

# Aulas Computação LFA

## Parte 1

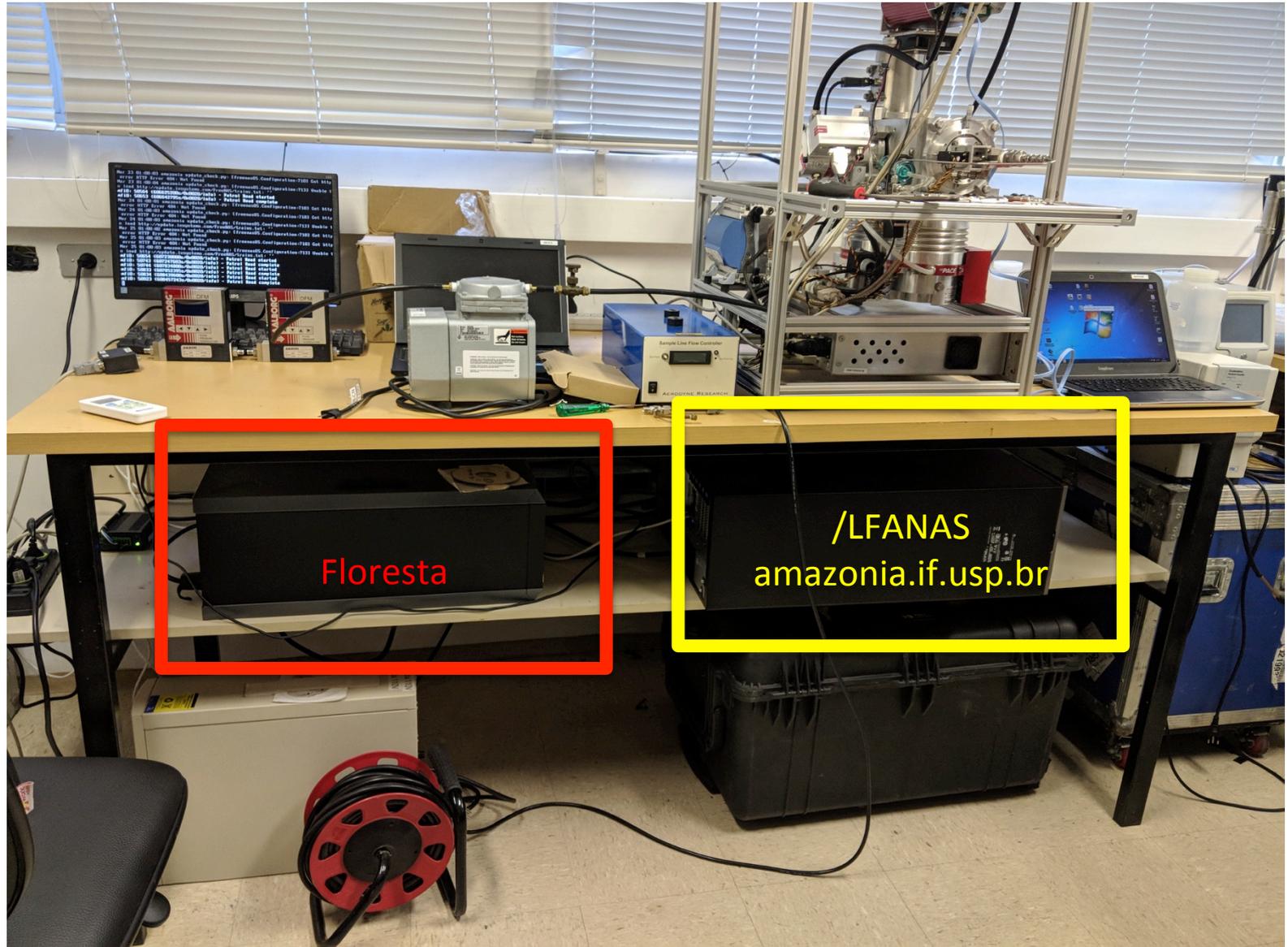
Henrique Barbosa

13-May-2020

# Overview

- **Servers**
  - Floresta
  - Aerossol
  - Network Attached Storages (NAS)
- Accessing different systems

# Sala 2, Ed. Milênio

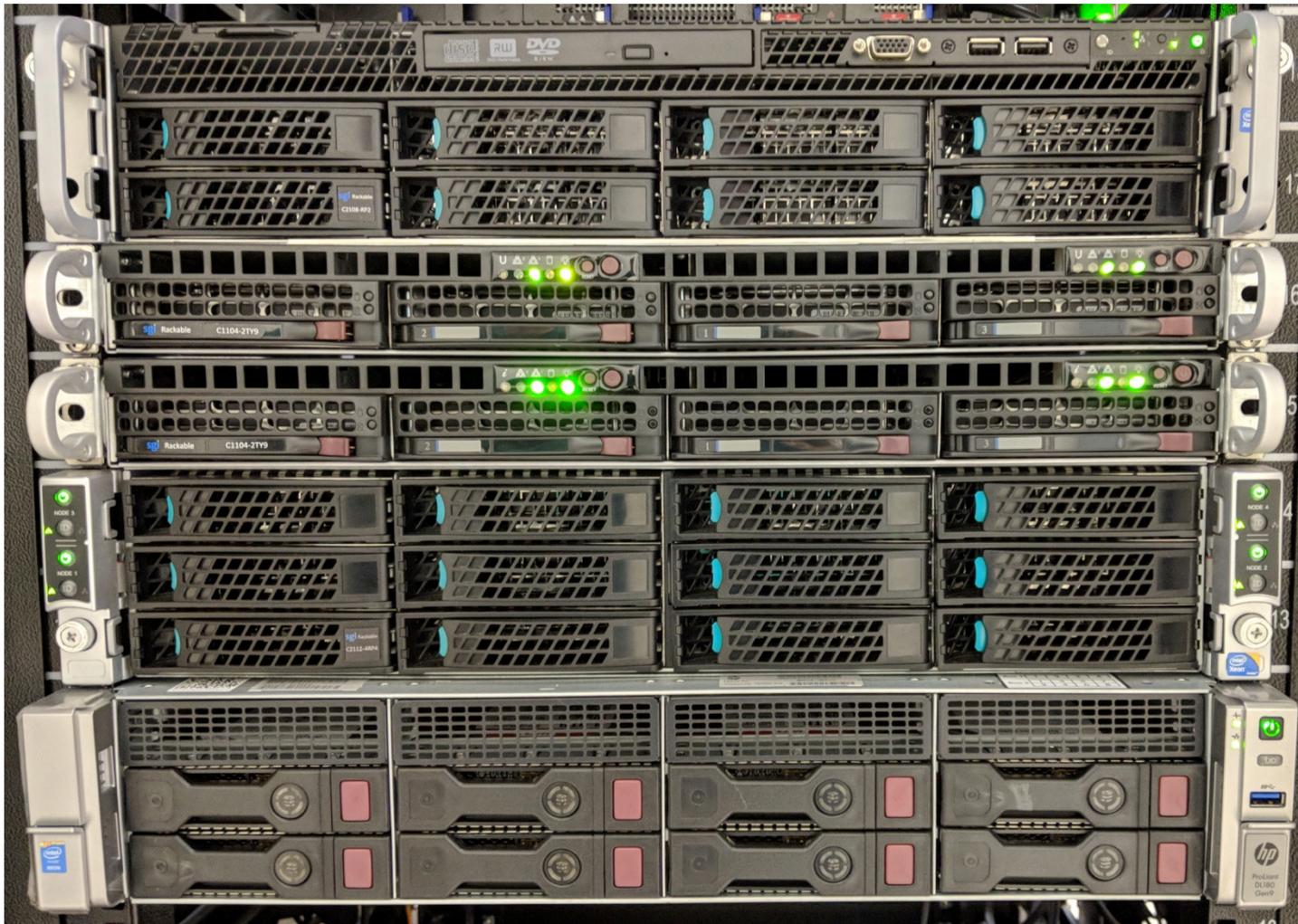


# Floresta

- Xeon 6 core E5-2420 @ 2.20Gb
- 32Gb RAM
- (4) HD de 4Tb
  - /server (4Tb, Raid0)
  - /work (4Tb, Raid0)
- **Server:**
  - WEB
  - SFTP
  - SSH (data processing)



# Ed. HEPIC, CC-IFUSP



Cluster SGI

# Cluster SGI



- Head node = 12 core, 64Gb RAM, 18Tb disco
- n001 to n004= 12 core, 24Gb RAM, 4Tb disco
- n005 to n008 = 20 core, 64Gb RAM, 1Tb disco

Total = 128 core, 352Gb RAM  
20Tb de disco local  
18Tb no head-node (Raid5)  
20Tb /LFASGI (nas)  
10Tb /LFANAS (nas)

# Network Attached Storages (NAS)



/LFANAS

amazonia.if.usp.br

3 x 2Tb (backup)

5 x 2Tb (data)

Total: 10Tb

2 x QuadCore Xeon E5430 @2.66GHz 20Gb RAM  
Old LFASERVER,DELL PowerEdge 2900 from 2008

1 x SixCore Xeon E5-2603 @1.60GHz 16Gb RAM  
HP Enterprise DL180, from 2016



/LFASGI

pantanal.if.usp.br

3 x 4Tb (backup)

5 x 4Tb (data)

Total: 20Tb

Storage do IF | Centro de Com... | what is Network Attached Stor... | amazonia - FreeNAS-9.10.2-U6... | cerrado - FreeNAS-9.10.2-U6... | +

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**FreeNAS™** **iXsystems™**

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- Services
- Plugins
- Jails
- Reporting
- Guide
- Wizard
- Display System Processes
- Shell
- Log Out
- Reboot
- Shutdown

View Disks

Name	Serial	Disk Size	Description	Transfer Mode	HDD Standby	Advanced Power Management	Acoustic Level	Enable S.M.A.R.T.	S.M.A.R.T. extra options
ada0	WD-WCC4E3CUE101	4.0 TB		Auto	5	64	Disabled	true	
ada1	Z3074XY6	4.0 TB		Auto	5	64	Disabled	true	
ada2	Z3075H9F	4.0 TB		Auto	5	64	Disabled	true	
ada3	Z3074XPR	4.0 TB		Auto	5	64	Disabled	true	
ada4	Z306F36L	4.0 TB		Auto	5	64	Disabled	true	
ada5	Z306F1HY	4.0 TB		Auto	5	64	Disabled	true	
ada6	WD-WCC4E1AH8451	4.0 TB		Auto	5	64	Disabled	true	
ada7	Z306F2CW	4.0 TB		Auto	5	64	Disabled	true	

Could be mounted on windows, but its better if we don't...

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# Overview

- Servers
  - Floresta
  - Aerossol
  - Network Attached Storages (NAS)
- Accessing different systems

# floresta.if.usp.br

- From outside Physics/USP  
floresta.if.usp.br
- Only by SSH with exchange of public key  
ssh -X -i <key\_path> user@aerossol
- Use SFTP (e.g. filezilla) to transfer files

A terminal window with a title bar showing the connection path: 1. hbarbosa@floresta: /server/apacheroot/lfa.if.usp.br/htdocs/ftp/public (ssh). The terminal shows the user hbarbosa at a Mac prompt, typing the ssh command with the path to the key file. It displays a warning about the RSA host key, the user's response 'yes', and the prompt for a passphrase.

```
Henriques-iMac:~ hbarbosa$  
Henriques-iMac:~ hbarbosa$  
Henriques-iMac:~ hbarbosa$  
Henriques-iMac:~ hbarbosa$ ssh -i .ssh/id_rsa.cluster hbarbosa@floresta.if.usp.br  
Warning: the RSA host key for 'floresta.if.usp.br' differs from the key for the IP address '143.107.131.164'  
Offering key for IP in /Users/hbarbosa/.ssh/known_hosts:25  
Matching host key in /Users/hbarbosa/.ssh/known_hosts:9  
Are you sure you want to continue connecting (yes/no)? yes  
Enter passphrase for key '.ssh/id_rsa.cluster':
```

Files on FTP: web browser or SFTP client (Filezilla)

# floresta.if.usp.br

```
hbarbosa@floresta:~$ ll /opt/
total 28
drwxr-xr-x 24 root    root    4096 Oct 23 12:22 anaconda3
-rw-r--r--  1 root    root     653 Oct  4 2010 bashrc11.1.opt
-rw-r--r--  1 root    root     820 Oct  4 2010 bashrc.opt
drwxr-xr-x  6 root    root      52 May  2 2017 ffmpeg
drwxrwxr-x  2 root    root   4096 May 30 2016 flexlm
drwxr-xr-x  9 root    root   4096 Aug  5 2015 grads
drwxr-xr-x  5 libuuid users   61 Sep 28 2010 idl
drwxr-xr-x  3 libuuid users  112 Sep 28 2010 idl7
drwxr-xr-x 10 root    root   4096 Mar 11 2010 intel
drwxr-xr-x 20 root    root   4096 Nov  8 2017 Matlab_R2015a
drwxr-xr-x 13 root    root    133 Mar  6 2009 mpich1-intel
drwxr-xr-x  6 root    root     52 Mar  6 2009 netcdf-intel
hbarbosa@floresta:~$ df -h
Filesystem                Size      Used Avail Use% Mounted on
udev                      16G       4.0K   16G   1% /dev
tmpfs                     3.2G       1.2M   3.2G   1% /run
/dev/sdc2                  28G       25G    3.3G  89% /
none                      4.0K         0   4.0K   0% /sys/fs/cgroup
none                      5.0M         0   5.0M   0% /run/lock
none                      16G       80K    16G   1% /run/shm
none                      100M      16K   100M   1% /run/user
/dev/sdc3                  411G    105G   306G  26% /home
/dev/sdb1                  3.7T     2.1T   1.6T  58% /server
/dev/sda1                  3.7T     2.8T   905G  76% /work
143.107.128.207:/mnt/volume1/dataset1 20T     16T   4.6T  78% /LFASGI
143.107.131.169:/mnt/volume1/dataset1 10T     8.7T   1.4T  87% /LFANAS
hbarbosa@floresta:~$
```

- Python3
- Grads
- IDL
- Matlab 2015
- Intel compiler

Disks:  
/work (4Tb)  
/LFASGI (20Tb)  
/LFANAS (10Tb)

# Cluster SGI

- From outside Physics/USP  
[aerossol.if.usp.br](http://aerossol.if.usp.br)
- Only by SSH with exchange of public key  
`ssh -X -i <key_path> user@aerossol`
- Use SFTP (e.g. filezilla) to transfer files

# Cluster SGI

```
1. Default (ssh)
Default (ssh) ⌘1
Default (ssh) ⌘2
(base) MacBookoBarbosa:~ hbarbosa$
(base) MacBookoBarbosa:~ hbarbosa$
(base) MacBookoBarbosa:~ hbarbosa$
(base) MacBookoBarbosa:~ hbarbosa$
(base) MacBookoBarbosa:~ hbarbosa$ ssh -i .ssh/id_rsa.cluster hbarbosa@aerossol.if.usp.br
Enter passphrase for key '.ssh/id_rsa.cluster':
Last login: Thu May 14 02:08:11 2020 from 187.75.54.164
hbarbosa@aerossol:~> ping n001
PING n001.default.domain (10.0.1.1) 56(84) bytes of data.
64 bytes from n001.default.domain (10.0.1.1): icmp_seq=1 ttl=64 time=0.136 ms
64 bytes from n001.default.domain (10.0.1.1): icmp_seq=2 ttl=64 time=0.108 ms
^C
--- n001.default.domain ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 999ms
rtt min/avg/max/mdev = 0.108/0.122/0.136/0.014 ms
hbarbosa@aerossol:~> mpirun -hosts n001,n002,n003,n004,n005,n006,n007,n008 hostname
n004
n007
n006
n001
n003
n008
n002
n005
hbarbosa@aerossol:~> |
```

# Regular Linux User

The screenshot displays the FileZilla interface with the Site Manager dialog box open. The Site Manager dialog has the following fields and values:

- Host: lfa.if.usp.br
- Port: 22
- Protocol: SFTP - SSH File Transfer Protocol
- Logon Type: Key file
- User: embrapa
- Key file: (empty) with a "Browse..." button
- Background color: None
- Comments: (empty)

Below the Site Manager dialog, a "Password required" dialog box is visible, containing the text: "Enter the password for the file '/Users/hbarbosa/id\_rsa.cluster'. The converted file will be protected with the same password." Below this text is an empty password input field and "Cancel" and "OK" buttons.

At the bottom, a "Save" dialog box is open, titled "Save" and "Select filename for converted key file". It has a "Save As:" field with "Untitled" entered, a "Where:" dropdown menu set to "hbarbosa", and "Cancel" and "Save" buttons.

The background shows the FileZilla main window with the local site path "/Users/hbarbosa/" and a list of files and directories. The status bar at the bottom indicates "22 files and 38 directories. Total size: 427737613 bytes".

# Regular Linux User

Copy of LFA-FTPS - sftp://hbarbosa@lfa.if.usp.br - FileZilla

Host:  Username:  Password:  Port:  Quickconnect

Status: Directory listing of / successful  
Status: Disconnected from server  
Status: Connecting to lfa.if.usp.br...  
Status: Connected to lfa.if.usp.br  
Status: Retrieving directory listing...  
Status: Listing directory /home/hbarbosa  
Status: Directory listing of "/home/hbarbosa" successful

Local site: /Users/hbarbosa/ Remote site: /home/hbarbosa

Local site contents:

- hbarbosa
- Volumes
- bin
- cores

Remote site contents:

Filename	Filesize	Filetype	Last modified	Permissions	Owner/Gr
..		Directory			
.Mathematica		Directory	10/04/10 19:1...	drwxr-xr-t	hbarbosa
.VirtualBox		Directory	02/06/13 16:...	drwx-----	hbarbosa
.cache		Directory	03/29/19 16:...	drwx-----	hbarbosa
.conda		Directory	05/10/18 17:...	drwxrwxr-x	hbarbosa
.config		Directory	05/10/18 18:...	drwxr-xr-x	hbarbosa
.dbus		Directory	10/05/12 14:...	drwx-----	hbarbosa
.emacs.d		Directory	01/29/17 23:...	drwx-----	hbarbosa
.felix		Directory	02/28/19 11:...	drwxr-xr-x	hbarbosa
.fontconfig		Directory	05/08/15 18:...	drwxr-xr-x	hbarbosa
.gconf		Directory	03/12/19 09:...	drwx-----	hbarbosa
.gconfd		Directory	02/15/13 18:1...	drwx-----	hbarbosa
.gdl		Directory	07/11/16 17:0...	drwx-----	hbarbosa
.gegl-0.0		Directory	05/08/15 18:...	drwx-----	hbarbosa
.gimp-2.4		Directory	02/15/13 19:...	drwxr-xr-x	hbarbosa
.gimp-2.6		Directory	05/08/15 19:...	drwxr-xr-x	hbarbosa

22 files and 38 directories. Total size: 427737613 bytes

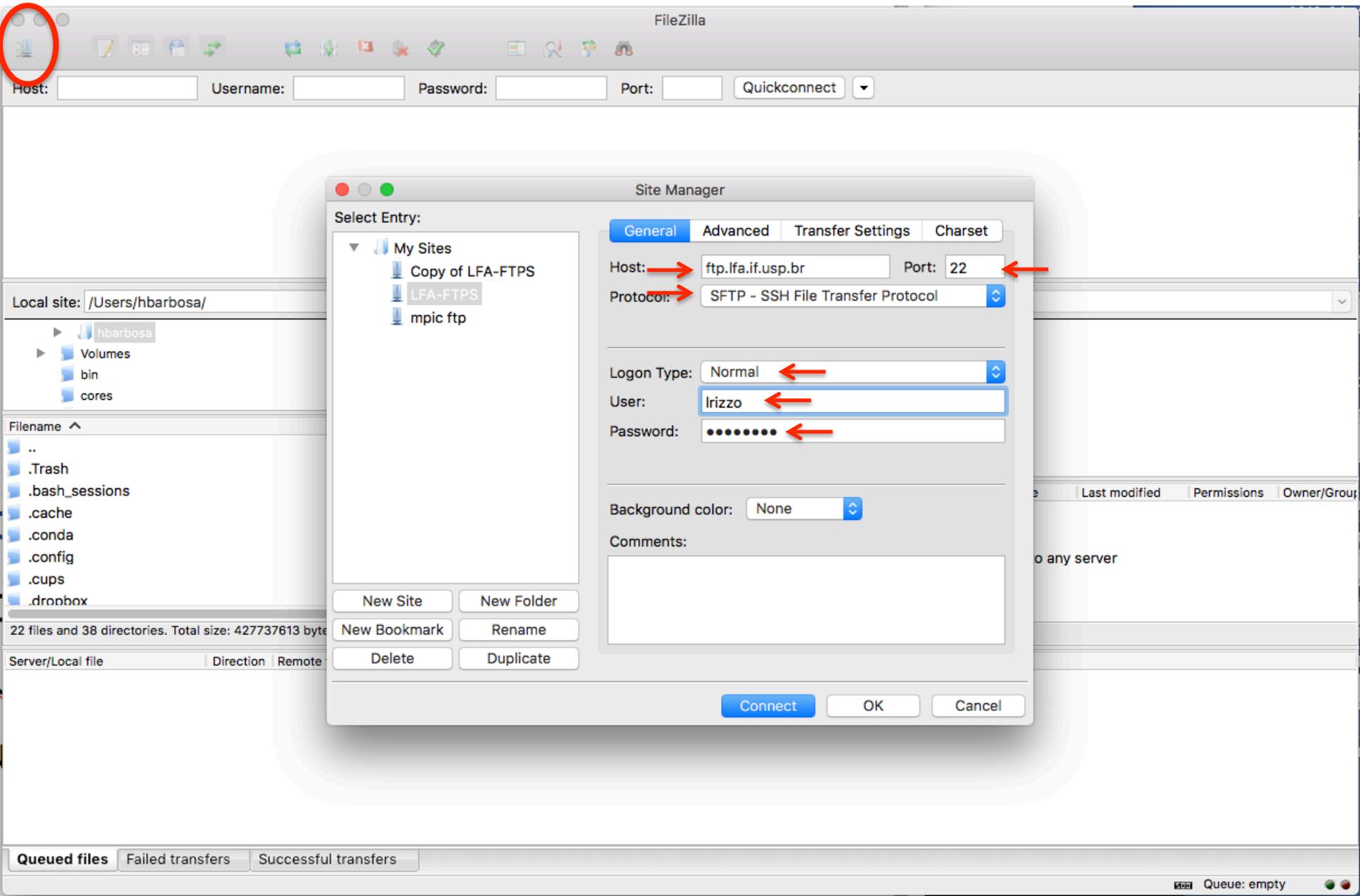
123 files and 77 directories. Total size: 28815263325 bytes

Server/Local file | Direction | Remote file | Size | Priority | Status

Queued files | Failed transfers | Successful transfers

Queue: empty

# SFTP-only user



# SFTP only user

Host:  Username:  Password:  Port:  Quickconnect

Status: Connecting to ftp.lfa.if.usp.br...  
Status: Connected to floresta.if.usp.br  
Status: Retrieving directory listing...  
Status: Listing directory /  
Status: Directory listing of "/" successful

Local site: /Users/hbarbosa/ Remote site: /

Just sees the ftp root folder (very safe)

Filename	Filesize	Filetype	Last modified	Permissions	Owner/Gr
..		Directory			
2015SummerCourse		Directory	10/30/15 10:...	drwxr-xr-x	1023 125
2016Hybrid_Tutorial		Directory	05/14/16 10:1...	drwxr-xr-x	1023 125
ATTO		Directory	6:...	drwxr-xr-x	1023 125
GNSS_MAO		Directory	5:...	drwxr-xr-x	1023 125
GNSS_MAO_zip		Directory	7:1...	drwxr-xr-x	1023 125
IGAC_iCACGP2014		Directory	5:...	drwxr-xr-x	1023 125
IGAC_iCACGP2014_YS		Directory	2:...	drwxr-xr-x	1023 125
LFA_Processed_Data		Directory	09/24/14 08:...	drwxr-xr-x	1023 125
Manacapuru		Directory	07/19/18 09:...	drwxrwxr-x	1023 125
Pantanal		Directory	02/23/16 14:...	drwxr-xr-x	1023 125
Pelletron		Directory	05/18/18 10:...	drwxr-xr-x	1033 125
Presentations_Paulo_Arta...		Directory	07/24/18 14:...	lrwxrwxrwx	0 0
Publications_Paulo_Artaxo		Directory	11/11/16 14:0:...	drwxr-xr-x	1023 125
RioBranco		Directory	03/12/19 09:...	drwxr-xr-x	1023 125
		Directory	04/11/19 10:3...	drwxrwxr...	1023 125

Can see the hidden folders

22 files and 38 directories. Total size: 427737613 bytes

2 files and 31 directories. Total size: 65 bytes

Server/Local file | Direction | Remote file | Size | Priority | Status

Queued files | Failed transfers | Successful transfers

Queue: empty

**Pay attention not to delete data from the FTP!**

# Public-Private Keys



WIKIPEDIA  
The Free Encyclopedia

- **Public-key cryptography, or asymmetric cryptography**, is a cryptographic system that uses pairs of keys:
  - **public keys**, which may be disseminated widely, and
  - **private keys**, which are known only to the owner.
- The generation of such keys depends on cryptographic algorithms (...) to produce one-way functions. Effective security only requires keeping the private key private.

# Create Key pair in \*NIX

```
(base) MacBookoBarbosa:~ hbarbosa$ ssh-keygen -f ./mykeyfile -t rsa
Generating public/private rsa key pair.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Saving key "./mykeyfile" failed: passphrase is too short (minimum five characters)
(base) MacBookoBarbosa:~ hbarbosa$ ssh-keygen -f ./mykeyfile -t rsa
Generating public/private rsa key pair.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in ./mykeyfile.
Your public key has been saved in ./mykeyfile.pub.
The key fingerprint is:
SHA256:1E53fReEP+4A8Vdjfq+WTGLk0XZXcPvJZtJD1KCS9nc hbarbosa@MacBookoBarbosa
The key's randomart image is:
+---[RSA 2048]-----+
|          =*+|
|         . o +.*|
|        + = = *o*|
|       + o = =+B*|
|      S   =.BBE|
|          *+.=.|
|         . * o|
|          +o|
|          . |
+-----[SHA256]-----+
(base) MacBookoBarbosa:~ hbarbosa$
```

Annotations:

- arquivo (pointing to `./mykeyfile`)
- algoritmo (pointing to `-t rsa`)
- Passphrase not a password (pointing to the error message)

```

(base) MacBookoBarbosa:~ hbarbosa$ ll mykeyfile*
-rw----- 1 hbarbosa  staff  1766 May 13 23:23 mykeyfile
-rw-r--r-- 1 hbarbosa  staff   406 May 13 23:23 mykeyfile.pub
(base) MacBookoBarbosa:~ hbarbosa$ cat mykeyfile.pub
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQDLFBjvKG4xxDT+0PI2HDpUmMsjWPczewdogKJsatG7doX7+o4AzrYzv0oGrUP8a8s
KgBz5YtofuIAwa1auph0Ez7qeJmDxISop0PGZiFZHYNf/CIHAFD3HAJdXRICio56derhjRZiYUlkKno0BJptQFehblee+l6dd4eDI0Q
GX+VppFIziRHYY0AALYqCln14/PSekUHUIJv/u2Azhtyc+LGAg38dcDECdLbdqTqLHE/sa+eshpd1UqWX917usU60b7Gx7gyZGhtJL0
MczXLPcU+TyP3elJspzcvLDqi30F5h7r8FD2ISDYN4b9T4xMsEk7+0nd8pLtQ0+esTqtX1 hbarbosa@MacBookoBarbosa
(base) MacBookoBarbosa:~ hbarbosa$ cat mykeyfile
-----BEGIN RSA PRIVATE KEY-----
Proc-Type: 4,ENCRYPTED
DEK-Info: AES-128-CBC,1DC3A8CEF5793AE966144C4661B66999

p1jKfLpJpnrenI8ZUaTpakAa3/BUAtax0BLxCSst00DGBLMJBfvNyZVTb6IyEM+5P
yeUHPPhInhqllLxdXRkZ8xnm3M4YnYapdc0Z0Koe+R9FH0Hvp58GSv579bnJrD4Rd
e4AI8Ydy9HJVdZkikKQDp21f8uCTSpYwXkRevFew4wi9IwWd35xH0A32/5A57Hr
lsQjkeKD0Hb7KCb1chCac1PYUElNomflThyHQ4FyEM//V33SCjhvPq8AXEpbI7xg
mCXOU3iNKjjTqVUQJYzyGnf0pzo+3mCS7mjQIex5gw4qGDSLQMV3NwW059TtHkkS
zWyTMbbcd2xUDteQtgz9nGwui5iNuItDlQsWSzaEyRL71MPFuWmtCzGssW2vw7IM
JxplVC2r6+RovSy4chz6hBF9W3vYzh9/da/7YJpr9xi/QgyfyrdIm2+c4if1U/ss
QKNhtyhUJfKUJfPWu0PW0Sf+Fpq7tMht3GRnw1/Y1BUvXxrRJqBFE7UdLJSJHCxR
KTYb0n2gjFQ4z/Eq0BhogL0AwggtWmjjenKe04Jf40CFTkZqIa28aKrWDY6sakHk
hMLC4g6dkIs2rqYLKYKVoexwgJxujNDcoSrqp1aEA9MuJpdPVfAx6A0uomGI2fWV
Ym4Af2p6yD6jJ7NzRU2wi0175ri1AEg/K/2T7r++25op6KLh1u/30cnCeW66S48k
CoIrAqryaAJDJBWmXcJLiskqMzBaVEGpHmz+JuY+HNu8IrFl02xR3Nava+vuSnJ1
IL/8gpw2MiWsdNevR8n5LQyzng41ttQJI/L7WFQp92uX5v7jo7JVzaEz0GSiM+Bv
.....

ZikbhPjdTk+0MHb6aecc0mn5C4RaBIctlr4jSvqCiU/XlSq+XhVn13F8QszEYoi
Mn628aIT+NoF6ZiJdIUEW1Cas7ik7+QxZTEtaagWXZoecpD9aYFkxriwvk4YajIz
j5S44AnhrQsBiqYbTjTnlpvFW0e+rJKr1aWQIVCzRB1P9aq4CXMcwLy1rQwbE2W5
pKuBT1rS8AHUmz/S1GMEwDF18RF08NwUv5tuA7moMq0r/feNuOrTkNmuJ4TRasPH
-----END RSA PRIVATE KEY-----
(base) MacBookoBarbosa:~ hbarbosa$

```

# Create Key pair in Windows

- The easiest is to use Putty, download it:

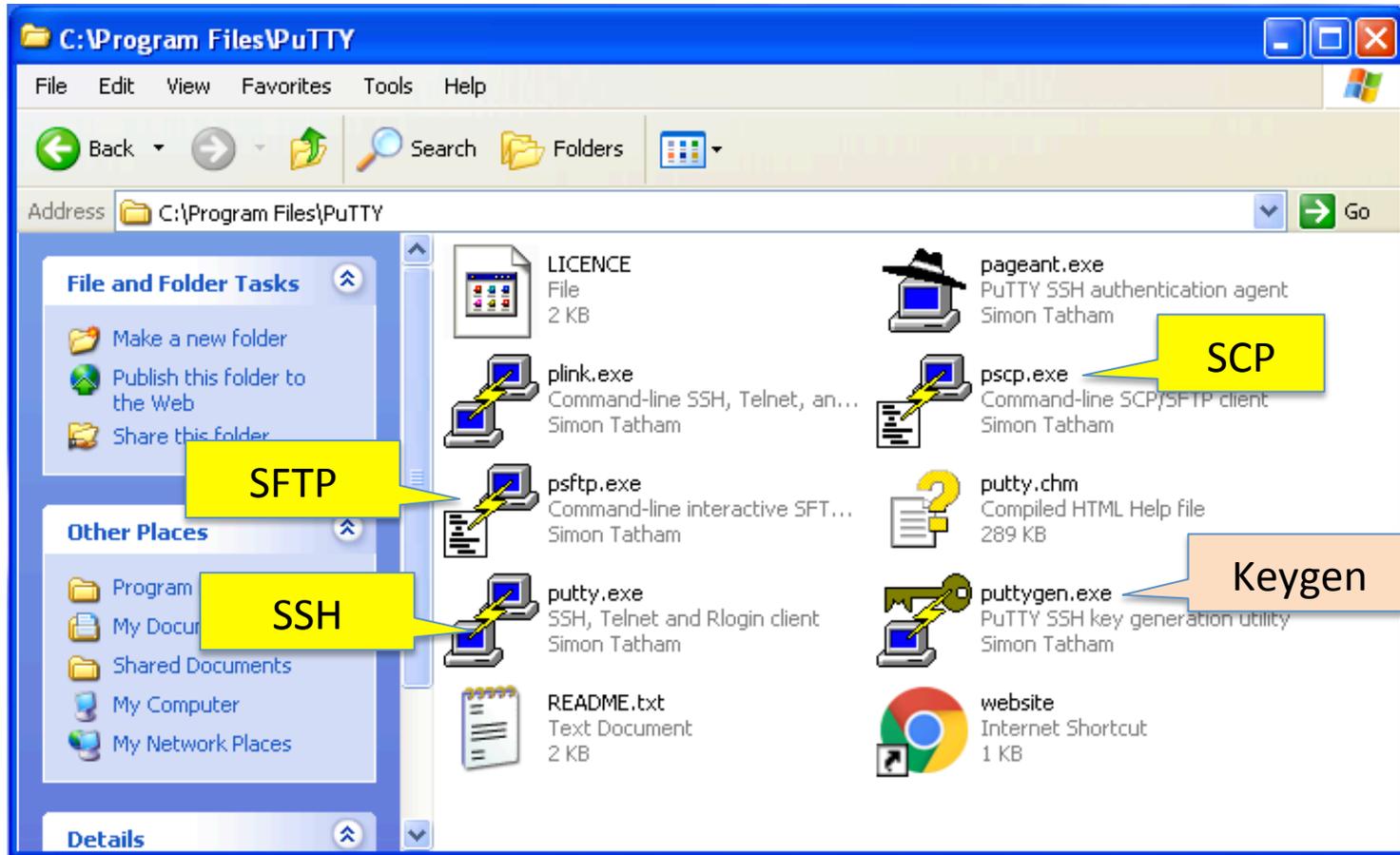
<https://www.ssh.com/ssh/putty/download>

## Download PuTTY installation package for Windows

Binary	Platform	Signature	Date
<a href="#">putty-0.73-installer.msi</a>	Windows (any)	<a href="#">GPG signature</a>	2019-09-29
<a href="#">putty-64bit-0.73-installer</a>	Windows (64-bit)	<a href="#">GPG signature</a>	2019-09-29

<https://www.ssh.com/ssh/putty/windows/puttygen>

# Putty



# Keygen

**Move the mouse for randomness**

**Click**

**Add a passphrase to your public key**

**And save the PPK file**

**PuTTY Key Generator**

File Key Conversions Help

**Key**

Please generate some randomness by moving the mouse over the blank area.

ssh-rsa  
AAAAB3NzaC1yc2EAAAABJQAAAQEA4j/z8SvroQ929/7k9NXTH9T94n4i8Ji/tRBIh+O  
43vFiLoebPp+Rn0vWbWLLQ898IUNFbumkgiS'w'jw'nvgsNMhjtotEE vnsWHDAT aC7c6t  
+nps7-95UUKUQUU... 2vp2cwUHpuUP58Biehm+NcSaNGb/7IPjnkRmVZuilnS3s  
YKUUUPk4bzGWEFRuRDkifggAxowJYB7SspZmo3vHaPs

sa 2048 fc:85:a3:0a:c0:bf:f6:a2:ae:34:7e:1d:49:21:2d:fb

key-20200513

Key passphrase:

Confirm passphrase:

**Actions**

Generate a public/private key pair

Load an existing private key file

Save the generated key

**Parameters**

Type of key to generate:  
 RSA  DSA  ECDSA  Ed25519

Number of bits in a generated key:

# Keygen

The image shows a desktop environment with two windows. On the left is a Notepad window titled 'teste.pub' containing the following text:

```
----- BEGIN SSH2 PUBLIC KEY -----  
Comment: "rsa-key-20200513"  
AAAAB3NzaC1yc2EAAAABJQAAAQEA4j/z8svrOQ929/7k9NXtH9T94n4i8Ji/trB1  
h+043vFiLoebPp+RnOvVbwLLQ898IJNFbumkgjSwjwnvgsNMhjtotEEvnsWHDAT  
ac7c6tpABf1D7r8t5JUKH8Uhc0/32vp2cwUHpuUP5BBiehm+NcSANGb/7IPjnkRm  
VZuiInS3s+16i2J+Q9T05J3vSDPi0wNYKUUUPk4bzGWEFrURDkjfggAxovJYB7S  
spZmo3vHaPsE1CdBE4Riz6uGys1QyGPjVCS4na55TJbiUNA5zybxPrqqCLOQuXit  
ur05QBYYK1XvmMxwXzCQID8vHoA7+09HPx8xw+URSxGgz1dBaQ==  
----- END SSH2 PUBLIC KEY -----
```

An orange callout box with a pointer to the text says: "Wrong format for linux".

On the right is the PuTTY Key Generator window. A yellow callout box at the top says: "For the server, we need this public key!". The 'Public key for pasting into OpenSSH authorized\_keys file:' field contains the same text as in the Notepad window. Below this, the 'Key fingerprint:' field shows 'ssh-rsa 2048 fc:85:a3:0a:c0:bf:f6:a2:ae:34:7e:1d:49:21:2d:fb'. The 'Key comment:' field is 'rsa-key-20200513'. The 'Key passphrase:' and 'Confirm passphrase:' fields are filled with dots. The 'Actions' section has buttons for 'Generate', 'Load', 'Save public key', and 'Save private key'. The 'Parameters' section shows 'Type of key' as 'RSA' (selected) and 'Number of bits' as '2048'. An orange callout box with a pointer to the 'Save public key' button says: "This is not good!".

# public key => sys admin

```
hbarbosa@aerossol:~/ssh> ll -a
total 88
drwx----- 2 hbarbosa users 4096 May 14 03:15 .
drwxr-xr-x  2 hbarbosa users 8192 May 14 03:12 ..
-rw-----  1 hbarbosa users 1591 May 14 03:04 authorized_keys
-rw-r--r--  1 hbarbosa users  178 Jun 21  2016 config
-rw-----  1 hbarbosa users  668 Aug  8  2014 id_dsa
-r-----  1 hbarbosa users  102 Jun 21  2016 id_dsa.master.hbarbosa
-rw-r--r--  1 hbarbosa users  102 Jun 21  2016 id_dsa.pub
-rw-r--r--  1 hbarbosa users  102 Jun 21  2016 id_dsa.pvt
-rw-r--r--  1 hbarbosa users  102 Jun 21  2016 id_dsa.pvt.ppk
-rw-----  1 hbarbosa users  102 Jun 21  2016 id_dsa.cluster
-rw-----  1 hbarbosa users  396 Jun 21  2016 id_rsa.cluster.pub
-rw-----  1 hbarbosa users 1766 May 15  2012 id_rsa.git
-rw-r--r--  1 hbarbosa users  402 May 15  2012 id_rsa.git.pub
-rw-----  1 hbarbosa users 1743 Oct 22  2012 id_rsa_novo
-rw-r--r--  1 hbarbosa users  399 Oct 22  2012 id_rsa_novo.pub
-rw-r--r--  1 hbarbosa users  399 May 27  2011 id_rsa.pub
-rw-r--r--  1 hbarbosa users 4528 Sep  5  2019 id_rsa.pvt
-rw-r--r--  1 hbarbosa users 6046 Oct 19  2017 id_rsa.pvt.ppk
hbarbosa@aerossol:~/ssh> cat config
Host github.com
  IdentityFile ~/.ssh/id_rsa.git
Host floresta floresta.if.usp.br
  IdentityFile ~/.ssh/id_rsa.cluster
Host code.grasp-open.com
  IdentityFile ~/.ssh/id_rsa.cluster
hbarbosa@aerossol:~/ssh> |
```

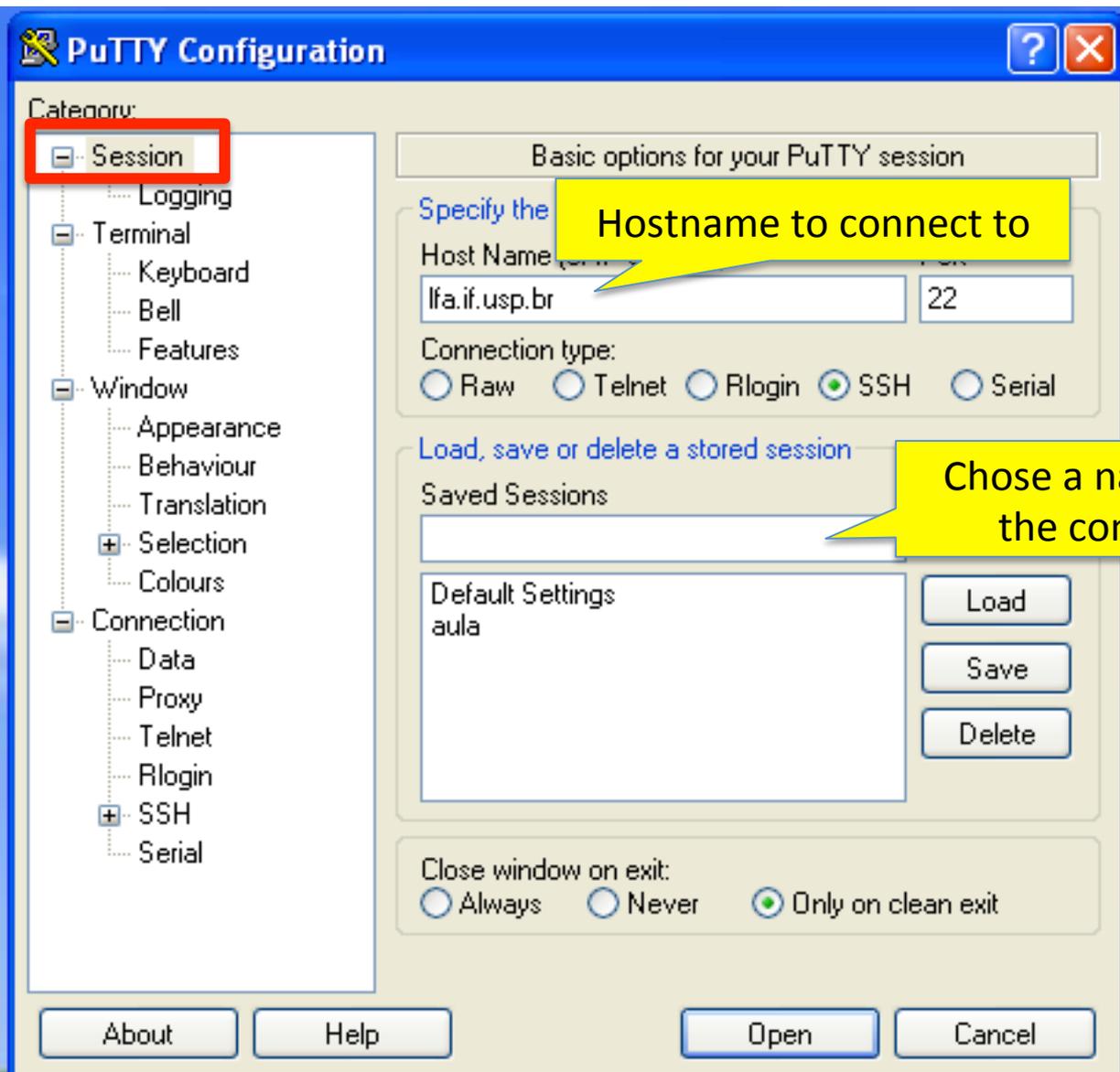
Folder with your ssh stuff

Pub keys authorized to connect

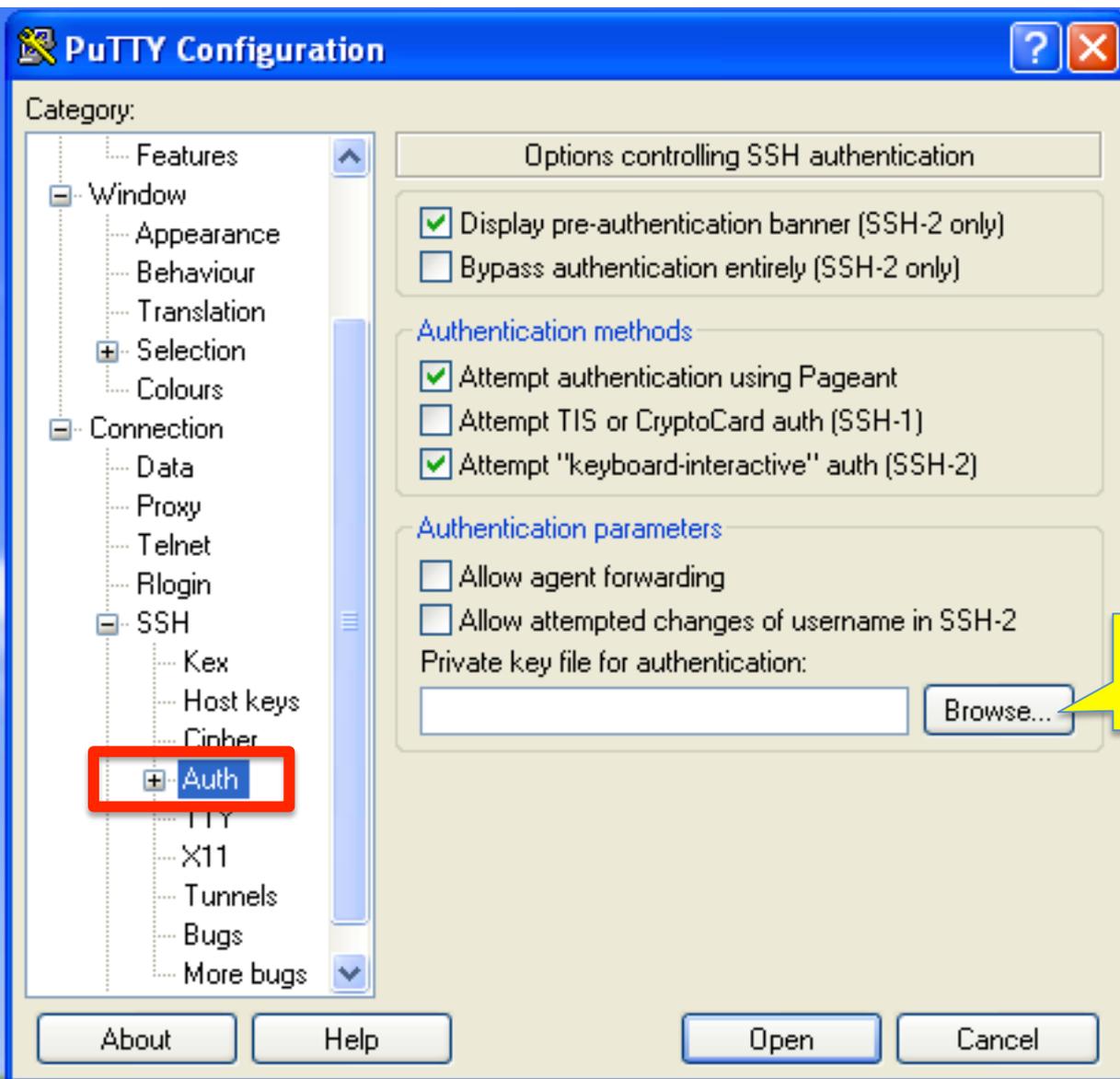
ssh/ folder and private files need to be "user-only"

Use the config file to automatically use the right private key when access other servers

# Putty

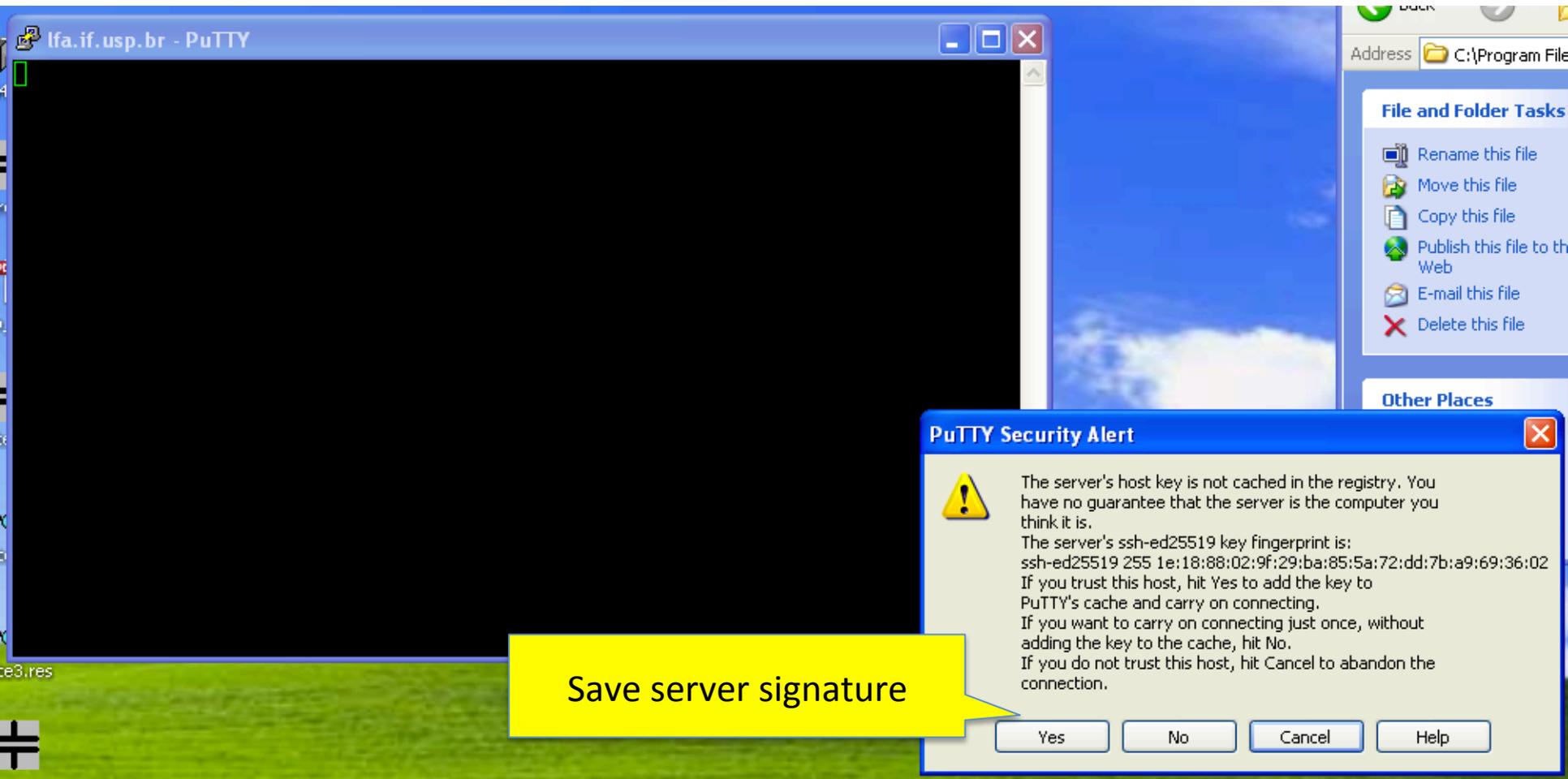


# Putty



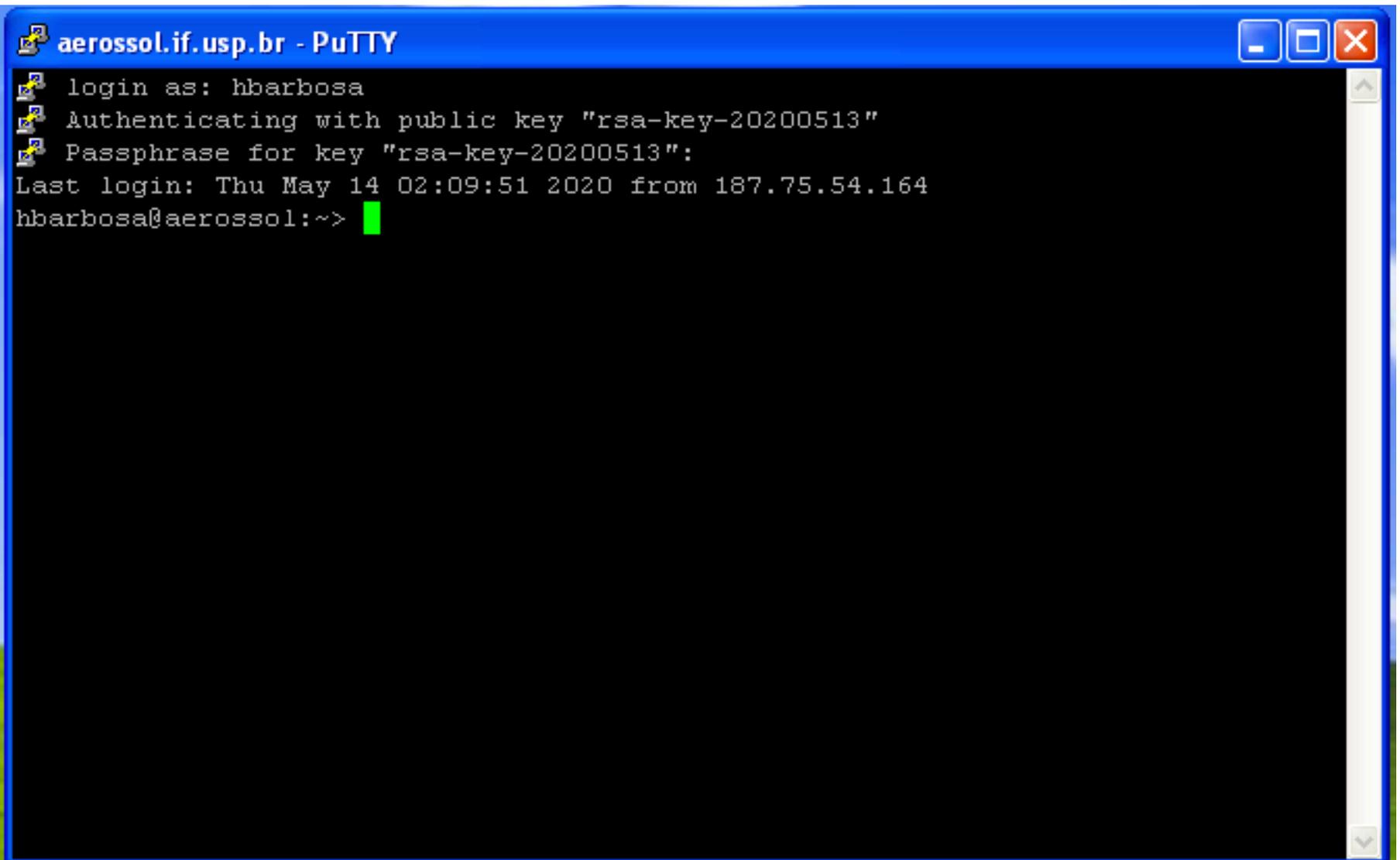
Chose the PPK private key file

# Putty



Save server signature

# Putty



The image shows a PuTTY terminal window with a blue title bar. The title bar text is "aerossol.if.usp.br - PuTTY". The terminal content is as follows:

```
login as: hbarbosa
Authenticating with public key "rsa-key-20200513"
Passphrase for key "rsa-key-20200513":
Last login: Thu May 14 02:09:51 2020 from 187.75.54.164
hbarbosa@aerossol:~>
```

The prompt "hbarbosa@aerossol:~>" is followed by a green cursor block. The window includes standard window controls (minimize, maximize, close) and a vertical scrollbar on the right side.

# Linux basics: the shell prompt

```
aerossol.if.usp.br - PuTTY
login as: hbarbosa
Authenticating with public key "rsa-key-20200513"
Passphrase for "rsa-key-20200513":
Last login: Thu May 14 02:09:51 2020 from 187.75.54.164
hbarbosa@aerossol:~>
```

Username

hostname

Current directory

~ is the user's home directory  
/home/\$USER

# Directories

```
1. Default (ssh)
Default (ssh) [bash] 862
hbarbosa@aerossol:~> pwd
/home/hbarbosa
hbarbosa@aerossol:~> cd Desktop
hbarbosa@aerossol:~/Desktop> pwd
/home/hbarbosa/Desktop
hbarbosa@aerossol:~/Desktop> ls
a_file_on_my_desktop.txt
hbarbosa@aerossol:~/Desktop> ls -la
total 12
drwxr-xr-x  2 hbarbosa users  37 May 14 17:47 .
drwxr-xr-x 62 hbarbosa users 8192 May 14 17:44 ..
-rw-r--r--  1 hbarbosa users   0 May 14 17:47 a_file_on_
hbarbosa@aerossol:~/Desktop>
```

pwd = present working directory

cd = change directory

ls = list

. = current directory  
.. = parent directory

ls options:  
-a all files (including hidden files)  
-l long listing format

# Directories

```
hbarbosa@aerossol:~/Desktop> cd /tmp
hbarbosa@aerossol:/tmp>
hbarbosa@aerossol:/tmp> cd /bin
hbarbosa@aerossol:/bin>
hbarbosa@aerossol:/bin> cd tmp
-bash: cd: tmp: No such file or directory
hbarbosa@aerossol:/bin>
hbarbosa@aerossol:/bin> cd
hbarbosa@aerossol:~>
hbarbosa@aerossol:~> cd /
hbarbosa@aerossol:/>
hbarbosa@aerossol:/> cd ~
hbarbosa@aerossol:~>
hbarbosa@aerossol:~> cd /
hbarbosa@aerossol:/>
hbarbosa@aerossol:/> echo $HOME
/home/hbarbosa
hbarbosa@aerossol:/> cd $HOME
hbarbosa@aerossol:~>
hbarbosa@aerossol:~> |
```

Changed to temp folder

Then to bin folder

Back to home dir:  
cd  
cd ~  
cd \$HOME

Absolute paths start with /  
Relative paths without or with ./



Root /

C:\

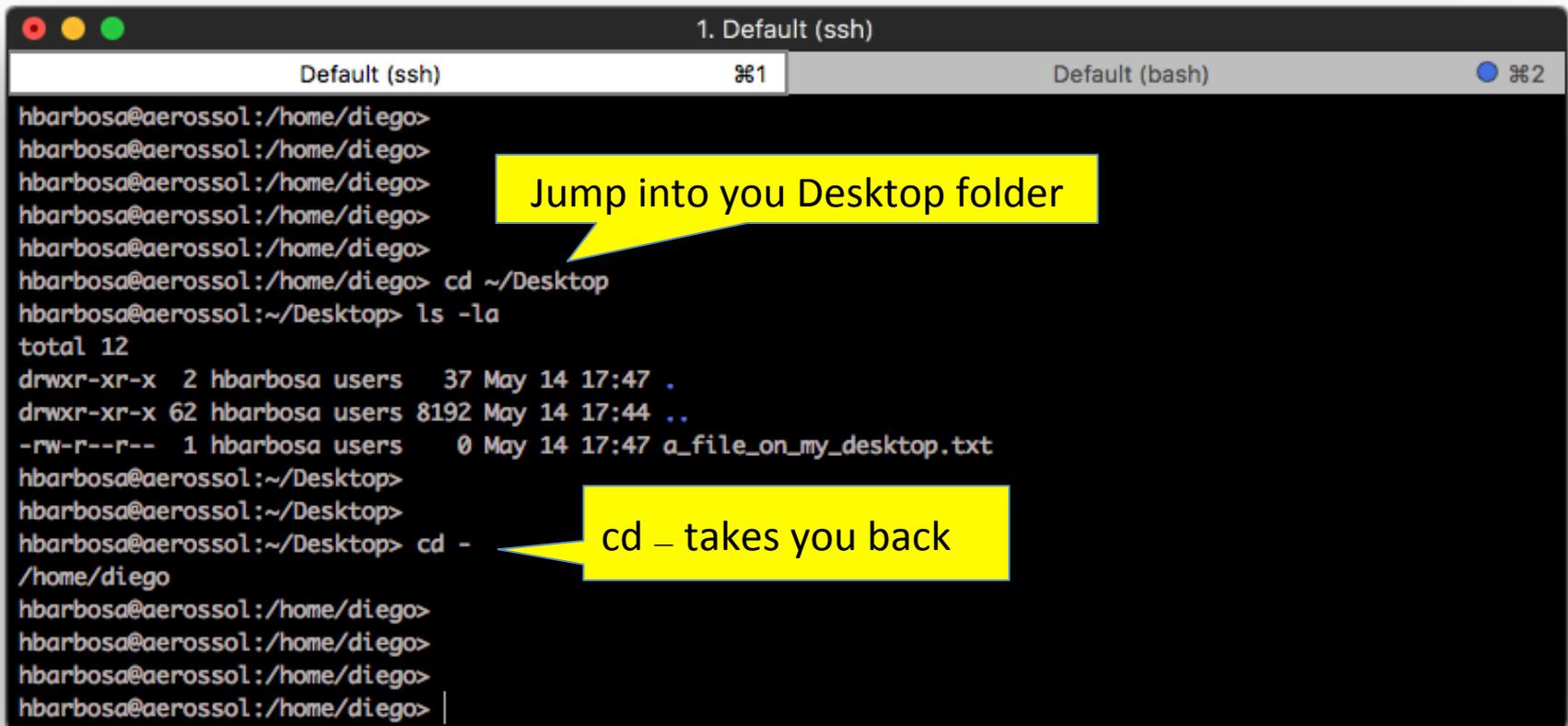
# Directories

```
1. Default (ssh)
Default (ssh)
hbarbosa@aerossol:~> cd /
hbarbosa@aerossol:~> ls
bin      dev      LFANAS  lib64      mnt      proc     science   srv      temp      work
boot    etc      LFASGI  Matlab 8.01.desktop  opt      root     selinux   sys      usr
compute home    lib      media      orphanage  sbin    sgi_make_host_clone  tftpboot  var
hbarbosa@aerossol:~>
hbarbosa@aerossol:~> ls home
acesars   bramsgdata.tgz  hbarbosa  leandroff12  sgi.old  torqueadmin
acorreia  diego           helber    pbsdata      teste    wrfdata
aputhukkudy  djunior       janaina   sandroal     theotonio wrfdata.tgz
bramsdata  erlacher       jvila    sgi           thiago   X86_64_SLES11.3_SGIMC-CMK-MI_1.9.0_0.tar.gz
hbarbosa@aerossol:~>
hbarbosa@aerossol:~> cd /home/diego
hbarbosa@aerossol:~/home/diego> ls
bin                matlab_crash_dump.24142-1  matlab_crash_dump.32729-3  matlab_crash_dump.53359-1
Desktop            matlab_crash_dump.24787-1  matlab_crash_dump.35632-1  matlab_crash_dump.7633-1
matlab_crash_dump.1074-1  matlab_crash_dump.30801-1  matlab_crash_dump.36889-1  matlab_crash_dump.8044-1
matlab_crash_dump.13099-1  matlab_crash_dump.30801-2  matlab_crash_dump.4524-1  matlab_crash_dump.972-1
matlab_crash_dump.18757-1  matlab_crash_dump.30801-3  matlab_crash_dump.4524-2  matlab_crash_dump.972-2
matlab_crash_dump.19693-1  matlab_crash_dump.31451-1  matlab_crash_dump.4524-3  mpd.hosts
matlab_crash_dump.20839-1  matlab_crash_dump.32729-1  matlab_crash_dump.45822-1  #.profile#
matlab_crash_dump.20839-2  matlab_crash_dump.32729-2  matlab_crash_dump.45822-2  prog
hbarbosa@aerossol:~/home/diego> |
```

root folder

Change inside multiple folders at once

# Directories



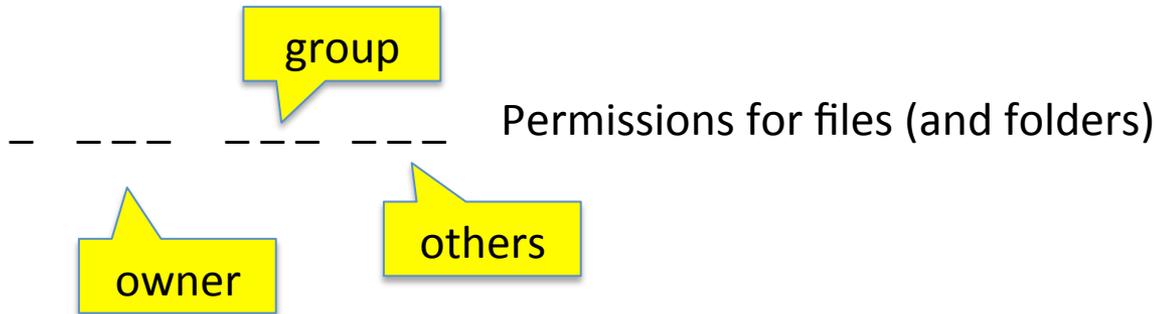
A terminal window titled "1. Default (ssh)" with two tabs: "Default (ssh)" and "Default (bash)". The terminal shows a user named hbarbosa at a host named aerossol. The user starts in the directory ~/home/diego and repeatedly enters the prompt. Then, they enter `cd ~/Desktop` to move to the Desktop directory. A yellow callout bubble points to this command with the text "Jump into you Desktop folder". Next, they enter `ls -la`, which outputs the following directory listing:

```
total 12
drwxr-xr-x  2 hbarbosa users   37 May 14 17:47 .
drwxr-xr-x 62 hbarbosa users 8192 May 14 17:44 ..
-rw-r--r--  1 hbarbosa users    0 May 14 17:47 a_file_on_my_desktop.txt
```

Then, they enter `cd -` to return to the previous directory. A yellow callout bubble points to this command with the text "cd - takes you back". Finally, they enter `cd` to return to the home directory, and the prompt changes to `hbarbosa@aerossol:~/home/diego>`.

# Permissions

```
hbarbosa@aerossol:~/Desktop$ ls -ld
total 12
drwxr-xr-x  2 hbarbosa users  37 May 14 17:47 .
drwxr-xr-x 62 hbarbosa users 8192 May 14 17:44 ..
-rw-r--r--  1 hbarbosa users   0 May 14 17:47 a_file_on_my_desktop.txt
hbarbosa@aerossol:~/Desktop>
```



r w x for read, write execute

To change the permissions:  
chown <options> <files>

<https://www.guru99.com/unix-linux-tutorial.html>

Linux/Unix Tutorial For Beginners (5:30)

- [https://www.youtube.com/watch?v=xRX6ZI\\_P-LA](https://www.youtube.com/watch?v=xRX6ZI_P-LA)

Command Line V/s GUI - Linux Tutorial (11:40)

- <https://www.youtube.com/watch?v=G0LsYZ7Kwh8>

Important Linux Commands for Beginners (15:02)

- <https://www.youtube.com/watch?v=TIK0-5EJ-Y>

Introduction to Linux Operating System (2:29:04)

- <https://www.youtube.com/watch?v=V1y-mbWM3B8&t=3049s>

```
$ shutdown -h now
```

```
URGENT: broadcast message from root:  
System going down IMMEDIATELY!
```

```
... time to leave ...
```

```
Now you can turn off the power...
```