

Linux Introduction

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Enabler for Life Sciences

Linux Introduction

Look up the links from Pre-course material, use Google, and ...

Practice makes perfect :)

Enabler for Life Sciences

- **Parallelldatorcentrum**
<http://www.pdc.kth.se>
(KTH:s supercomputer center)
- 1 computer cluster, **Dardel**
- Uses Linux

- Why Linux?

- A powerful command-line interface
- Built for multi-user systems.
- An enormous amount of software is freely available

The image shows a Linux desktop environment with three main windows:

- Terminal Window:** Displays a Python script for testing a web API. The script uses the `requests` library and `dotenv` to load environment variables. It checks for the presence of `esm_host`, `esm_user`, and `esm_password` and prints error messages if they are missing. The script is named `edgeAPITest.py` and is located in the `testarea` directory.
- File Manager Window:** Shows the contents of the `testarea` directory. It lists various folders and files, including `1MB438`, `ADBFForwarder`, `asus_wmi`, `audiobook-chapter-spl...`, `benchmark_disk`, `benchmark_lun...`, `bokadirekt-watcher`, `btrfs_find_corrupted_...`, `ceph-kvm-cluster`, `confluence-server-to...`, `courses`, `cuda`, `dineros`, `edge2redmine`, `forbok-cli`, `hertz-config`, `imei`, `it87`, `john`, `john-jumbo`, `leodium-ReLive-NoMa...`, `mattias`, `maya`, `mimir`, `mimir2librechat`, `ml`, `modorganizer2-linux-i...`, `nbfc-linux`, and `nms`.
- Web Browser Window:** Displays a news article from Upsala Nya Tidning. The article is titled "Lagkompisen drabbades av allvarlig sjukdom – nu agerar hela laget" (The team manager was hit by a serious illness – now the whole team acts). The article includes a photo of a man in a hospital bed and a man in a black jacket. The article is dated 2024-11-24 at 21:39:03.

Directory tree

Name	Size	Type	Date Modified
+ annotations	--	folder	2011-05-18 15:34:34
- annovar	--	folder	2011-05-18 15:34:31
+ annovarFiles	--	folder	2011-05-18 15:34:05
+ compare	--	folder	2011-05-18 15:34:29
+ prepStat	--	folder	2011-05-18 15:34:29
+ statFiles	--	folder	2011-05-18 15:34:06
- summarizePerGene	--	folder	2011-05-18 15:34:31
- data	--	folder	2011-05-18 15:34:31
1.annovar	1.4 MB	unknown	2011-05-18 15:34:30
1.annovar.alleleFreq.pdf	895 bytes	PDF document	2011-05-18 15:34:30
1.annovar.exonic_variant_function	242.9 KB	unknown	2011-05-18 15:34:30
1.annovar.hg19_snp131_dropped	837.2 KB	unknown	2011-05-18 15:34:30
1.annovar.hg19_snp131_filtered	905.6 KB	unknown	2011-05-18 15:34:30
1.annovar.log	725 bytes	application log	2011-05-18 15:34:30
1.annovar.stat	938 bytes	unknown	2011-05-18 15:34:30
1.annovar.variant_function	2.3 MB	unknown	2011-05-18 15:34:31
1.non_sym_gene_list	94.3 KB	unknown	2011-05-18 15:34:31
1.non_sym_gene_list_not_in_dbsnp	78.8 KB	unknown	2011-05-18 15:34:31
1.stop_gain_gene_list	4.4 KB	unknown	2011-05-18 15:34:31
1.stop_gain_gene_list_not_in_dbsnp	4.3 KB	unknown	2011-05-18 15:34:31
1.sym_gene_list	51.4 KB	unknown	2011-05-18 15:34:31
1.sym_gene_list_not_in_dbsnp	34.3 KB	unknown	2011-05-18 15:34:31
test.out	2.7 MB	out document	2011-05-18 15:34:31
all.plot	500 bytes	unknown	2011-05-18 15:34:30
summary.ods	23.2 KB	OpenDocument Spreadsheet	2011-05-18 15:34:31


Navigation Commands

- **ls** – list the content of a directory

Navigation Commands

- **ls** – list the content of a directory







```
[dahlo@kalkyl4 dir]$
```

Name	Size	Type	Date Modified
 dir		-- folder	2012-01-05 13:44:47

Navigation Commands







- **ls** – list the content of a directory

```
[dahlo@kalkyl4 dir]$ ls
anotherFile.doc  directory1  file1.txt  file2.old  secondDirectory
```

Name	Size	Type	Date Modified
 dir		-- folder	2012-01-05 13:44:47
 directory1		-- folder	2012-01-05 13:45:43
 secondDirectory		-- folder	2012-01-05 13:46:21
 anotherFile.doc	27.6 KB	Word document	2012-01-05 13:44:47
 file1.txt	35.6 KB	plain text document	2012-01-05 13:44:15
 file2.old	2.2 KB	backup file	2012-01-05 13:44:33







- **ls** – list the content of a directory

```
[dahlo@kalkyl4 dir]$ ls -l
total 192
-rw-r--r-- 1 dahlo uppmax 28214 Jan  5 13:44 anotherFile.doc
drwxr-xr-x 2 dahlo uppmax  4096 Jan  5 13:45 directory1
-rw-r--r-- 1 dahlo uppmax 36458 Jan  5 13:44 file1.txt
-rw-r--r-- 1 dahlo uppmax  2273 Jan  5 13:44 file2.old
drwxr-xr-x 2 dahlo uppmax  4096 Jan  5 13:46 secondDirectory
```

Name	Size	Type	Date Modified
 dir		-- folder	2012-01-05 13:44:47
 directory1		-- folder	2012-01-05 13:45:43
 secondDirectory		-- folder	2012-01-05 13:46:21
 anotherFile.doc	27.6 KB	Word document	2012-01-05 13:44:47
 file1.txt	35.6 KB	plain text document	2012-01-05 13:44:15
 file2.old	2.2 KB	backup file	2012-01-05 13:44:33

- **ls** – list the content of a directory

```
[dahlo@kalkyl4 dir]$ ls -l
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-rw-r--r-- 1 dahlo uppmax 28214 Jan  5 13:44 anotherFile.doc
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-rw-r--r-- 1 dahlo uppmax  2273 Jan  5 13:44 file2.old
drwxr-xr-x 2 dahlo uppmax  4096 Jan  5 13:46 secondDirectory
```

Name	Size	Type	Date Modified
 dir		-- folder	2012-01-05 13:44:47
 directory1		-- folder	2012-01-05 13:45:43
 secondDirectory		-- folder	2012-01-05 13:46:21
 anotherFile.doc	27.6 KB	Word document	2012-01-05 13:44:47
 file1.txt	35.6 KB	plain text document	2012-01-05 13:44:15
 file2.old	2.2 KB	backup file	2012-01-05 13:44:33

Navigation Commands

- **cd – change working directory**
 - `cd <directory name> = down`
 - `cd .. = up`

```
[dahlo@kalkyl4 dir]$ cd directory1  
[dahlo@kalkyl4 directory1]$
```

Name	Size	Type	Date Modified
dir	--	folder	2012-01-05 13:44:47
directory1	--	folder	2012-01-05 13:45:43
secondDirectory	--	folder	2012-01-05 13:46:21
anotherFile.doc	27.6 KB	Word document	2012-01-05 13:44:47
file1.txt	35.6 KB	plain text document	2012-01-05 13:44:15
file2.old	2.2 KB	backup file	2012-01-05 13:44:33

Navigation Commands

- **cd – change working directory**
 - `cd <directory name> = down`
 - `cd .. = up`

```
[dahlo@kalkyl4 dir]$ cd directory1
[dahlo@kalkyl4 directory1]$ ls -l
total 184
-rw-r--r-- 1 dahlo uppmx 56427 Jan  5 13:45 notes
-rw-r--r-- 1 dahlo uppmx 25301 Jan  5 13:45 test.txt
```

Name	Size	Type	Date Modified
dir	--	folder	2012-01-05 13:44:47
directory1	--	folder	2012-01-05 13:45:43
notes	55.1 KB	unknown	2012-01-05 13:45:43
test.txt	24.7 KB	plain text document	2012-01-05 13:45:26
secondDirectory	--	folder	2012-01-05 13:46:21
anotherFile.doc	27.6 KB	Word document	2012-01-05 13:44:47
file1.txt	35.6 KB	plain text document	2012-01-05 13:44:15
file2.old	2.2 KB	backup file	2012-01-05 13:44:33

Navigation Commands

- **cd – change working directory**
 - `cd <directory name> = down`
 - `cd .. = up`

```
[dahlo@kalkyl4 directory1]$ cd ../secondDirectory
[dahlo@kalkyl4 secondDirectory]$ ls -l
total 252
-rw-r--r-- 1 dahlo uppmx 28214 Jan  5 13:46 bird.jpg
-rw-r--r-- 1 dahlo uppmx 112853 Jan  5 13:46 tree.jpg
```

Name	Size	Type	Date Modified
dir	--	folder	2012-01-05 13:44:47
directory1	--	folder	2012-01-05 13:45:43
secondDirectory	--	folder	2012-01-05 13:46:21
bird.jpg	27.6 KB	JPEG Image	2012-01-05 13:46:21
tree.jpg	110.2 KB	JPEG Image	2012-01-05 13:46:09
anotherFile.doc	27.6 KB	Word document	2012-01-05 13:44:47
file1.txt	35.6 KB	plain text document	2012-01-05 13:44:15
file2.old	2.2 KB	backup file	2012-01-05 13:44:33

Navigation Commands

- **cd – change working directory**
 - `cd <directory name> = down`
 - `cd .. = up`

```
[dahlo@kalkyl4 secondDirectory]$ ls -l ../directory1/
total 184
-rw-r--r-- 1 dahlo uppmx 56427 Jan  5 13:45 notes
-rw-r--r-- 1 dahlo uppmx 25301 Jan  5 13:45 test.txt
```

Name	Size	Type	Date Modified
dir	--	folder	2012-01-05 13:44:47
directory1	--	folder	2012-01-05 13:45:43
notes	55.1 KB	unknown	2012-01-05 13:45:43
test.txt	24.7 KB	plain text document	2012-01-05 13:45:26
secondDirectory	--	folder	2012-01-05 13:46:21
anotherFile.doc	27.6 KB	Word document	2012-01-05 13:44:47
file1.txt	35.6 KB	plain text document	2012-01-05 13:44:15
file2.old	2.2 KB	backup file	2012-01-05 13:44:33

- **pwd** – **p**rint **w**orking **d**irectory

```
[dahlo@kalkyl4 dir]$ pwd  
/home/dahlo/glob/work/testarea/temp/dir
```


- **pwd** – print working directory

```
[dahlo@kalkyl4 dir]$ pwd  
/home/dahlo/glob/work/testarea/temp/dir
```

```
[dahlo@kalkyl4 dir]$ cd directory1/
```

```
[dahlo@kalkyl4 directory1]$ pwd  
/home/dahlo/glob/work/testarea/temp/dir/directory1
```


Absolute/Relative paths

- Absolute paths
 - Starts with a /
 - Defined from the root of the file system

`/home/dahlo/documents/results.csv`

`/proj/g2019031/nobackup/`

- Absolute paths
 - Starts with a /
 - Defined from the root of the file system

`/home/dahlo/documents/results.csv`

`/proj/g2019031/nobackup/`

- Like an address
Husargatan 3, Uppsala, Sweden

- Relative paths
 - Does not start with a /
 - Relative to where you are when using it

`../documents/results.csv`

`nobackup/dahlo/linux_intro/files.zip`

- Relative paths
 - Does not start with a /
 - Relative to where you are when using it









`../documents/results.csv`

`nobackup/dahlo/linux_intro/files.zip`

- Like a direction
4 blocks to the right, 2nd house

Navigation Commands

- Summary
 - **ls** – list content of directory
 - **cd** – change working directory
 - **pwd** – print working directory
 - Use them to explore absolute/relative paths

Name	Size	Type	Date Modified
 dir		-- folder	2012-01-05 13:44:47
 directory1		-- folder	2012-01-05 13:45:43
 secondDirectory		-- folder	2012-01-05 13:46:21
 bird.jpg	27.6 KB	JPEG Image	2012-01-05 13:46:21
 tree.jpg	110.2 KB	JPEG Image	2012-01-05 13:46:09
 anotherFile.doc	27.6 KB	Word document	2012-01-05 13:44:47
 file1.txt	35.6 KB	plain text document	2012-01-05 13:44:15
 file2.old	2.2 KB	backup file	2012-01-05 13:44:33

Interaction Commands

cp - copy a file

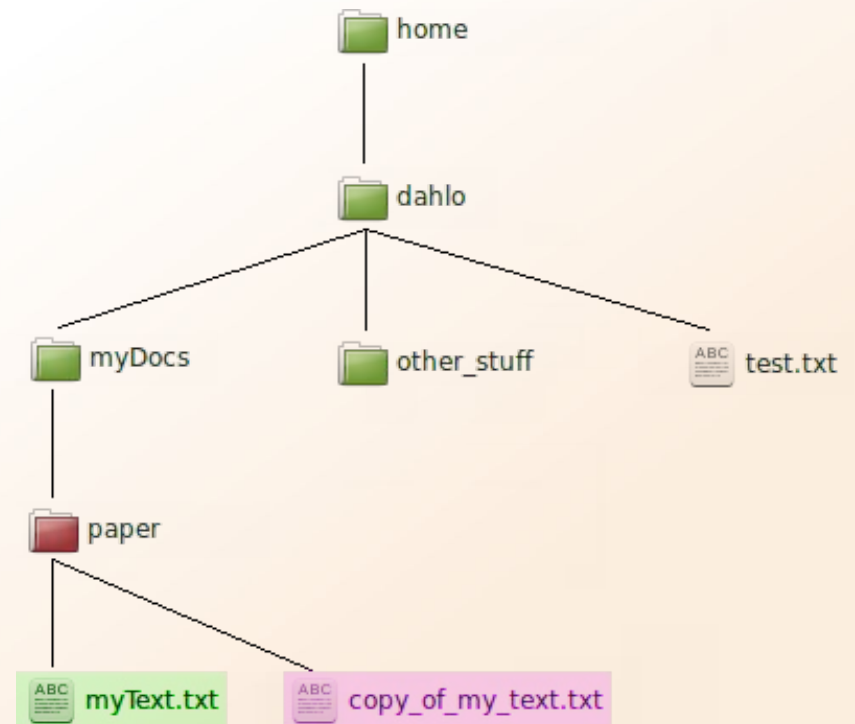
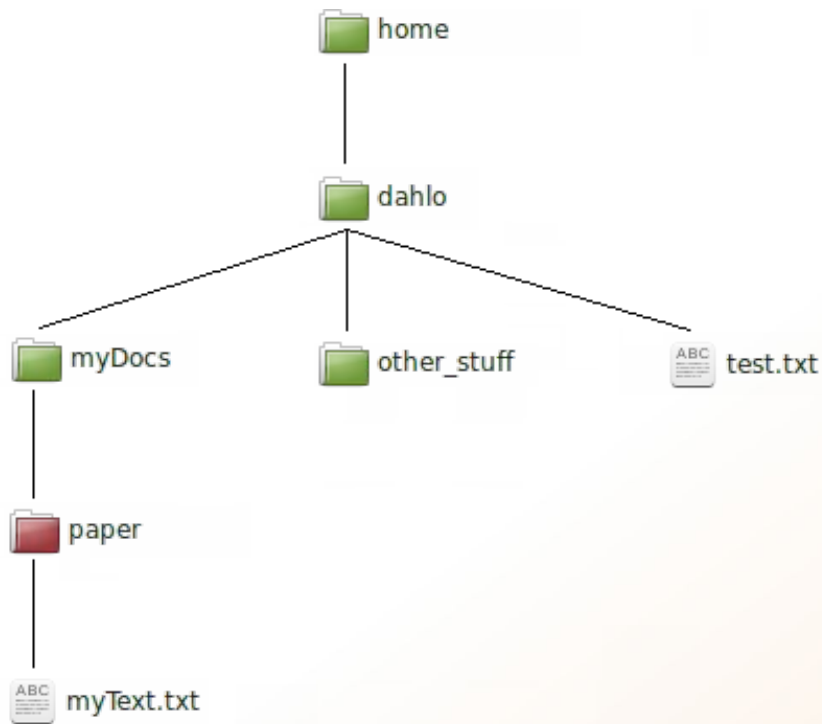
```
cp <name of original> <name of copy>
```


Interaction Commands

cp - copy a file

`cp <name of original> <name of copy>`

`cp myText.txt copy_of_my_text.txt`

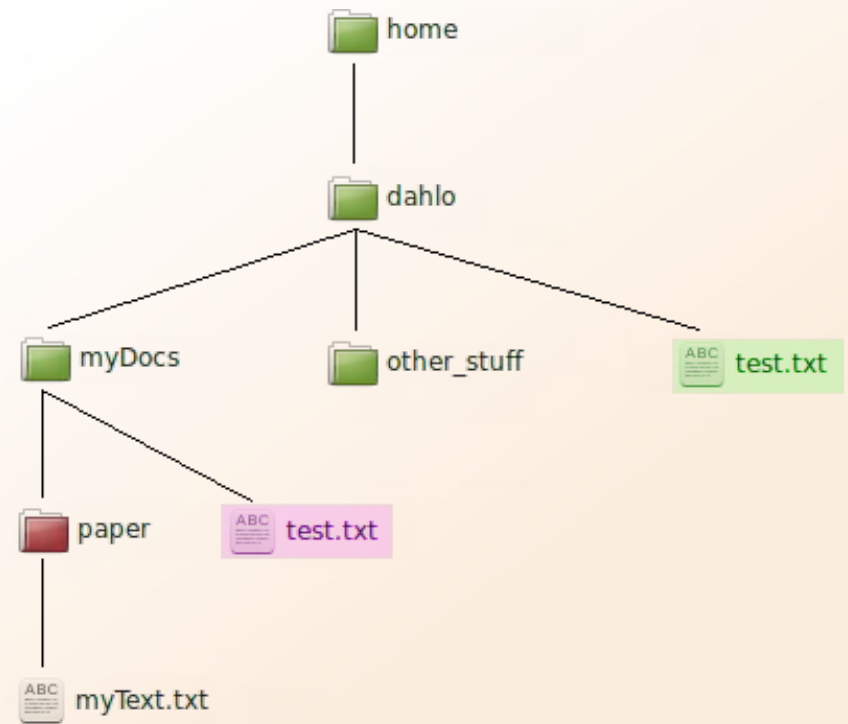
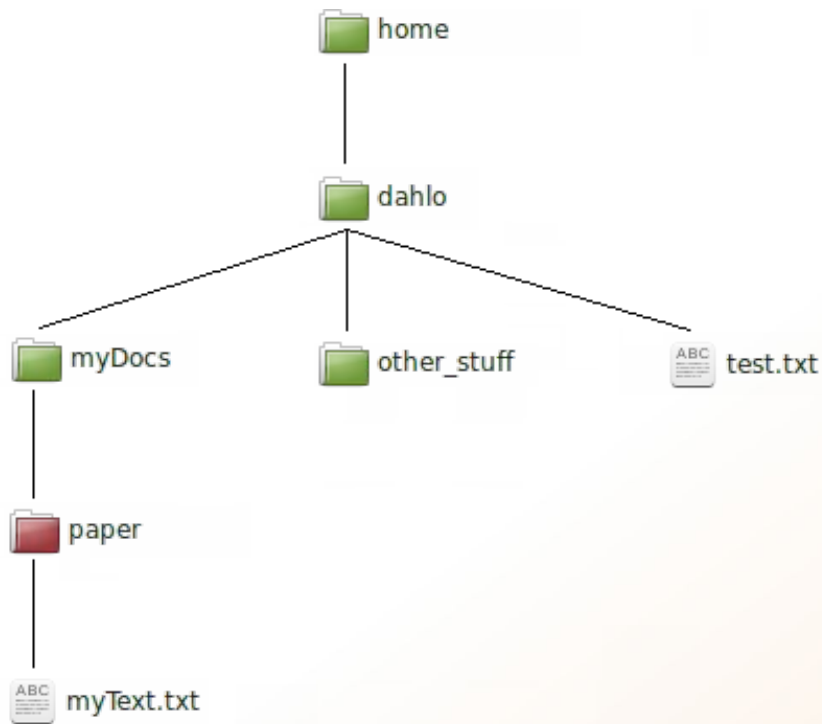


Interaction Commands

cp - copy a file

```
cp <name of original> <name of copy>
```

```
cp /home/dahlo/test.txt ../
```

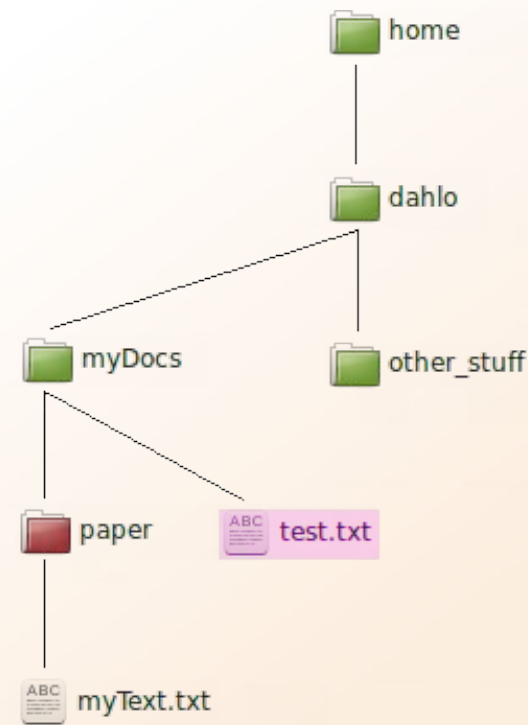
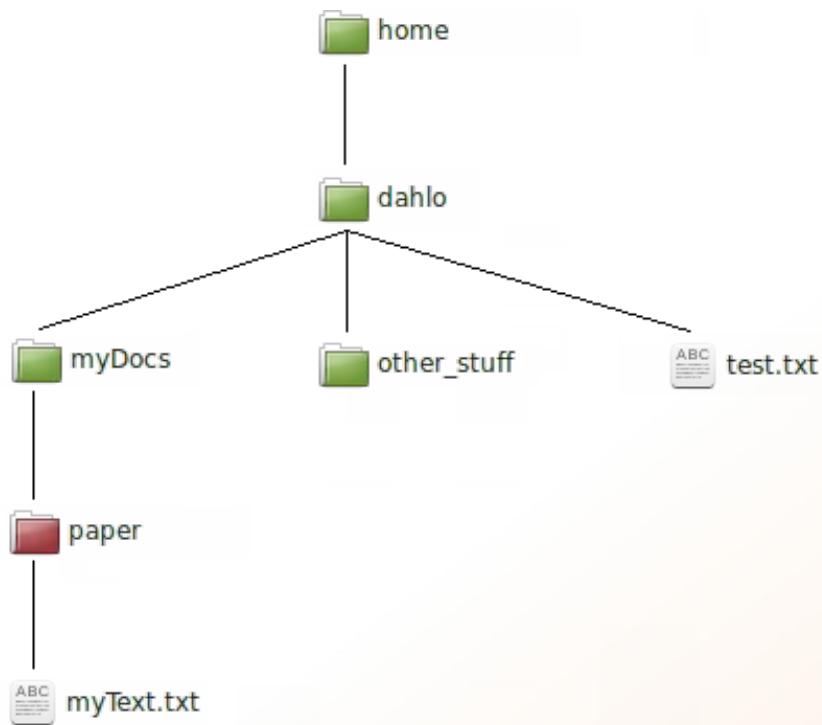


Interaction Commands

mv - move a file

`mv <name of the file> <name of the "copy">`

`mv /home/dahlo/test.txt ../../myDocs/`

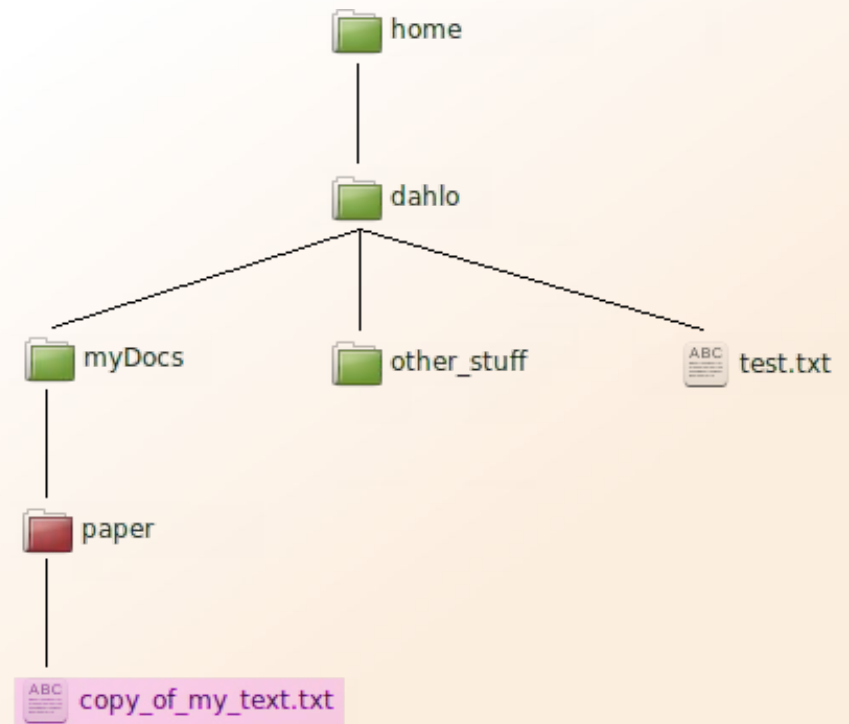
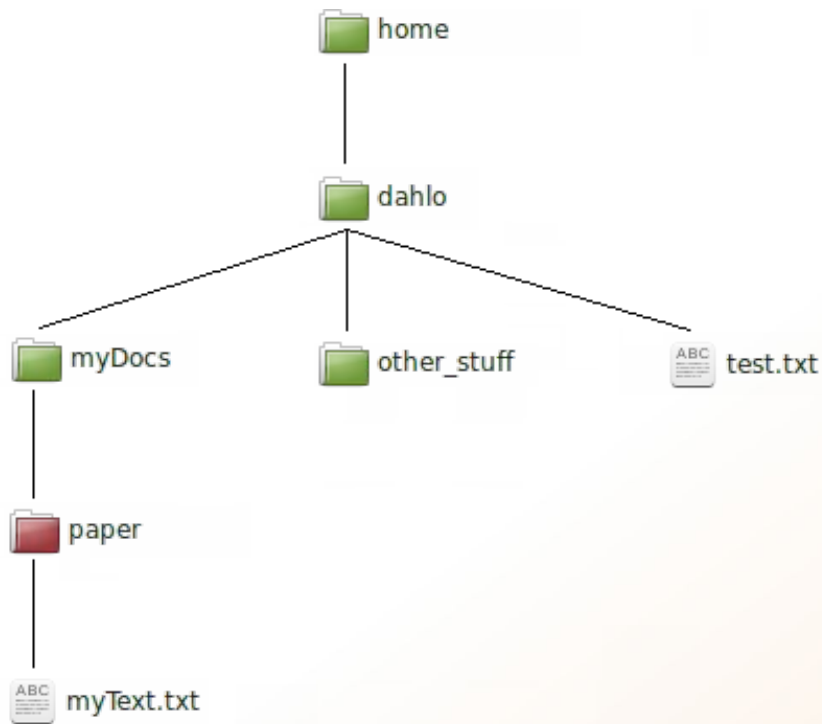


Interaction Commands

mv - rename a file

`mv <original name> <new name>`

`mv myText.txt copy_of_my_text.txt`

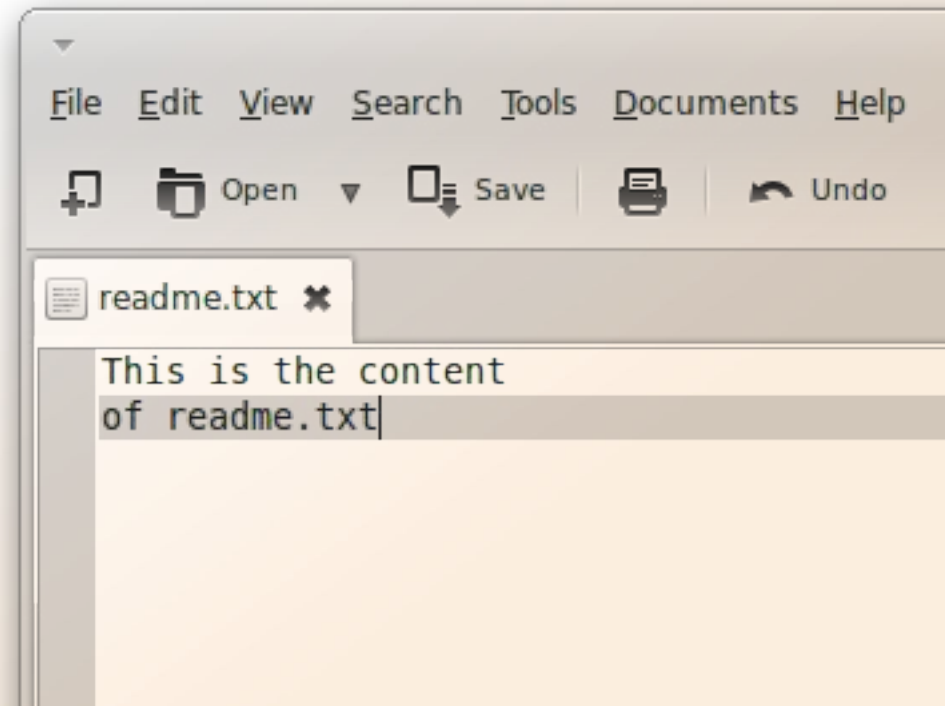


Interaction Commands

less - view content of a file

```
less <file name>
```

```
less readme.txt
```



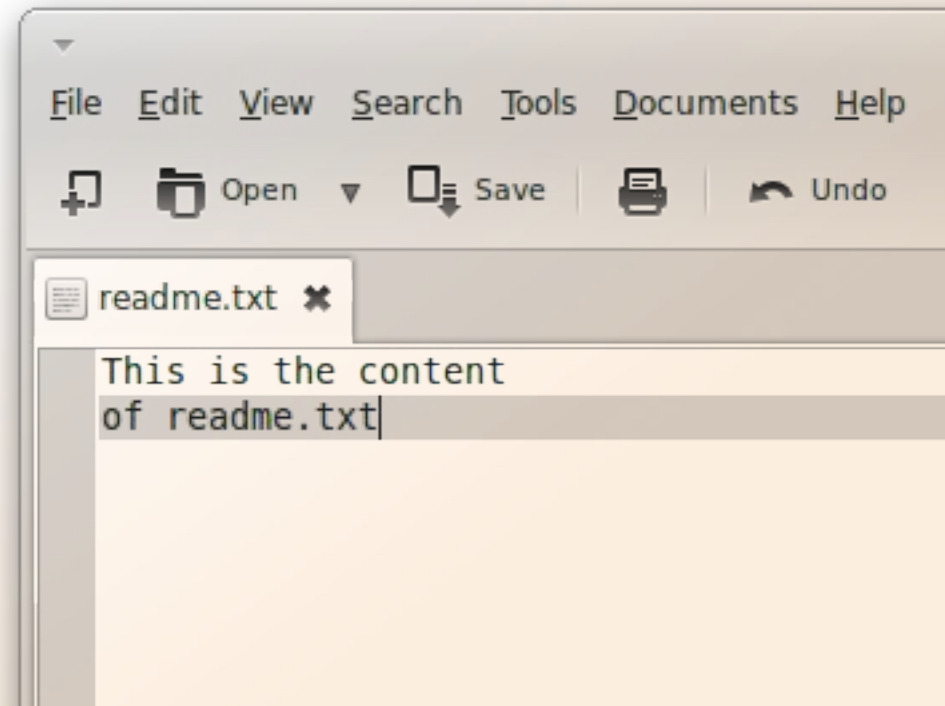
Interaction Commands

less - view content of a file

```
less <file name>
```

```
less readme.txt
```

```
This is the content  
of readme.txt  
(END)
```



Interaction Commands

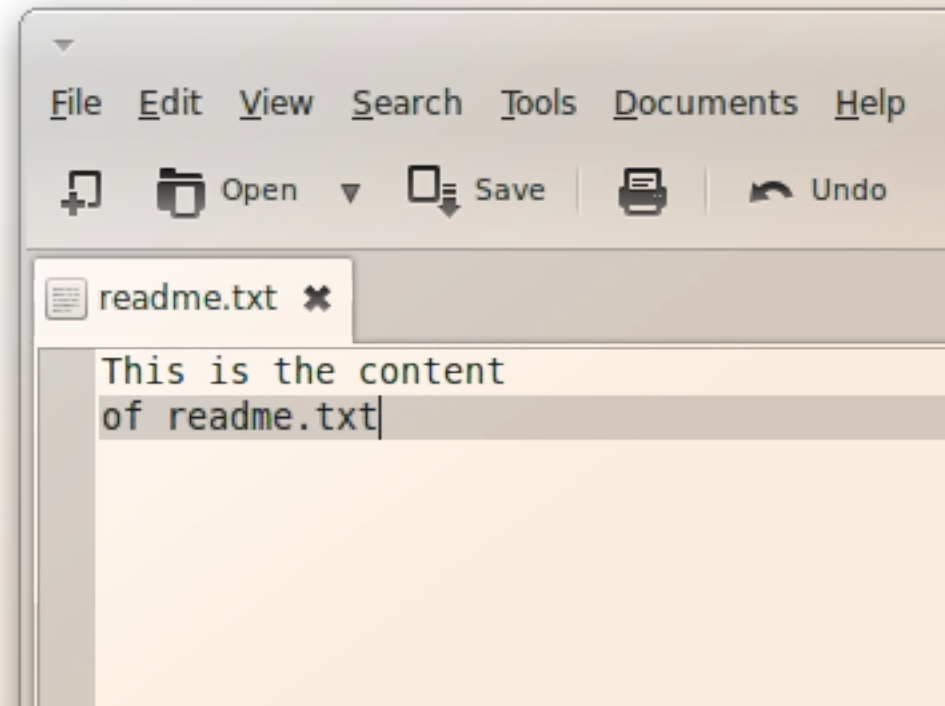
less - view content of a file

```
less <file name>
```

```
less readme.txt
```

```
This is the content  
of readme.txt  
(END)
```

press **Q** to exit less



head - view the first rows of a file

```
head <filename>
```

```
[dahlo@dahlo dahlo]$
```


head - view the first rows of a file

`head <filename>`

```
[dahlo@dahlo dahlo]$ ls -l
total 57
drwxrwxrwx 1 root root 4096 2012-09-14 10:16 .
drwxrwxrwx 1 root root    0 2012-01-17 08:28 ..
drwxrwxrwx 1 root root    0 2012-01-28 21:41 glob
drwxrwxrwx 1 root root    0 2012-08-22 17:06 myDocs
drwxrwxrwx 1 root root    0 2012-01-29 01:10 other stuff
-rwxrwxrwx 1 root root   36 2012-09-13 15:16 readme.txt
-rwxrwxrwx 1 root root 53027 2012-09-12 10:31 test.txt
[dahlo@dahlo dahlo]$
```


head - view the first rows of a file

`head <filename>`

```
[dahlo@dahlo dahlo]$ ls -l
total 57
drwxrwxrwx 1 root root 4096 2012-09-14 10:16 .
drwxrwxrwx 1 root root    0 2012-01-17 08:28 ..
drwxrwxrwx 1 root root    0 2012-01-28 21:41 glob
drwxrwxrwx 1 root root    0 2012-08-22 17:06 myDocs
drwxrwxrwx 1 root root    0 2012-01-29 01:10 other stuff
-rwxrwxrwx 1 root root   36 2012-09-13 15:16 readme.txt
-rwxrwxrwx 1 root root 53027 2012-09-12 10:31 test.txt
[dahlo@dahlo dahlo]$
[dahlo@dahlo dahlo]$ head test.txt
```


head - view the first rows of a file

head <filename>

```
[dahlo@dahlo dahlo]$ ls -l
total 57
drwxrwxrwx 1 root root 4096 2012-09-14 10:16 .
drwxrwxrwx 1 root root 0 2012-01-17 08:28 ..
drwxrwxrwx 1 root root 0 2012-01-28 21:41 glob
drwxrwxrwx 1 root root 0 2012-08-22 17:06 myDocs
drwxrwxrwx 1 root root 0 2012-01-29 01:10 other stuff
-rwxrwxrwx 1 root root 36 2012-09-13 15:16 readme.txt
-rwxrwxrwx 1 root root 53027 2012-09-12 10:31 test.txt
[dahlo@dahlo dahlo]$
[dahlo@dahlo dahlo]$ head test.txt
This file contains any messages produced by compilers while
running configure, to aid debugging if configure makes a mistake.

It was created by PSNC DRMAA for SLURM configure 1.0.5, which was
generated by GNU Autoconf 2.67. Invocation command line was

 $ ./configure --with-slurm-inc=/usr/include/slurm --with-slurm-lib=/usr/lib64/slurm --prefix=/bubo/sw/apps/build/slurm
-drmma/1.0.5

## ----- ##
## Platform. ##
[dahlo@dahlo dahlo]$
```


head - view the first rows of a file

head -n <nr of lines> <filename>

```
[dahlo@dahlo dahlo]$ ls -l
total 57
drwxrwxrwx 1 root root 4096 2012-09-14 10:16 .
drwxrwxrwx 1 root root 0 2012-01-17 08:28 ..
drwxrwxrwx 1 root root 0 2012-01-28 21:41 glob
drwxrwxrwx 1 root root 0 2012-08-22 17:06 myDocs
drwxrwxrwx 1 root root 0 2012-01-29 01:10 other stuff
-rwxrwxrwx 1 root root 36 2012-09-13 15:16 readme.txt
-rwxrwxrwx 1 root root 53027 2012-09-12 10:31 test.txt
[dahlo@dahlo dahlo]$
[dahlo@dahlo dahlo]$ head -n 3 test.txt
This file contains any messages produced by compilers while
running configure, to aid debugging if configure makes a mistake.

[dahlo@dahlo dahlo]$
```


tail - view the last rows of a file

`tail <filename>`

```
[dahlo@dahlo dahlo]$ ls -l
total 57
drwxrwxrwx 1 root root 4096 2012-09-14 10:16 .
drwxrwxrwx 1 root root    0 2012-01-17 08:28 ..
drwxrwxrwx 1 root root    0 2012-01-28 21:41 glob
drwxrwxrwx 1 root root    0 2012-08-22 17:06 myDocs
drwxrwxrwx 1 root root    0 2012-01-29 01:10 other stuff
-rwxrwxrwx 1 root root   36 2012-09-13 15:16 readme.txt
-rwxrwxrwx 1 root root 53027 2012-09-12 10:31 test.txt
[dahlo@dahlo dahlo]$
[dahlo@dahlo dahlo]$ tail test.txt
#define HAVE_STRCASECMP 1
#define HAVE_STRCHR 1
#define HAVE_STRDUP 1
#define HAVE_STRERROR 1
#define HAVE_STRNDUP 1
#define HAVE_STRSTR 1
#define HAVE_STRTOL 1
#define HAVE_VASPRINTF 1

configure: exit 0
[dahlo@dahlo dahlo]$
```


tail - view the last n rows of a file

`tail -n <nr of lines> <filename>`

```
[dahlo@dahlo dahlo]$ ls -l
total 57
drwxrwxrwx 1 root root 4096 2012-09-14 10:16 .
drwxrwxrwx 1 root root 0 2012-01-17 08:28 ..
drwxrwxrwx 1 root root 0 2012-01-28 21:41 glob
drwxrwxrwx 1 root root 0 2012-08-22 17:06 myDocs
drwxrwxrwx 1 root root 0 2012-01-29 01:10 other stuff
-rwxrwxrwx 1 root root 36 2012-09-13 15:16 readme.txt
-rwxrwxrwx 1 root root 53027 2012-09-12 10:31 test.txt
[dahlo@dahlo dahlo]$
[dahlo@dahlo dahlo]$ tail -n 3 test.txt
#define HAVE_VASPRINTF 1

configure: exit 0
[dahlo@dahlo dahlo]$
```


nano - edit content of a file

```
nano <file name>
```

```
nano readme.txt
```


Interaction Commands

nano - edit content of a file

```
nano <file name>
```

```
nano readme.txt
```

^ = ctrl

```
GNU nano 2.2.6      File: readme.txt
```

```
This is the content  
of readme.txt
```

```
[ Read 3 lines ]
```

```
^G Get Help    ^O WriteOut    ^R Read File   ^Y Prev Page   ^K Cut Text     ^C Cur Pos  
^X Exit        ^J Justify     ^W Where Is    ^V Next Page   ^U UnCut Text  ^T To Spell
```


rm - remove a file

There is no trash bin in CLI! Gone is gone..

```
rm <file name>
```

Ex.

```
rm readme.txt
```

```
rm ../../../../file1.txt
```

```
rm /home/dahlo/test.txt
```


*

```
[dahlo@dahlo dir]$ ls -l
total 68
-rwxrwxrwx 1 root root 28214 2012-01-05 13:44 anotherFile.doc
drwxrwxrwx 1 root root    0 2012-01-17 08:28 directory1
-rwxrwxrwx 1 root root 36458 2012-01-05 13:44 file1.txt
-rwxrwxrwx 1 root root  2273 2012-01-05 13:44 file2.old
drwxrwxrwx 1 root root    0 2012-01-17 08:28 secondDirectory
[dahlo@dahlo dir]$
```


*

```
[dahlo@dahlo dir]$ ls -l
total 68
-rwxrwxrwx 1 root root 28214 2012-01-05 13:44 anotherFile.doc
drwxrwxrwx 1 root root    0 2012-01-17 08:28 directory1
-rwxrwxrwx 1 root root 36458 2012-01-05 13:44 file1.txt
-rwxrwxrwx 1 root root  2273 2012-01-05 13:44 file2.old
drwxrwxrwx 1 root root    0 2012-01-17 08:28 secondDirectory
[dahlo@dahlo dir]$
[dahlo@dahlo dir]$ ls -l *.txt
-rwxrwxrwx 1 root root 36458 2012-01-05 13:44 file1.txt
[dahlo@dahlo dir]$
```


*

```
[dahlo@dahlo dir]$ ls -l
total 68
-rwxrwxrwx 1 root root 28214 2012-01-05 13:44 anotherFile.doc
drwxrwxrwx 1 root root      0 2012-01-17 08:28 directory1
-rwxrwxrwx 1 root root 36458 2012-01-05 13:44 file1.txt
-rwxrwxrwx 1 root root  2273 2012-01-05 13:44 file2.old
drwxrwxrwx 1 root root      0 2012-01-17 08:28 secondDirectory
[dahlo@dahlo dir]$
[dahlo@dahlo dir]$ ls -l *.txt
-rwxrwxrwx 1 root root 36458 2012-01-05 13:44 file1.txt
[dahlo@dahlo dir]$
[dahlo@dahlo dir]$ ls -l file*
-rwxrwxrwx 1 root root 36458 2012-01-05 13:44 file1.txt
-rwxrwxrwx 1 root root  2273 2012-01-05 13:44 file2.old
[dahlo@dahlo dir]$
```


*

Works with most Linux commands

Ex:

```
cp *.txt directory1/
```


*

Works with most Linux commands

Ex:

```
cp *.txt directory1/  
rm *.tmp
```


The most important thing

TAB COMPLETION

(try to) never type a path or filename without it!

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```
[dahlo@dahlo-linux dir]$ ls -l
total 68
-rwxrwxrwx 1 root root 28214 2012-01-05 13:44 anotherFile.doc
drwxrwxrwx 1 root root    0 2012-01-17 08:28 directory1
-rwxrwxrwx 1 root root 36458 2012-01-05 13:44 file1.txt
-rwxrwxrwx 1 root root  2273 2012-01-05 13:44 file2.old
drwxrwxrwx 1 root root    0 2012-01-17 08:28 secondDirectory
[dahlo@dahlo-linux dir]$ nano fi
```


TAB COMPLETION

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total 68
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[dahlo@dahlo-linux dir]$ nano file
```


TAB COMPLETION

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[dahlo@dahlo-linux dir]$ nano file
file1.txt file2.old
[dahlo@dahlo-linux dir]$ nano file█
```


TAB COMPLETION

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```
[dahlo@dahlo-linux dir]$ ls -l
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[dahlo@dahlo-linux dir]$ nano file
file1.txt  file2.old
[dahlo@dahlo-linux dir]$ nano file1.txt
```


Good to Know Commands

top - how much is the computer working?

top

```
top - 21:27:48 up 37 days, 7:34, 2 users, load average: 6.38, 6.09, 6.03
Tasks: 278 total, 4 running, 274 sleeping, 0 stopped, 0 zombie
Cpu(s): 73.5%us, 1.5%sy, 0.0%ni, 24.3%id, 0.6%wa, 0.0%hi, 0.0%si, 0.0%st
Mem: 24598372k total, 17703556k used, 6894816k free, 83596k buffers
Swap: 25165816k total, 29704k used, 25136112k free, 15403636k cached
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
5751	zhibing	20	0	1531m	45m	9492	S	100.0	0.2	679:58.20	invaperco
5755	zhibing	20	0	1531m	43m	9492	S	100.0	0.2	679:49.38	invaperco
5759	zhibing	20	0	1531m	43m	9480	S	100.0	0.2	679:56.71	invaperco
5779	zhibing	20	0	1531m	44m	9492	S	100.0	0.2	679:21.84	invaperco
6212	nicusor	20	0	451m	377m	3356	R	100.0	1.6	668:47.67	cretin
28221	roca	20	0	3114m	88m	4188	R	99.7	0.4	8:26.15	seward.exe
16870	root	20	0	0	0	0	S	0.7	0.0	0:13.69	flush-8:0
1781	root	39	19	0	0	0	S	0.3	0.0	17:26.31	kipmi0
1903	root	20	0	0	0	0	S	0.3	0.0	1:24.46	kpanfs_dispatch
28483	dahlo	20	0	13384	1292	884	R	0.3	0.0	0:00.03	top
1	root	20	0	21416	652	448	S	0.0	0.0	0:01.70	init
2	root	20	0	0	0	0	S	0.0	0.0	0:00.03	kthreadd
3	root	RT	0	0	0	0	S	0.0	0.0	0:00.14	migration/0
4	root	20	0	0	0	0	S	0.0	0.0	0:01.40	ksoftirqd/0
5	root	RT	0	0	0	0	S	0.0	0.0	0:00.00	migration/0

Instructions how to use programs

Easy to forget syntax

Manual pages

`man <program name>`

Ex.

`man ls`

(q to quit)

```

LS(1)                                User Commands                                LS(1)

NAME
    ls - list directory contents

SYNOPSIS
    ls [OPTION]... [FILE]...

DESCRIPTION
    List information about the FILES (the current directory by default).
    Sort entries alphabetically if none of -cftuvSUX nor --sort.

    Mandatory arguments to long options are mandatory for short options
    too.

    -a, --all
        do not ignore entries starting with .

    -A, --almost-all
        do not list implied . and ..
    
```


How do I log out?

```
exit
```

Exits only the current terminal

- Summary

- `cp` – copy a file
- `mv` – move a file
- `less` – view a file
- `nano` – view and edit a file
- `rm` – remove a file
- `head / tail`
- wildcards
- **tab completion** – use it!!!
- `top` – see active processes
- `man` – manual pages
- `exit` – Log out current terminal

About 581 000 results (0,79 seconds)

However, **renaming multiple** or group of **files** quickly makes it very difficult task in a terminal. **Linux** comes with a very powerful built-in tool called **rename**. The **rename** command is used to **rename multiple** or group of **files**, **rename files** to lowercase, **rename files** to uppercase and overwrite **files** using perl expressions. Oct 10, 2013



Rename – A Command Line Tool For Renaming Multiple Files in Linux

<https://www.tecmint.com/rename-multiple-files-in-linux/>

 About this result  Feedback

Howto: Linux Rename Multiple Files At a Shell Prompt – nixCraft

<https://www.cyberciti.biz/tips/renaming-multiple-files-at-a-shell-prompt.html> ▼

Nov 26, 2005 - **Rename** command syntax. It is a faster way to group **rename files** in **Linux** or Unix-like system. Say hello to zmv for zsh. Say hello to mmv command. Examples: **Linux Rename Multiple Files** Using a Shell Script. POSIX shell **rename** all *.bak to *.txt. **Linux** Shell script to **rename files**. Perl Script To **Rename File**.

linux - How to rename multiple files in single command or script in ...

<https://unix.stackexchange.com/.../how-to-rename-multiple-files-in-single-command-...> ▼

ssh - Secure SHell connection (ssh)

```
ssh -Y <username>@dardel.pdc.kth.se
```

Ex:

```
ssh -Y dahlo@dardel.pdc.kth.se
```

Terminal in Linux and OS X

PowerShell in Windows

ssh - Secure SHell connection (ssh)

```
ssh -Y <username>@dardel.pdc.kth.se
```

Ex:

```
ssh -Y dahlo@dardel.pdc.kth.se
```

Terminal in Linux and OS X

PowerShell in Windows

Requires SSH keys or Kerberos

Laboratory time!

https://nbisweden.github.io/workshop-ngsintro/2511/topics/linux/lab_linux_intro.html