



# JUPYTERLAB - SUPERCOMPUTING IN YOUR BROWSER

Training course "Introduction to the usage and programming of supercomputer resources in Jülich"

2021-11-22 | JENS H. GÖBBERT

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# JUPYTER-JSC WEBSERVICE

## Start your JupyterLab

**JÜLICH** SUPERCOMPUTING CENTRE

Start Links

j.goebbert@jz-juelich.de Logout

50%

Your server is starting up.

You will be redirected automatically when it's ready for you.

Server requested

Start Service in a virtual Machine. (Timeout at 2020-05-19 21:41:44)

**JÜLICH** SUPERCOMPUTING CENTRE

Start Links

j.goebbert@jz-juelich.de Logout

Configurations

Please give each of your configurations a name. This way you can run multiple instances at the same time. Supported characters are a-z, 0-9 and '-'.

Name	System	AccountImage	Project	Partition	Reservation	Resources	Actions
jureca_login	JURECA	goebbert1	covid19dynstat	Logintode			stop

**JÜLICH** SUPERCOMPUTING CENTRE

Start Links

j.goebbert@jz-juelich.de Logout

**JUPYTER**

Supercomputing in Your Browser

We are pleased to bring "Supercomputing in your browser". Jupyter-jsc is designed to provide the rich high performance computing (HPC) ecosystem to the world's most popular software: web browsers. JupyterLab is a web-based interactive development environment for Jupyter notebooks, code, and data. JupyterLab is flexible to support a wide range of workflows in data science, scientific computing, and machine learning. [Read more](#)

Please use your Jülicher account to log in or register with Jülicher if you have not already done so.

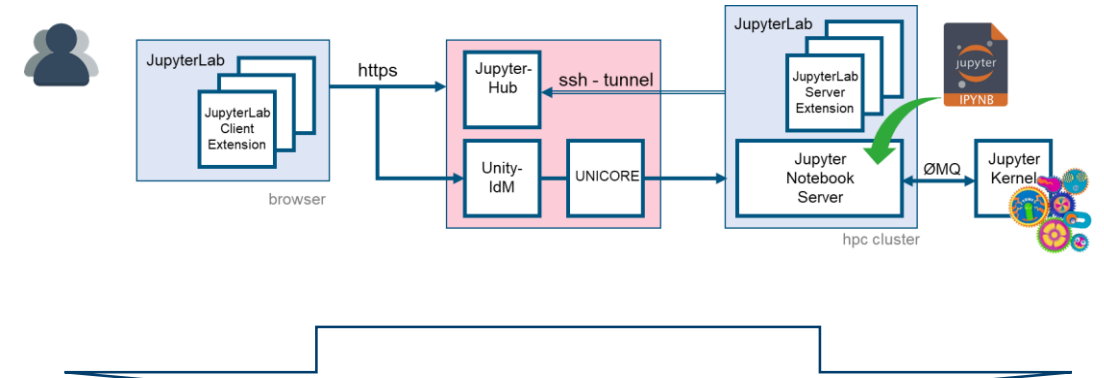
Login Register

**HELMHOLTZ** RESEARCH FOR GRAND CHALLENGES

Jupyter-jsc JUWELS JURECA JUSUF DEEP JURON HDF-Cloud

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**HELMHOLTZ** RESEARCH FOR GRAND CHALLENGES



File Edit View Run Kernel Git Help

GPU DASHBOARDS

- GPU Utilization
- GPU Memory
- File Throughput
- Link Throughput
- Link Timeline
- Matching Resources

```
[1]: 1 import math
2 import numpy as np
3 from numba import cuda
4 import matplotlib.pyplot as plt
5 matplotlib.interactive(True)

[2]: 1 len(cuda.gpus)

[3]: 1 len(cuda.gpus)

[4]: 1 @cuda.jit
2 def mandelbrot_numba(numbits, iterations):
3     # Numba kernel
4     i, j = cuda.grid(2)
5     size = nbits[0]
6     # Skip through outside the matrix.
7     if i > size or j > size:
8         return
9     # Run the simulation.
10    e = 0.2 + 0.5j * size * j
11    z = 0
12    for n in range(iterations):
13        z = z**2 + e
14        if abs(z) > 10:
```

GPU Memory: 332.40 MB

Variables: module, np: module, cuda: module, gh: module, mandelbrot\_numba: numba.cuda.compiler.Dispatcher

Breakpoints: 4

# JUPYTER-JSC WEBSERVICE

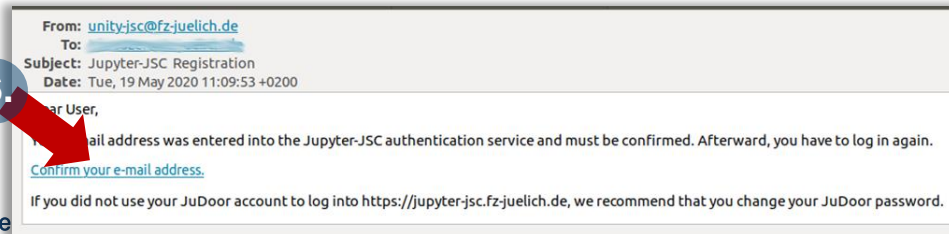
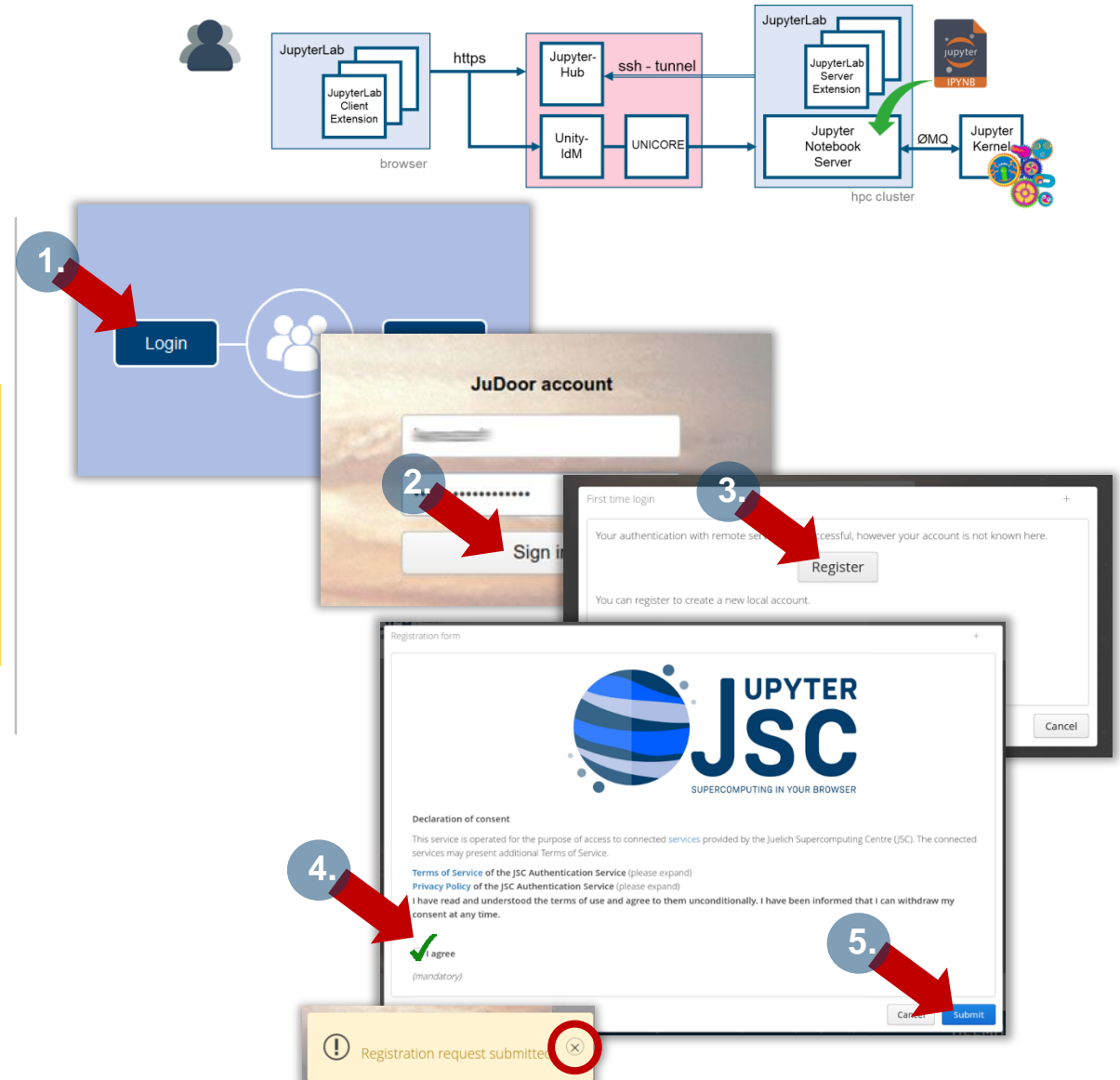
## First time login

=> <https://jupyter-jsc.fz-juelich.de>

### Jupyter-JSC first time login

- Requirements:
  - Registered at [judoor.fz-juelich.de](https://judoor.fz-juelich.de)
    - (check "Connected Services" = jupyter-jsc)
  - Project membership + signed systems usage agreement
  - Waited ~10 minutes

1. Login at <https://jupyter-jsc.fz-juelich.de>
2. Sign in with your JSC account
3. Register to Jupyter-JSC
4. **Accept usage agreement**
5. Submit the registration
6. Wait for email and confirm your email address





# JUPYTER-JSC WEBSERVICE

## Control Panel

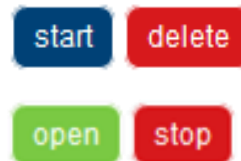
### A. Jupyter-JSC – Add new JupyterLab

- Name your new JupyterLab configuration
  - Unique Jupyter workspace in `~/jupyter`
- => the **JupyterLab Options** page will open

### B. Jupyter-JSC – Actions

If a configuration has been added

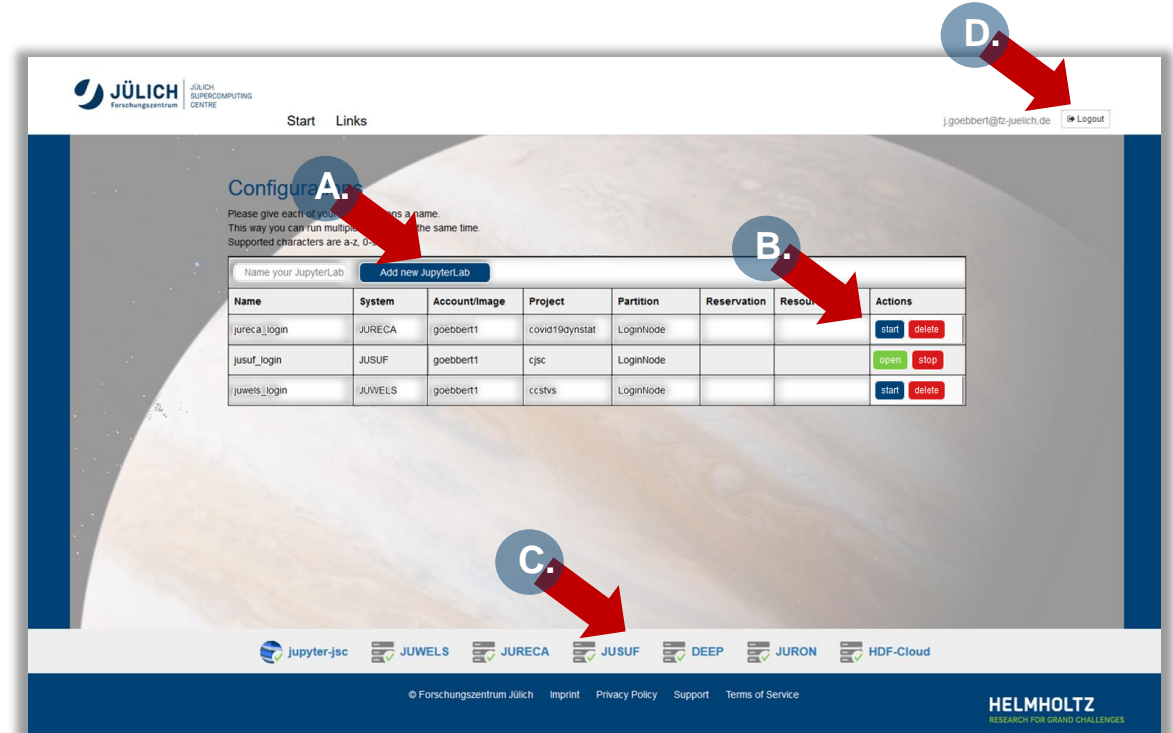
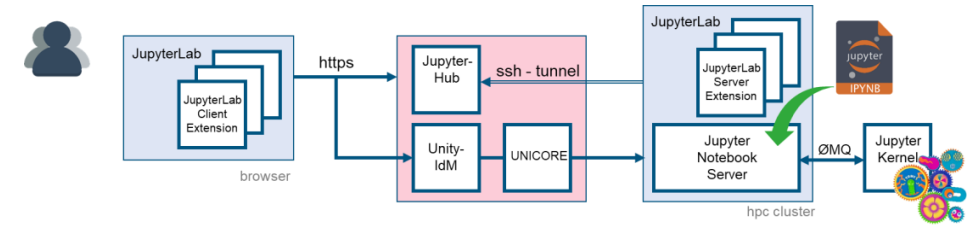
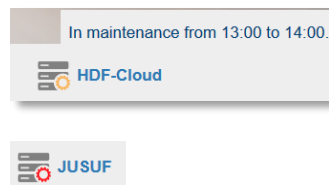
- Start/delete the named configuration (workspace will not be deleted)
- Open/stop a **running** JupyterLab



### C. Jupyter-JSC -- Statusbar

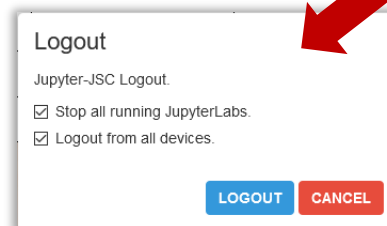


- Upcoming maintenance (mouse hover for details)
- System offline



### B. Jupyter-JSC – Logout

**Logout will ask what you want to do with the running JupyterLabs – be careful what you answer!**



# JUPYTER-JSC WEBSERVICE

## JupyterLab Options

### Jupyter-JSC – Options

Available options **depend on**

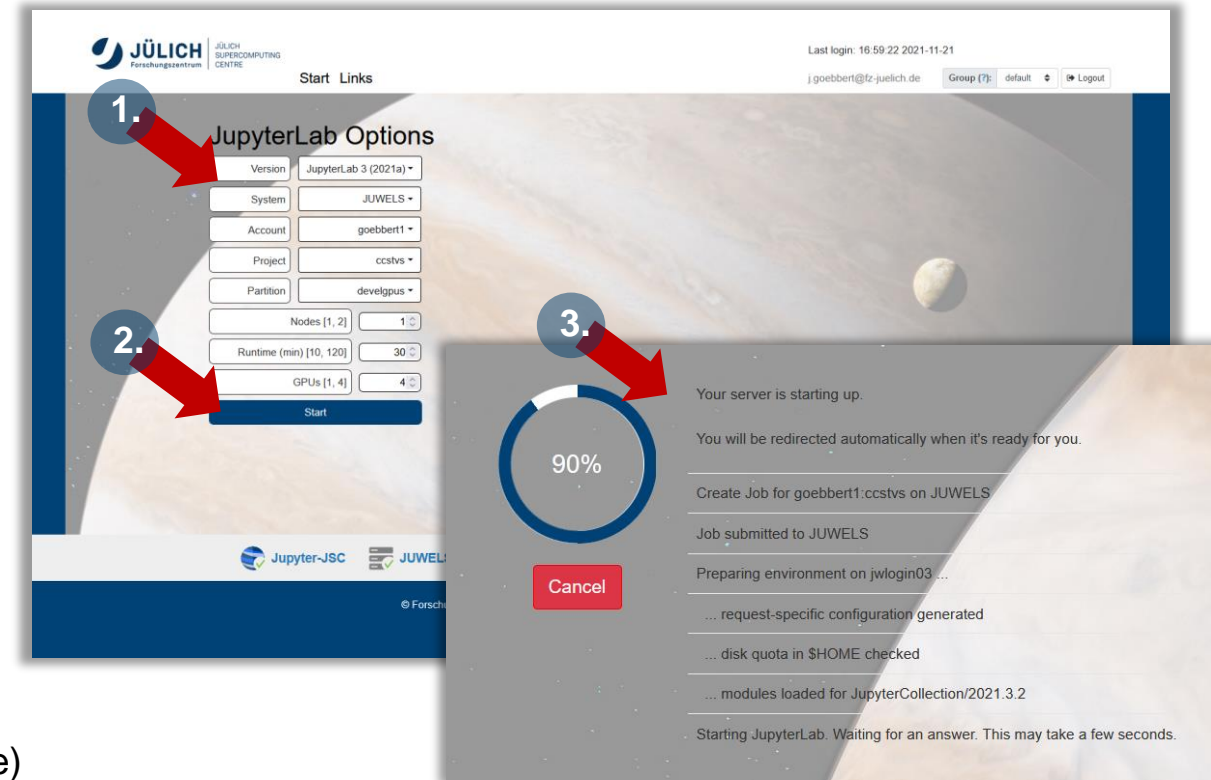
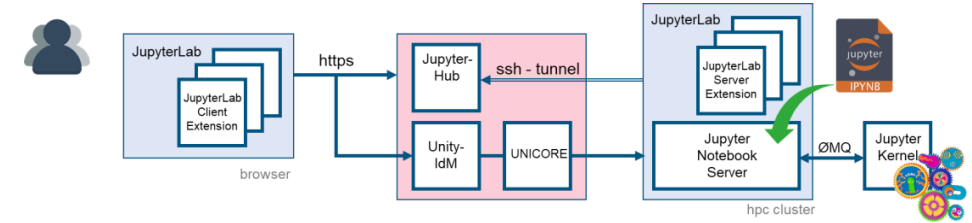
- user account settings visible in [judoor.fz-juelich.de](https://judoor.fz-juelich.de)
- currently available systems in all of your projects
  - system specific usage agreement on JuDoor is signed

### Basic options

- Version:  
JupyterLab 2 and JupyterLab 3 (default) is installed
- System:  
JUWELS, JURECA, JUSUF, DEEP, HDFML, HDF-Cloud
- Account:  
In general users only have a single account
- Project:  
project which have access to the selected system
- Partition:  
partition which are accessible by the project  
(this includes the decision for LoginNode and ComputeNode)

### Extra options

- Partition == compute      Nodes, Runtime, GPUs, ...



### NEW: Version

- Choose the version of JupyterLab 2 or 3 (default)

# JUPYTERLAB – REMOTE DESKTOP

## Run your X11-Applications in the browser

Jupyter-JSC gives you easy access to a remote desktop

1. <https://jupyter-jsc.fz-juelich.de>
2. Click on “Xpra”

### Xpra - X Persistent Remote Applications

is a tool which runs X clients on a remote host and directs their display to the local machine.

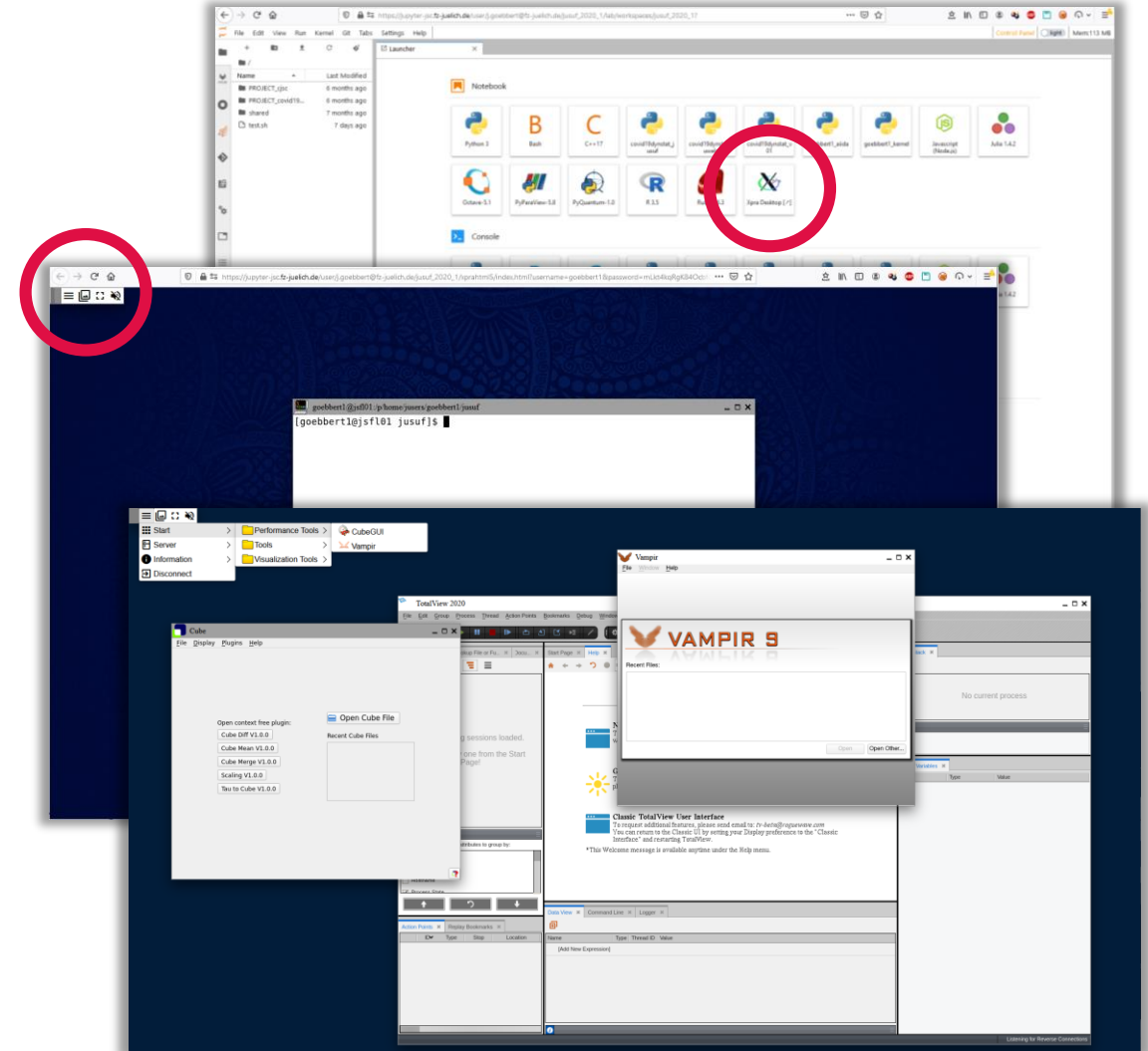
- Runs in a browser
- allows dis-/reconnection without disrupting the forwarded application
- <https://xpra.org>

The remote desktop will run on the same node as your JupyterLab does (this includes compute nodes).

It gets killed, when you stop your JupyterLab session.

Hint:

- CTRL + C -> CTRL + Insert
- CTRL + V -> SHIFT + Insert



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### Xpra - X Persistent Remote Applications

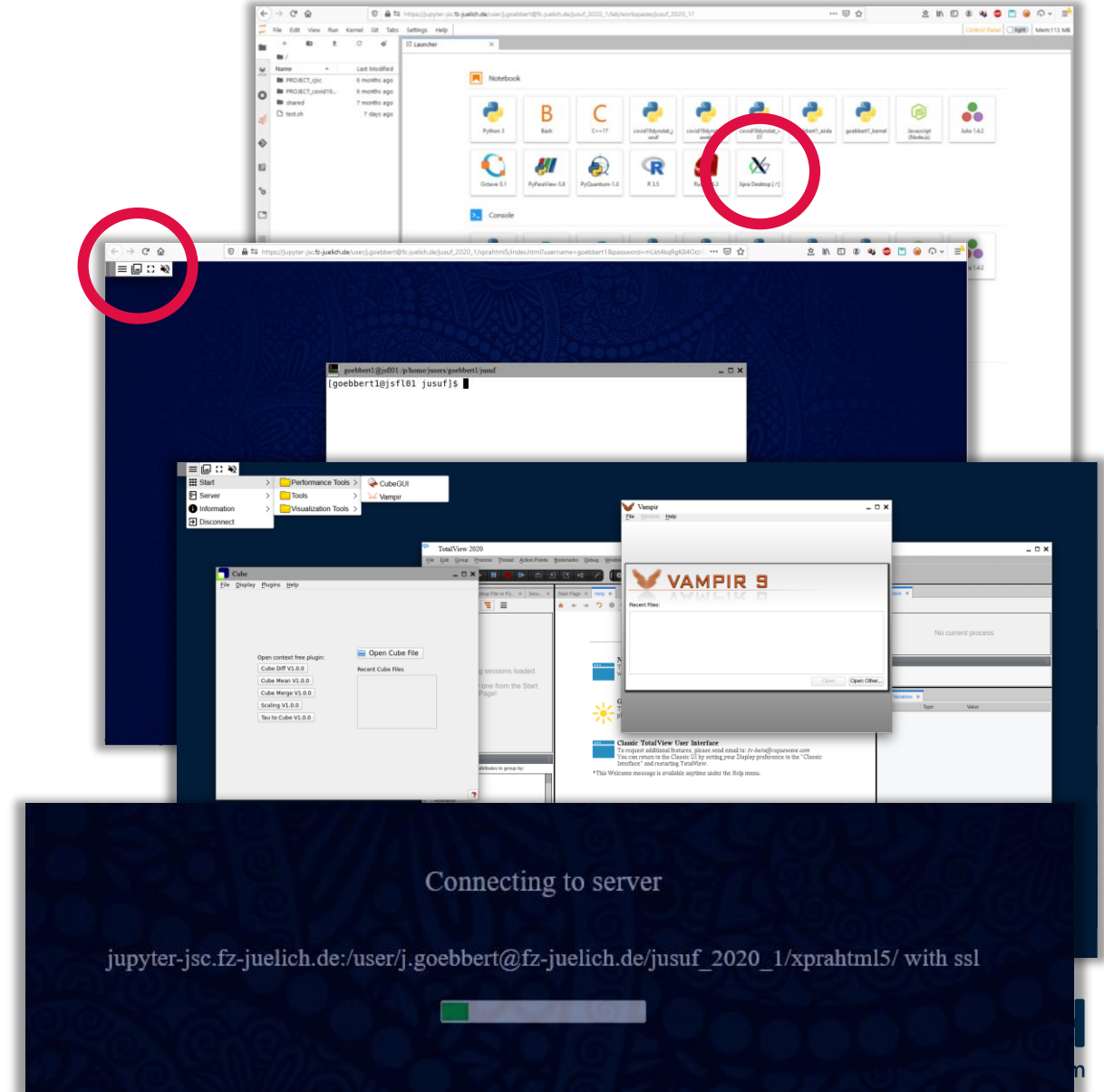
is a tool which runs X clients on a remote host and directs their display to the local machine.

- Runs in a browser
- allows dis-/reconnection without disrupting the forwarded application
- <https://xpra.org>

If the connection got lost at some point,  
just hit the “reload” button of your browser.

### Hint:

- CTRL + C -> CTRL + Insert
- CTRL + V -> SHIFT + Insert



# QUESTIONS?

<https://jupyter-jsc.fz-juelich.de>

