

# Accessing and working on our servers

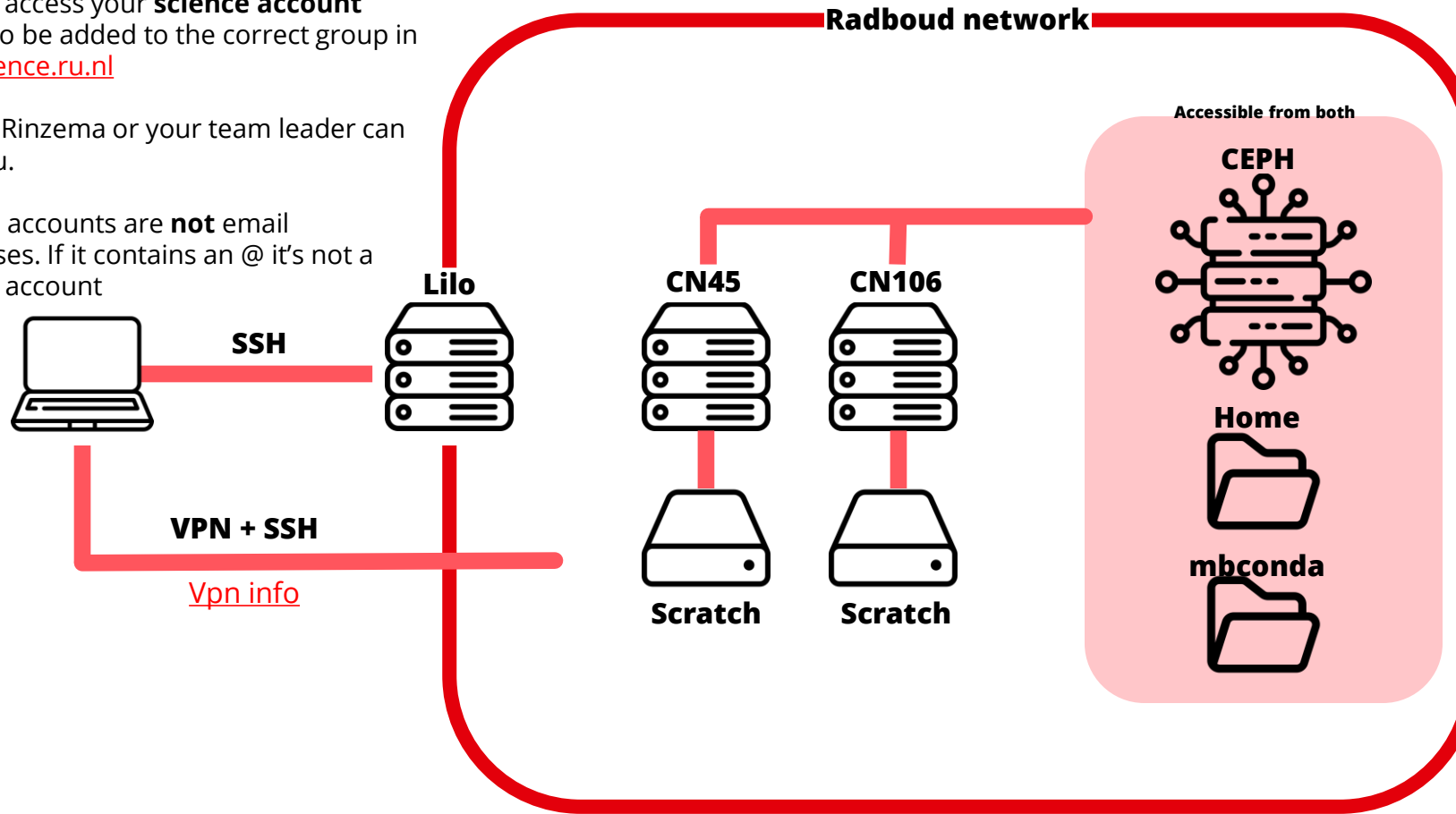
February 2023  
Sybren Rinzema

# INFRASTRUCTURE

To gain access your **science account** needs to be added to the correct group in [dhz.science.ru.nl](http://dhz.science.ru.nl)

Sybren Rinzema or your team leader can add you.

Science accounts are **not** email addresses. If it contains an @ it's not a science account



## Scratch

Work space  
+ fast  
- limited space

## CEPH

Storage space  
+ slower  
- easily expanded

## Home

You start here  
System files are stored here

## mbconda

Environments created with the conda package manager are stored here



# ACCESSING THE SERVERS

On windows a popular interface is **MobaXterm**

The screenshot shows the MobaXterm application window. The menu bar includes Terminal, Sessions, View, X server, Tools, Games, Settings, Macros, and Help. A red box highlights the 'Session' icon in the menu bar, with the text '1. Start a session' overlaid. Below the menu bar is a 'Quick connect...' search bar. The main area is titled 'Session settings' and contains various protocol icons: SSH, Telnet, Rsh, Xdmcp, RDP, VNC, FTP, SFTP, Serial, File, Shell, Browser, and Mc. A red box highlights the 'SSH' icon, with the text '2. Specify ssh protocol' overlaid. Below the protocol icons is a 'Basic SSH settings' section, which is highlighted with a red box and the text '3. Fill in necessary info'. This section contains a 'Remote host' field with the value 'lilo.science.ru.nl', a checked 'Specify username' checkbox with a field containing 'slrinzema', and a 'Port' field with the value '22'. At the bottom, there are tabs for 'Advanced SSH settings', 'Terminal settings', 'Network settings', and 'Bookmark settings'.

The screenshot shows the MobaXterm sidebar. The top part is titled 'Quick connect...' and has a search bar. Below that is a 'User sessions' section with a list of sessions: 'cn106.science.ru.nl (slrinzema)' and 'cn45.science.ru.nl (slrinzema)'. The sidebar also has a 'Sessions' section with a star icon and a 'Tools' section with a wrench icon.

**Remembers previous sessions in the sidebar**

## A QUICK INTRO TO BASH

**Our servers run Ubuntu, which is controlled by *shell* script. Specifically Bash** (Bourne-Again SHell)

- Here is a great tutorial on [datacamp](#). First chapter is free, the rest is optional and will come naturally.

**Shell is used to run programs and bash scripts.**

- An example of a bash script is located at: **`/vol/mbconda/install_conda.sh`**
- This script installs the package manager conda and can be run with:

```
bash /vol/mbconda/install_conda.sh
```

- This installation script downloads and sets up conda in the correct location.

# CONDA PACKAGE MANAGER

**Conda as a package manager helps you find and install packages**

**It helps with finding the right dependencies** (like python versions)

**Specifically made for use with Python** (R is also an option)

**Uses environments to keep programs from breaking** (due to differing dependencies)

- The base environment (miniconda3) is protected.
- Environments are easily shareable, *making analysis reproducible*
- Automatically stored on /vol/mbconda (accessible across servers)

A guide provided on managing environments can be found [here](#)

```
(miniconda3)slrinzema@cn106:~$ conda activate scanpy
(scanpy)slrinzema@cn106:~$ █
```

Switching from the base environment to an environment called *scanpy*

## STORING AND WORKING WITH DATA

- **Scratch is a great place to work on data**
  - Fast
  - Limited space, meaning it needs to be wiped clean from time to time.
  - Not accessible between servers
- **The path to scratch is always: /scratch**
- **No data backup or protection from user error at all**

# STORING AND WORKING WITH DATA

## Each server can access our CEPH storage.

- Make a *personal directory* in your team directory
- Do not store data in team / department dirs
- Large and expandable
- Slow to work on (but allowed)
  
- **Protected against hardware failure**
- **Not protected against user error** (deletion or changes)
- **No version control** (data from yesterday can't be recovered)

The root path to our CEPH partition is `/ceph/rimlsfnwi/`

```
/ceph/rimlsfnwi/  
├── data  
│   ├── cellbio  
│   ├── genomes  
│   ├── molbio  
│   └── moldevbio  
├── raw_data  
│   ├── bcl  
│   ├── fastq  
│   └── ms  
├── web_share  
│   ├── mldata  
│   └── trackhub  
└──
```

**Accessible from:**  
<https://mldata.science.ru.nl/>

**Published trackhubs:**  
<https://trackhub.science.ru.nl/>  
Specify specific trackhub

```
/ceph/rimlsfnwi/data/  
├── cellbio  
│   ├── eeftens  
│   ├── mhlanga  
│   ├── minoda  
│   └── share_cellbio  
├── genomes  
│   ├── GRCh37  
│   ├── GRCh38  
│   ├── GRCh38_ERCC92_velo  
│   ├── GRCh38.p13  
│   ├── GRCm39  
│   ├── GRCz11  
│   └── hg38  
├── molbio  
│   ├── bartfai  
│   ├── genomes  
│   ├── logie  
│   ├── marks  
│   ├── martens  
│   ├── share_molbio  
│   └── vermeulen  
├── moldevbio  
│   ├── heeringen  
│   ├── mulder  
│   ├── share_moldevbio  
│   ├── usr  
│   ├── veenstra  
│   ├── yu  
│   └── zhou  
└──
```



# Advanced options

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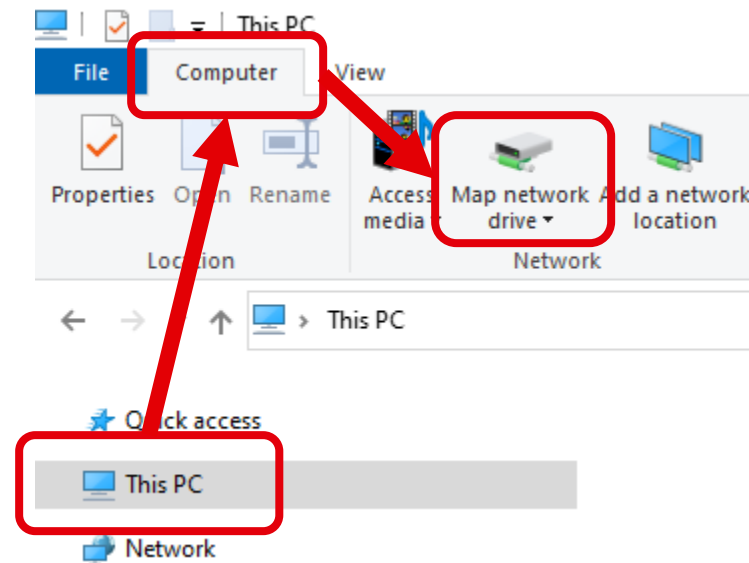
## MOUNTING CEPH AS A NETWORK DISK

### Apartment directories on ceph are mountable as network disks

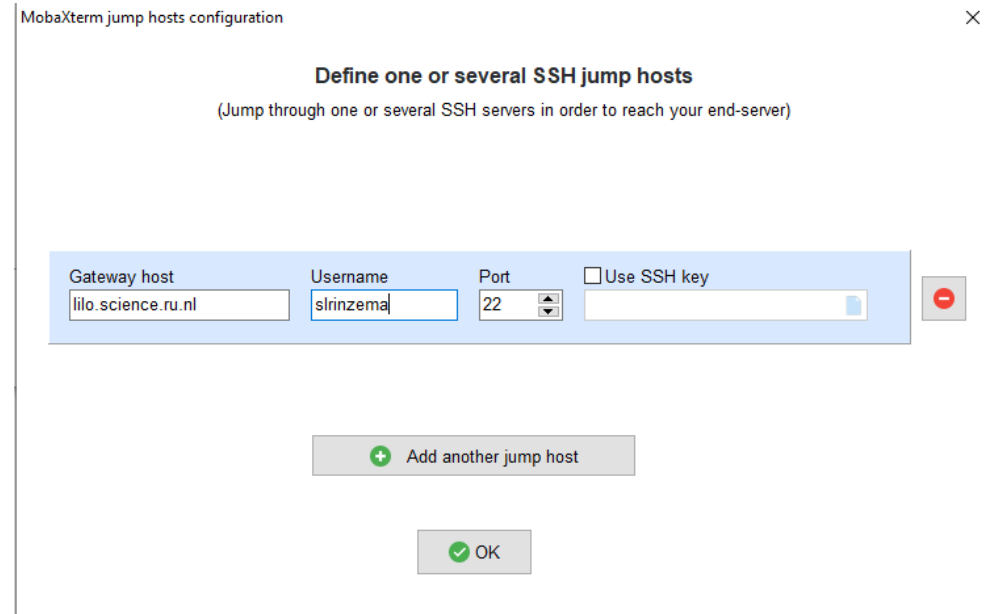
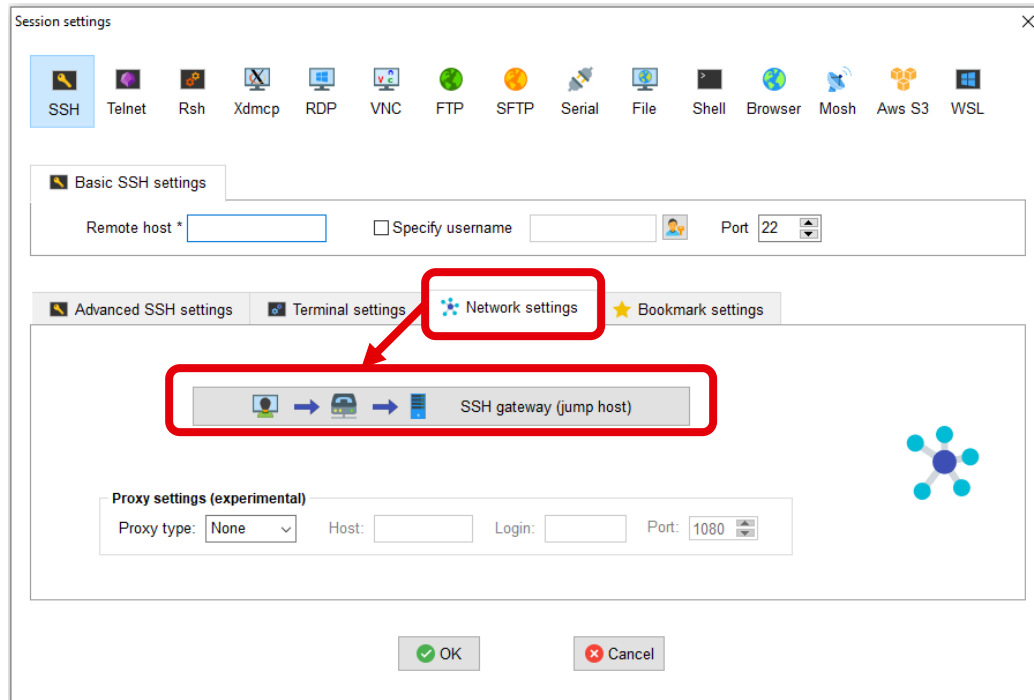
- \\molbio-srv.science.ru.nl\cellbio
- \\molbio-srv.science.ru.nl\molbio
- \\molbio-srv.science.ru.nl\moldevbio

Mac is slightly different. The addresses are as followed:

smb://molbio-srv.science.ru.nl/cellbio



# USING LILO AS A JUMP HOST ON MOBAXTERM



**Eliminates the need of a vpn, automatically logs into lilo and jumps to the specified server in "Basic SSH settings"**

## **PORT FORWARDING WITH SSH**

**A port is like a virtual door in a computer where data can come in or go out**

**A specific numbered port is needed, so your computer knows where to listen**

**Once someone uses a port on a server, you can't use that port**

**Acceptable ports are between 8000 and 9999, so there's little chance someone's using your preferred port**

**Jupyter notebook and Rserver use ports**

## PORT FORWARDING WITH SSH

**We are running a jupyter notebook instance on CN45 and are using port 9999.**

**The ssh command we should use is:**

```
ssh -L 9999:cn45.science.ru.nl:9999 slrinzema@lilo.science.ru.nl
```

- The **-L** flag is used to link two ports
- **9999:cn45.science.ru.nl:9999** links our port (the left 9999) to the port on cn45 (right 9999)
- **slrinzema@lilo.science.ru.nl** specifies our science account and the jump host.

**We can go to <http://localhost:9999> on our computer to connect to the jupyter notebook on cn45**

# PORT FORWARDING WITH SSH

**MobaXterm has an option as well**

The screenshot displays the MobaXterm application window. The title bar shows the user's name 'slrinzema' and the host 'cn45.science.ru.nl'. The menu bar includes Terminal, Sessions, View, X server, Tools, Games, Settings, Macros, and Help. Below the menu bar is a toolbar with icons for Servers, Tools, Games, Sessions, View, Split, MultiExec, Tunneling, Packages, Settings, and Help. The 'Tunneling' icon, which depicts a computer with two green arrows pointing in opposite directions, is highlighted with a red square. A red arrow points from this icon to a 'New SSH tunnel' button located at the bottom left of the window. The main area of the window contains a table with columns for Name, Type, Start/stop, Forward port, and Destination server, which is currently empty. Below the table are buttons for 'Start all tunnels' and 'Stop all tunnels'.

Name	Type	Start/stop	Forward port	Destination server
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New SSH tunnel

Start all tunnels

Stop all tunnels

# PORT FORWARDING WITH SSH

