



# HPC School - Beginner

High Performance  
Computing &  
Big Data Services

S1-1 - Connection to ULHPC

-  [hpc.uni.lu](http://hpc.uni.lu)
-  [hpc@uni.lu](mailto:hpc@uni.lu)
-  [@ULHPC](https://twitter.com/ULHPC)



# Overview

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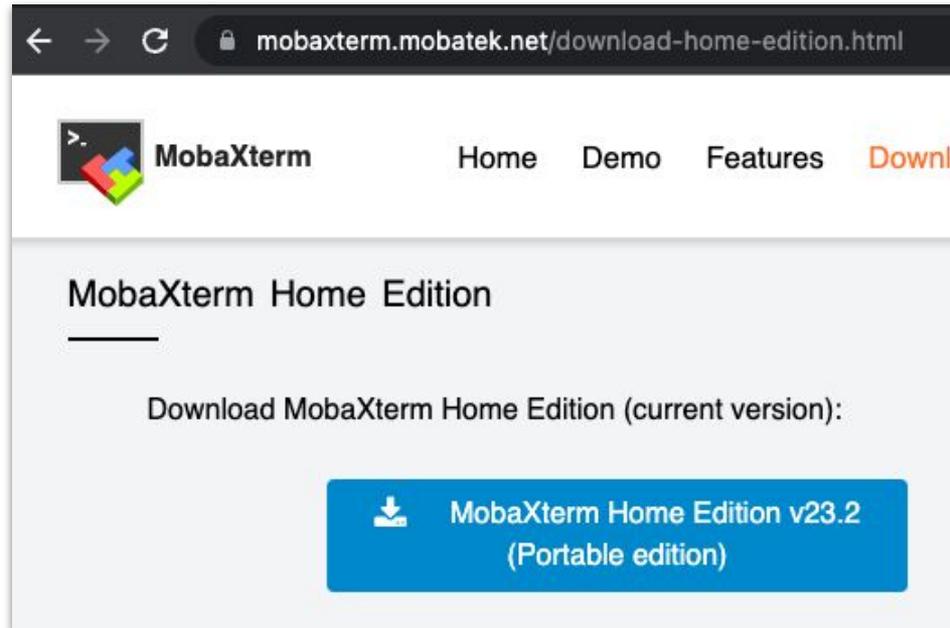
The main steps are:

1. Install the necessary software to connect to the ULHPC
2. Create a pair of SSH keys to authenticate yourself on the ULHPC
3. Set your public key in our authentication system
4. Establish a first connection

# Step 1 - necessary software

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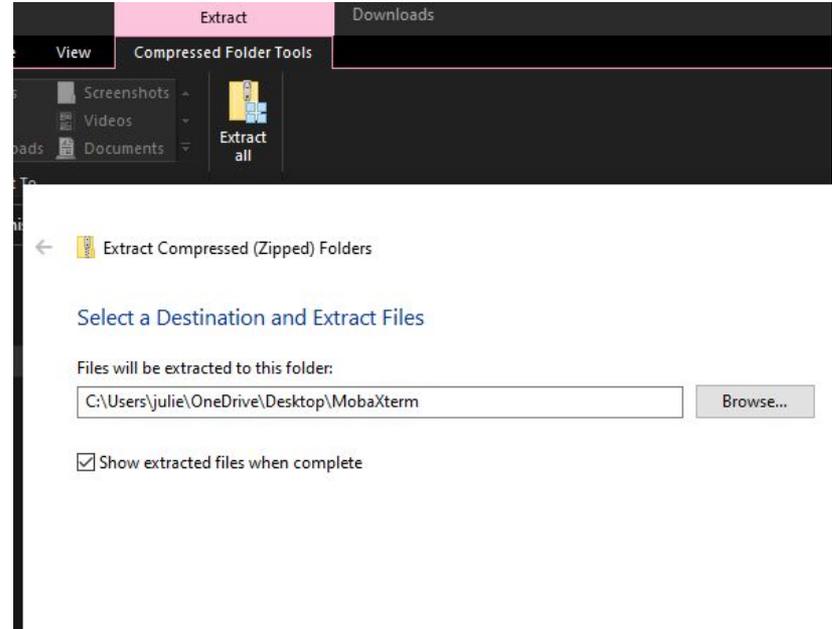
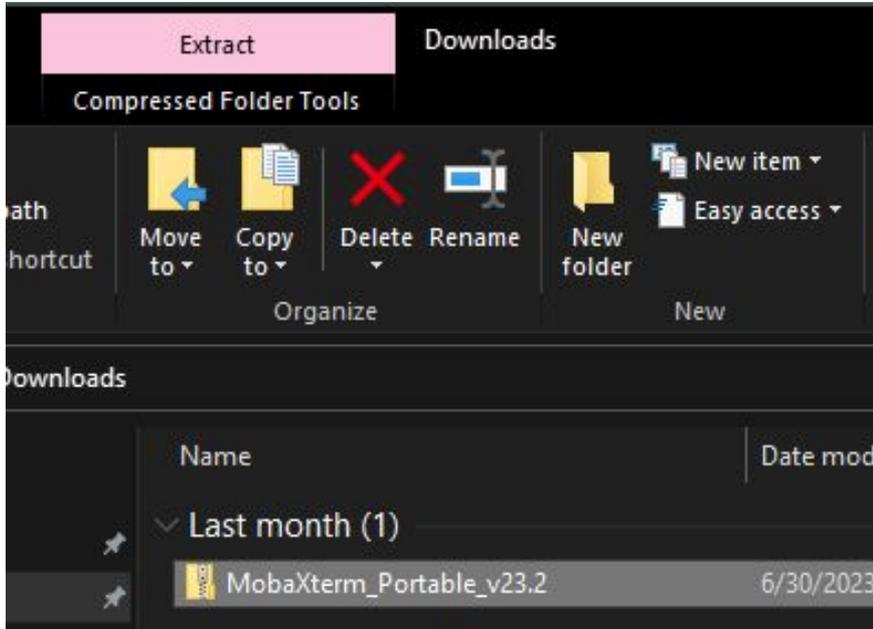
Download MobaXterm Home Edition (portable), [use this link](#)



The screenshot shows a web browser window with the URL `mobaxterm.mobatek.net/download-home-edition.html`. The page features the MobaXterm logo and navigation links for Home, Demo, Features, and Download. The main heading is "MobaXterm Home Edition". Below it, the text reads "Download MobaXterm Home Edition (current version):". A prominent blue button with a download icon and the text "MobaXterm Home Edition v23.2 (Portable edition)" is centered on the page.

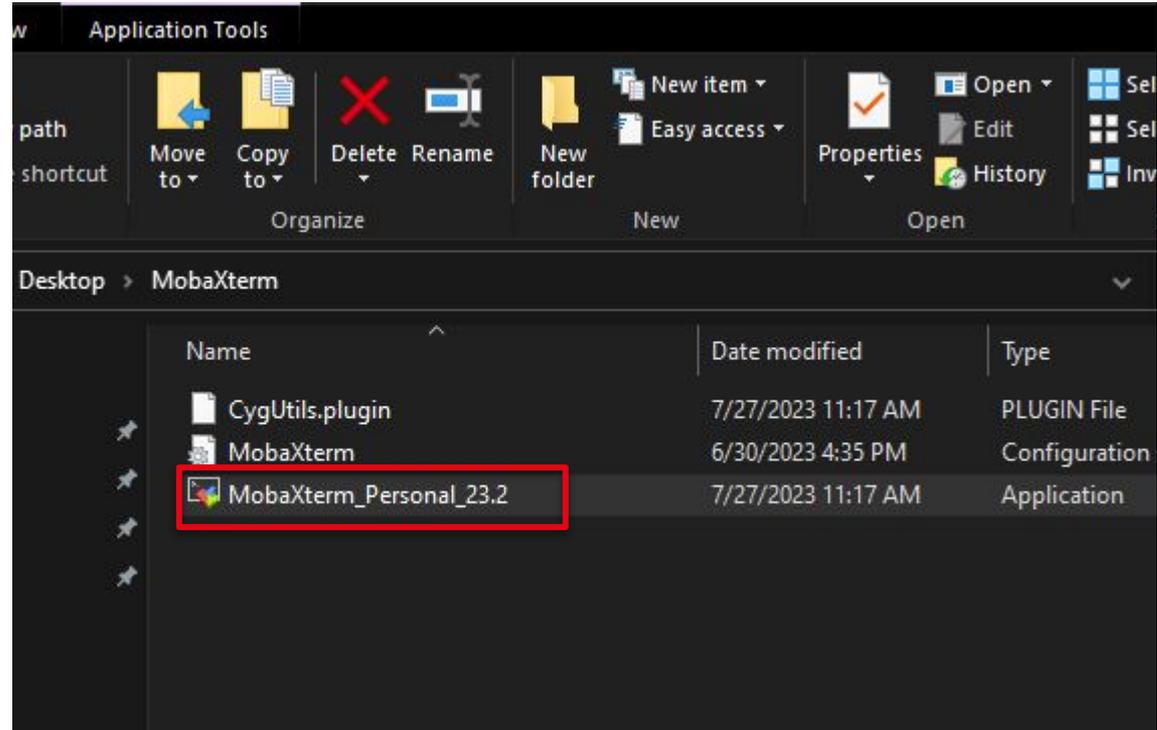
# Step 1 - necessary software

Extract the archive containing the application in a folder of your choice



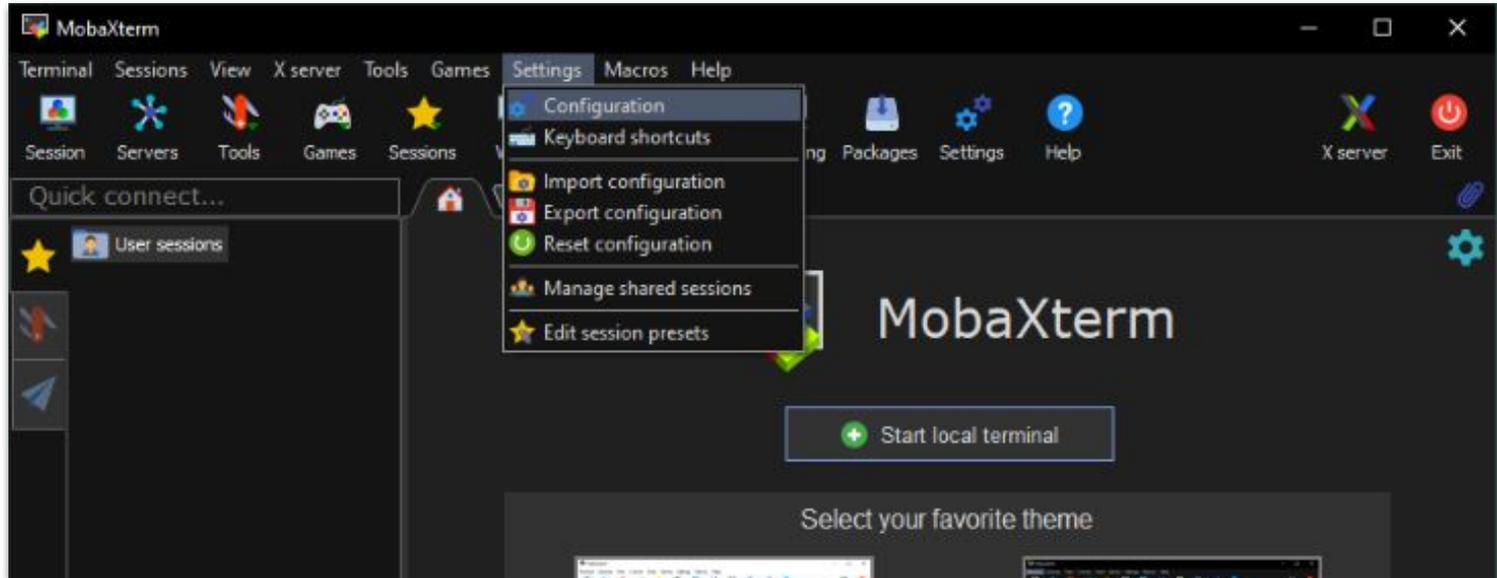
# Step 1 - necessary software

Open MobaXterm



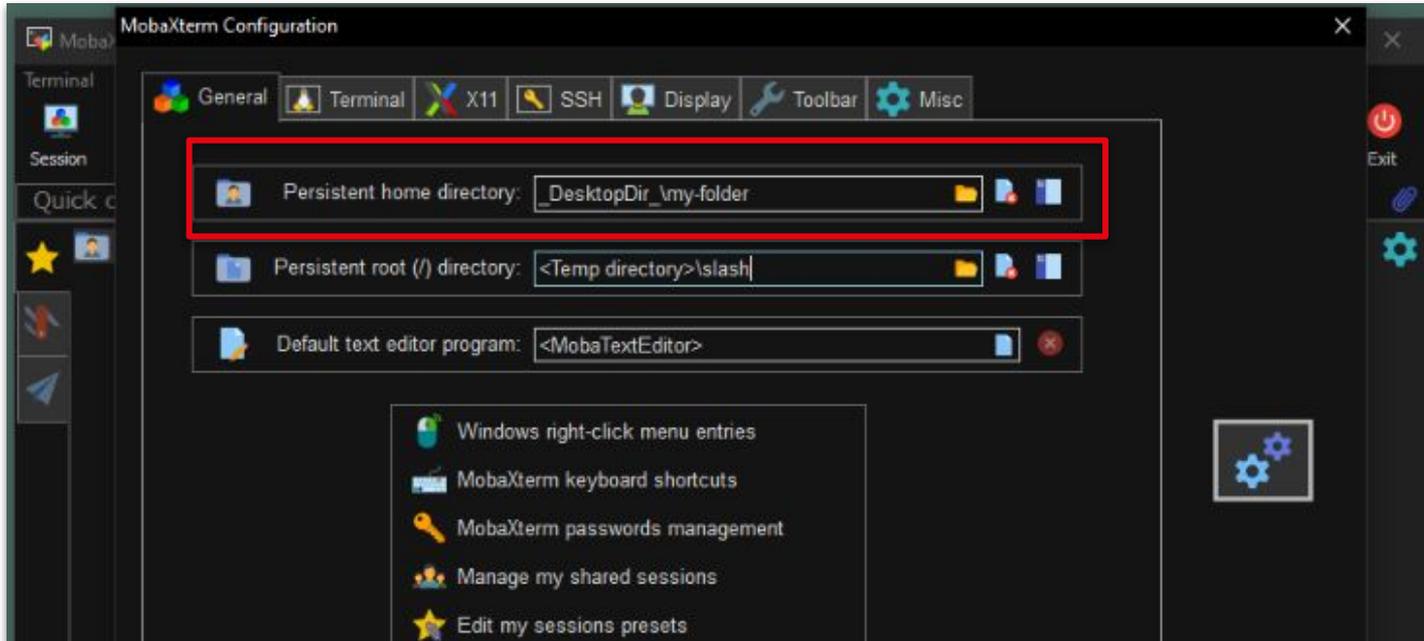
# Step 1 - necessary software

Go to the configuration screen



# Step 1 - necessary software

Change the persistent home directory to a folder of your choice on your machine



# Step 2 - Creation of the SSH key pair

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## What is it?

SSH key pairs are a couple of files used to authenticate a user on a server without exchanging password

## A pair of keys?

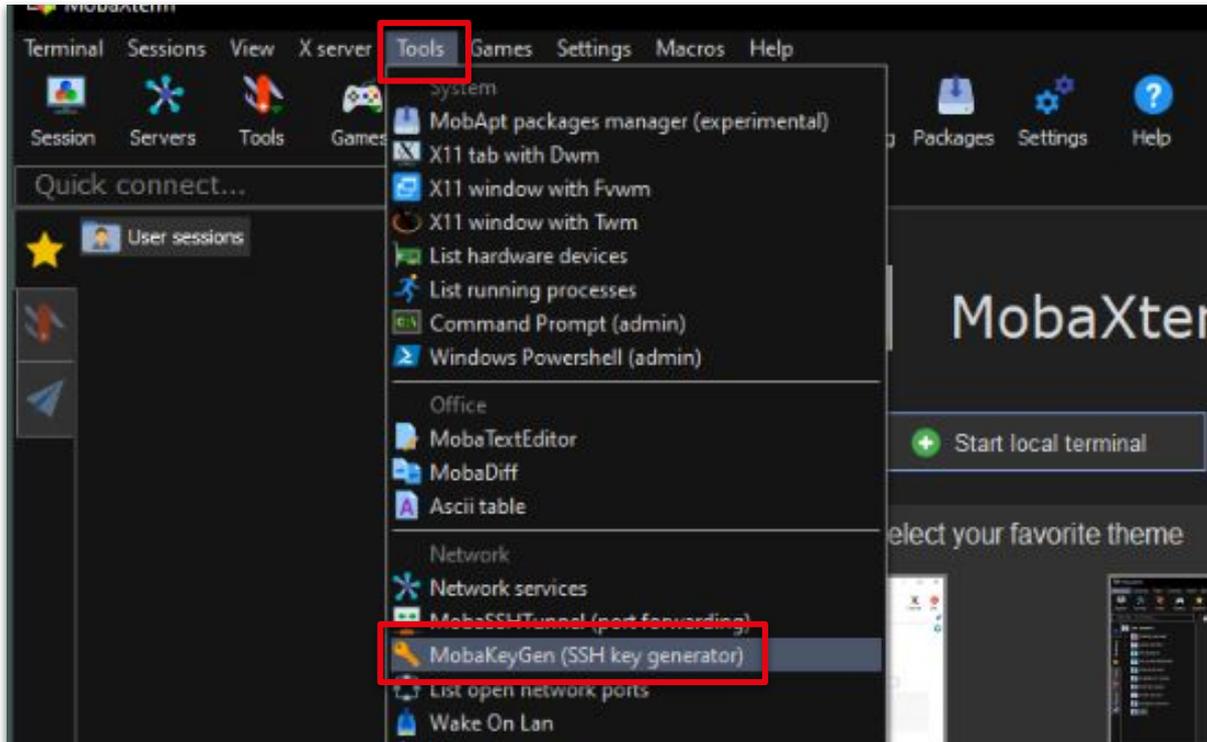
- the public key can (and should) be shared
- the private key should never be shared

## Why not passwords?

Servers allowing access via password exchange are prone to be attacked

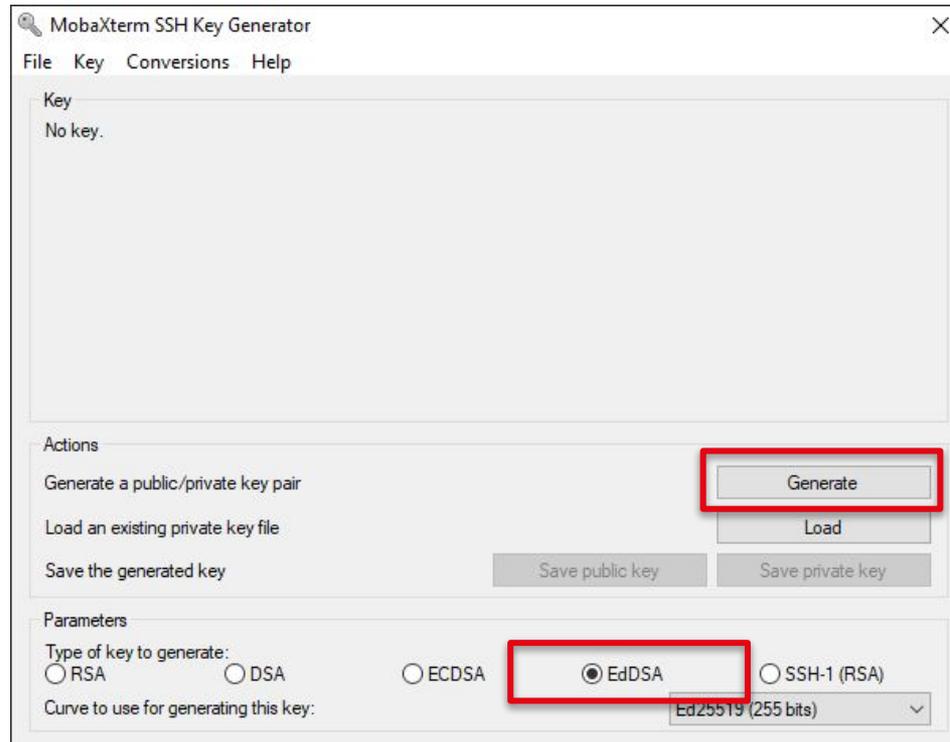
# Step 2 - Creation of the SSH key pair

Go to the Tools menu and select MobaKeyGen (SSH key generator)



# Step 2 - Creation of the SSH key pair

Select EdDSA and click on Generate and move your mouse to speed up the generation process



## Step 2 - Creation of the SSH key pair

After a moment you should see a similar screen, click on Save public key

Key

Public key for pasting into OpenSSH server (~/.ssh/authorized\_keys file):

```
ssh-ed25519 AAAAC3NzaC1lZDI1NTE5AAAAIC+uXp5Es93Uup311ly3J8H520GG0qyEV3c1BCXHjWU eddsa-key-20230727
```

Key fingerprint: ssh-ed25519 255 SHA256:kPyEuGQ6myk2EKydJf7AsGE7usGAi6F3XC2M3rLVloc

Key comment: eddsa-key-20230727

Key passphrase:

Confirm passphrase:

Actions

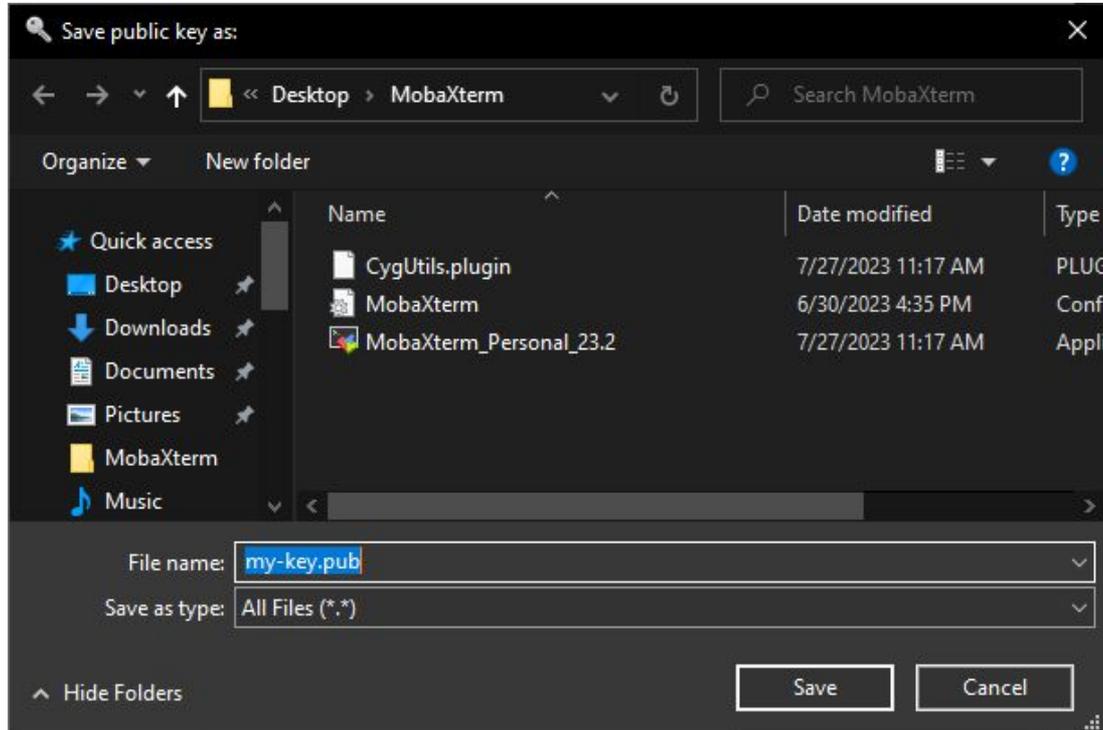
Generate a public/private key pair

Load an existing private key file

Save the generated key

# Step 2 - Creation of the SSH key pair

Select a folder and pick up a name, e.g. my-key.pub for your public key



# Step 2 - Creation of the SSH key pair

Then click on Save private key

Key

Public key for pasting into OpenSSH server (~/.ssh/authorized\_keys file):

```
ssh-ed25519 AAAAC3NzaC1lZDI1NTE5AAAAIC+uXp5Es93Uup311ly3J8H520GG0qyEV3c1BCXHjWU eddsa-key-20230727
```

Key fingerprint: ssh-ed25519 255 SHA256:kPyEuGQ6myk2EKydJf7AsGE7usGAi6F3XC2M3rLVloc

Key comment: eddsa-key-20230727

Key passphrase:

Confirm passphrase:

Actions

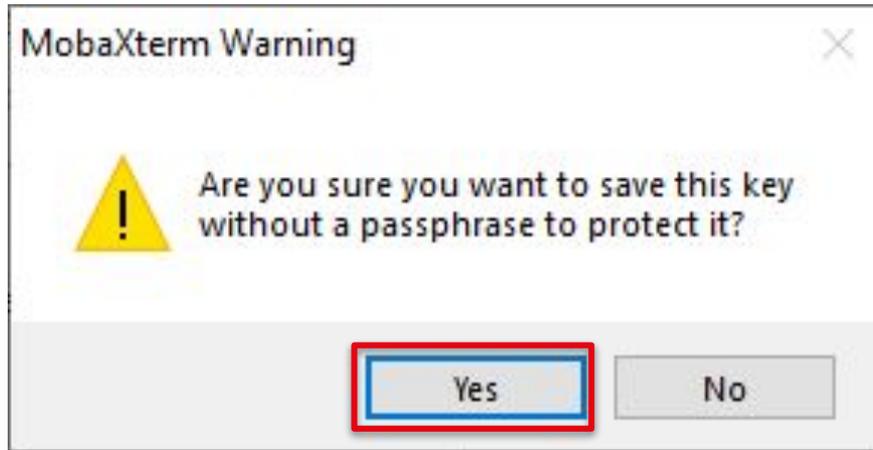
Generate a public/private key pair

Load an existing private key file

Save the generated key

## Step 2 - Creation of the SSH key pair

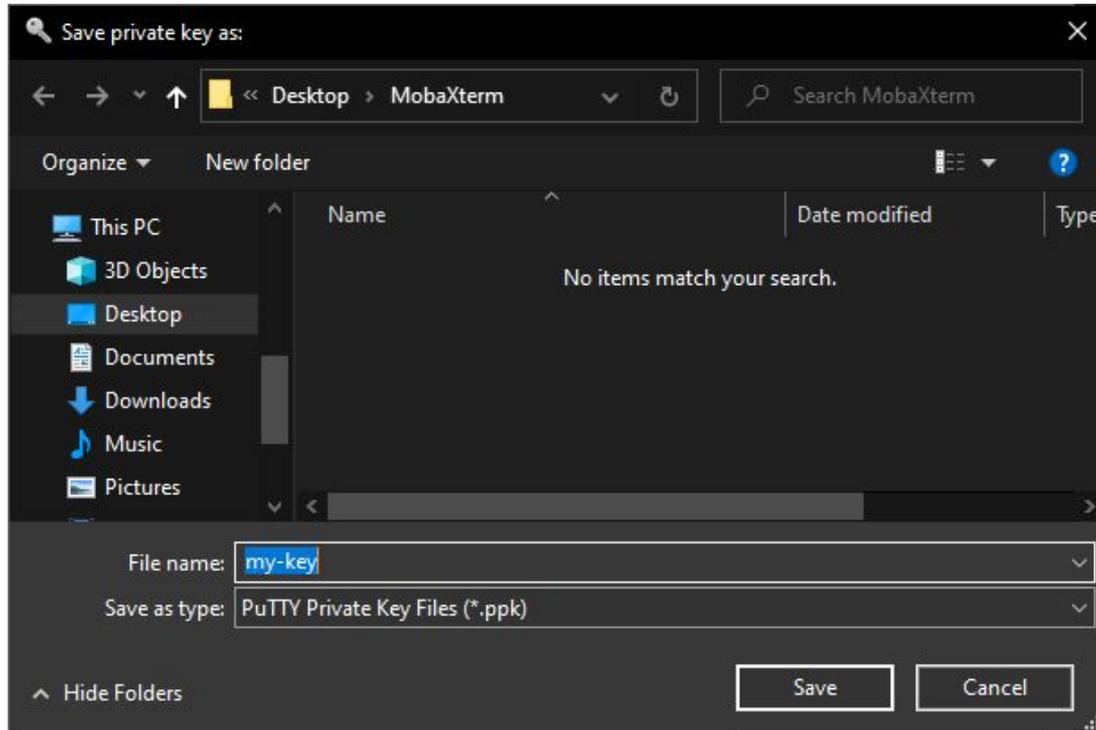
Choose Yes



Unlike what is shown, you can add a passphrase to add an extra layer of security. In this presentation we do not use it for the sake of simplicity.

## Step 2 - Creation of the SSH key pair

Find the folder in which you stored your public key pick up a name, e.g. my-key for your private key



## Step 3 - Give us your public key

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IPA is the name of our authentication server: <https://hpc-ipa.uni.lu>

When your account has been created, you should have received an email with a link to IPA in order to set your account password.

Before being able to connect to the cluster, you need to add your public key to your account.

 Full documentation available here: <https://hpc-docs.uni.lu/connect/ipa/#upload-your-ssh-key-on-the-ulhpc-identity-management-portal>

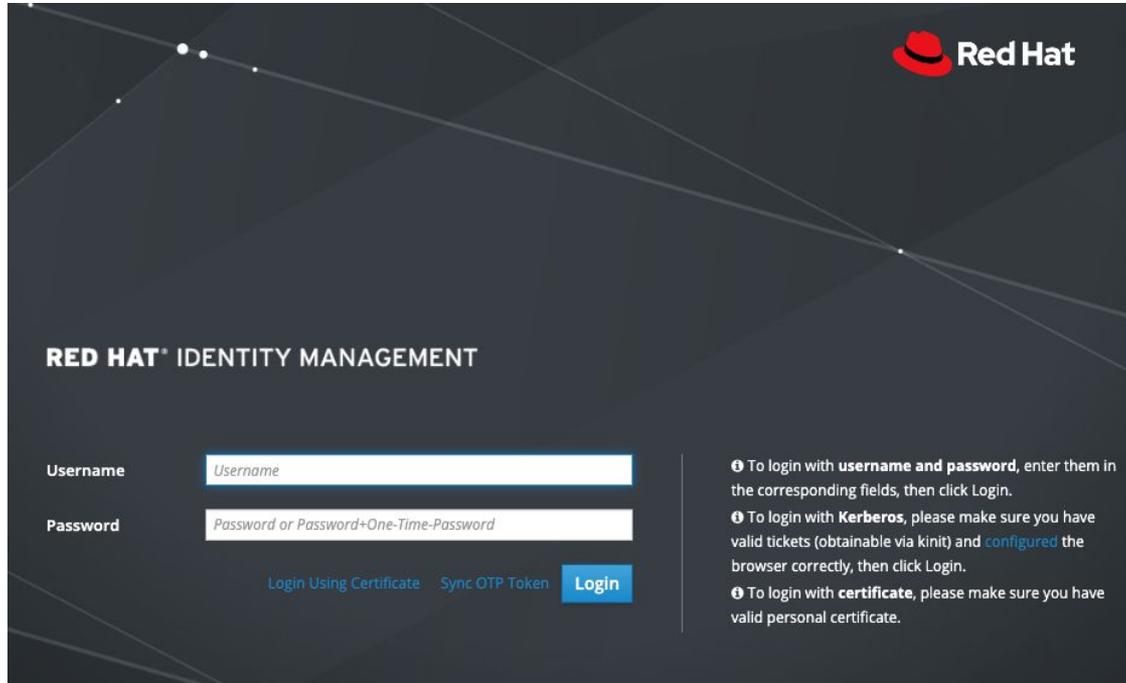
## Step 3 - Give us your public key

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- Log in on IPA with your password
- Select Identity / Users.
- Select your login (**this is not your UL account**, check your account creation email if you don't remember)
  - e.g., for me, it is `jschleich` and not `julien.schleich@uni.lu` or `julien.schleich`

# Step 3 - Give us your public key

Go to the following URL: <https://hpc-ipa.uni.lu> and enters your ULHPC username and password



The image shows a screenshot of the Red Hat Identity Management login page. The page has a dark background with the Red Hat logo in the top right corner. The main heading is "RED HAT® IDENTITY MANAGEMENT". Below this, there are two input fields: "Username" with a placeholder "Username" and "Password" with a placeholder "Password or Password+One-Time-Password". To the right of these fields, there are three instructions for different login methods, each preceded by a small icon. At the bottom, there are three links: "Login Using Certificate", "Sync OTP Token", and a blue "Login" button.

**RED HAT® IDENTITY MANAGEMENT**

Username

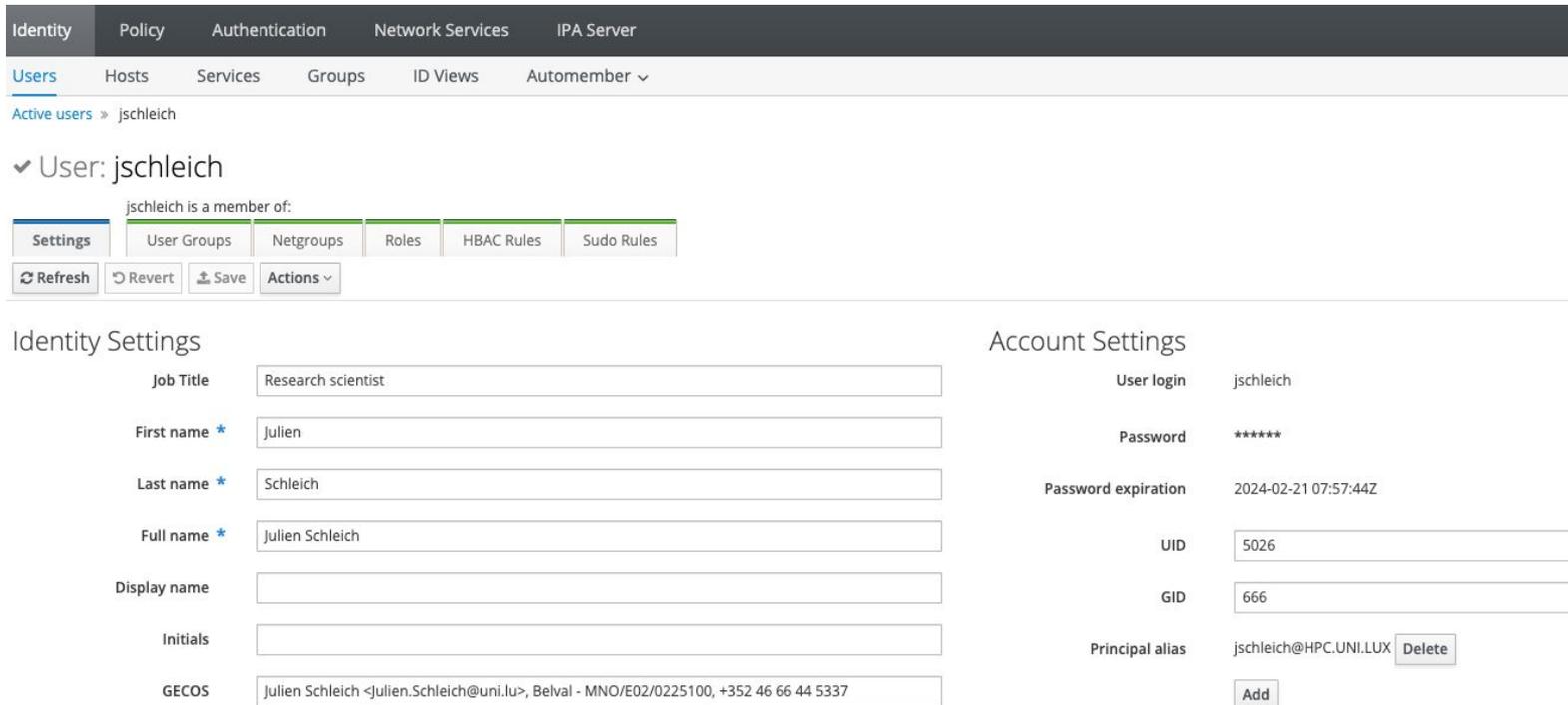
Password

[Login Using Certificate](#) [Sync OTP Token](#) [Login](#)

- To login with **username and password**, enter them in the corresponding fields, then click Login.
- To login with **Kerberos**, please make sure you have valid tickets (obtainable via kinit) and **configured** the browser correctly, then click Login.
- To login with **certificate**, please make sure you have valid personal certificate.

# Step 3 - Give us your public key

Click on your username and a similar page should open:



The screenshot shows a user management interface. At the top, there are tabs for Identity, Policy, Authentication, Network Services, and IPA Server. Below these are sub-tabs for Users, Hosts, Services, Groups, ID Views, and Automember. The current view is for the user 'jschleich'. A checkmark indicates the user is selected. Below the user name, it says 'jschleich is a member of:' followed by tabs for Settings, User Groups, Netgroups, Roles, HBAC Rules, and Sudo Rules. There are buttons for Refresh, Revert, Save, and Actions. The main content is divided into two columns: Identity Settings and Account Settings.

| Identity Settings   | Account Settings   |
|---|--|
| Job Title: Research scientist   | User login: jschleich                                      |
| First name *: Julien  | Password: *****  |
| Last name *: Schleich   | Password expiration: 2024-02-21 07:57:44Z                  |
| Full name *: Julien Schleich  | UID: 5026  |
| Display name:   | GID: 666   |
| Initials:   | Principal alias: jschleich@HPC.UNI.LUX <span>Delete</span> |
| GECOS: Julien Schleich <Julien.Schleich@uni.lu>, Belval - MNO/E02/0225100, +352 46 66 44 5337 | <span>Add</span>   |

## Step 3 - Give us your public key

On the right side, find SSH public keys and click on the Add button



The screenshot shows a configuration interface with the following elements:

- Login shell:** A text input field containing `/bin/sh`.
- Home directory:** A text input field containing `/home/user` and an **Undo** button.
- SSH public keys:** A section containing an **Add** button, which is highlighted with a red rectangular box.
- Certificate:** A section displaying a warning icon and the text **No Valid Certificate**.

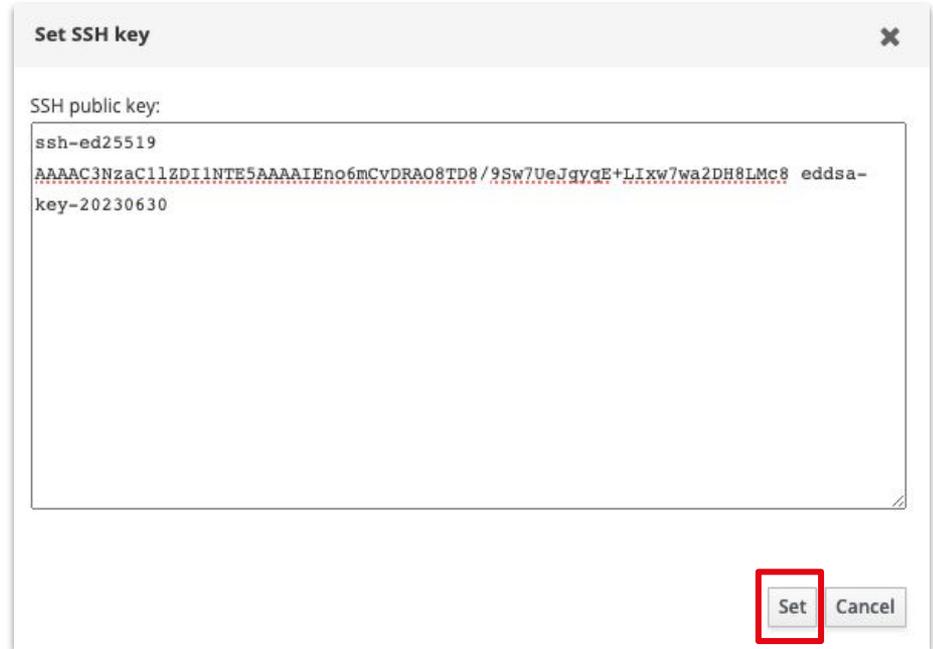


Full documentation available here:

<https://hpc-docs.uni.lu/connect/ipa/#upload-your-ssh-key-on-the-ulhpc-identity-management-portal>

# Step 3 - Give us your public key

Paste the content of your public key  
and click on Set



Set SSH key

SSH public key:

```
ssh-ed25519  
AAAAC3NzaC1lZDI1NTE5AAAAIENo6mCvDRAO8TD8/9Sw7UeJqygE+Lixw7wa2DH8LMc8 eddsa-  
key-20230630
```

Set Cancel



Full documentation available here:

<https://hpc-docs.uni.lu/connect/ipa/#upload-your-ssh-key-on-the-ulhpc-identity-management-portal>

## Step 3 - Give us your public key

Ensure that you clicked on **Save** before leaving IPA otherwise your key will not be taken into account.

✓ User: jschleich

jschleich is a member of:

|          |             |           |       |            |
|----------|-------------|-----------|-------|------------|
| Settings | User Groups | Netgroups | Roles | HBAC Rules |
|----------|-------------|-----------|-------|------------|

Refresh Revert **Save** Actions ▾

### Identity Settings

Job Title

Research scientist

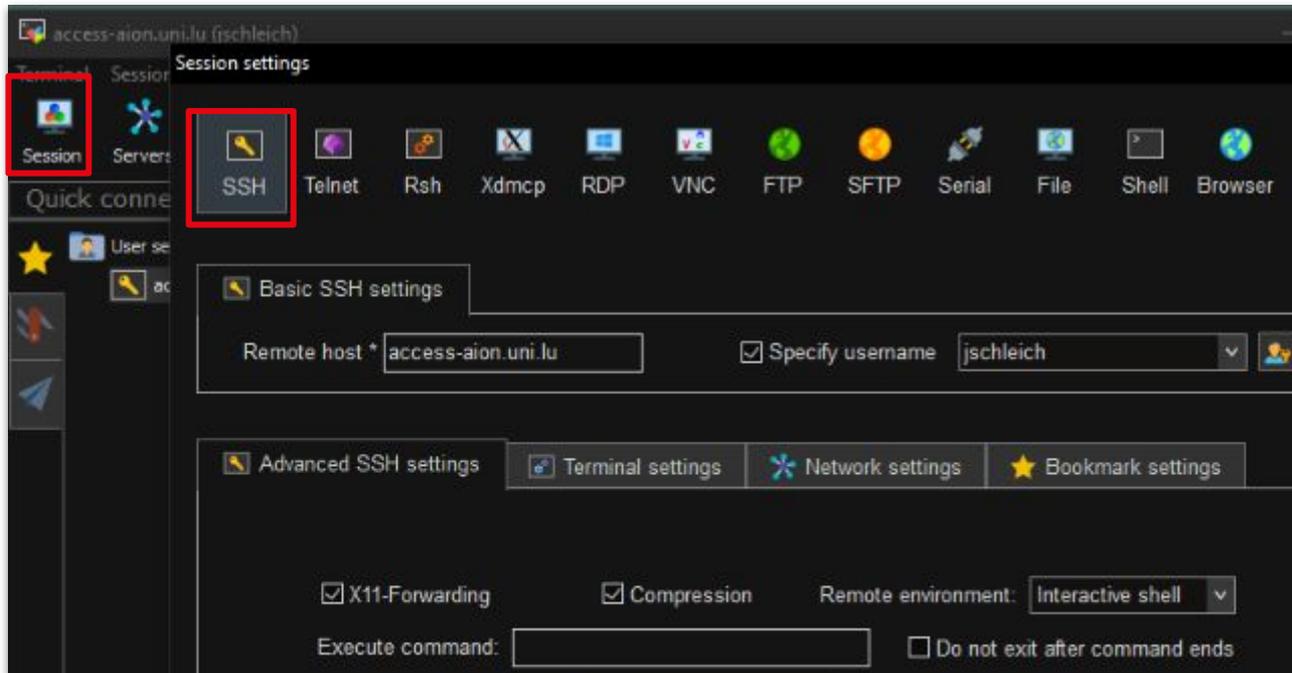


Full documentation available here:

<https://hpc-docs.uni.lu/connect/ipa/#upload-your-ssh-key-on-the-ulhpc-identity-management-portal>

# Step 4 - First connection

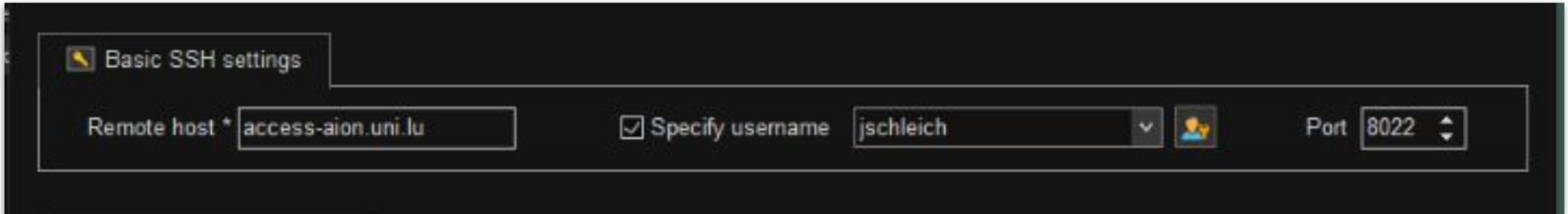
Click on Session and select SSH



# Step 4 - First connection

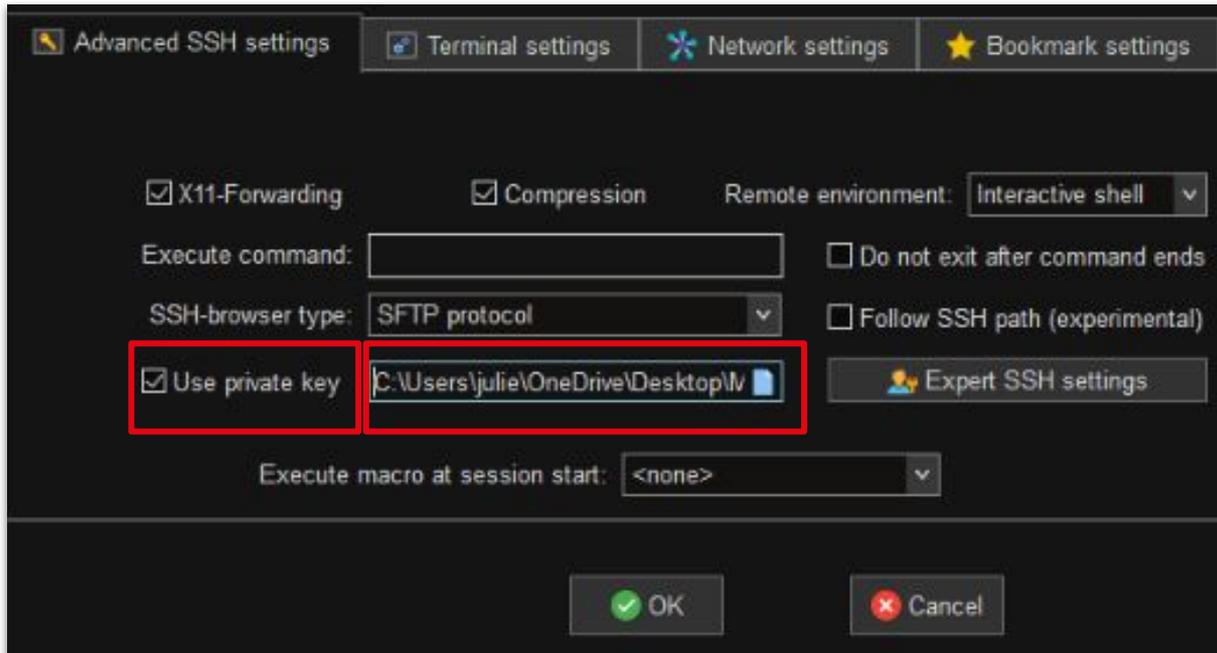
In Basic SSH settings, fill in:

- Remote host (access-aion.uni.lu or access-iris.uni.lu)
- Specify your ULHPC username
- Specify the port (8022)



# Step 4 - First connection

In Advanced SSH settings, select Use private key and select your private key file



## Step 4 - First connection

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Upon your first connection, you will be prompted with the following message. Type yes to accept.

```
The authenticity of host '[access-aion.uni.lu]:8022 ([172.20.3.16]:8022)' can't be established.  
ED25519 key fingerprint is SHA256:jwbW8pkfCzXrh1Xhf9n0UI+7hd/YGi4Fly0E92yxxe0.  
This key is not known by any other names  
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
```

## Step 4 - First connection

Click on the Ok button and you should be connected on the cluster!

```
=====
Welcome to access1.aion-cluster.uni.lux
=====

Access
(Aion Cluster)

=====
Atos BullSequana XH2000 Direct Liquid Cooling (DLC) supercomputer
                                     https://hpc-docs.uni.lu/systems/aion/
=== Computing Nodes ===== #RAM/n === #Cores ==
aion-[0001-0354] 354 Atos X2410 AMD compute blade      256GB      40704
                 (2 AMD Epyc ROME 7H12 @ 2.6 GHz [64c/280W])
```

# Troubleshooting

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## Connection timeout

You probably use an internet connection that filters out the 8022 port.

Try to use Eduroam or ethernet.

## No route to host

Check that there is no typo in your configuration

## Permission denied

- 1.You may have forgot to copy your public key in IPA
- 2.Check if you copy pasted correctly your key in IPA
- 3.If you already had other SSH keys, ensure you use the correct key to connect

# Connection the cluster - Troubleshooting

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A different situation? [Open a support ticket here](#)

Provide as many details as you can about the issue and what you tried to solve it.