



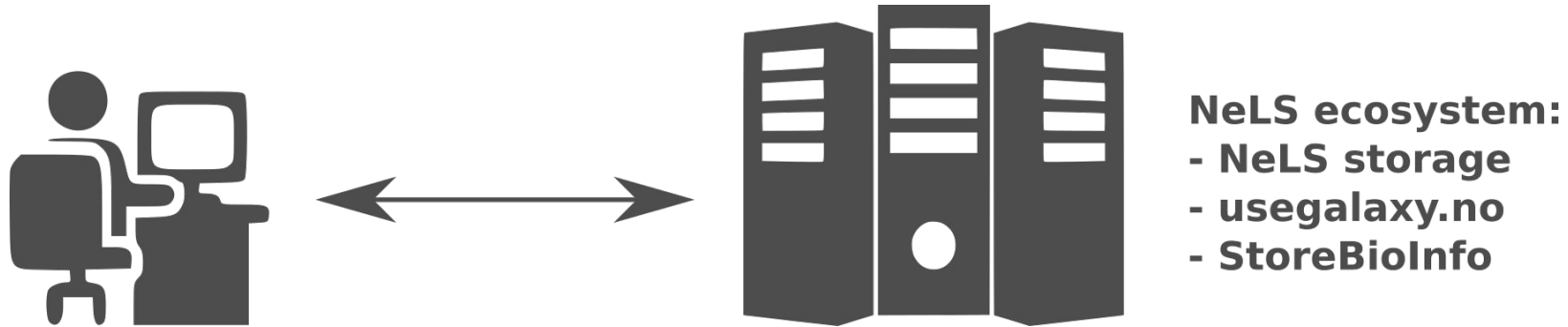
NeLS: Data transfer and organization

Tina Višňovská

ELIXIR Norway, Norwegian e-infrastructure for Life Sciences and usegalaxy.no



Why to transfer data to and from NeLS?



- 1) To organize, share and safely store and archive data on NeLS, one has to get the data there.
- 2) To import data to a national Galaxy server (usegalaxy.no) is faster from NeLS than from elsewhere, since there is direct high speed network between them.
- 3) To download results and plots from NeLS to your local computer for inclusion into a manuscript.

Various ways to transfer data to and from NeLS

1) Uploading and saving files via web browser in NeLS



2) Transferring data with FileZilla



3) Transferring data with command line tools: ssh, scp



(optional)

Which approach to choose?

- Depends on the volume of the transferred data.
- Depends on the user's familiarity with the available sw tools.
- We will address all the approaches and you can choose what works best for you.

NeLS in web browser

- Intuitive navigation using mouse or touchpad
- Suitable only to transfer small files; not for uploading fastq or bam files
- Log in with either FEIDE or Idp username

The screenshot shows the NeLS web interface in a browser. The address bar displays the URL: `https://nels.bioinfo.no/pages/file-browse.xhtml?path=cUZMaldtNGhITGIHNjIHZ252V...`. The navigation menu includes: NeLS, Dashboard, Personal (selected), Projects, StoreBioInfo, Available Pipelines, and Help (Support). Below the menu, there are buttons for 'Upload' and '+ New Folder'. The main content area shows the current path 'Personal' and a table of files:

<input type="checkbox"/>	Name ↕	Size ↕	Modified ↕	
<input type="checkbox"/>	first.txt	12 bytes	January 14, 2021	
<input type="checkbox"/>	second.txt	5 bytes	August 15, 2018	

At the bottom of the file list, there are action buttons: Copy, Cut, Paste, Delete Selected, and Clear Selection. On the right side, the 'Data Operations' panel shows two successful operations:

- 6309 : Copy**
Status: Completed successfully
Submitted time: Jan 14 2021 21:26:42
Completed: 100 %
- 5903 : NeLS >> StoreBioInfo**
Status: Completed successfully
Submitted time: Aug 13 2019 11:34:39
Completed: 100 %

Personal Area in NeLS

1. Upload + New Folder

2. Copy Cut Paste Delete Selected Clear Selection

3. Rename icon

4. first.txt second.txt

5. Projects

Name	Size	Modified
first.txt	12 bytes	January 14, 2021
second.txt	5 bytes	August 15, 2018

Data Operations

- 6309 : Copy
Status: Completed successfully
Submitted time: Jan 14 2021 21:26:42
Completed: 100 %
- 5903 : NeLS >> StoreBioInfo
Status: Completed successfully
Submitted time: Aug 13 2019 11:34:39
Completed: 100 %

1. Upload - only one file at a time, add new folder;
2. File/folder manipulation;
3. Rename file/folder;
4. (De)select all/some items;
5. Projects - containing projects you have access to - more info later

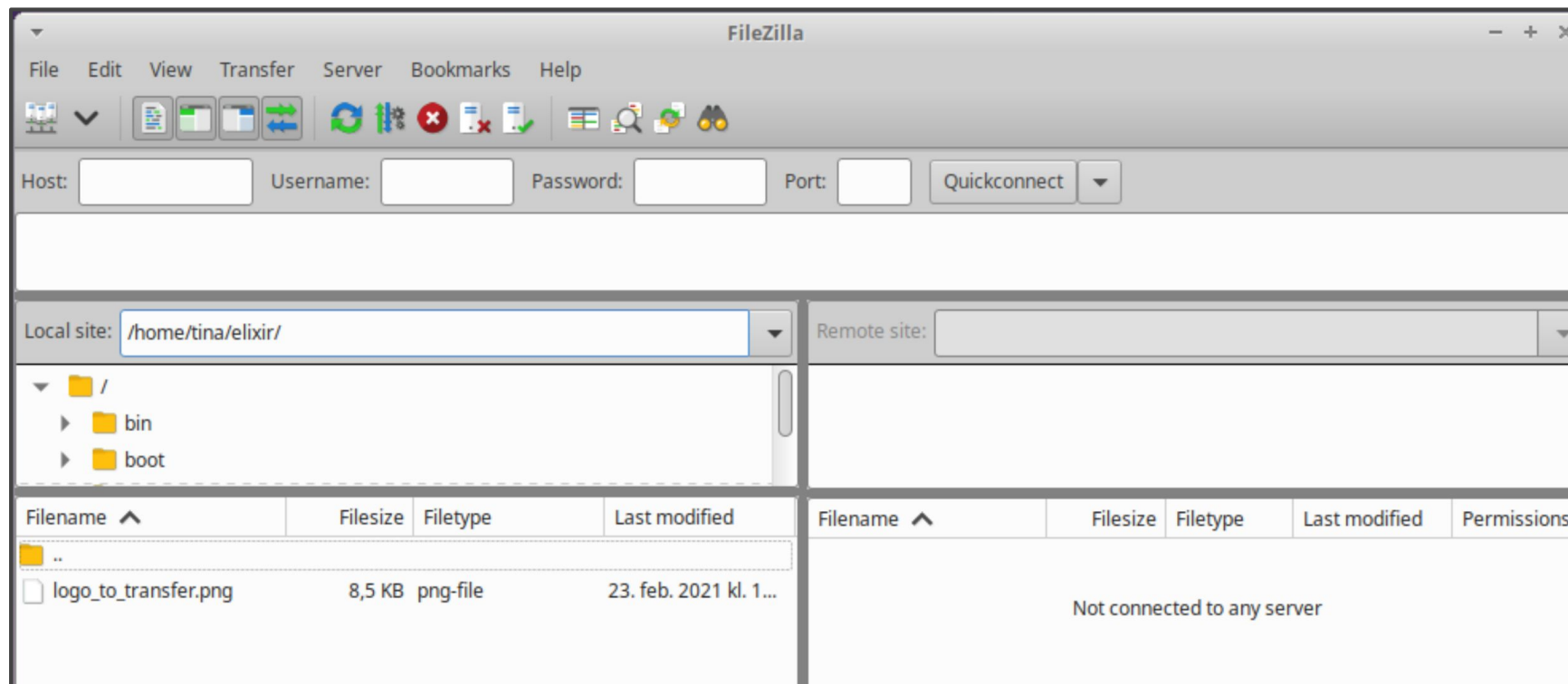
Quotas: Personal Area - small; Projects Area - depends on the projects



FileZilla - Introduction



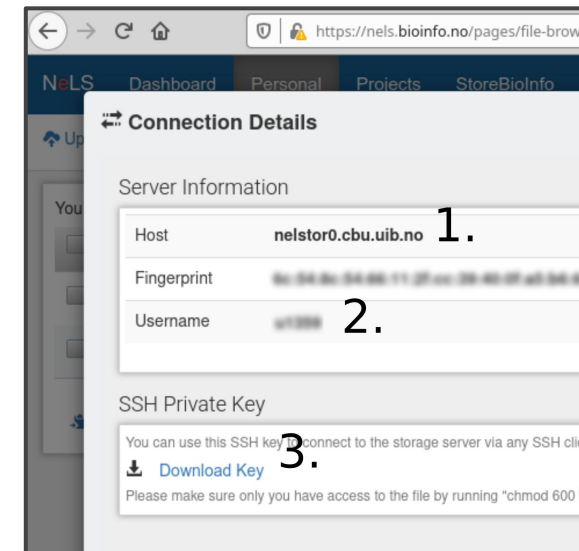
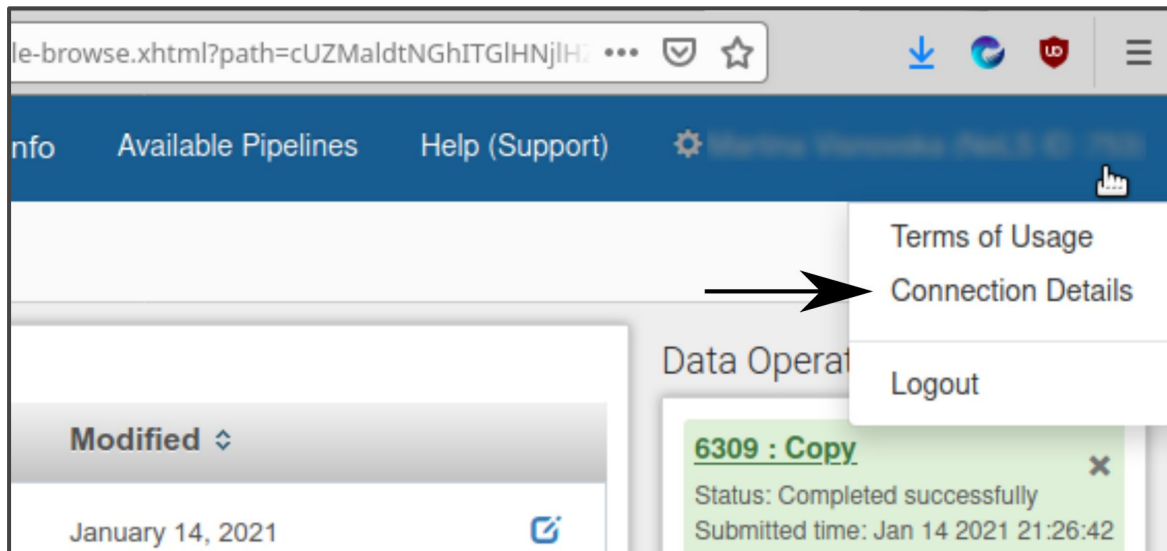
- A file manager tool with functionality to handle connections to remote servers.
- After proper setup of a connection, file transfer is done by dragging and dropping selected files between two areas - Local site (left) and Remote site (right).
- Suitable to transfer large files.
- Similar tools: winSCP, sshfs,...



FileZilla - Setup 1



- From NeLS web: Setting > Connection Details:
We will need the following details: Host (1), User (2), and Key File (3).



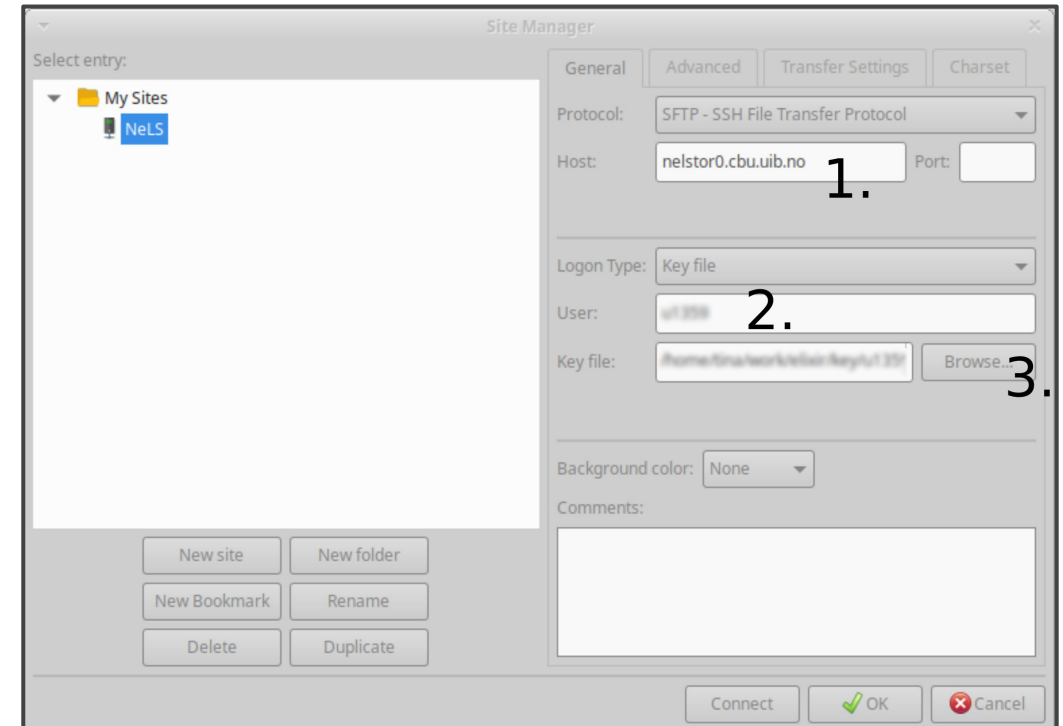
- The Key File has to be downloaded to your computer.

FileZilla - Setup 2

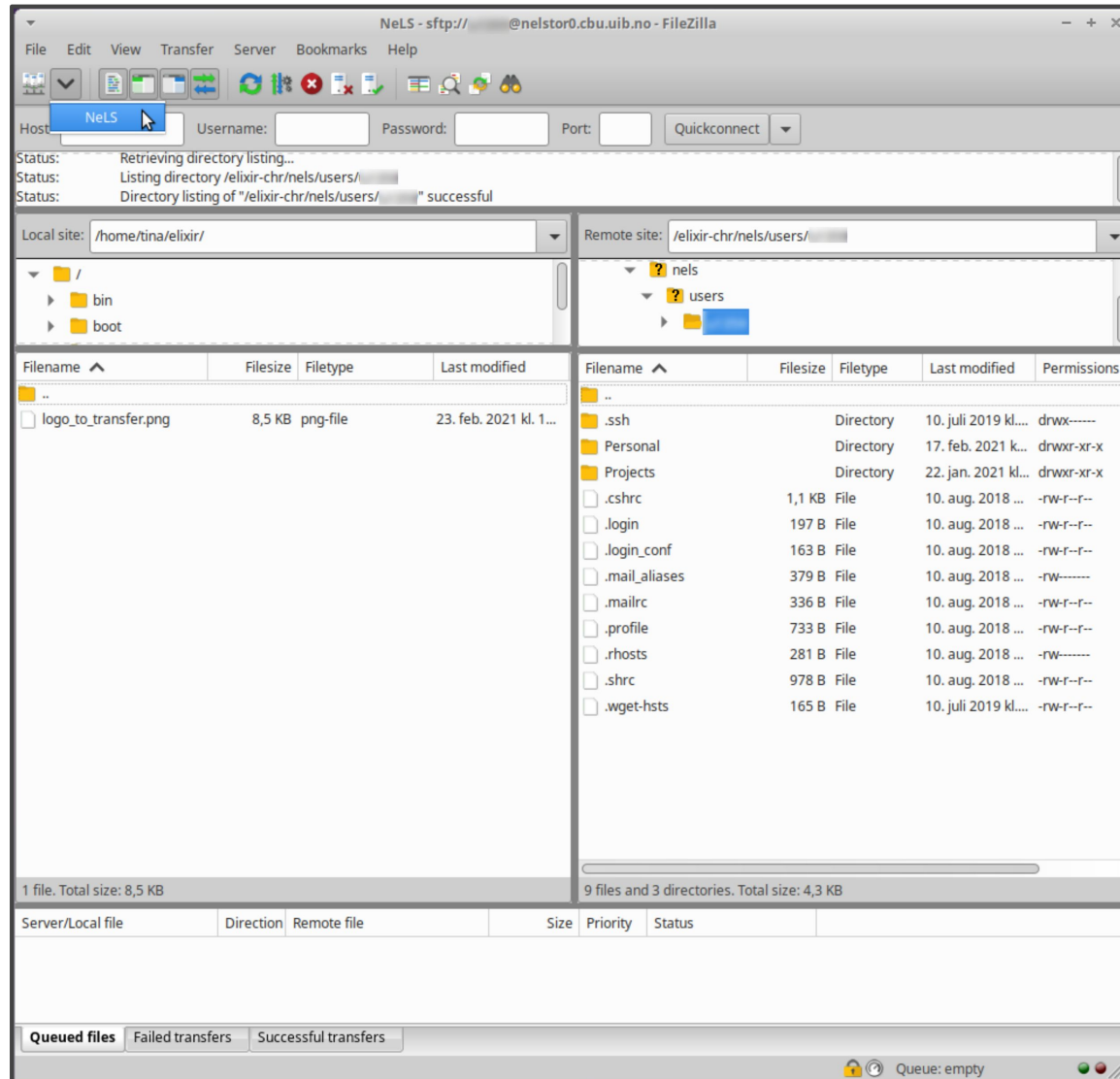


In FileZilla - setup connection to a new site:
Go to File > Site Manager > New Site

- Rename the New Site to NeLS and fill in the following info:
 - Protocol: SFTP - SSH File Transfer Protocol
 - Logon Type: Key File
 - Host (1.), User (2.), and Key File (3.)
 - from the NeLS Connection Details
- Press the Connect button to initiate connection to the NeLS server.



FileZilla - Established Connection

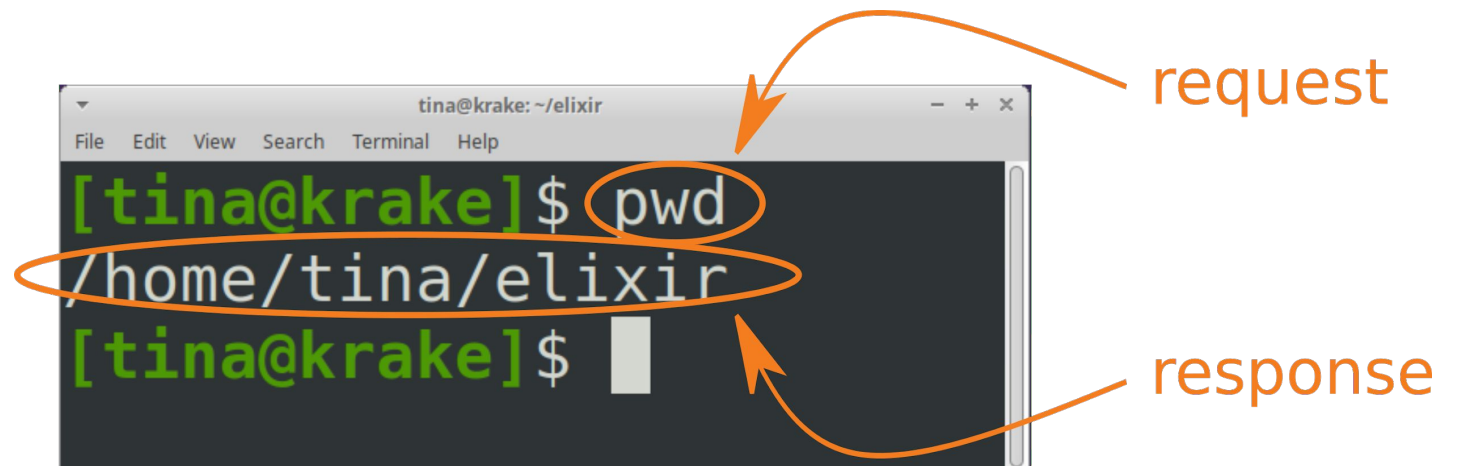


- When the connection to NeLS is established, FileZilla shows content of the local computer in the left-hand side window and content of NeLS server in the right-hand side window.
- For the future connections: short-cut to the NeLS connection is via the highlighted NeLS pop-up button.

Using commands in terminal window



- Terminal facilitates dialogue between a user and a computer:
The user types in a request (command), presses enter and the computer executes the command and prints its response to the screen (if needed).
- When the computer is done answering, the user can make another request.
- Further screenshots of a terminal window will be capturing such a dialogue.



(optional)

Selection of command-line tools



pwd (print working directory):

- a command that prints the working directory

ls (list directory content):

- a command that prints content of the specified directory

cd (change directory):

- a command that changes a directory to a directory is specified in the command

ssh (secure shell):

- a command to securely log into a remote server
- in combination with commands pwd, ls, and cd we can get overview of the accessible content on a remote server

scp (secure copy):

- a command to securely copy data to and from a remote server

(optional)



Using `pwd`, `ls`, and `cd` locally



```
tina@krake:~/elixir
[tina@krake]$ pwd
/home/tina/elixir
[tina@krake]$
[tina@krake]$ ls
logo_to_transfer.png  @nelstor0.cbu.uib.no.key
[tina@krake]$
[tina@krake]$ cd ..
[tina@krake]$ pwd
/home/tina
[tina@krake]$ ls
calibre_thrash  Downloads  Music      R           tools
Desktop         elixir     Pictures   snap        Videos
Documents       miniconda3 Public     Templates  work
[tina@krake]$
[tina@krake]$ cd elixir
[tina@krake]$
[tina@krake]$ pwd
/home/tina/elixir
[tina@krake]$
[tina@krake]$
```

Working directory is called `elixir`. It is located in my home folder `tina` which is located in the `home` folder.

`cd ..` - go one folder up

`cd <folder_name>`

(optional)



Preliminaries for ssh and scp



- Knowing Host (1.) and User (2.) from NeLS Connection Details.
 - Host: nelstor0.cbu.uib.no
 - User: <user>
- SSH Private Key (3.) downloaded from NeLS.
- Change file mode of the SSH Private Key in a terminal with chmod command as suggested in the NeLS download details:

```
chmod 600 <user>@nelstor0.cbu.uib.no.key
```

chmod (change file mode bits) - modifies permissions to write and read a file and to execute it, more details about how to do this will be presented in the practical exercises.

(optional)



Using ssh to log into NeLS



authentication who@whereToConnect
ssh -i <key_file> <user>@<host/server>

ssh -i <user>@nelstor0.cbu.uib.no.key <user>@nelstor0.cbu.uib.no

```
tina@krake:~/elixir$ ssh -i @nelstor0.cbu.uib.no.key @nelstor0.cbu.uib.no
The authenticity of host 'nelstor0.cbu.uib.no ( )' can't be established.
ECDSA key fingerprint is SHA256:kf0UmdJJwsChkQ5xtELCaTHhWwPp7PegtSSM2D1H0sE.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'nelstor0.cbu.uib.no' (ECDSA) to the list of known hosts.
Last login: Tue Feb 16 09:45:25 2021 from
Installed operating system FreeBSD 11.4

Welcome to

  N E L S

Help (Support)
Send an e-mail to contact@bioinfo.no if you have difficulty, question, remark or suggestions.
You should include your full name and your affiliation in your request.

$
```

```
tina@krake:~/elixir$ pwd
/elixir-chr/nels/users/
$
$ ls
Personal          Projects
$
$ ls Personal/
first.txt          second.txt
$
$ ls Projects/
ELIXIR_online_course_2021
$
```

(optional)



Using scp to transfer data to NeLS



authentication whatToTransferLocal whereToTransferRemote
scp -i <key_file> <local_file> <user>@<host/server>:<destination>

scp -i <user>@nelstor0.cbu.uib.no.key \
 logo_to_transfer.png \
 <user>@nelstor0.cbu.uib.no:/elixir-chr/nels/users/<user>/Personal

```
tina@krake: ~/elixir
File Edit View Search Terminal Help
[tina@krake]$ scp -i [redacted]@nelstor0.cbu.uib.no.key \  
> logo_to_transfer.png \  
> [redacted]@nelstor0.cbu.uib.no:/elixir-chr/nels/users/[redacted]/Personal
logo_to_transfer.png                               100% 8465   353.1KB/s   00:00
[tina@krake]$
```

(optional)



More commands (optional)



cp: copy a file

mv: move (rename) a file

rm: remove a file - be careful, not reversible
do not use 'rm -r' first couple of years

mkdir: make directory

Help on a command usage:
search through internet for
<cmd> command usage examples

```
tina@krake: ~/elixir
File Edit View Search Terminal Help
$ pwd
/elixir-chr/nels/users/██████
$
$ cd Personal
$
$ pwd
/elixir-chr/nels/users/██████/Personal
$
$ ls
first.txt          logo_to_transfer.png  second.txt
$
$ cp logo_to_transfer.png transferred_logo.png
$
$ ls
first.txt          logo_to_transfer.png  second.txt          transferred_logo.png
$
$ rm logo_to_transfer.png
$
$ ls
first.txt          second.txt            transferred_logo.png
$
```

While ssh-ing in
NeLS/Personal



Using scp to transfer data from NeLS



authentication whatToTransferRemote whereToTransferLocal
scp -i <key_file> <user>@<host/server>:<file_path> <local_destination>

```
scp -i <user>@nelstor0.cbu.uib.no.key \  
  <user>@nelstor0.cbu.uib.no:/elixir-chr/nels/users/<user>/Personal/transferred_logo.png \  
  .
```

A screenshot of a terminal window titled "tina@krake: ~/elixir". The terminal shows the execution of an scp command to transfer a file from a remote host to the local machine. The command is: `scp -i [redacted]@nelstor0.cbu.uib.no.key \> [redacted]@nelstor0.cbu.uib.no:/elixir-chr/nels/users/[redacted]/Personal/transferred_logo.png \> .`. The output shows the file transfer progress: `transferred_logo.png 100% 8465 257.4KB/s 00:00`. Following the transfer, the user runs `ls`, and the output shows `logo_to_transfer.png transferred_logo.png [redacted]@nelstor0.cbu.uib.no.key`. The terminal prompt is `[tina@krake]$`.

“..” - one folder up, “.” - this folder

(optional)



Questions, comments

Thank you for your attention

