov@rahmankurbanov:~$  
rkurbanov@rahmankurbanov:~$ mkdir australia play  
rkurbanov@rahmankurbanov:~$ touch my_os feathers  
rkurbanov@rahmankurbanov:~$ chmod 744 australia/  
rkurbanov@rahmankurbanov:~$ chmod 711 play/  
rkurbanov@rahmankurbanov:~$ chmod 544 my_os  
rkurbanov@rahmankurbanov:~$ chmod 664 feathers  
rkurbanov@rahmankurbanov:~$ ls -l  
итого 0  
-rw-rw-r--. 1 rkurbanov rkurbanov 0 июн 17 11:44 abc1  
drwxr--r--. 1 rkurbanov rkurbanov 0 июн 17 11:45 australia  
-rw-rw-r--. 1 rkurbanov rkurbanov 0 июн 17 11:45 feathers  
drwxr-xr-x. 1 rkurbanov rkurbanov 74 июн 17 11:11 git-extended  
-rw-r--r--. 1 rkurbanov rkurbanov 0 июн 17 11:39 may  
drwx--x--x. 1 rkurbanov rkurbanov 24 июн 17 11:38 monthly  
-r-xr--r--. 1 rkurbanov rkurbanov 0 июн 17 11:45 my_os  
drwx--x--x. 1 rkurbanov rkurbanov 0 июн 17 11:45 play  
drwxr-xr-x. 1 rkurbanov rkurbanov 14 июн 17 11:39 reports  
drwxr-xr-x. 1 rkurbanov rkurbanov 28 июн 17 11:45 ski.places  
drwxr-xr-x. 1 rkurbanov rkurbanov 10 июн 17 10:42 work  
drwxr-xr-x. 1 rkurbanov rkurbanov 0 июн 17 10:27 Видео  
drwxr-xr-x. 1 rkurbanov rkurbanov 0 июн 17 10:27 Документы  
drwxr-xr-x. 1 rkurbanov rkurbanov 26 июн 17 10:48 Загрузки  
drwxr-xr-x. 1 rkurbanov rkurbanov 0 июн 17 10:27 Изображения  
drwxr-xr-x. 1 rkurbanov rkurbanov 0 июн 17 10:27 Музыка  
drwxr-xr-x. 1 rkurbanov rkurbanov 0 июн 17 10:27 Общедоступные  
drwxr-xr-x. 1 rkurbanov rkurbanov 0 июн 17 10:27 'Рабочий стол'  
drwxr-xr-x. 1 rkurbanov rkurbanov 0 июн 17 10:27 Шаблоны  
rkurbanov@rahmankurbanov:~$
```

```
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
avahi:x:70:70:Avahi mDNS/DNS-SD Stack:/var/run/avahi-daemon:/sbin/nologin
geoclue:x:999:999>User for geoclue:/var/lib/geoclue:/sbin/nologin
usbmuxd:x:113:113:usbmuxd user:/:/sbin/nologin
systemd-oom:x:998:998:systemd Userspace OOM Killer:/:/usr/sbin/nologin
qemu:x:107:107:qemu user:/:/sbin/nologin
polkitd:x:114:114>User for polkitd:/:/sbin/nologin
rtkit:x:172:172:RealtimeKit:/:/sbin/nologin
chrony:x:997:994:chrony system user:/var/lib/chrony:/sbin/nologin
dnsmasq:x:996:993:Dnsmasq DHCP and DNS server:/var/lib/dnsmasq:/usr/sbin/nologin
gluster:x:995:992:GlusterFS daemons:/run/gluster:/sbin/nologin
rpc:x:32:32:Rpcbind Daemon:/var/lib/rpcbind:/sbin/nologin
pipewire:x:994:991:PipeWire System Daemon:/run/pipewire:/usr/sbin/nologin
```

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

Рис. 7: Работа с файлами и правами доступа

```
rkurbanov@rahmankurbanov:~ — 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|runbindabl
e]
    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:

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

```
rkurbanov@rahmankurbanov:~ — 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

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

```
rkurbanov@rahmankurbanov:~ — 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.

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

```
rkurbanov@rahmankurbanov:~ — 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
    Manual page kill(1) line 1 (press h for help or q to quit)
```


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.