

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

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

Рис. 1: Выполнение примеров

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

Рис. 2: Выполнение примеров

```
hzipbahakim@hzipbahakim:~$  
hzipbahakim@hzipbahakim:~$ touch may  
hzipbahakim@hzipbahakim:~$ ls -l may  
-rw-r--r--. 1 hzipbahakim hzipbahakim 0 июн 25 10:37 may  
hzipbahakim@hzipbahakim:~$ chmod u+x may  
hzipbahakim@hzipbahakim:~$ ls -l may  
-rwxr--r--. 1 hzipbahakim hzipbahakim 0 июн 25 10:37 may  
hzipbahakim@hzipbahakim:~$ chmod u-x may  
hzipbahakim@hzipbahakim:~$ ls -l may  
-rw-r--r--. 1 hzipbahakim hzipbahakim 0 июн 25 10:37 may  
hzipbahakim@hzipbahakim:~$ chmod g-r,o-r monthly  
hzipbahakim@hzipbahakim:~$ chmod g+w abc1  
hzipbahakim@hzipbahakim:~$
```

Рис. 3: Выполнение примеров

Создание директорий и копирование файлов

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

Рис. 4: Работа с каталогами

Работа с командой chmod

```
hziabahakim@hziabahakim:~$ mkdir australia play
hziabahakim@hziabahakim:~$ touch my_os feathers
hziabahakim@hziabahakim:~$ chmod 744 australia/
hziabahakim@hziabahakim:~$ chmod 711 play/
hziabahakim@hziabahakim:~$ chmod 544 my_os
hziabahakim@hziabahakim:~$ chmod 664 feathers
hziabahakim@hziabahakim:~$ ls -l
итого 0
-rw-rw-r--. 1 hziabahakim hziabahakim 0 июн 25 10:41 abc1
drwxr--r--. 1 hziabahakim hziabahakim 0 июн 25 10:41 australia
-rw-rw-r--. 1 hziabahakim hziabahakim 0 июн 25 10:42 feathers
drwxr-xr-x. 1 hziabahakim hziabahakim 74 июн 25 10:18 git-extended
-rw-r--r--. 1 hziabahakim hziabahakim 0 июн 25 10:37 may
drwx--x--x. 1 hziabahakim hziabahakim 24 июн 25 10:36 monthly
-r-xr--r--. 1 hziabahakim hziabahakim 0 июн 25 10:42 my_os
drwx--x--x. 1 hziabahakim hziabahakim 0 июн 25 10:41 play
drwxr-xr-x. 1 hziabahakim hziabahakim 14 июн 25 10:37 reports
drwxr-xr-x. 1 hziabahakim hziabahakim 28 июн 25 10:41 ski.plases
drwxr-xr-x. 1 hziabahakim hziabahakim 10 июн 25 09:53 work
drwxr-xr-x. 1 hziabahakim hziabahakim 0 июн 25 09:42 Видео
drwxr-xr-x. 1 hziabahakim hziabahakim 0 июн 25 09:42 Документы
drwxr-xr-x. 1 hziabahakim hziabahakim 26 июн 25 10:00 Загрузки
drwxr-xr-x. 1 hziabahakim hziabahakim 0 июн 25 09:42 Изображения
drwxr-xr-x. 1 hziabahakim hziabahakim 0 июн 25 09:42 Музыка
drwxr-xr-x. 1 hziabahakim hziabahakim 0 июн 25 09:42 Общедоступные
drwxr-xr-x. 1 hziabahakim hziabahakim 0 июн 25 09:42 'Рабочий стол'
drwxr-xr-x. 1 hziabahakim hziabahakim 0 июн 25 09:42 Шаблоны
hziabahakim@hziabahakim:~$
```

```
hzbahakim@hzbahakim:~ — 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
sssd:x:990:986:User for sssd:/run/sss:/sbin/nologin
openvpn:x:989:985:OpenVPN:/etc/openvpn:/sbin/nologin
/etc/passwd
```

Работа с файлами и правами доступа

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

Рис. 7: Работа с файлами и правами доступа

```
hzibahakim@hzibahakim:~ — 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)
```

```
hzipbahakim@hzipbahakim:~ — 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)
```

```
hzipahakim@hzipahakim:~ — 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)
```

```
hziabahakim@hziabahakim:~ — 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
    The list of processes to be signaled can be a mixture of names and PIDs.
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.