Tutorial: How can I work with Jupyter at home?

There are two ways to work with Jupyter at home:

- Either you install Python, Jupyter and all other dependencies on your device so you can run Jupyter locally.
- Or you connect with the Tardis work stations you already use during the class!

There are dozens of tutorials on how to run Jupyter locally.

Install Jupyter locally (linux, recommended)

- Install Python 3 and pip using your package manager
  - Ubuntu: `sudo apt install python3 python3-pip`
- Install jupyter using pip (pip3 on ubuntu/debian) (might need sudo):
  - `pip3 install notebook`
- Setup your git repo like in Lecture 1
- Start the notebook with `jupyter-notebook`
- Any missing libraries can be installed using `pip3 install <library>` (read the error messages carefully)

Install Jupyter locally (windows)

- Download and install git for windows (use default settings)
  https://git-scm.com/download/win
- Download and install anaconda
  https://www.anaconda.com/distribution/
- Clone and set up the git repo and ssh keys like in lecture 1
  (use git bash, then everything works like Linux)
- Launch jupyter notebook from the start menu or open the anaconda prompt and type jupter-notebook
- Any missing libraries can be installed using `conda install <library>` or `pip install <library>` in the anaconda prompt (read the error messages carefully)

The D-ITET Tardis computer network

The D-ITET has around 100 freely accessible computers to use for

- Student's personal computing/work
- Computer Classes or Student Labs
- Distributed Computing, when not in use

The computers in this network are called tardis and are enumerated with two-digit numbers and the letters: [b,c,d]. Each computer has a domain hostname and a (public) static IP address:

tardis-c13.ee.ethz.ch / 129.132.3.140

More info: https://computing.ee.ethz.ch/Workstations/ComputerRooms

Use Secure Shell to connect to a Tardis computer

First of all, make sure you are on the ETH Zurich network:

Use eth|eduroam WiFi or connect to the ETH virtual private network.
(Almost all ETH servers are only available inside their network!)

Open a Terminal on your client and enter this command to open a SSH connection:

$ ssh <username>@tardis-c<XX>.ee.ethz.ch

Now as you are connected to a Tardis computer go to your python-class folder and start jupyter:

$ cd path_to_class/folder

$ anaconda

$ jupyter-notebook

Make note of the link that is given to you by Jupyter!

A practical approach to use SSH-Tunneling

SSH can redirect IP connections from your local computer by tunnelling them through the encrypted SSH session to the remote computer. This allows to establish connections to ports on the remote machine that are otherwise not accessible from the local computer (also by-passing firewalls). The endpoints of the tunnel are defined by an IP port on the local machine and on the remote machine. All connections to the port on the local machine will be forwarded the specified port on the remote machine.

Checkout the ‘-L’ argument in ‘man ssh’ for more information.

(This can also be used to connect securely to a Desktop Environment using the VNC protocol)

To forward the port of your Jupyter-Notebook, enter this command in **another** local terminal (replace the missing keywords)

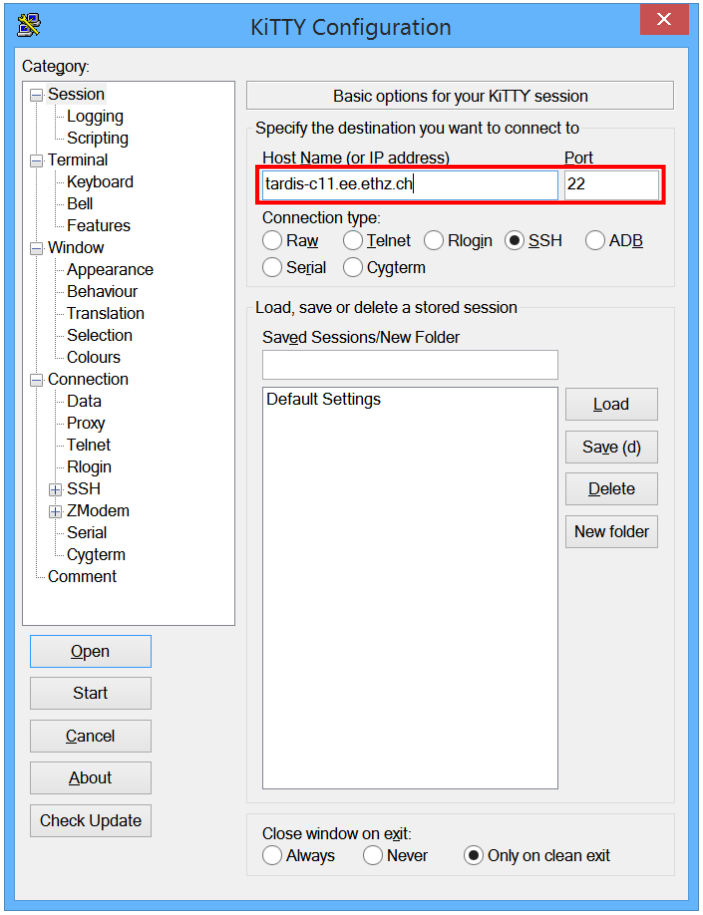
```
$ ssh -L localhost:8888:localhost:8888 <username>@tardis-cXX.ee.ethz.ch
```

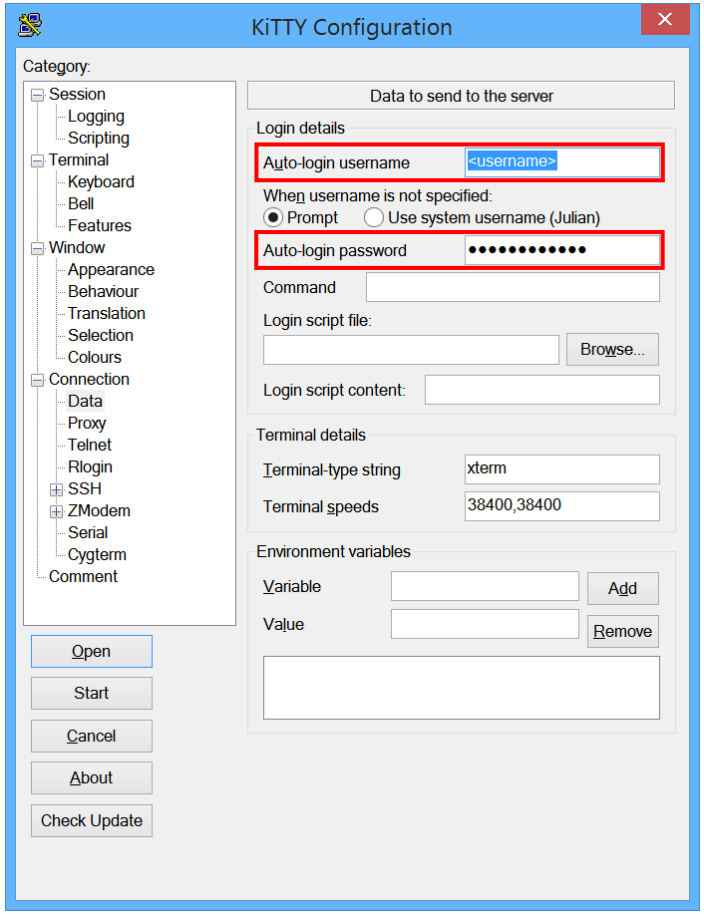
Now open the link given by jupyter notebook in your local browser.

The link can look like: http://127.0.0.1:8888/tree?token=c88dc46125c8c4a2c50848fc2e0756439b2a8edf4ad154b2

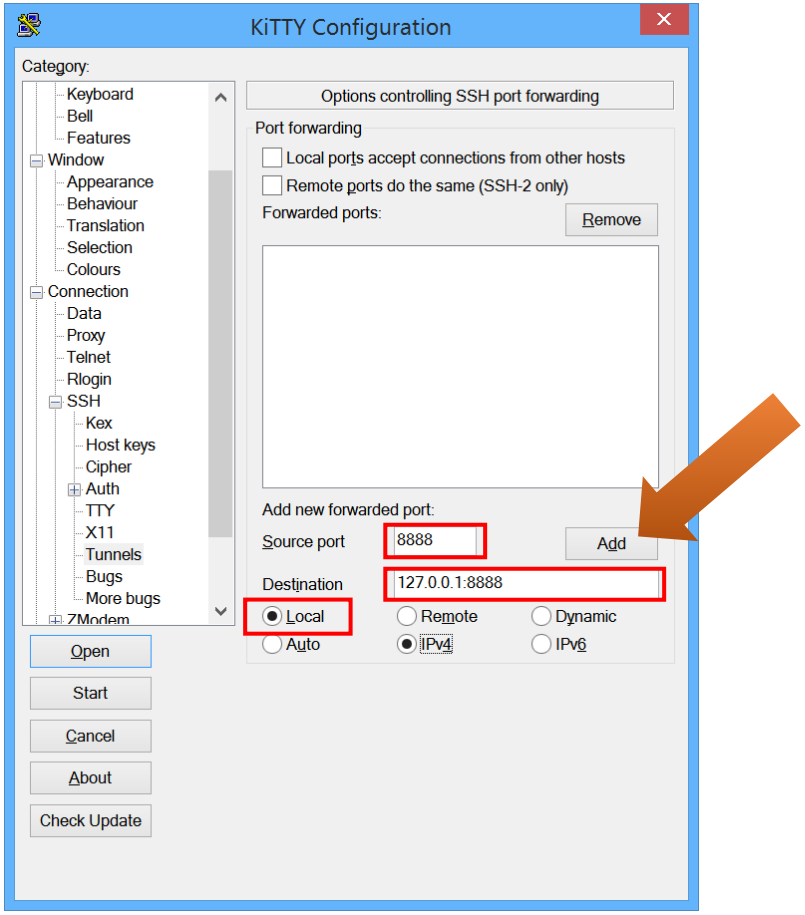
Note: closing this SSH session will also close the forwarded network connection from your computer to jupyter-notebook on tardis-cXX.

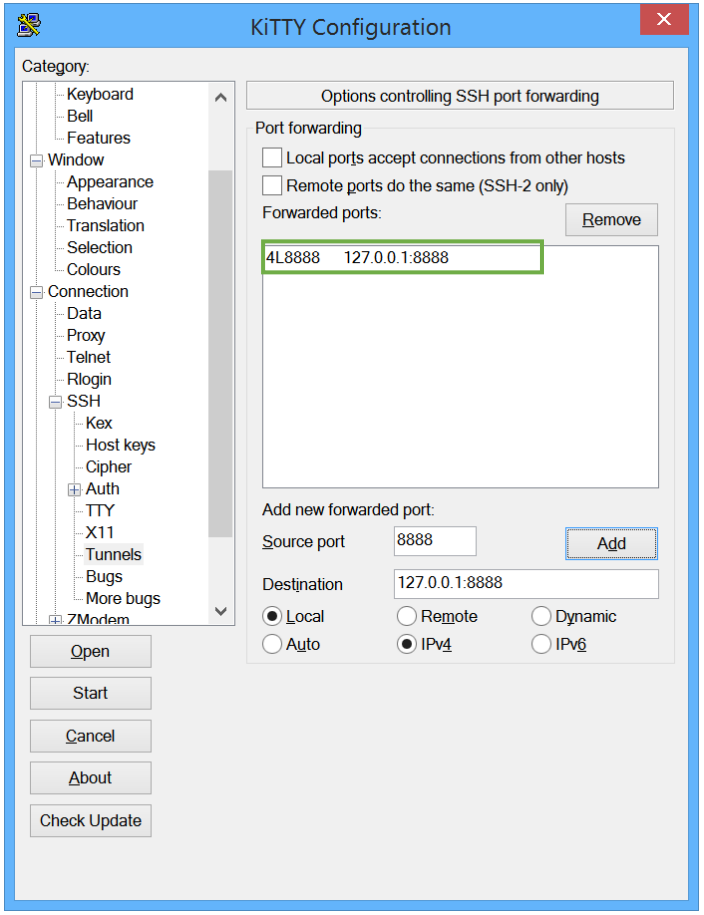
On Windows: using PuTTY/KiTTY





On Windows: using PuTTY/KiTTY

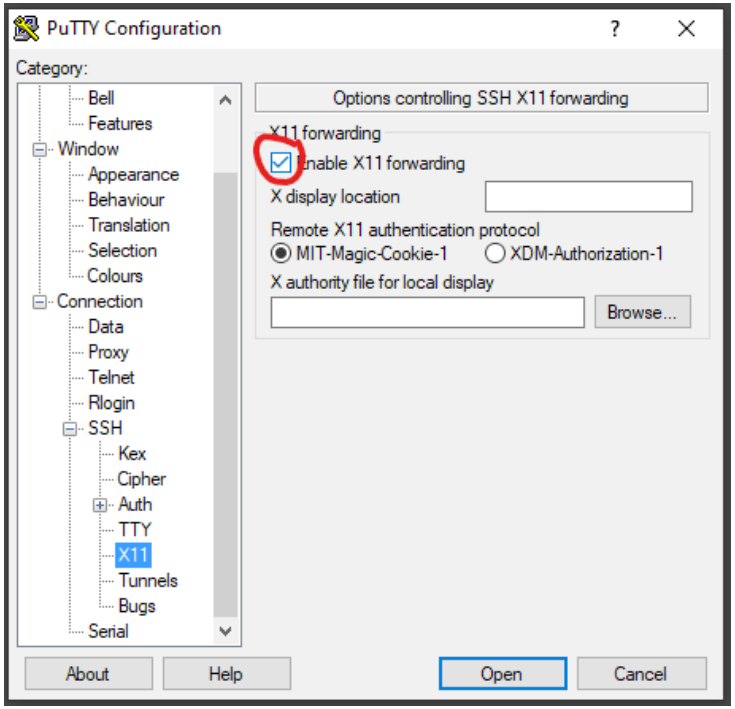




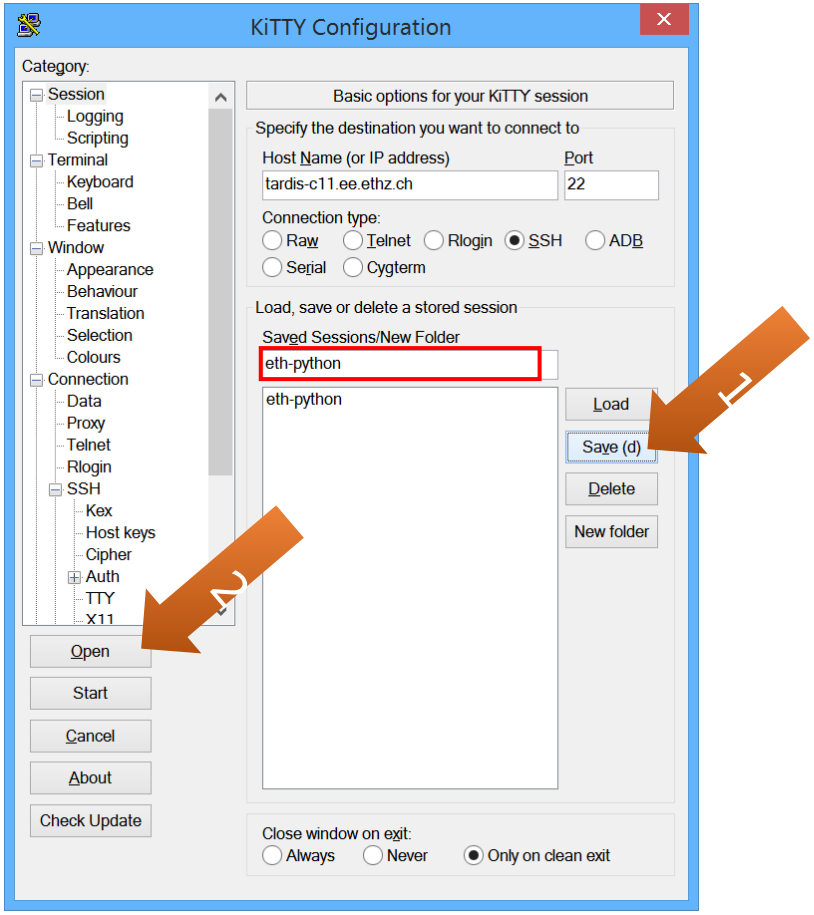
On Windows: using PuTTY/KiTTY

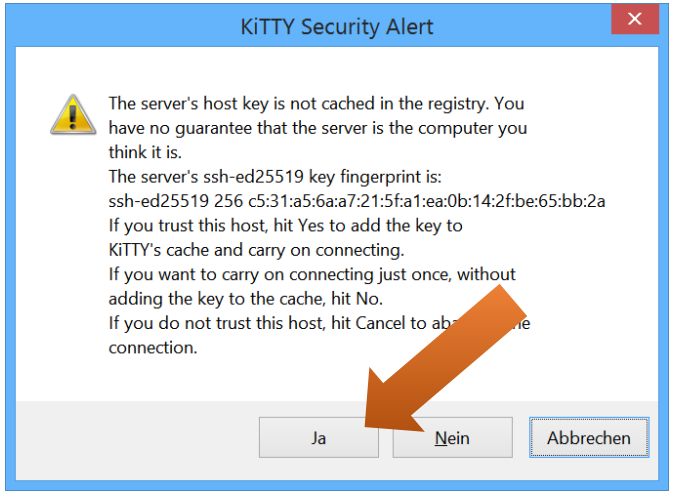
- If you need TKinter or other python GUI:

1) Download and install Xming: https://sourceforge.net/projects/xming/
2) launch Xming
3) Enable X11 forwarding in PuTTY/KiTTY



On Windows: using PuTTY/KiTTY





On Windows: using PuTTY/KiTTY

Shell Prompt

Launch Jupyter notebook with the `--no-browser` argument to stop it from trying to open a terminal browser, then copy/paste the URL to your local browser