

Rossinante – Good practices



Nicolas Casajus

September 10, 2021

Table of contents

1. First connexion	3
1.1. Secure Shell	3
1.2. SSH configuration file	4
1.3. Generating SSH keys	4
2. Sending files	5
2.1. sFTP	5
2.2. scp	6
2.3. Git and GitHub	7
3. Git credentials	9
3.1. Configuring git	9
3.2. GitHub SSH key	9
4. RStudio Server	9
4.1. Connection	9
4.2. Installing packages	10
4.3. R in the terminal	10
5. Python	10

Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.

- htop
- Slack
- New softwares
- Directory access

Important: Rossinante is **not a storage server**. Its 6 TB storage are shared among all users. You can store large datasets on your personal space to run yours analyses. But once you've finished, please remove your data.

1. First connexion

1.1. Secure Shell

The first connection to the Rossinante server must be done using the **SSH** (Secure SHell) protocol. This protocol is a cryptographic network protocol that allows you to securely access a remote computer over an unsecured network.

For this tutorial, let's say your name is **Jane DOE**, your user name on your laptop is **jane**, your laptop name is **laptop**, your user name on Rossinante is **jdoe**, the public IP¹ of Rossinante is **92.168.45.3**, and the port of the SSH server is **22**.

To open an SSH connection on Unix-based OS (macOS and Linux)², open a terminal session and run:

```
# SSH connection to Rossinante ----
jane@laptop:~$ ssh -p 22 jdoe@92.168.45.3
```

You'll be asked to change your password. Enter the old password and set your new password (twice).

Then, your prompt will look like:

```
jdoe@rossinante:~$
```

This means that you are now connected to Rossinante under the user name **jdoe**. You can check your current directory with the command **pwd**:

```
# Print working (current) directory ----
jdoe@rossinante:~$ pwd
## /home/jdoe
```

To stop the SSH connection, use the command **exit** (or **logout**):

```
jdoe@rossinante:~$ exit
## Connection to 92.168.45.3 closed.
```

¹When you are inside the CESAB, you can use the local IP address of the server.

²On Windows, you'll need to install the software Putty.

1.2. SSH configuration file

It can be painful to remember the IP address and the SSH port of Rossinante, especially if you use several servers. Fortunately you can store Rossinante credentials (except your password) and SSH connection information in a special file located on **your laptop** (not in the server): `~/.ssh/config`.

To create this config file, follow these steps:

```
# Navigate to your home directory (symbolized by ~) ----
jane@laptop:~$ cd ~

# Create a new hidden folder ----
jane@laptop:~$ mkdir .ssh

# Change folder permissions ----
# (only Jane can read, write, and execute this folder) ----
jane@laptop:~$ chmod 700 .ssh

# Create the (empty) SSH config file ----
jane@laptop:~$ touch .ssh/config

# Change config file permissions ----
# (only Jane can read and write this file) ----
jane@laptop:~$ chmod 600 ~/.ssh/config

# Open the SSH config file with the CLI editor nano ----
jane@laptop:~$ nano ~/.ssh/config
```

Now add the follow lines in the SSH Config file:

```
## Host rossinante
##     HostName 92.168.45.3
##     Port 22
##     User jdoe
```

To save changes press CTRL + X and Y (or O if the language of your system is French) and press Enter.

You can now connect to Rossinante as follow:

```
jane@laptop:~$ ssh rossinante
```

1.3. Generating SSH keys

Though SSH supports password-based authentication, it is generally recommended that you use SSH keys instead. SSH keys are a more secure method of logging into an SSH server, because they are not vulnerable to common brute-force password hacking attacks. Generating an SSH key pair creates two long strings of characters: a public and a private key. You can place the public key on any server, and then connect to the server using an SSH client that has access to the private key.

Let's create a new SSH keys pair using the cryptosystem RSA and a key size of 4096 bits.

```
# Create a new SSH key pair ----
ssh-keygen -f ~/.ssh/id_rossinante -t rsa -b 4096 -C "jane.doe@mail.com"
```

If you want you can add a passphrase to increase the security of your key pair but each time you will connect to Rossinante you will be asked to enter it.

This SSH key pair has been stored in `~/.ssh/`.

```
# Content of the ~/.ssh folder ----
jane@laptop:~$ ls ~/.ssh
## config      id_rossinante      id_rossinante.pub
```

The private key is `id_rossinante` and the public one `id_rossinante.pub`. Nobody (except you) can have access to your private key. So we need to change the permissions of this file.

```
# Change private key permissions ----
# (only Jane can read this file) ----
jane@laptop:~$ chmod 400 ~/.ssh/id_rossinante
```

On the opposite your public can be deployed everywhere. In our case, we will store it on the Rossinante server.

```
# Copying public key to Rossinante ----
jane@laptop:~$ ssh-copy-id -i ~/.ssh/id_rossinante.pub rossinante
```

Now we can connect to Rossinante without entering password (except if you have added a passphrase to your SSH key pair).

```
jane@laptop:~$ ssh rossinante
```

The first time you use your new SSH key pair you will see:

```
## The authenticity of host '[92.168.45.3]:22' can't be established.
## RSA key fingerprint is ...
## Are you sure you want to continue connecting (yes/no/[fingerprint])?
```

Just write **yes** and press **Enter**.

Our public key on Rossinante has been stored under the name `authorized_keys`.

```
# Content of the ~/.ssh folder ----
jdoe@rossinante:~$ ls ~/.ssh
## authorized_keys
```

2. Sending files

2.1. sFTP

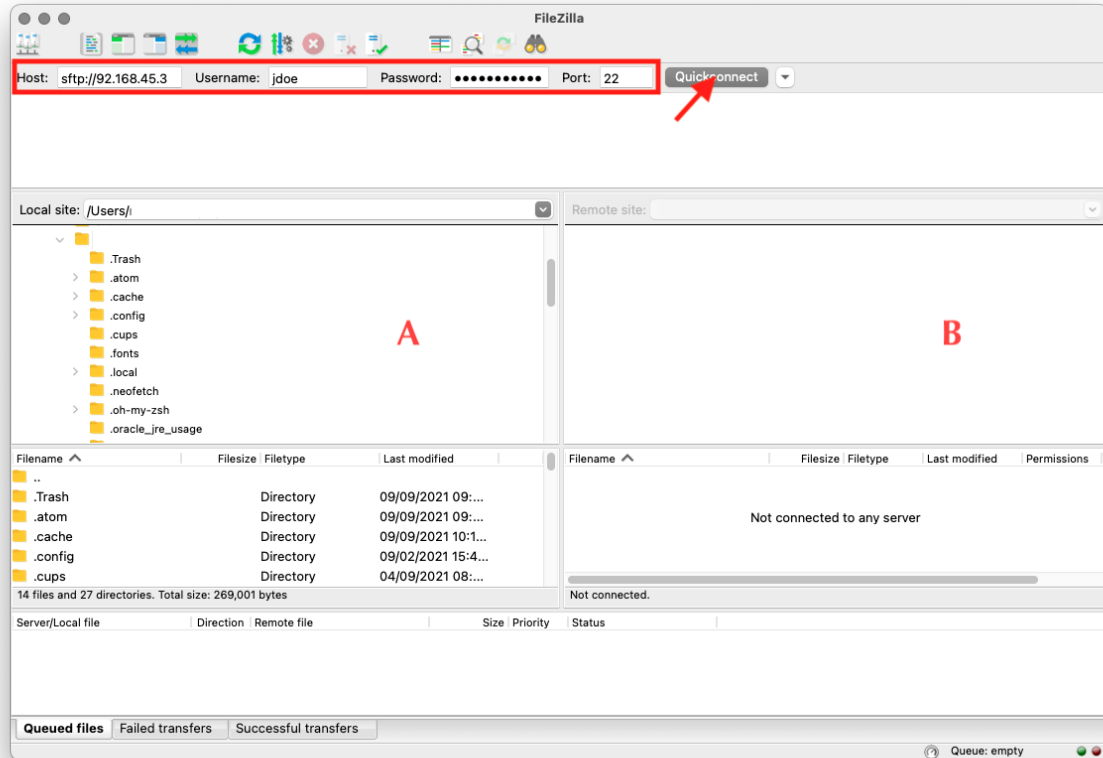
The easiest way to transfer files from your laptop to Rossinante (or vice versa) is by using the sFTP (Secure File Transfer Protocol) protocol. Filezilla client is a freeware that supports this protocol.

You will need to define these following parameters:

- Host: `sftp://92.168.45.3`

- Username: jdoe
- Password: your Rossinante user's password
- Port: 22

To make the connection, click on **Quick connect**.



The left panel (A) lists your local folders/files. The right panel (B) shows the content of your personal directory on Rossinante.

To send local files to Rossinante, first select the directory in B to send these files in. Then select the files in A, right click, and click on Upload.

To send remote files to your laptop, first select the directory in A to send these files in. Then select the files in B, right click, and click on Download.

Important: If your project is tracked by git do not use this method. See section 2.3.

2.2. scp

An alternative way to transfer files is by using the command `scp` that allows to copy files using the SSH protocol.

Let's say we want to copy the local file **script.R**, located in the **Documents/** folder, to Rossinante (in the folder **projects/** in our personal directory). We will use `scp` as follow:

```
# Send a file from local to Rossinante ----
scp ~/Documents/script.R rossinante:projects/
```

If we want to download a file from Rossinante:

```
# Send a file from Rossinante to local ----  
scp rossinante:projects/script.R ~/Documents/
```

To copy folders we will add the option `-r` (for recursive):

```
# Send a folder from local to Rossinante ----  
scp -r ~/Documents/project_1 rossinante:projects/  
  
# Send a folder from Rossinante to local ----  
scp -r rossinante:projects/project_1 ~/Documents/
```

N.B. If you want you can also use the command `rsync`.

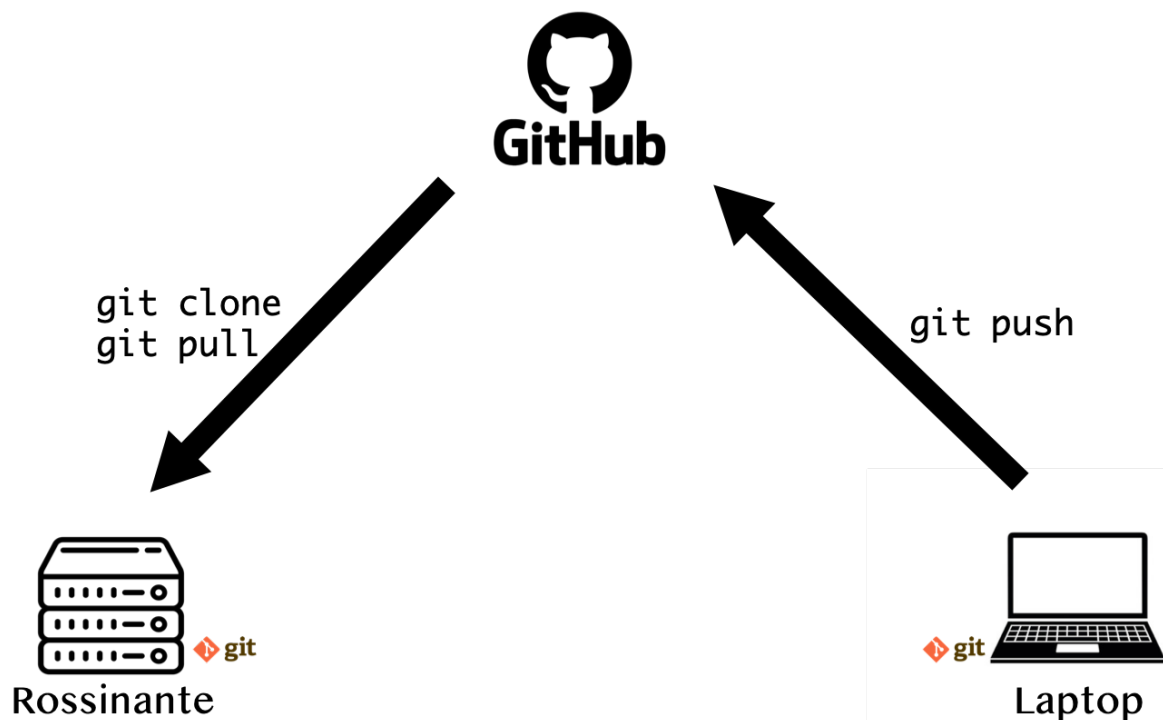
2.3. Git and GitHub

If your project is tracked by the versioning system control **git**, you may prefer sending files through GitHub (or GitLab).

This method has the advantage of keeping your project tracked by git, synchronized with GitHub, and backed up on Rossinante.

The workflow is the following:

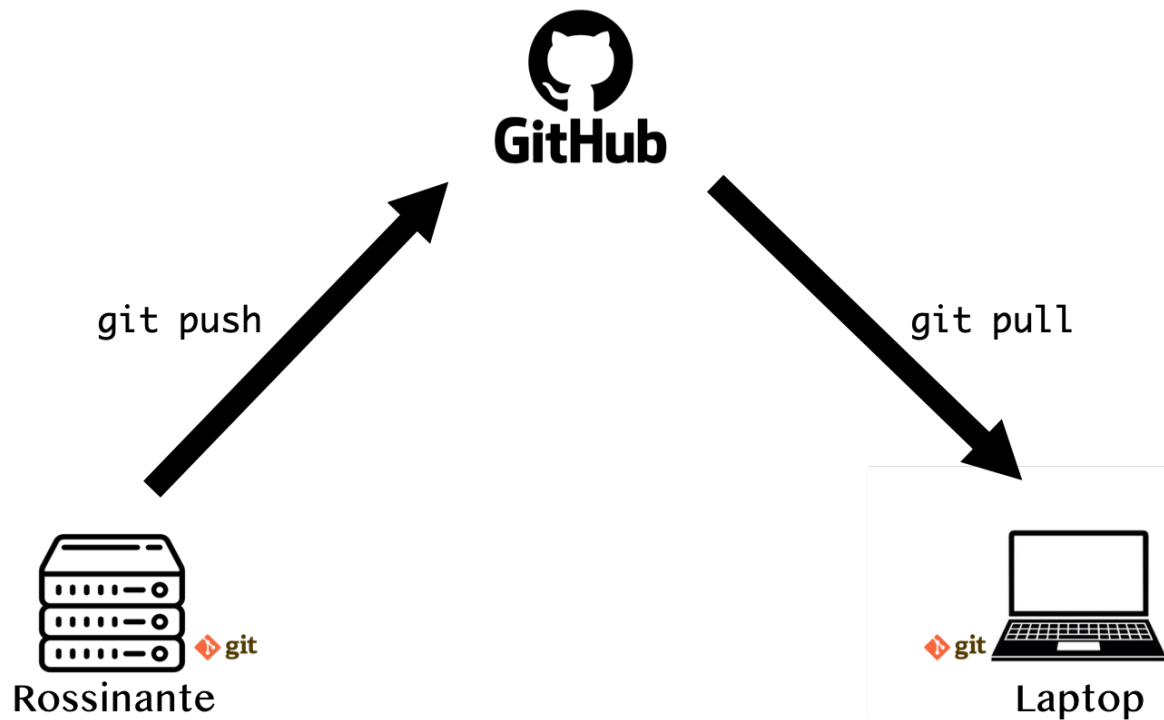
1. On your laptop, commit changes
2. Then push changes to your repository on GitHub
3. Connect to Rossinante via SSH
4. Clone the GitHub repository on Rossinante or pull changes if your project is already cloned
5. Run analysis on Rossinante



Once your analysis is finished, you can:

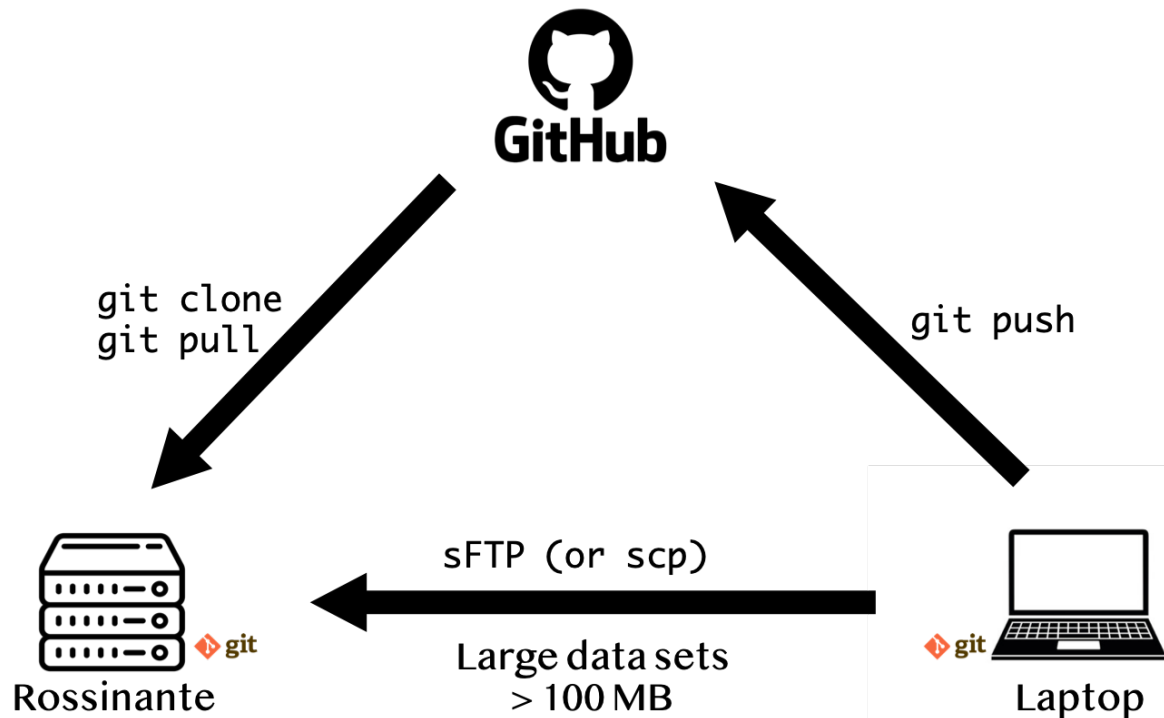
1. Commit changes

2. Push changes to your repository on GitHub
3. On your laptop, pull changes



At this stage, the project on your laptop, GitHub and Rossinante is in the same state.

Important: GitHub does not accept file > 100MB. If your project contains large datasets (added in the `.gitignore`), you need to send these files through sFTP or SCP.



3. Git credentials

3.1. Configuring git

When you first use **git** on Rossinante, you need to set your user name and email (required for commits). Run the following lines:

```
# Connection to Rossinante ----
jane@laptop:~$ ssh rossinante

# Set Git user name (globally) ----
jdoe@rossinante:~$ git config --global user.name "Jane Doe"
jdoe@rossinante:~$ git config --global user.email jane.doe@mail.com
```

3.2. GitHub SSH key

If you want to communicate with GitHub through the SSH protocol (recommended) you need to generate a new SSH key pair (different from the one used to connect with Rossinante).

```
jdoe@rossinante:~$ ssh -T git@github.com
## Hi janedoe! You've successfully authenticated, but GitHub does not provide
## shell access.
```

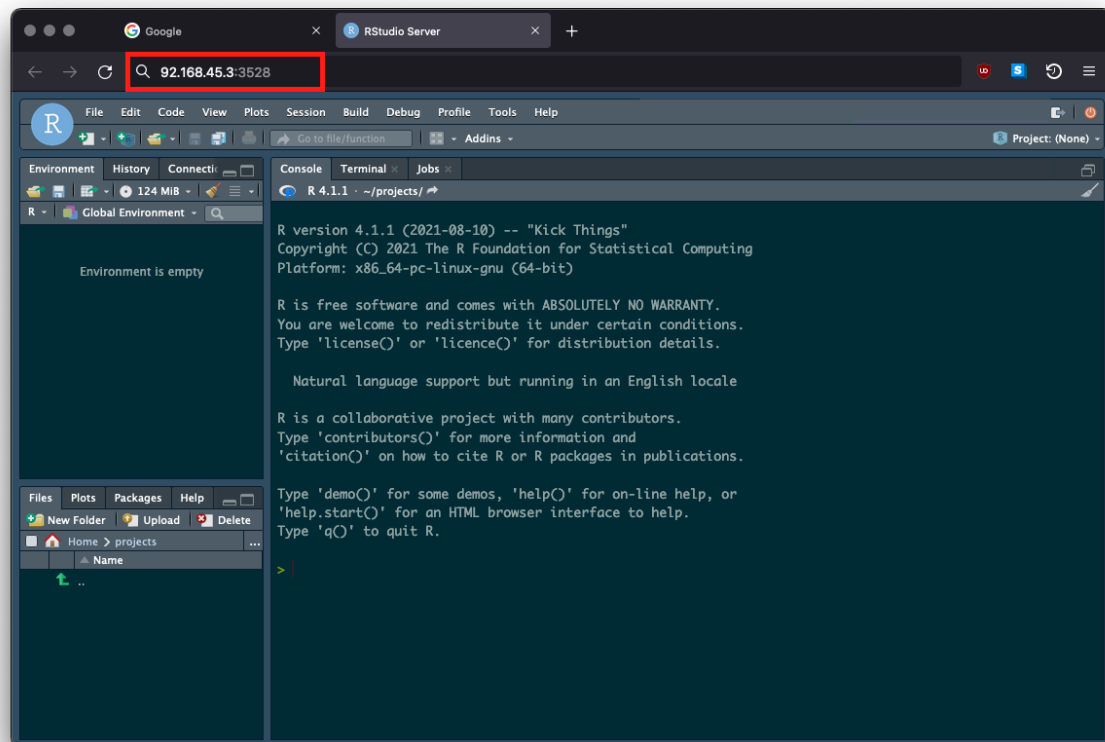
4. RStudio Server

4.1. Connection

Open a web browser (Firefox, Chrome, etc.) and enter the URL of the RStudio Server:

92.168.45.3:3528

After entering your Rossinante login information, you are connected to an RStudio Server.



You can now use this interface as the one you knows (RStudio Desktop).

4.2. Installing packages

...

4.3. R in the terminal

...

- screen

5. Python

...