



HPC School - Beginner

High Performance
Computing &
Big Data Services

S1-1 - Connection to ULHPC - Mac and Linux

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



Overview

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

- Mac and Linux users have a pre-installed terminal
- You can install any other terminal however it is out of the scope of this lecture

Step 2 - Creation of the SSH key pair

- Start a terminal and type the following command: `ssh-keygen -t ed25519 -a 100`
- A new key pair should be created in a hidden folder of your home folder `~/ .ssh`
- `~` (tilde) represents your user home directory
- You can list the files of that folder to ensure the presence of both
 - `~/ .ssh/id_ed25519` (private key)
 - `~/ .ssh/id_ed25519 .pub` (public key)
- List the files via the following command: `ls ~/ .ssh/`

Reminder: only share the public key file (`~/ .ssh/id_ed25519 .pub`)

Note: if you already have a pair of key, feel free to use it. However if you want to generate a new pair of key, be careful and set another key name or you may override and lose your existing key.

You can do: `ssh-keygen -t ed25519 -a 100 -f newname`



Step 3 - Give us your public key

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.

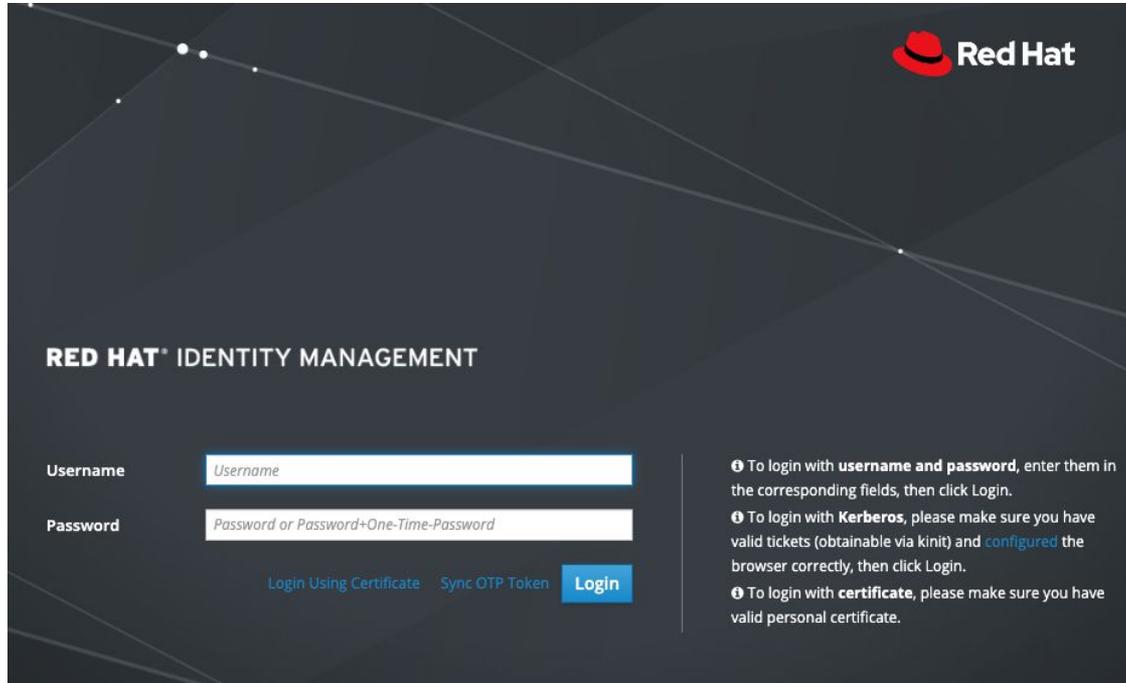
 Full documentation available here: <https://hpc-docs.uni.lu/connect/ipa/#upload-your-ssh-key-on-the-ulhpc-identity-management-portal>

Step 3 - Give us your public key

- 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 an information icon. At the bottom, there are three links: "Login Using Certificate", "Sync OTP Token", and a blue "Login" button.

RED HAT® IDENTITY MANAGEMENT

Username

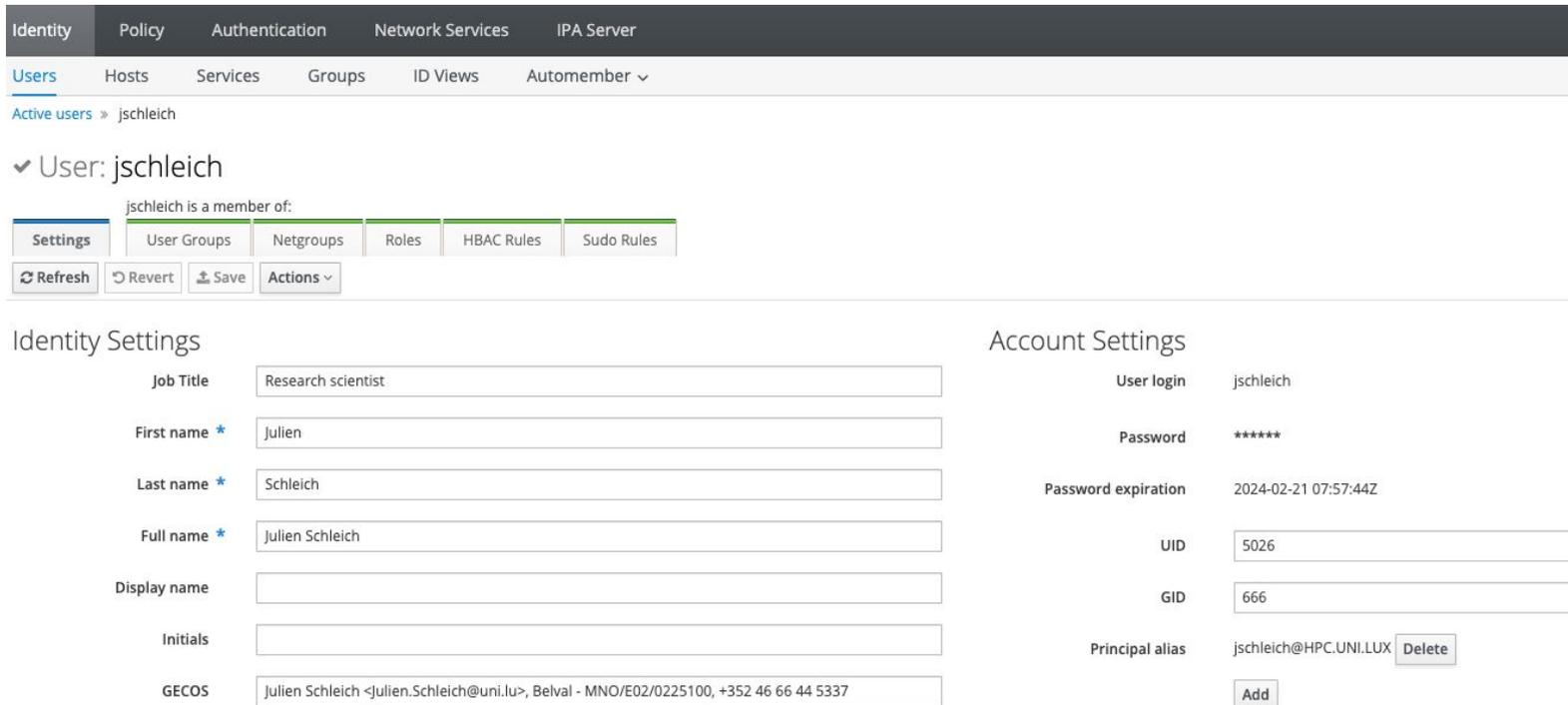
Password

[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 Delete
GECOS: Julien Schleich <Julien.Schleich@uni.lu>, Belval - MNO/E02/0225100, +352 46 66 44 5337	Add

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 user configuration interface with the following elements:

- Login shell:** /bin/sh
- Home directory:** /home/user (with an Undo button)
- SSH public keys:** A section containing an **Add** button, which is highlighted with a red rectangular box.
- Certificate:** No Valid Certificate (with a warning triangle icon)

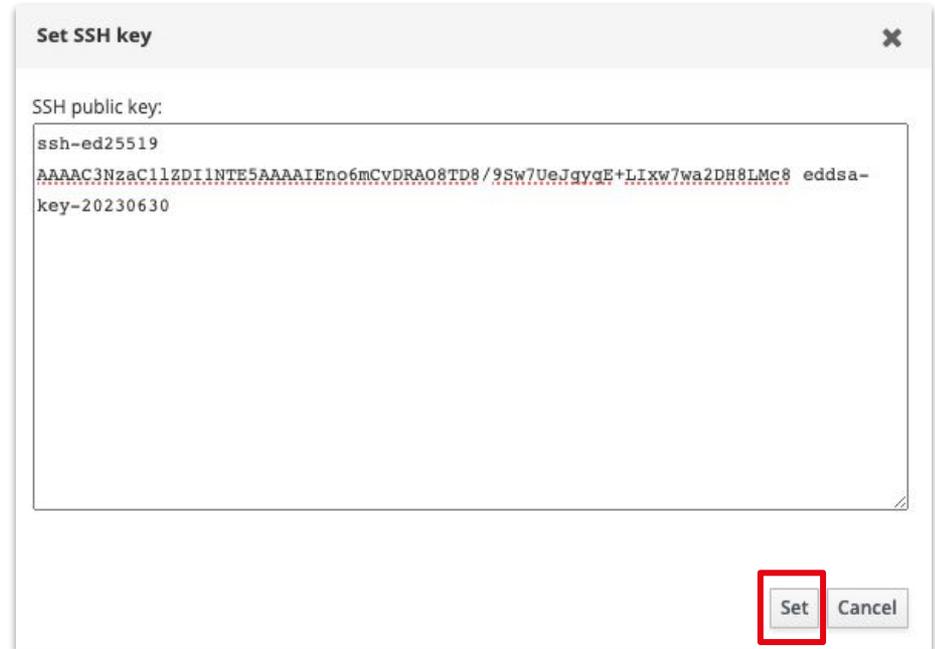


Full documentation available here:

<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



The screenshot shows a dialog box titled "Set SSH key" with a close button (X) in the top right corner. Inside the dialog, there is a text area labeled "SSH public key:" containing the following text: `ssh-ed25519
AAAAC3NzaC1lZDI1NTE5AAAAIENo6mCvDRAO8TD8/9Sw7UeJqygE+LIxw7wa2DH8LMc8 eddsa-
key-20230630`. At the bottom right of the dialog, there are two buttons: "Set" and "Cancel". The "Set" button is highlighted with a red square.



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

To connect to the ULHPC via the ssh command, you can type:

- `ssh yourlogin@access-aion.uni.lu -p 8022` for AION
- `ssh yourlogin@access-iris.uni.lu -p 8022` for IRIS

In order to simplify the commands to this:

- `ssh aion-cluster`
- `ssh iris-cluster`

you can create a SSH configuration file which will contain the different, non-changing parameters.



Full documentation available here: <https://hpc-docs.uni.lu/connect/ssh/#ssh-configuration>

Step 4 - First connection

The configuration file will look like this:

```
# ~/.ssh/config -- SSH Configuration
# Common options
Host *
    Compression yes
    ConnectTimeout 15

# ULHPC Clusters
Host iris-cluster
    Hostname access-iris.uni.lu

Host aion-cluster
    Hostname access-aion.uni.lu

# !\ ADAPT 'yourlogin' accordingly
Host *-cluster
    User yourlogin
    Port 8022
    ForwardAgent no
```

Do not type it, next slide contain a link to that configuration file

Step 4 - First connection

- You should create the following file: `~/ .ssh/config`
- This can be done in your terminal, e.g., using `nano ~/ .ssh/config` or any other text editor
- You can copy paste the configuration from this [documentation link](#).
- **Do not forget** to change your `login` with your ULHPC username

Note for MacOS users: `~/ .ssh` is a hidden folder as all folders starting with a dot ". To display all hidden folder, your can press `Command + Shift + .`



Full documentation available here: <https://hpc-docs.uni.lu/connect/ssh/#ssh-configuration>

Step 4 - First connection

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

Success!

```
ssh aion-cluster
Welcome to access1.aion-cluster.uni.lu

=====
                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])
=====

Fast interconnect using InfiniBand HDR 100 Gb/s technology
Shared Storage with iris (raw capacity): 2180 TB (GPFS)+1300 TB (Lustre) = 3480TB

Support (in this order!)                                Platform notifications
- *NEW* Technical Docs ... https://hpc-docs.uni.lu      - Twitter: @ULHPC
- FAQ ..... https://hpc-docs.uni.lu/support/
- User Mailing-list ..... hpc-users@uni.lu (moderated)
- Helpdesk/Bug reports ... https://hpc.uni.lu/support (Service Now)
- HPC Devops/Admins ..... hpc-team@uni.lu (OPEN TICKETS)
ULHPC user guide is available on https://hpc-docs.uni.lu

*NEW (Apr. 6, 2023)*: Since Slurm 22.05, srun no longer inherits
--cpus-per-task from salloc/sbatch.
You should add '-c/'/--cpus-per-task' to srun or set SRUN_CPUS_PER_TASK
environment variable. **Please update your workflow accordingly.**

=====
/!\ NEVER COMPILE OR RUN YOUR PROGRAMS FROM THIS FRONTEND !
First reserve your nodes (using srun/sbatch(1))
/!\ BEWARE of OS and architecture differences between Iris and Aion
Identify the cluster used to compile your programs (Ex: <name>-cluster)
Last login: Thu Jun 29 09:51:31 2023 from 10.186.26.12
(base) 0 [jschleich@access1 ~]$
```

Troubleshooting

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

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.