

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

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

Рис. 1: Выполнение примеров

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

Рис. 2: Выполнение примеров

```
timursimdyanov@timursimdyanov:~$  
timursimdyanov@timursimdyanov:~$ touch may  
timursimdyanov@timursimdyanov:~$ ls -l may  
-rw-r--r--. 1 timursimdyanov timursimdyanov 0 сен  5 14:31 may  
timursimdyanov@timursimdyanov:~$ chmod u+x may  
timursimdyanov@timursimdyanov:~$ ls -l may  
-rwxr--r--. 1 timursimdyanov timursimdyanov 0 сен  5 14:31 may  
timursimdyanov@timursimdyanov:~$ chmod u-x may  
timursimdyanov@timursimdyanov:~$ ls -l may  
-rw-r--r--. 1 timursimdyanov timursimdyanov 0 сен  5 14:31 may  
timursimdyanov@timursimdyanov:~$ chmod g-r,o-r monthly  
timursimdyanov@timursimdyanov:~$ chmod g+w abc1  
timursimdyanov@timursimdyanov:~$
```

Рис. 3: Выполнение примеров

Создание директорий и копирование файлов

```
timursimdyanov@timursimdyanov:~$  
timursimdyanov@timursimdyanov:~$ cp /usr/include/linux/sysinfo.h ~  
timursimdyanov@timursimdyanov:~$ mv sysinfo.h equipment  
timursimdyanov@timursimdyanov:~$  
^[[200~mkdir ski.plases  
^[[201~timursimdyanov@timursimdyanov:~$ mkdir ski.plases.plases  
timursimdyanov@timursimdyanov:~$ mv equipment ski.plases/  
timursimdyanov@timursimdyanov:~$ mv ski.plases/equipment ski.plases/equipl  
ist  
timursimdyanov@timursimdyanov:~$ touch abc1  
timursimdyanov@timursimdyanov:~$ cp abc1 ski.plases/equiplist2  
timursimdyanov@timursimdyanov:~$ cd ski.plases/  
timursimdyanov@timursimdyanov:~/ski.plases$ mkdir equipment  
timursimdyanov@timursimdyanov:~/ski.plases$ mv equiplist equipment/  
timursimdyanov@timursimdyanov:~/ski.plases$ mv equiplist2 equipment/  
timursimdyanov@timursimdyanov:~/ski.plases$ cd  
timursimdyanov@timursimdyanov:~$ mkdir newdir  
timursimdyanov@timursimdyanov:~$ mv newdir ski.plases/  
timursimdyanov@timursimdyanov:~$ mv ski.plases/newdir/ ski.plases/plans  
timursimdyanov@timursimdyanov:~$
```

Рис. 4: Работа с каталогами

Работа с командой chmod

```
timursimdyanov@timursimdyanov:~$  
timursimdyanov@timursimdyanov:~$ mkdir australia play  
timursimdyanov@timursimdyanov:~$ touch my_os feathers  
timursimdyanov@timursimdyanov:~$ chmod 744 australia/  
timursimdyanov@timursimdyanov:~$ chmod 711 play/  
timursimdyanov@timursimdyanov:~$ chmod 544 my_os  
timursimdyanov@timursimdyanov:~$ chmod 664 feathers  
timursimdyanov@timursimdyanov:~$ ls -l  
итого 0  
-rw-rw-r--. 1 timursimdyanov timursimdyanov 0 сен 5 14:32 abc1  
drwxr--r--. 1 timursimdyanov timursimdyanov 0 сен 5 14:36 australia  
-rw-rw-r--. 1 timursimdyanov timursimdyanov 0 сен 5 14:36 feathers  
drwxr-xr-x. 1 timursimdyanov timursimdyanov 74 сен 5 13:40 git-extended  
-rw-r--r--. 1 timursimdyanov timursimdyanov 0 сен 5 14:31 may  
drwx--x--x. 1 timursimdyanov timursimdyanov 24 сен 5 14:29 monthly  
-r-xr--r--. 1 timursimdyanov timursimdyanov 0 сен 5 14:36 my_os  
drwx--x--x. 1 timursimdyanov timursimdyanov 0 сен 5 14:36 play  
drwxr-xr-x. 1 timursimdyanov timursimdyanov 14 сен 5 14:31 reports  
drwxr-xr-x. 1 timursimdyanov timursimdyanov 28 сен 5 14:33 ski.places  
drwxr-xr-x. 1 timursimdyanov timursimdyanov 10 сен 5 12:49 work  
drwxr-xr-x. 1 timursimdyanov timursimdyanov 0 сен 5 12:36 Видео  
drwxr-xr-x. 1 timursimdyanov timursimdyanov 0 сен 5 12:36 Документы  
drwxr-xr-x. 1 timursimdyanov timursimdyanov 26 сен 5 12:57 Загрузки  
drwxr-xr-x. 1 timursimdyanov timursimdyanov 0 сен 5 12:36 Изображения  
drwxr-xr-x. 1 timursimdyanov timursimdyanov 0 сен 5 12:36 Музыка  
drwxr-xr-x. 1 timursimdyanov timursimdyanov 0 сен 5 12:36 Общедоступные  
drwxr-xr-x. 1 timursimdyanov timursimdyanov 0 сен 5 12:36 'Рабочий стол'  
drwxr-xr-x. 1 timursimdyanov timursimdyanov 0 сен 5 12:36 Шаблоны  
timursimdyanov@timursimdyanov:~$
```

```
timursimdyanov@timursimdyanov:~ — less /etc/passwd
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
unbound:x:993:990:Unbound DNS resolver:/var/lib/unbound:/sbin/nologin
nm-openconnect:x:992:989:NetworkManager user for OpenConnect:/:sbin/nologin
rpcuser:x:29:29:RPC Service User:/var/lib/nfs:/sbin/nologin
wsdd:x:991:988:Web Services Dynamic Discovery host daemon:/:sbin/nologin
/etc/passwd
```

Работа с файлами и правами доступа

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

Рис. 7: Работа с файлами и правами доступа

```
timursimdyanov@timursimdyanov:~ — 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|run
bindable]
    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:
```

```
timursimdyanov@timursimdyanov:~ — 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)
```

```
timursimdyanov@timursimdyanov:~ — 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)
```

```
timursimdyanov@timursimdyanov:~ — man kill
```

KILL(1)	User Commands	KILL(1)
NAME kill - terminate a process		
SYNOPSIS kill [-signal -s <u>signal</u> -p] [-q <u>value</u>] [-a] [--timeout <u>milliseconds</u> <u>signal</u>] [--] <u>pid</u> <u>name</u> ...		
kill -l [<u>number</u>] -L		
DESCRIPTION The command kill sends the specified <u>signal</u> 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 <u>signal</u> 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.