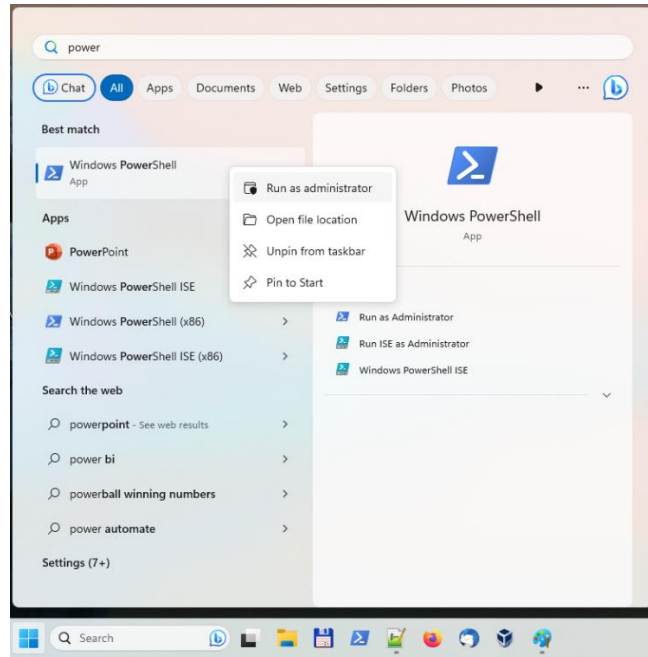


Installation guide for OpenMC and JupyterLab environment

In the followings, detailed list of instructions are provided for Windows 10 and 11 users to help with the installation process.

I. Install WSL 2 (Windows Subsystem for Linux)

- 1) Open powershell in administrator mode



- 2) Check if wsl is installed by entering the following command

```
PS C:\> wsl -l -v
```

If the output is a help text (similar to the figure on the right), you need to install it.

```
Administrator: Windows PowerShell
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.
Try the new cross-platform PowerShell https://aka.ms/pscore6
PS C:\WINDOWS\system32> wsl -l
Copyright (c) Microsoft Corporation. All rights reserved.
Usage: wsl.exe [Argument]

Arguments:

--install, -i
    Install Windows Subsystem for Linux features. If no options are specified,
    the recommended features will be installed along with the default distribution.
    To view the default distribution as well as a list of other valid distributions,
    use 'wsl --list --online'.

Options:
--distribution, -d [Argument]
    Specifies the distribution to be downloaded and installed by name.

Arguments:
    A valid distribution name (not case sensitive).

Examples:
wsl --install -d ubuntu
wsl --install --distribution Debian

--inbox
    Install the optional Windows feature instead of the version available via the Microsoft Store.

--no-distribution
    Do not install a distribution (cannot be used with --distribution).

--no-launch, -n
    Do not launch the distribution after install.

--web-download
    Download the most recent version of WSL from the Internet instead of the Microsoft Store.

--list, -l [Options]
    Lists distributions.

Options:
--online, -o
    Displays a list of available distributions for install with 'wsl --install'.

--status
    Show the status of Windows Subsystem for Linux.

--help
    Display usage information.
PS C:\WINDOWS\system32>
```

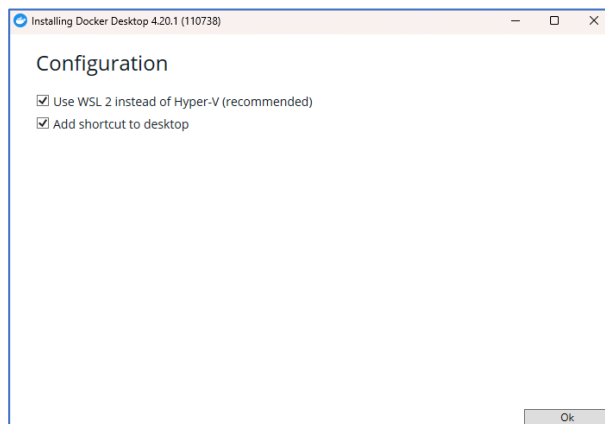
- 3) Install WSL2 by entering the following command:

```
PS C:\> wsl --install -n
```

- 4) Restart the computer.

II. Install Docker Desktop application

- 1) Download the latest installer from: <https://www.docker.com/products/docker-desktop/>
- 2) Follow the installation steps with default settings



- 3) Restart the computer.
- 4) Open powershell and check the wsl databases:

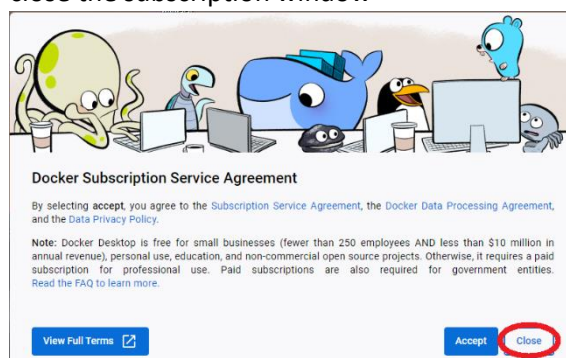
```
PS C:\> wsl -l -v
  NAME                                STATE      VERSION
*  docker-desktop-data                Stopped    2
  docker-desktop                      Stopped    2
  Ubuntu                              Stopped    2
PS C:\>
```

Here:

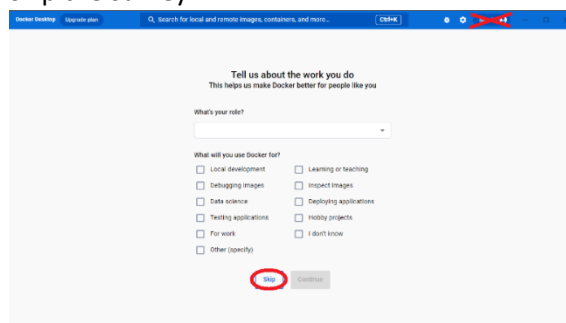
- Both „docker-desktop” and „docker-desktop-data” should be listed
- The default (*) distribution should be either of these two. If that is not the case, use the following command:

```
PS C:\> wsl --setdefault docker-desktop-data
```

- 5) When you start the application, you may
 - a. close the subscription window

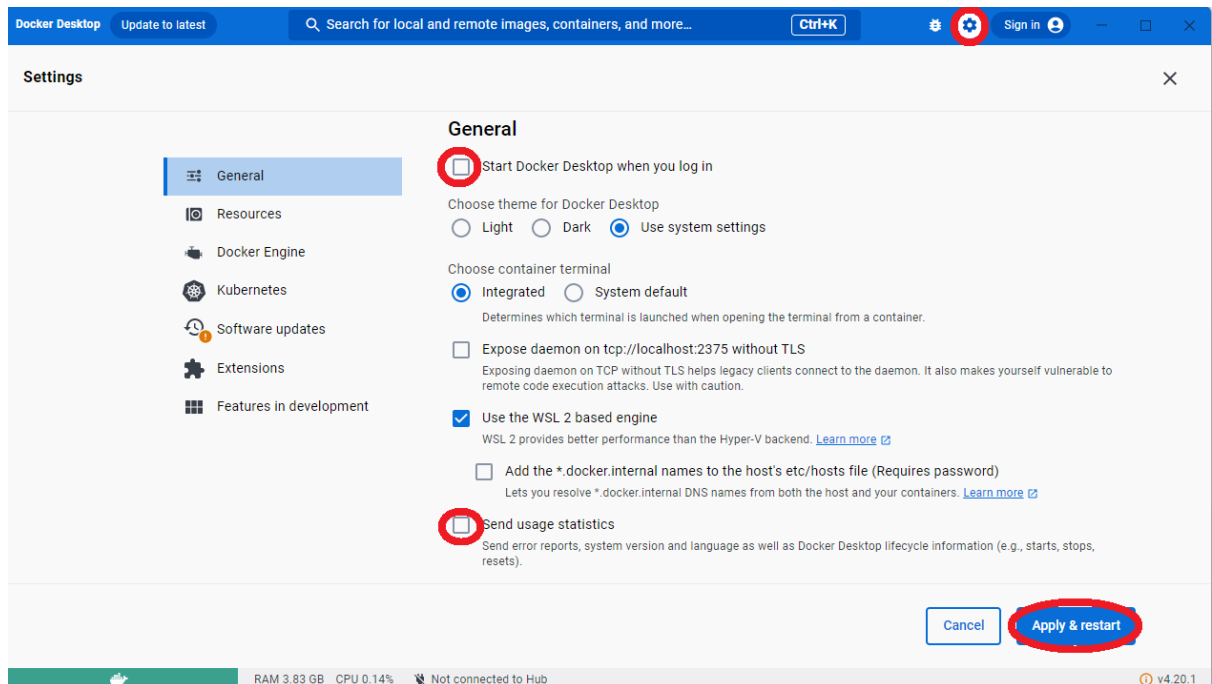


- b. skip the survey

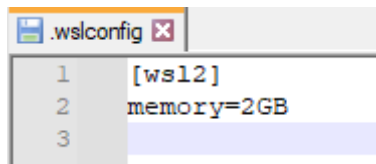


None of these, or the account feature are required to use the application.

- 6) Click on the gear icon to access the settings, and unmark the automatic startup and the statistics options, then click on the „Apply & Restart” button



- 7) **OPTIONAL**, IF your computer has less than ~12 GB memory:
Download and extract [wslconfig.zip](#), then navigate to the %UserProfile% direcorey and copy the .wslconfig file into it (or modify the contents accordingly if it already exists).

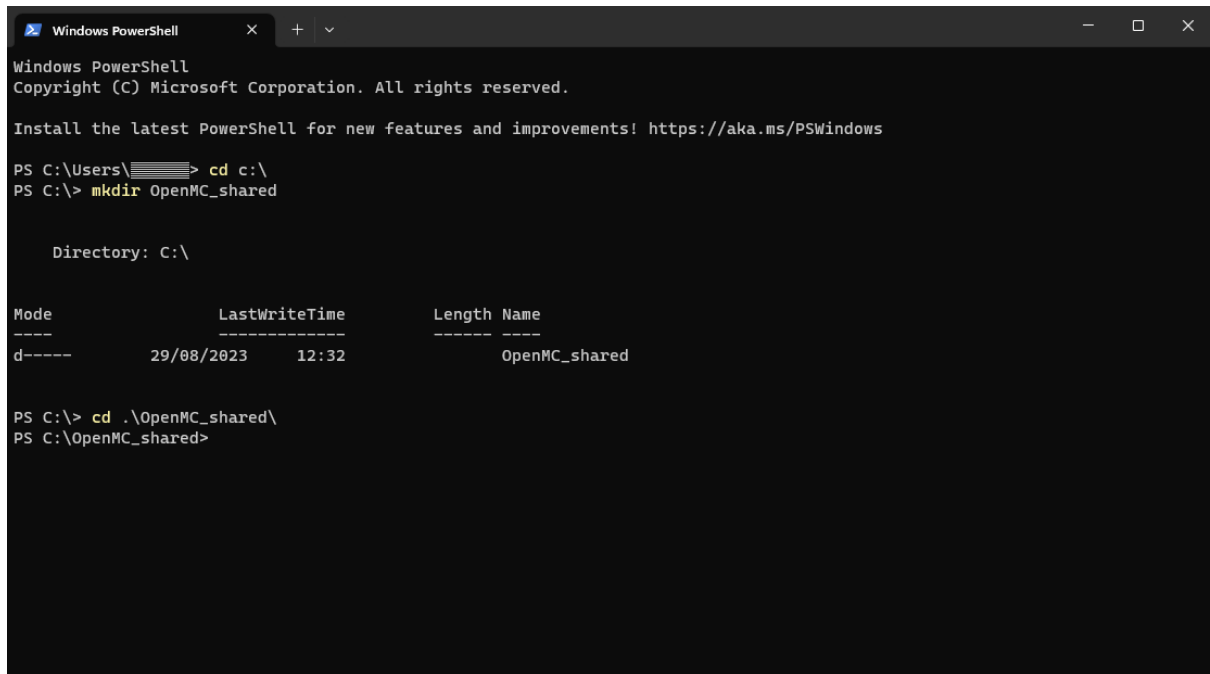


- 8) **OPTIONAL**, IF you have less than ~20 GB free space on C:\:
Follow the instructions [on this external site](#) to relocate the database.

III. Installing OpenMC with JupyterLab environment using docker and setting up a shared folder with the host system

- 1) Open PowerShell
- 2) Create a folder on the host system that will be shared with the container:

Mind that directory names are case-sensitive!



```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\> cd c:\
PS C:\> mkdir OpenMC_shared

Directory: C:\

Mode                LastWriteTime         Length Name
----                -
d-----          29/08/2023   12:32             OpenMC_shared

PS C:\> cd .\OpenMC_shared\
PS C:\OpenMC_shared>
```

- 3) Download and extract [Dockerfile.zip](#), then copy Dockerfile into C:\OpenMC_shared



```
Dockerfile
1 # build with:
2 # docker build -t openmc_with_jupyter .
3 # run with:
4 # docker run -p 8888:8888 -v C:\OpenMC_shared:/root/OpenMC/openmc/notebooks openmc_with_jupyter
5
6 FROM openmc/openmc:latest
7
8 RUN pip install jupyterlab
9 CMD ["jupyter", "lab", "--notebook-dir=/root/OpenMC/openmc", "--port=8888", "--no-browser", "--ip=0.0.0.0", "--allow-root"]
```

- 4) Run the following command to install the container:

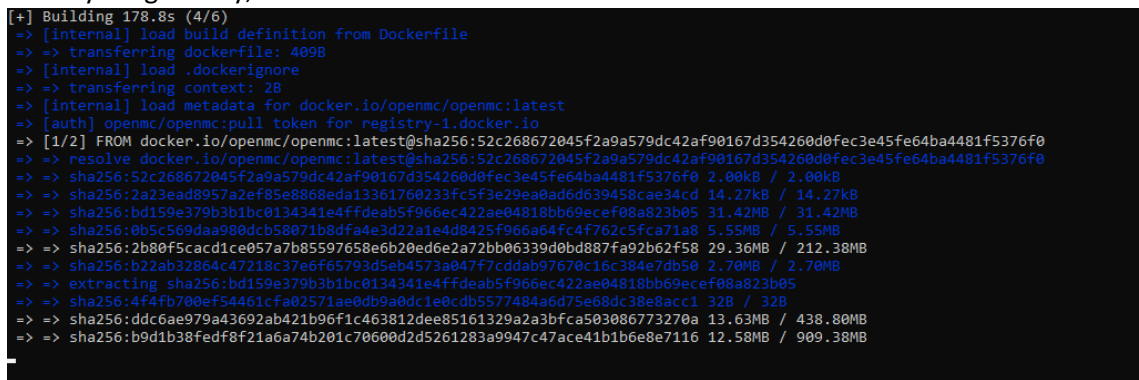
docker build -t openmc_with_jupyter .

(Mind that there is a „." at the end!)

If it cries that it cannot find the Dockerfile (possible issue if the wsl database was moved to another drive), use this command instead:

docker build -t openmc_with_jupyter C:\OpenMC_shared

If everything is okay, installation starts:



```
[+] Building 178.8s (4/6)
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 409B
=> [internal] load .dockerignore
=> => transferring context: 28
=> [internal] load metadata for docker.io/openmc/openmc:latest
=> [auth] openmc/openmc:pull token for registry-1.docker.io
=> [1/2] FROM docker.io/openmc/openmc:latest@sha256:52c268672045f2a9a579dc42af90167d354260d0fec3e45fe64ba4481f5376f0
=> => resolve docker.io/openmc/openmc:latest@sha256:52c268672045f2a9a579dc42af90167d354260d0fec3e45fe64ba4481f5376f0
=> => sha256:52c268672045f2a9a579dc42af90167d354260d0fec3e45fe64ba4481f5376f0 2.00kB / 2.00kB
=> => sha256:2a23ead8957a2ef85e8868eda13361760233fc5f3e29ea0ad6d639458cae34cd 14.27kB / 14.27kB
=> => sha256:bd159e379b3b1bc0134341e4ffdeab5f966ec422ae04818bb69ecef08a823b05 31.42MB / 31.42MB
=> => sha256:0b5c569daa980dc58071b8dfa4e3d22a1e4d8425f966a64fc4f762c5fca71a8 5.55MB / 5.55MB
=> => sha256:2b80f5cadd1ce057a7b85597658e6b20ed6e2a72bb06339d0bd887fa92b62f58 29.36MB / 212.38MB
=> => sha256:b22ab32864c47218c37e6f65793d5eb4573a047f7cddab97670c16c384e7db50 2.70MB / 2.70MB
=> => extracting sha256:bd159e379b3b1bc0134341e4ffdeab5f966ec422ae04818bb69ecef08a823b05
=> => sha256:4f4fb700ef54461cfa02571ae0db9a0dc1e0cdb5577484a6d75e68dc38e8acc1 32B / 32B
=> => sha256:ddc6ae979a43692ab421b96f1c463812dee85161329a2a3bfc5a03086773270a 13.63MB / 438.80MB
=> => sha256:b9d1b38fedf8f21a6a74b201c70600d25261283a9947c47ace41b1b6e8e7116 12.58MB / 909.38MB
```

(IF at any point you encounter the following error, open/restart the Docker Desktop application to start the docker service:

```
ERROR: error during connect: this error may indicate that the docker daemon is not running: Get "http://%2F%2F.%2Fpipe%2Fdocker_engine/_ping": open //./pipe/docker_engine: The system cannot find the file specified.
```

- 5) After the installation, start the container using the following command:

```
docker run -p 8888:8888 -v C:\OpenMC_shared:/root/OpenMC/openmc/notebooks openmc_with_jupyter
```

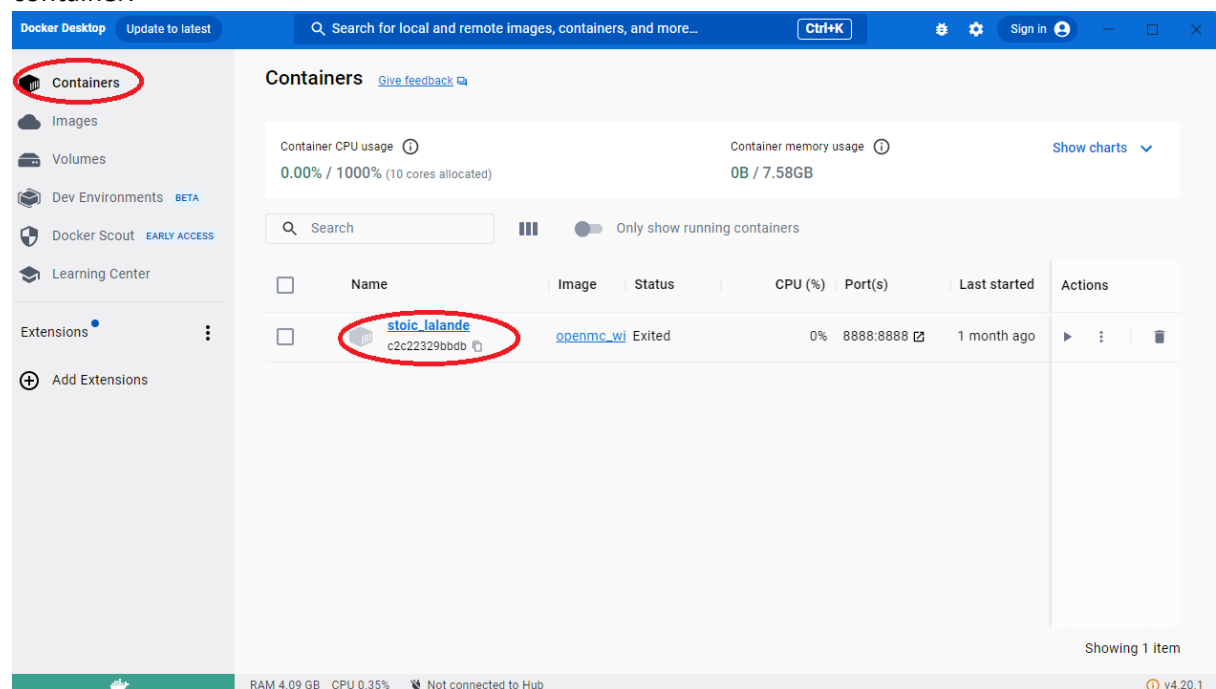
```
PS C:\OpenMC_shared> docker run -p 8888:8888 -v C:\OpenMC_shared:/root/OpenMC/openmc/notebooks openmc_with_jupyter
[I 2023-08-29 12:06:19.011 ServerApp] Package jupyterlab took 0.0000s to import
[I 2023-08-29 12:06:17.018 ServerApp] Package jupyter_lsp took 0.0057s to import
[W 2023-08-29 12:06:17.018 ServerApp] A '.jupyter_server_extension_points' function was not found in jupyter_lsp. Instead, a '.jupyter_server_extension_paths' function was found and will be used for now. This function name will be deprecated in future releases of Jupyter Server.
[I 2023-08-29 12:06:17.022 ServerApp] Package jupyter_server_terminals took 0.0037s to import
[I 2023-08-29 12:06:17.022 ServerApp] Package notebook_shim took 0.0000s to import
[W 2023-08-29 12:06:17.022 ServerApp] A '.jupyter_server_extension_points' function was not found in notebook_shim. Instead, a '.jupyter_server_extension_paths' function was found and will be used for now. This function name will be deprecated in future releases of Jupyter Server.
[I 2023-08-29 12:06:17.022 ServerApp] jupyter_lsp | extension was successfully linked.
[I 2023-08-29 12:06:17.026 ServerApp] jupyter_server_terminals | extension was successfully linked.
[I 2023-08-29 12:06:17.030 ServerApp] jupyterlab | extension was successfully linked.
[I 2023-08-29 12:06:17.031 ServerApp] Writing Jupyter server cookie secret to /root/.local/share/jupyter/runtime/jupyter_cookie_secret
[I 2023-08-29 12:06:17.109 ServerApp] notebook_shim | extension was successfully linked.
[I 2023-08-29 12:06:17.181 ServerApp] notebook_shim | extension was successfully loaded.
[I 2023-08-29 12:06:17.183 ServerApp] jupyter_lsp | extension was successfully loaded.
[I 2023-08-29 12:06:17.184 ServerApp] jupyter_server_terminals | extension was successfully loaded.
[I 2023-08-29 12:06:17.185 LabApp] JupyterLab extension loaded from /usr/local/lib/python3.9/dist-packages/jupyterlab
[I 2023-08-29 12:06:17.185 LabApp] JupyterLab application directory is /usr/local/share/jupyter/lab
[I 2023-08-29 12:06:17.185 LabApp] Extension Manager is 'pypi'.
[I 2023-08-29 12:06:17.187 ServerApp] jupyterlab | extension was successfully loaded.
[I 2023-08-29 12:06:17.188 ServerApp] Saving notebooks from local directory: /root/OpenMC/openmc
[I 2023-08-29 12:06:17.188 ServerApp] Jupyter Server 2.7.0 is running at:
[I 2023-08-29 12:06:17.188 ServerApp] http://b891eac5b526:8888/lab?token=1ef6432c29618c57c8bfbfaecb5a2333be186b489cf91217
[I 2023-08-29 12:06:17.188 ServerApp] http://127.0.0.1:8888/lab?token=1ef6432c29618c57c8bfbfaecb5a2333be186b489cf91217
[I 2023-08-29 12:06:17.188 ServerApp] Use Control-C to stop this server and shut down all kernels (twice to skip confirmation).
[C 2023-08-29 12:06:17.191 ServerApp]

To access the server, open this file in a browser:
file:///root/.local/share/jupyter/runtime/jpserver-1-open.html
Or copy and paste one of these URLs:
http://b891eac5b526:8888/lab?token=1ef6432c29618c57c8bfbfaecb5a2333be186b489cf91217
http://127.0.0.1:8888/lab?token=1ef6432c29618c57c8bfbfaecb5a2333be186b489cf91217
[I 2023-08-29 12:06:17.200 ServerApp] Skipped non-installed server(s): bash-language-server, dockerfile-language-server-nodejs, javascript-typescript-langservers, jedi-language-server, julia-language-server, pyright, python-language-server, python-lsp-server, r-language-server, sql-language-server, texlab, typescript-language-server, unified-language-server, vscode-css-languageserver-bin, vscode-html-languageserver-bin, vscode-json-languageserver-bin, yaml-language-server
```

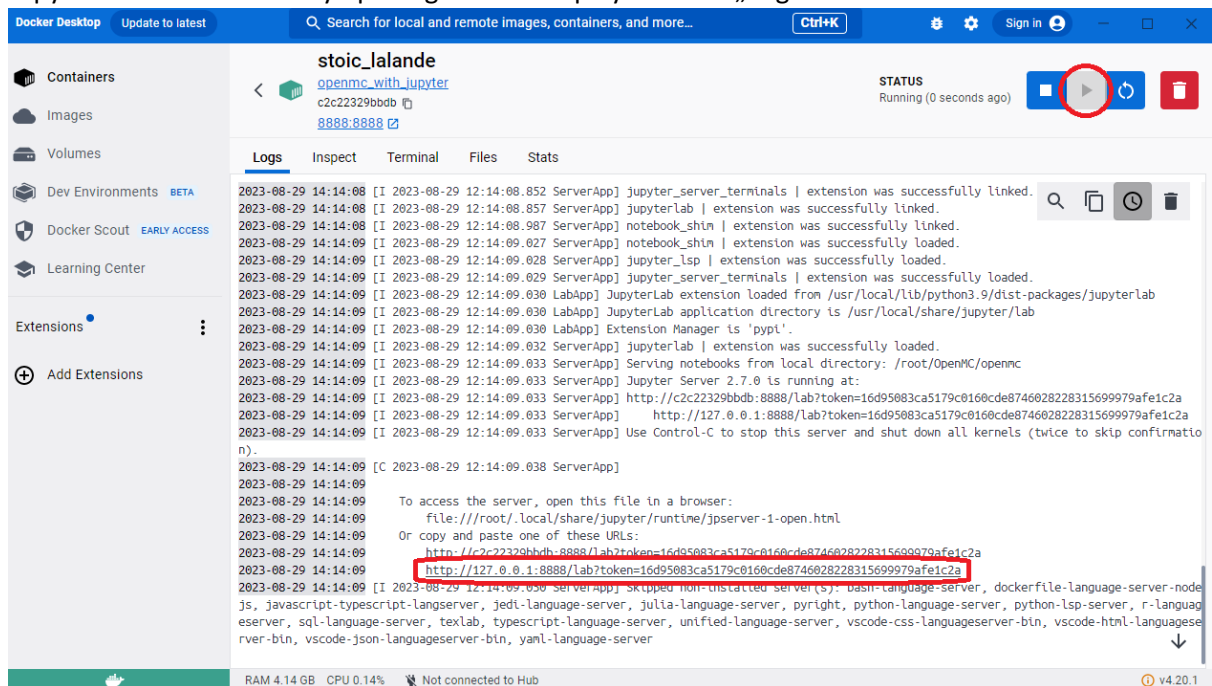
Then, when no new lines are appearing for a while, hit **CTRL+C** combination to interrupt.

```
[I 2023-08-29 12:01:03.317 ServerApp] Skipped non-installed server(s): bash-language-server, dockerfile-language-server-nodejs, javascript-typescript-langservers, jedi-language-server, julia-language-server, pyright, python-language-server, python-lsp-server, r-language-server, sql-language-server, texlab, typescript-language-server, unified-language-server, vscode-css-languageserver-bin, vscode-html-languageserver-bin, vscode-json-languageserver-bin, yaml-language-server
[I 2023-08-29 12:02:58.428 ServerApp] Interrupted...
PS C:\OpenMC_shared> |
```

- 6) Open Docker Desktop application, open the „Containers” tab, and click on the name of the container:



- 7) You can start the container with the „play” button in the top right section, and you can access the JupyterLab environment by opening the link displayed in the „Logs” tab:



- 8) Inside the JupyterLab environment, you can:
- Upload files to the current folder with the arrow button
 - Find the contents of the shared folder `C:\OpenMC_shared` at `/notebooks/` (Mind that in the event of deleting the container, anything that is placed elsewhere will be lost.)

