

C2110 *UNIX and programming*

Lesson 4 / Module 2

PS / 2020 Distance form of teaching: Rev1

Petr Kulhanek

kulhanek@chemi.muni.cz

National Center for Biomolecular Research, Faculty of Science
Masaryk University, Kamenice 5, CZ-62500 Brno

File System

Quotas

Quotas are set for your home directories on disk partition wolf.ncbr.muni.cz/~home/. The current status and quota settings can be seen by the command **quota**:

```
[kulhanek@wolf ~]$ quota -vs
```

```
Disk quotas for user kulhanek (uid 18773):
```

Filesystem	blocks	quota	limit	grace	files	quota	limit
wolf.ncbr.muni.cz:/home/	1550M	1954M	2051M		20453	0	0

Current use



Quota that can be temporarily exceeded.

Hard limit that cannot be exceeded.

Exceeded quota can lead to **unsuccessful login** using a graphical interface. In this case, log into a text terminal (e.g., Ctrl + Alt + F1) and move the files to another partition (e.g., temporarily to the /scratch/username or delete unnecessary files).

Disk Device

An overview of file system usage, disk devices, and their mount points is provided by the command **df**.

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/mapper/server1-root	ext4	15G	8.4G	5.5G	61%	/
none	tmpfs	4.0K	0	4.0K	0%	/sys/fs/cgroup
udev	devtmpfs	3.9G	4.0K	3.9G	1%	/dev
tmpfs	tmpfs	793M	888K	792M	1%	/run
none	tmpfs	5.0M	0	5.0M	0%	/run/lock
none	tmpfs	3.9G	952K	3.9G	1%	/run/shm
none	tmpfs	100M	36K	100M	1%	/run/user
/dev/mapper/server1-vbox	ext4	64G	52G	9.5G	85%	/win
/dev/mapper/server1-scratch	ext4	598G	2.8G	565G	1%	/scratch
wolf.wolf.inet:/software/ncbr	nfs4	197G	156G	33G	83%	/software/ncbr
wolf.wolf.inet:/home/	nfs4	493G	371G	98G	80%	/home

device

file system type

mount point

File system types:

Ext3, ext4 third / fourth extended filesystem (native file system of linux)

nfs3, nfs4 network filesystem

Vfat Virtual File Allocation Table (file system used by MS Windows)

ntfs New technology File System (developed by Microsoft for its operating systems)

!!! not case-sensitive !!! - Be careful when copying files with different cases

USB Drives

In the graphic environment, USB drives **connect** automatically into the bundle **/media/username**.

```
[kulhanek@wolf01 ~]$ df -Th
Filesystem                                Type      Size  Used Avail Use% Mounted on
.....
wolf.ncbr.muni.cz:/home                    nfs4      280G  164G  102G   62% /home
/dev/sdg1                                  vfat      962M   841M  122M   88% /media/kulhanek/B19A-1CA2
```

The disk can be **disconnect** in a graphical environment or by a command **umount**. The command argument is the device mount point.

```
[kulhanek@wolf01 ~]$ umount /media/kulhanek/B19A-1CA2
```

The disk can be disconnected only if it is not in use (no file must be open, no process must have a (sub)directory from the mount point, including the mount point, set as the working directory). An overview of the processes using the given directory (mount point) can be obtained by the command **lsof** (or **fuser**).

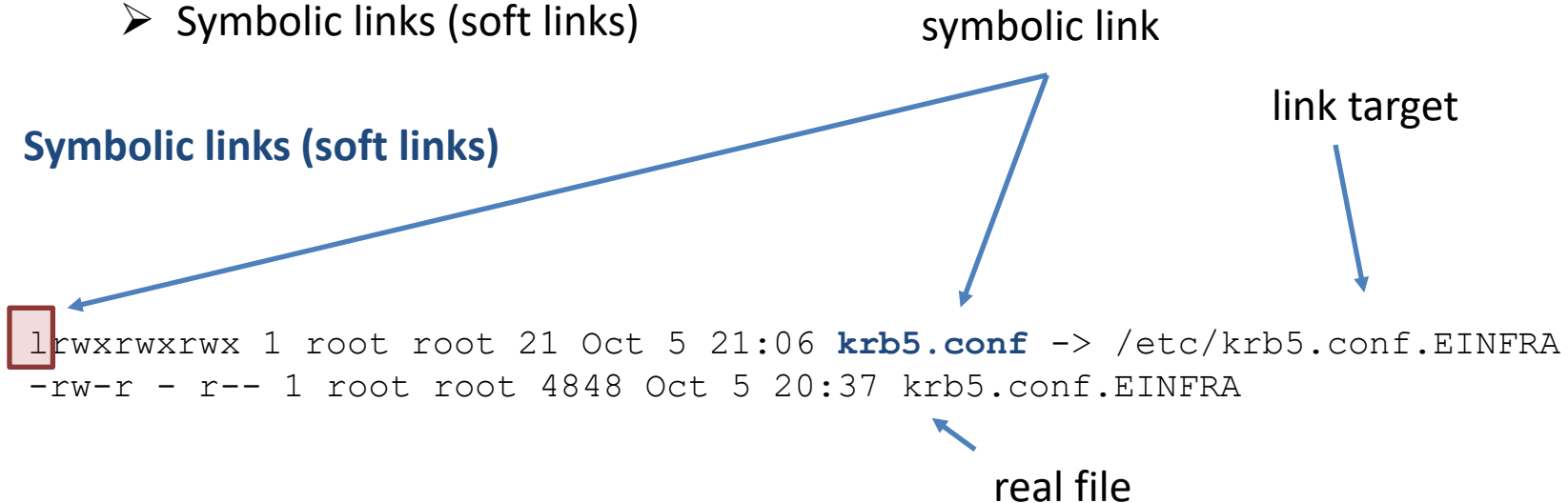
```
[kulhanek@wolf01 ~]$ lsof /media/kulhanek/B19A-1CA2/
COMMAND PID      USER      FD      TYPE DEVICE SIZE/OFF NODE NAME
bash    31521 kulhanek   cwd     DIR   8,97   4096   518 /media/kulhanek/B19A-1CA2/GoslarFinal
bash    31893 kulhanek   cwd     DIR   8,97   4096   518 /media/ kulhanek/ B19A-1CA2/GoslarFinal
vi      32011 kulhanek   cwd     DIR   8,97   4096   518 /media/ kulhanek/ B19A-1CA2/GoslarFinal
```

Links

Links:

- Hard links
- Symbolic links (soft links)

Symbolic links (soft links)



Properties of symbolic links:

- contain information about the path to the target object (file, directory,...)
- from the point of view of the system, they behave as the target object
- access rights are derived from the target object
- the target object may not exist
- they are created with the command `ln` with the `-s` option, example:

```
ln -s /etc/krb5.conf.EINFRA krb5.conf
```

Overview of Commands

File system:

cd	changes the current working directory
pwd	lists the path to the current working directory
ls	lists the contents of a directory

Mkdir	creates a directory
rmdir	deletes a directory (must be empty)
Cp	copies a file or directory
mv	moves a file or directory
rm	deletes a file or directory
find	searches for files or directories

basic operations

ld	lists the user's groups
getent	lists information about users, user groups, and other information
chmod	changes access rights to a file or directory
chown	changes the owner of the file or directory
chgrp	changes the access group of a file or directory
umask	default access rights for newly created files or directories

access rights

Overview of Commands

File system (continued):

advanced functions

quota	prints information about set quotas for mount points
du	lists the size of directories or files
stat	lists detailed information about a file or directory
df	lists information about mounted partitions
lsdf	lists processes that have files / directories open on a mount point (directory)
ln	creates a link to a file or directory
unlink	unlinks a file or directory

Exercise 1

1. Use the command **quota** to view the current occupancy of your home directory on a WOLF cluster.
2. Download this presentation to your home directory.
3. What is the size of the presentation file?
4. Create a symbolic link to the presentation named **lesson4.pdf**.
5. What is the size of the symbolic link?
6. Delete the presentation file.
7. Is there a symbolic link? If so, is the link valid?
8. Delete the symbolic link.