

Shell tutorial

02-06-2020

A Shell is a program that enables user to interact with the operating system. There are a few common implementaion of a shell.

- bash
 - the most common shell
 - default in linux
 - used to be the default shell on macOS
- zsh
 - the default shell in macOS 10.15 Catalina
- powershell
 - primarily used in windows

We will focus on **bash** (and **zsh** is **bash** compatible).

There are a few program to launch the shell.

- linux
 - depends on the desktop environment, it could be gnome terminal, konsole etc..
- macOS
 - the default Terminal
 - iTerm2
- Windows
 - Powershell
 - Cmd (which runs DOS)
 - Cmder
- RStudio terminal
- Rmarkdown (for bash script)

Commands to cover

File navigation

- ls - list the current directory
- A usful alias for unix is

```
alias ls='ls --color=auto -F'
```

- pwd - show the current directory
- cd - change directory
 - cd .. go to parent directory
 - cd - go to the previous directory
 - cd ~ go to the home directory

File manipulation

- touch - create an empty file
- mkdir
 - create a directory
 - mkdir -p folder1/folder2/folder3
- mv rename / move a file
- cp
- rm
 - rm file
 - rm -r dir

Utility

- echo
- cat
 - print the content of a file
- which
- export

SSH

The SSH protocol (also referred to as Secure Shell) is a method for secure remote login from one computer to another.

To use ssh, we need to install ssh.

- linux and macOS
 - you should have the ssh program already
- Windows
 - if you have installed git for windows, we should have git-bash and ssh installed.

Login to your peloton account

```
ssh sta141c-NUMBER@peloton.cse.ucdavis.edu
```

Unfortunately, you will need to copy and paste password everytime you login. (I will teach you a way to do it in R without typing password each time).

File editing over ssh

Editing a file over SSH is not an easy task.

- use a text editor in the system
- edit it locally and upload it to the server
 - either use `scp` functions
 - or a software, for example “Cyber Duck” for macOS and WinScp for Windows.

scp function to copy files from to to server

To copy a local file `file.txt` to remote `~/foo/file.txt`

```
scp file.txt sta141c-98@peloton.cse.ucdavis.edu:~/foo/
```

To copy a local directory to remote `~/foo/local_directory`

```
scp -r local_directory sta141c-98@peloton.cse.ucdavis.edu:~/foo/
```

To copy a local file `file.txt` from remote `~/foo/file.txt`

```
scp sta141c-98@peloton.cse.ucdavis.edu:~/foo/file.txt ./
```

To copy a directory from remote `~/foo/`

```
scp -r sta141c-98@peloton.cse.ucdavis.edu:~/foo/ ./
```

The package `ssh` and `keyring`.

```
library(keyring)
# only need to do it once
key_set("PELTONPASSWORD")
```

```
library(ssh)
session <- ssh_connect(
  "sta141c-98@peloton.cse.ucdavis.edu",
  passwd = keyring::key_get("PELTONPASSWORD"))
session
```

```
session %>% ssh_exec_wait(
  "ls -A"
)
```

```
session %>% ssh_exec_wait("mkdir -p shell")
session %>% scp_upload("shell.Rmd", to = "shell/")
session %>% scp_download("shell/shell.Rmd", to = "foo/")
```

```
ssh_disconnect(session)
```

Reference

- Episode 1 to 3 of <http://swcarpentry.github.io/shell-novice/>