Unix like system

Command line is your friend

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Test your account

In a terminal:

```
ssh my_cc_account@mp2.ccs.usherbrooke.ca
```
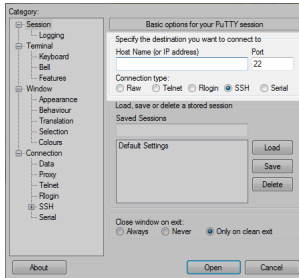
on older windows systems:
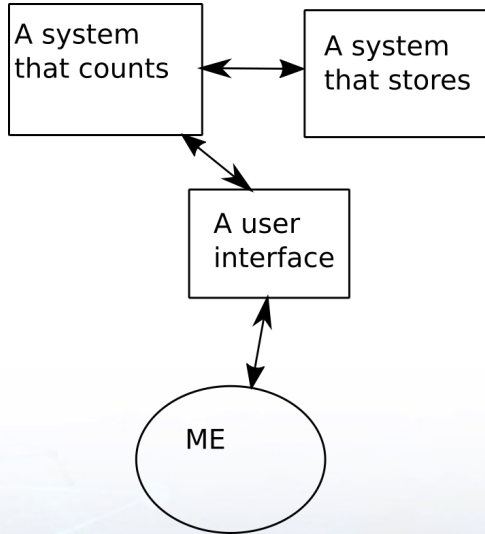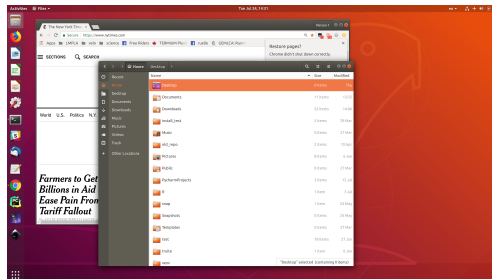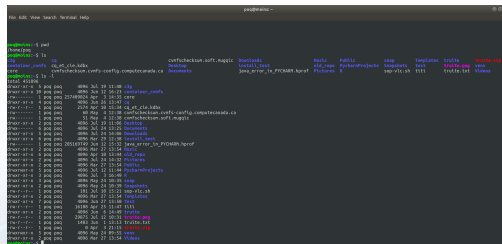

Figure: Putty

Simple computer

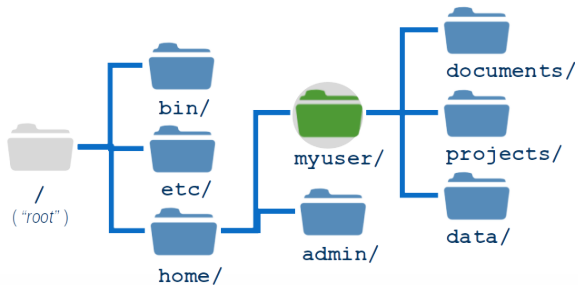Figure: very simple

A User Interface (UI)

GUI

UI

A System that Stores

The file system is like a serie of interlinked drawers

Root /
system comfiguration /etc
home $HOME == /home/myuser
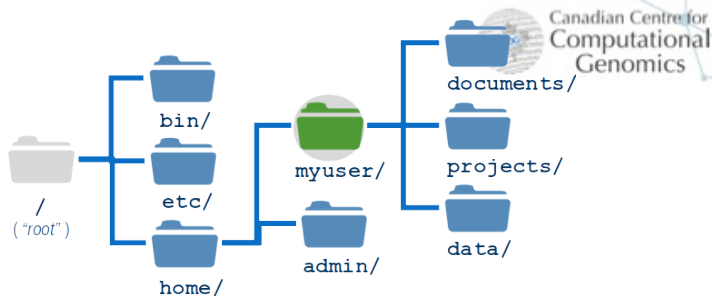
File System

```
[poq@ip15-mp2 ~]$ pwd
/home/poq
[poq@ip15-mp2 ~]$ ls
bin   projects   scratch
[poq@ip15-mp2 ~]$ ls -al
total 1011
drwx————      6 poq   poq     4096 Jul 12 15:36 .
drwxr-xr-x 16925 root  root  876544 Jul 24 14:17 ..
-rw————      1 poq   poq     4748 Jul 12 13:37 .bash_history
-rw-r—r——      1 poq   poq       18 Feb 16 18:23 .bash_logout
-rw-r—r——      1 poq   poq      193 Feb 16 18:23 .bash_profile
-rw-r—r——      1 poq   poq      260 Jul 11 17:31 .bashrc
drwxrwxr-x     2 poq   poq     4096 Jul 11 17:32 bin
drwxrwxr-x     2 poq   poq     4096 May 22 09:54 .licenses
drwxr-xr-x     2 root  poq     4096 Jun 14 16:17 projects
lrwxrwxrwx     1 poq   poq       12 Feb 25 17:28 scratch -> /scratch/poq
drwx————      2 poq   poq     4096 Jul 12 13:37 .ssh
-rw————      1 poq   poq    13217 Jul 12 13:37 .viminfo
[poq@ip15-mp2 ~]$ cd bin/
[poq@ip15-mp2 bin]$ pwd
/home/poq/bin
[poq@ip15-mp2 bin]$ ls
partition-stats   toto
```

Relative or full path:

relative path `project/`

relative path `./project/`

relative path `../admin/`

absolute path `/home/myuser/project/`

absolute path`$HOME/project/`

- ▶ Relative to the user though

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Creating/deleting files/directory and moving them around

- ► create (make) directory: `mkdir a_dir/`
- ► create a file : `nano new_file.txt`
- ► delete (remove) a file : `rm a_file.txt`
- ► delete directory (and file in it recurcively): `rm -r a_dir/`
- ► move (or rename) a file or directory: `mv old_name ../new_place_and_name`
- ► Remeber not to panic!

```
[poq@ip18-mp2 hand_on]$ rm-r toto/
rm-r: command not found
```

Ownership and Permissions

```
[poq@ip18-mp2 hand_on]$ ls -al
total 55
drwxr-xr-x 2 poq poq 4096 Jul 25 18:46 .
drwx------ 7 poq poq 4096 Jul 25 17:08 ..
-rw-rw-r-- 1 poq poq    2 Jul 25 16:20 a_file.txt
-rwxr-xr-x 1 poq poq  106 Jul 25 16:45 a_script.sh
```

- ► UID
- ► GID
- ► USER GROUP OTHER
- ► rwx -> read, write, execute
- ► To change: `chmod g+rx`

Simple Computer
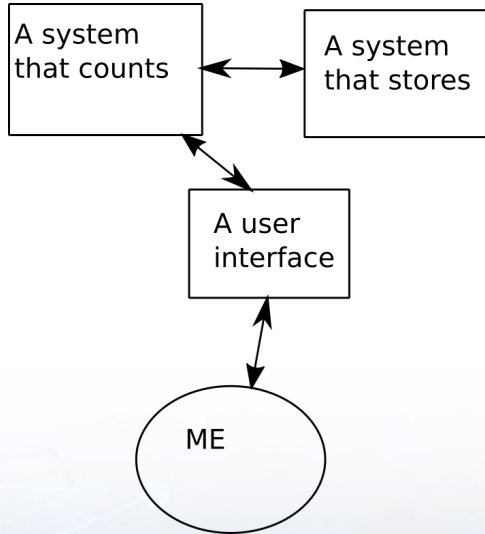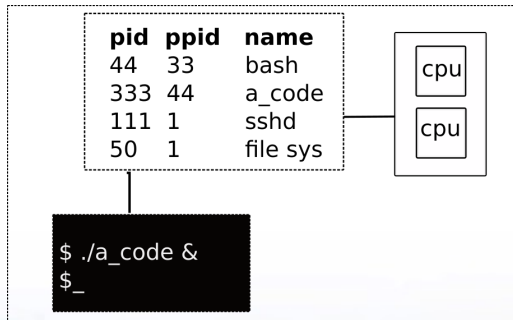
Figure: very simple

A System that Counts

▶ All commands are script/binary/software that tell the computer to execute some code. The script can be written in BASH, python, Fortran, C++, ...

▶ Once a script is executed, it "transforms" into a process.

pid	ppid	name
44	33	bash
333	44	a_code
111	1	sshd
50	1	file sys

```
$ ./a_code &
$ _
```

cpu

cpu

▶ This process has ways to talk to the external world: streams. There are three "standard" streams called stdin, stdout and stderr.

Bigger computers

Super Computer

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▶ Compute Canada (CC) is an umbrella organisation that helps providing computing services to Canadians. It is undergoing a transformation right now, sweeping from the West: it closes smaller supercomputers managed by universities and opens regional SuperComputers

▶ New: Cedar (Simon Fraiser- West Grid)
New: Graham (Waterloo - Compute Ontario)
New: Niagara (Toronto - Compute Ontario)
To come: Beluga (Montréal - Calcul Québec)
Legacy: Guillimin (U. McGill), Mammouth (U. Sherbrooke), etc.

▶ The Mammouth cluster (mp2b) used for this workshop is a test bed for Beluga.
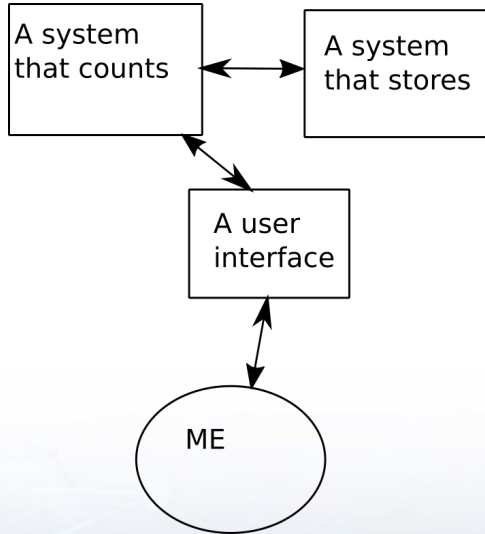
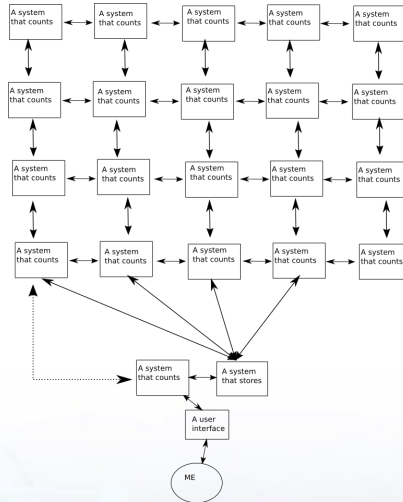# Simple computer

Figure: very simple

Simple Super Computer

Figure: HPC for numerical simulation
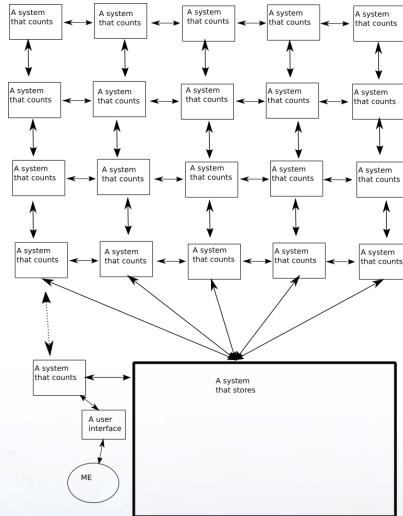
Simple Super Computer for Big data

Figure: HPC for data sciences
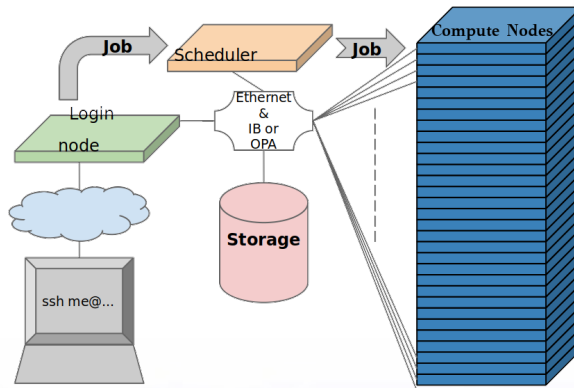
- ▶ Parallel jobs
- ▶ Pipelines or batch jobs (That is GenPipes)

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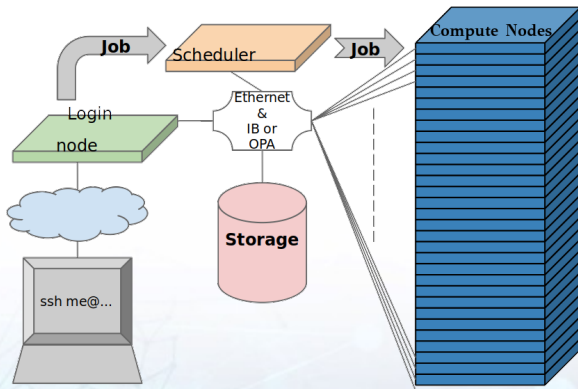Genomics

For many task, you don't have to think that the super computer is super... In fact, GenPipes is taking care of that part for you!

▶ You run Genpipes on a a single (simple) computer and it creats a script with supercomputer commands

▶ You just ask the supercomputer to execute it and then look at your data being generated.

Scheduler

- ▶ Older sites often use or still uses PBS/TORQUE (qsub)
- ▶ On all new CC system SLRUM (Simple Linux Utility for Resource Managemen) is the workload manager/job scheduler (Useful SLRUM commands **sbatch, scancel, squeue**)

Thank you!