Accessing workstations from your laptop

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I. Install and run X window (X11) system

To use the graphic user interface for programs running on remote machines, it is necessary to install X11. The installation depends on your operating system (OS).

I.A. Windows

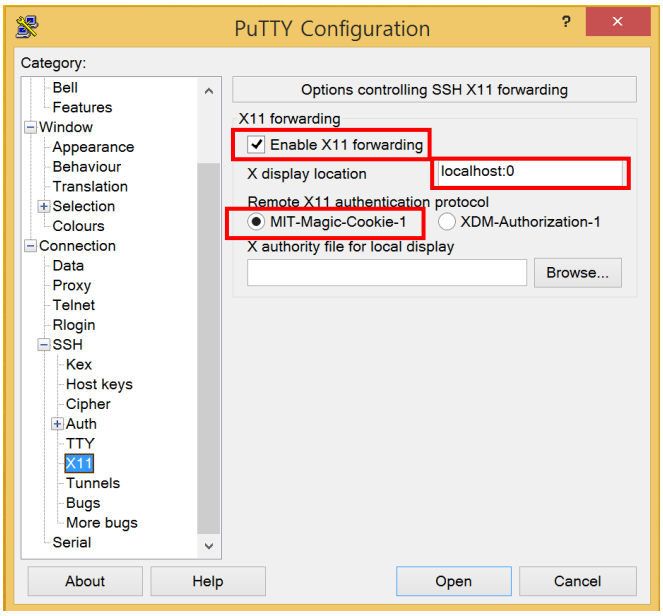
We recommend the combination of VcXsrv + PuTTY for X11 and SSH connection, respectively. Instead of VcXsrv, one may also use Xming which is the classical choice. But Xming became non-free from 2007, while VcXsrv is free and more powerful.

I.A.1. Install VcXsrv

- Download installer from: https://sourceforge.net/projects/vcxsrv/
- Run the installer.
- If you followed the default installation setting, then there will be a shortcut icon of `XLaunch` in the Desktop. Or, you can simply find `xlaunch.exe` under the VcXsrv installation directory.

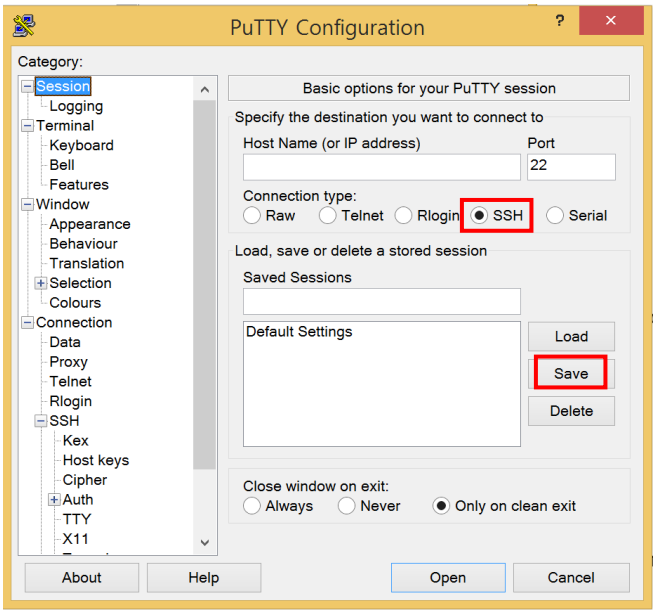
I.A.2. Install PuTTY

- Download installer from:
  https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html
  Actually, only a single file (`putty.exe`) is necessary. So one can download only that `putty.exe` file instead of the full installer.
- Run PuTTY (`putty.exe`).
- In the PuTTY window, click `Connection` (from the left tree) → `SSH` → `X11`. Check `Enable X11 forwarding` on the right panel. Fill the blank `X display location` with `localhost:0`. Choose `MIT-Magic-Cookie-1`. Then it should look like:



- Then click `Session` from the left tree. On the right panel, choose `SSH` as `Connection type`.

Click `Default Settings` in the right-lower white box, and click `Save` to its right. Then it should look like:



I.A.3. Run VcXsrv and PuTTY

- When one wants to connect remote machines, first check whether the X server is running. It can typically be seen as a small icon of "X" in the Taskbar.
- If not running, run `xlaunch.exe` by using the shortcut `Xlaunch` in the Desktop or by finding it from the VcXsrv directory. The X program should be running **before** starting SSH connections. The program will ask for display settings; the default setting would work best.
- Then run PuTTY. To access remote machines, (i) type the host name in the blank for `Host Name (or IP address)` in the `Session` page and (ii) type enter or click `Open` at the bottom. We will explain the host names of servers/workstations in Sec. II below.

I.B. Mac OS

- Download and install XQuartz. The installer can be downloaded from: https://www.xquartz.org/
- As the terminal program, one may use either the default `Terminal` or third-party programs such as `iTerm2`.
- To access servers/workstations, open terminal, and type: `ssh -Y host_name`
  `host_name` is the host names of servers/workstations, which will be explained in Sec. II below. XQuartz will start automatically when it is needed.

I.C. Linux

For linux laptops, no additional installation is necessary. To access servers/workstations, open terminal, and type: `ssh -Y host_name`
`host_name` is the host names of servers/workstations, which will be explained in Sec. II below.

II. Connect to workstations

Before trying to connect, check your account ID. Your ID is **case sensitive**. Typically, the first character of each word (separated by dot) is in upper case, and the rest is in lower case.

II.A. When you are within MWN (Munich Scientific Network)

When you are using eduroam or cable connection inside the ASC building, you are within MWN. Then you can directly connect to workstations. The host names for the workstations are:

```
th-ws-e5xx.theorie.physik.uni-muenchen.de
```

Here `xx` means two-digit number runs from 01 to 53. You will be asked for your ID and password. If not, try out for different numbers. It is possible that some workstations are down for technical reasons. If it does not work for several different numbers, try another way explained in Sec. II.B.

II.B. When you are outside of MWN

When you are e.g., at home, you are outside of MWN. One cannot directly access workstations from the outside of MWN, for security reasons. There are two ways.

II.B.1. Use SSH gateway

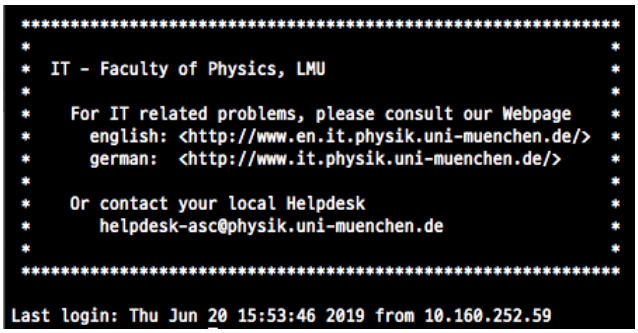
One can connect to workstations via the SSH gateway servers that are accessible from the outside of MWN. The host names for the gateway servers are:

```
th-sv-ssh1.theorie.physik.uni-muenchen.de
th-sv-ssh2.theorie.physik.uni-muenchen.de
```

Choose either of them. Use SSH to connect it, following the way described in Sec. I above. You will be asked for your ID and password. Note that one cannot run programs (such as MATLAB) on the gateway servers! So you need to move on to workstations. When you are in the gateway server, you can type only the first part of host name:

```
$ ssh -Y th-ws-e5xx
```

If the log-in is successful, you will see the following welcome message.



II.B.2. Use VPN

Another way is to use VPN. Visit the webpage of the IT service of the Faculty of Physics: https://www.en.it.physik.uni-muenchen.de/dienste/netzwerk/extern/index.html Follow the link to LRZ, then download and install the Cisco Anyconnect client.

To connect to workstations, start the Anyconnect client. Connect to the VPN server `asa-cluster.lrz.de` (which is default), by using your user name (`Your.Username@physik.lmu.de`) and password. Once you are connected to the VPN server, then you can directly connect to workstations.

When you want to transfer large amount of data between your laptop and workstations, please use VPN. If you use the SSH gateway server, the file transfer can make the gateway server overloaded.

II.C. Check workstation status

A good manner is **not to interfere somebody else's task running on a workstation**. For this, when you are connected to a workstation, type:

```
$ htop
```

Then the current usage of the workstation (CPU, memory) will be displayed. If the workstations are occupied by other task, try to move to another workstations. Once you are in workstations, you can type only the first part of host name:

```
$ ssh -Y th-ws-e5xx
```

Also, please keep in mind that another good manner is **not to occupy multiple workstations with heavy calculations**.

As the final check, type:

```
$ xeyes
```

You will see two eyes that are pointing towards your cursor.

III. File transfer between your laptop and workstations

When you access workstations from your laptop via network, it is recommended to **use your laptop to write codes and then transfer the codes to workstations**. Of course, you can write codes within the SSH session by using vi, MATLAB editor, etc. However, network failure can happen, especially when you connect from the outside of MWN. If happens, your edit will be lost. Also, delayed response for every keystroke will be annoying.

The ASC workstations have two types of file systems.

- The network drive which is **identically accessible from all workstations**, which includes your home directory `/home/...`. It is designed for storing codes and important results. The default path of MATLAB codes is `~/Documents/MATLAB` (here `~` is your home directory).
- Local hard disk drives that are directly accessible only from individual workstations. These are mounted as `/data/...`. It is designed for storing temporary data, since the data will be deleted after 30 days.

There are several ways to transfer files from your laptop to workstations, and vice versa. One easy way is to use FTP, by using clients such as FileZilla. Also, for the Mac OS and Linux, one may use `rsync` or `scp` from terminal or use `sshfs`.