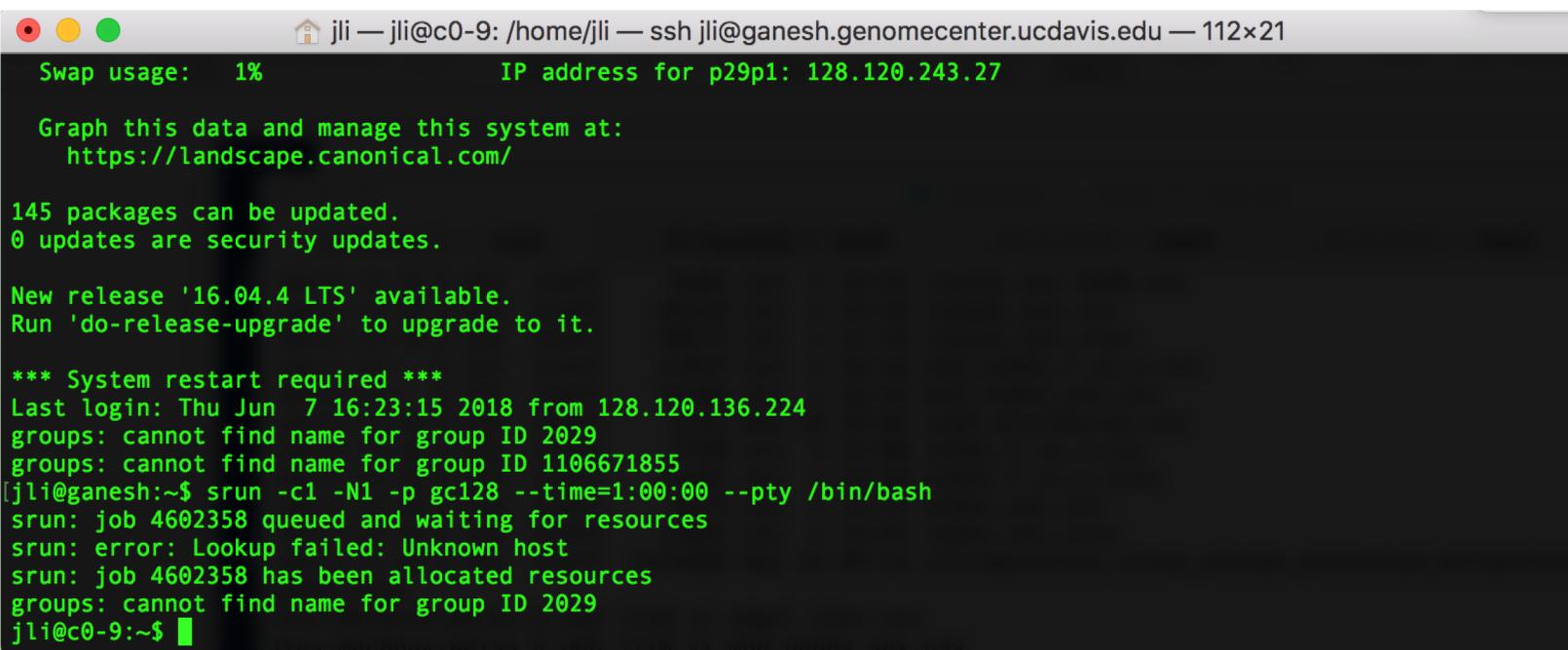


Introduction to Command Line

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What is command line interface

- CLI is a tool into which one can type commands to perform tasks.
- The user interface that accepts the typed responses and displays the data on the screen is called a shell. many shell types, most common is bash.
- An all-text display



A screenshot of a terminal window titled "jli — jli@c0-9: /home/jli — ssh jli@ganesh.genomecenter.ucdavis.edu — 112x21". The window displays system status and upgrade information:

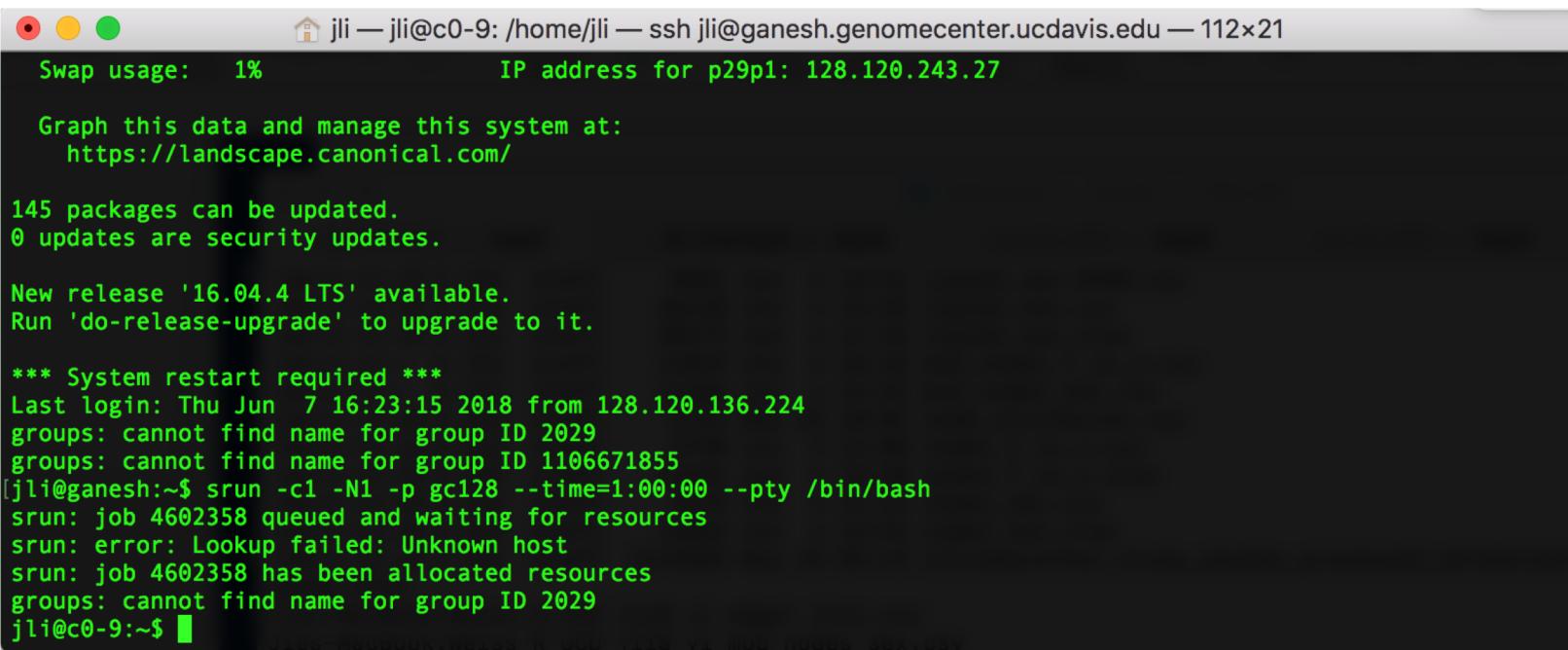
```
Swap usage:  1%          IP address for p29p1: 128.120.243.27
Graph this data and manage this system at:
  https://landscape.canonical.com/
145 packages can be updated.
0 updates are security updates.

New release '16.04.4 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

*** System restart required ***
Last login: Thu Jun  7 16:23:15 2018 from 128.120.136.224
groups: cannot find name for group ID 2029
groups: cannot find name for group ID 1106671855
[jli@ganesh:~$ srun -c1 -N1 -p gc128 --time=1:00:00 --pty /bin/bash
srun: job 4602358 queued and waiting for resources
srun: error: Lookup failed: Unknown host
srun: job 4602358 has been allocated resources
groups: cannot find name for group ID 2029
jli@c0-9:~$ ]
```

What is command line interface

- A prompt is a short text message at the start of the command line on CLI.
 - Ends with \$ in bash shell
 - Commands are typed after the prompt



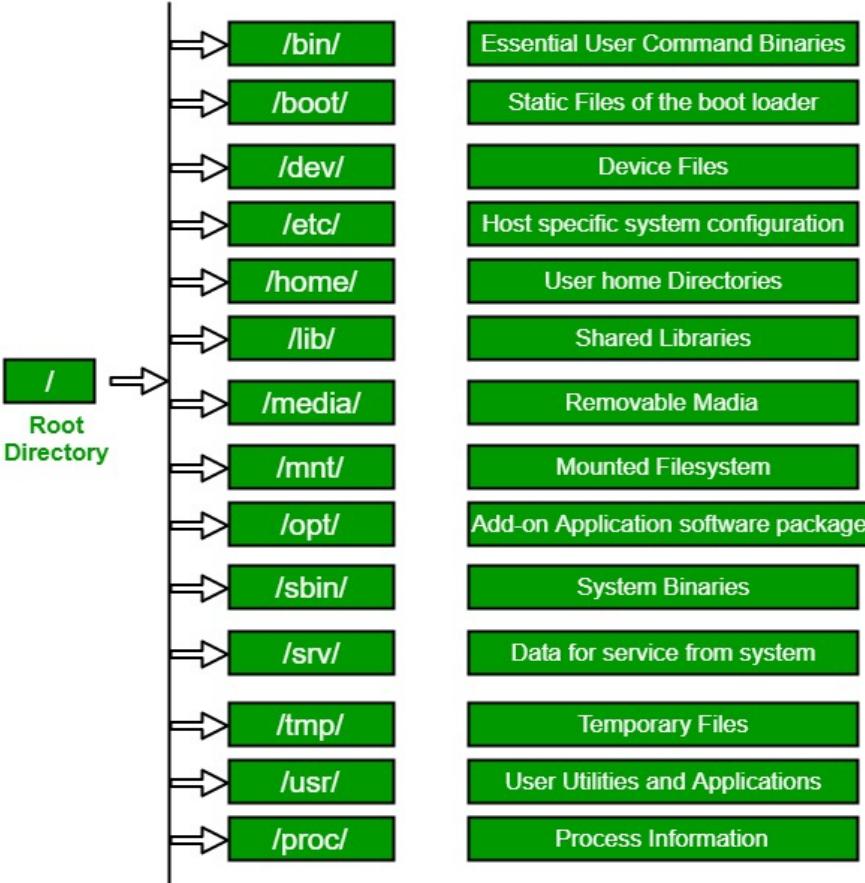
The screenshot shows a terminal window with a dark background and light-colored text. At the top, it displays the user's name (jli), session ID (jli@c0-9), current directory (/home/jli), and the fact that they are connected via SSH from another host (ganesh.genomecenter.ucdavis.edu). It also shows the resolution (112x21).

Below this, the terminal displays several system status messages:

- Swap usage: 1% (green text)
- IP address for p29p1: 128.120.243.27 (green text)
- Graph this data and manage this system at: <https://landscape.canonical.com/> (green text)
- 145 packages can be updated.
- 0 updates are security updates.
- New release '16.04.4 LTS' available.
- Run 'do-release-upgrade' to upgrade to it.
- *** System restart required ***
- Last login: Thu Jun 7 16:23:15 2018 from 128.120.136.224
- groups: cannot find name for group ID 2029
- groups: cannot find name for group ID 1106671855
- [jli@ganesh:~\$ srun -c1 -N1 -p gc128 --time=1:00:00 --pty /bin/bash
- srun: job 4602358 queued and waiting for resources
- srun: error: Lookup failed: Unknown host
- srun: job 4602358 has been allocated resources
- groups: cannot find name for group ID 2029

At the bottom, the prompt jli@c0-9:~\$ is visible, followed by a small black square icon.

File structure in CLI



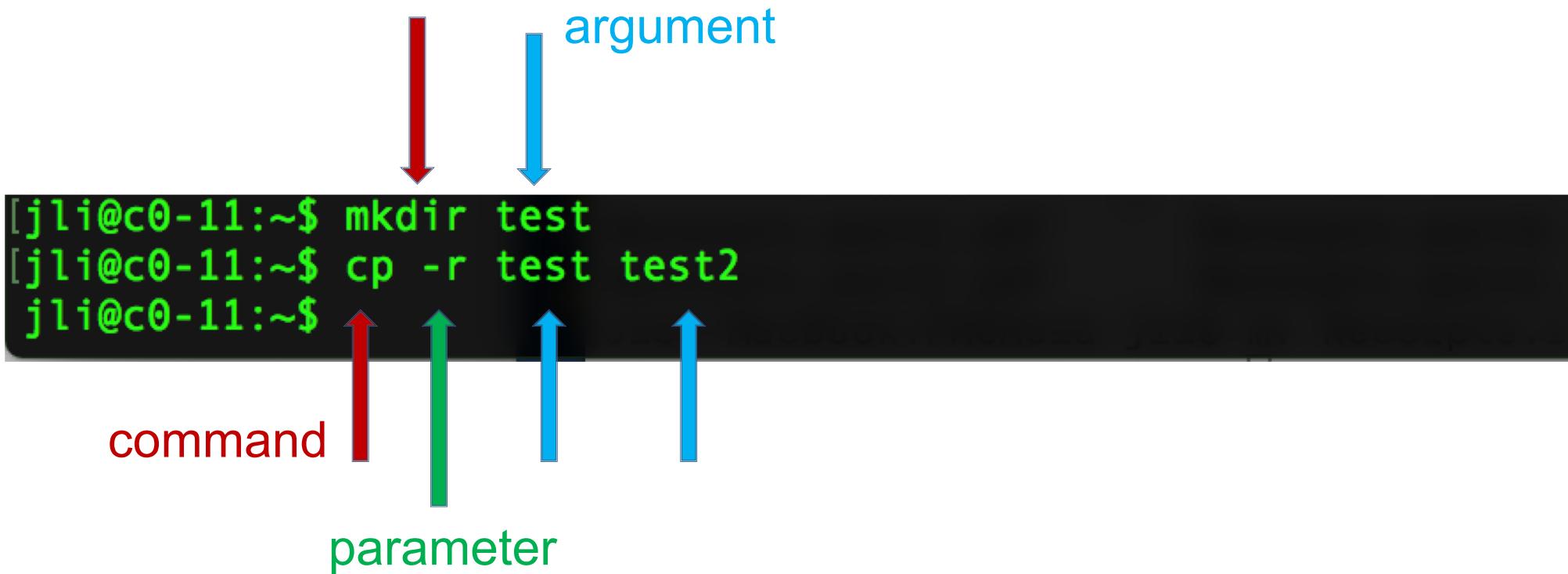
- Usually, **/home** (**/Users** on a mac) is where the user accounts reside, ie. user's home directory.
 - For example, for a user that has a user name of “jli”: /home/jli
 - It is the directory that a user is first at after logging into the system.
 - The *tilde* (~) represents a user's home directory.

File structure in CLI (continued...)

- Absolute path: always starts with "/"
 - /home/jli/test/file1
- Relative path: always relative to where we currently are
 - a single dot (.) refers to the current directory
 - two dots (..) refers to the directory one level up

Syntax of a command in CLI

- A command plus the required parameters/arguments
- The separator used is space



Move around in CLI

- Command to find out where we currently are
 - **pwd** (present working directory)
- Command to change to another directory
 - **cd** (change directory)
 - use absolute path: `cd /home/jli/test/run1`
 - use relative path: `cd ..`
 - without any argument (just `cd`), by default, change to user's home directory

Display files in CLI

- Command to display a list of files
 - **ls**
 - without any other parameters, it list all files/directories inside the current directory
 - may be combined with a path to list a specific file/directory
 - to show all files/directories and their associated information: *ls –lah*
 - 3 params: *-a* is for hidden files, *h* is for human readable file sizes, *l* is for long listing

```
drwxr-xr-x 12 jli  biocore   60 Apr  9 11:53 tmp
-rw-rw-r--  1 jli  biocore  1823 May 14 15:42 tt
-rw-rw-r--  1 jli  biocore 3614 Dec 27 2016 tt2
drwxr-xr-x  2 jli  biocore    3 Jun  8 10:31 .vim
-rw-r--r--  1 jli  biocore 29136 Jun  8 16:27 .viminfo
drwxrwxr-x  6 jli  biocore   6 Sep 26 2016 virtualenv
drwxrwxr-x  8 jli  biocore   9 Oct  6 2016 virtualenv-falcon
drwxrwxr-x  6 jli  biocore   6 Nov 17 2016 virtualenv-pysam
drwxrwxr-x  4 jli  biocore   4 Oct 20 2017 virtualenv-snakefile
drwxrwxr-x  6 jli  biocore   6 Nov  3 2016 virtualenv-tools
drwxrwxr-x  2 jli  biocore   2 Feb 10 2017 virtualenv-unzip
```

Move things around in CLI

- Command to move something from one place to another, also the way to rename a file.
 - **mv (move)**
 - two arguments required:
 - the file/directory that you want to be moved
 - the new location
 - it is also the command to rename things in CLI

Create things in CLI

- Command to create a directory
 - **mkdir (make directory)**
 - one argument required:
 - the directory that you want to create
 - may create multiple directories at the same time
 - by default, the directory is created in the current directory, unless another valid path is given
- Methods to create a file
 - Files can be created with a text editor, such as vi, vim, nano, Emacs (nano is the simplest)
 - An empty file can be created using ‘touch’ followed by the file name.

Make copies of things in CLI

- **cp (copy)**
 - two arguments required:
 - the thing to copy
 - the place to put the copy
 - use -r parameter to copy a directory (recursively)

Remove things in CLI

- **rm (remove)**
 - by default, it only removes a file
 - in order to remove a directory, use -r parameter (recursively)

```
drwxrwxr-x  2 jli biocore  2 Jun  8 17:28 test
```

```
[jli@c0-11:~$ rm test
rm: cannot remove 'test': Is a directory
[jli@c0-11:~$ rm -r test
jli@c0-11:~$ ]
```

NEVER EVER use the following command, unless you really mean it

rm -rf *

Remove everything in this directory

Move things to/from a remote location in CLI

- Between two remote unix (command line) based locations
 - **scp** (**s**ecure **c**opy)
 - wget
 - curl
 - rsync
- On Windows/Mac machines
 - WinSCP
 - Filezilla
 - Cyberduck
 - many others