



A central JupyterHub

Tim Kreuzer, [Björn Hagemeyer](#)

Services Roadshow by



Dec 04, 2024

What is Jupyter4NFDI?

Jupyter Notebook

Core tool for data science

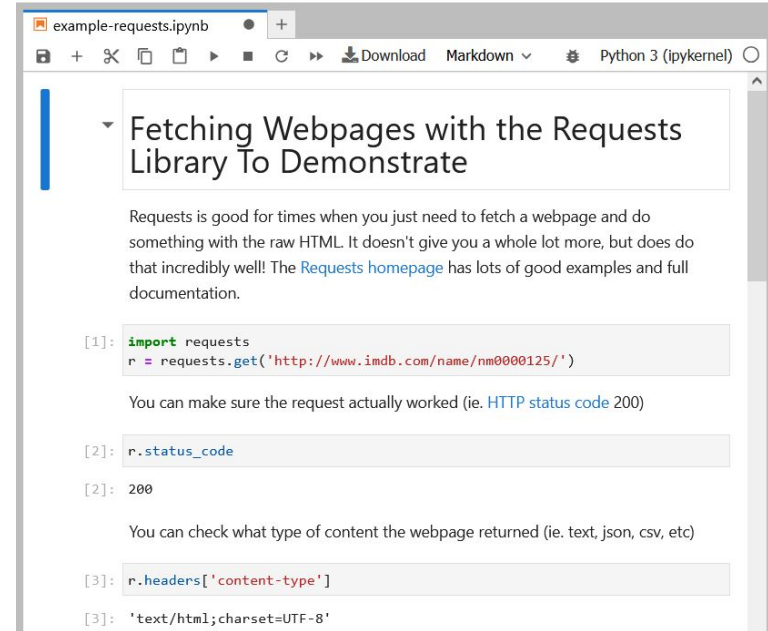
- Widely used for data analysis, machine learning, visualization, and prototyping

Interactive environment

- Each document is divided into cells that can hold code, text, equations, or visualizations

Supports reproducibility & sharing

- Documents are self-contained and can be shared, enabling reproducible workflows in science and education



The screenshot shows a Jupyter Notebook window titled 'example-requests.ipynb'. The cell contains a text block with the heading 'Fetching Webpages with the Requests Library To Demonstrate'. Below the text, there are three code cells. The first cell contains the code to import requests and fetch a webpage. The second cell prints the status code, which is 200. The third cell prints the content type, which is 'text/html; charset=UTF-8'.

```
[1]: import requests
r = requests.get('http://www.imdb.com/name/nm0000125/')

You can make sure the request actually worked (ie. HTTP status code 200)

[2]: r.status_code

[2]: 200

You can check what type of content the webpage returned (ie. text, json, csv, etc)

[3]: r.headers['content-type']

[3]: 'text/html; charset=UTF-8'
```

What is Jupyter4NFDI?

Jupyter Notebook + JupyterLab

Backend for notebooks

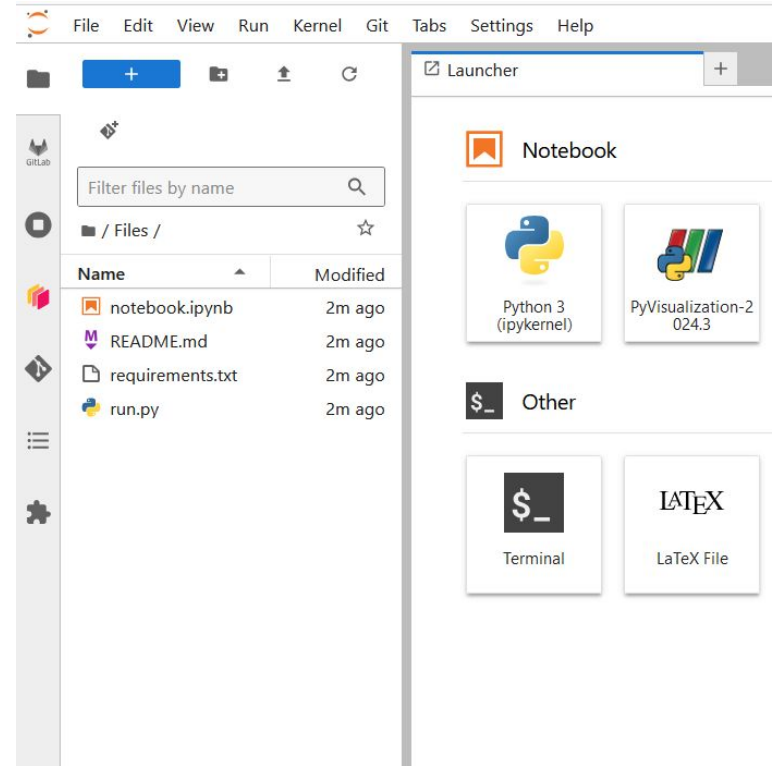
- Executes code and serves the notebook interface in a browser

Web interface

- Provides a browser based web interface

JupyterLab

- Next-gen Interface
- Extensible (Terminal, Text Editor, File Browser)
- Endless Customization



What is Jupyter4NFDI?

JupyterHub

Multi-user platform

- Run JupyterLabs in isolated environments

Remote resource management

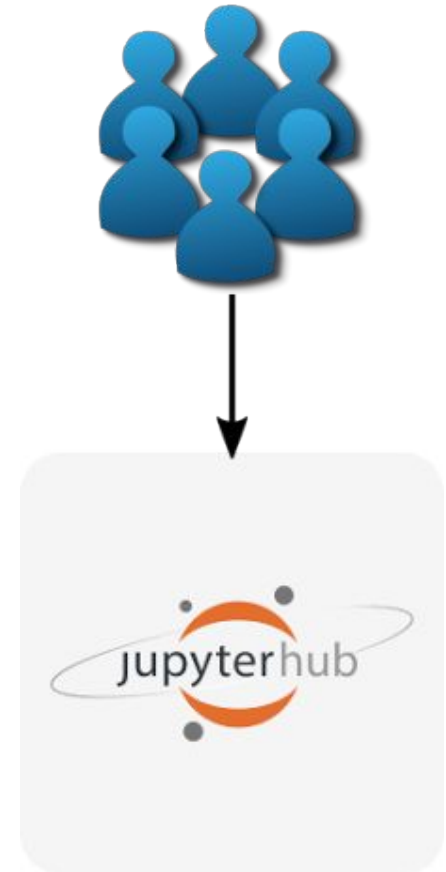
- Users don't have to install software locally
- Benefit from pre-installed environments

Centralized control

- Provides access management for resources

Customizable

- Configurable authentication
- Start JupyterLabs on different systems



Why Jupyter4NFDI?

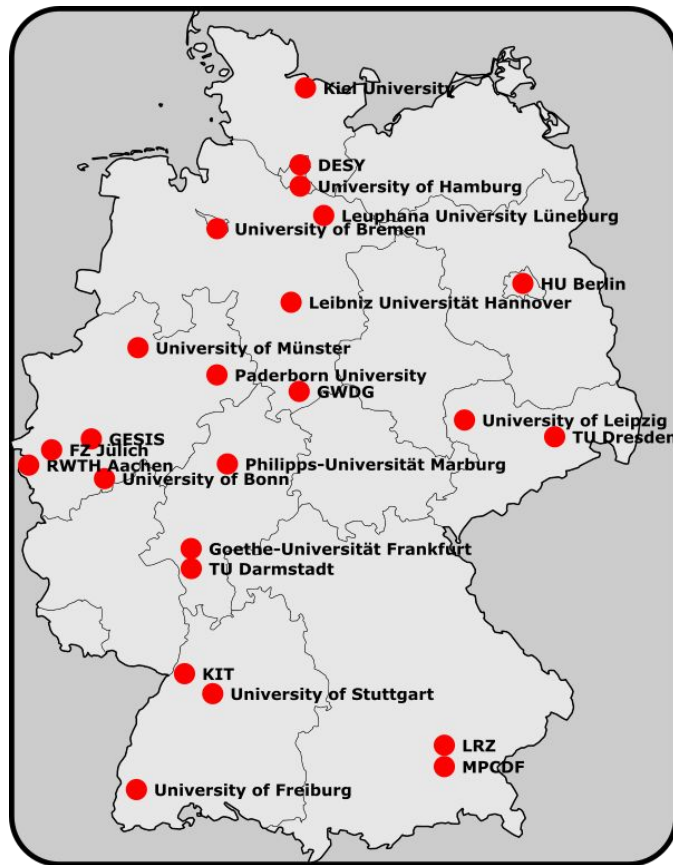
Dozens of JupyterHubs in Germany

Challenges

- Out of 24, 20 are not accessible to external users
- Which JupyterHubs are available to me?
- What are the differences?

Proposed solution

- Centralized “default” JupyterHub
- Combining resources of providers
- Not a replacement, but **complementary service** to enhance access and usability for all users



Why Jupyter4NFDI?

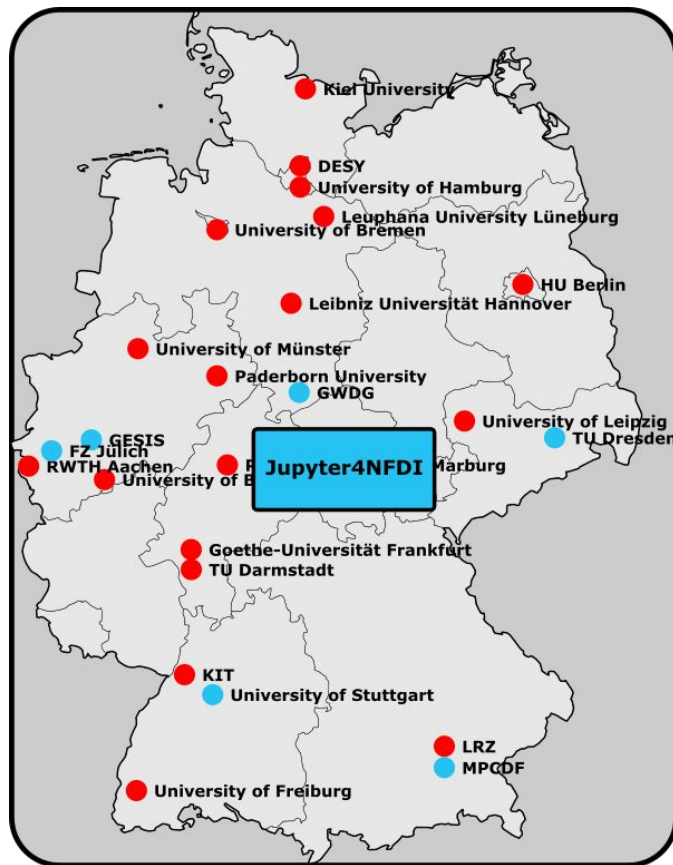
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Why use Jupyter4NFDI?

Easy access to resources

- Login with your Home IdP or social IdPs

Pre-installed environments

- Ready-to-use with popular libraries and tools

Exclusive features

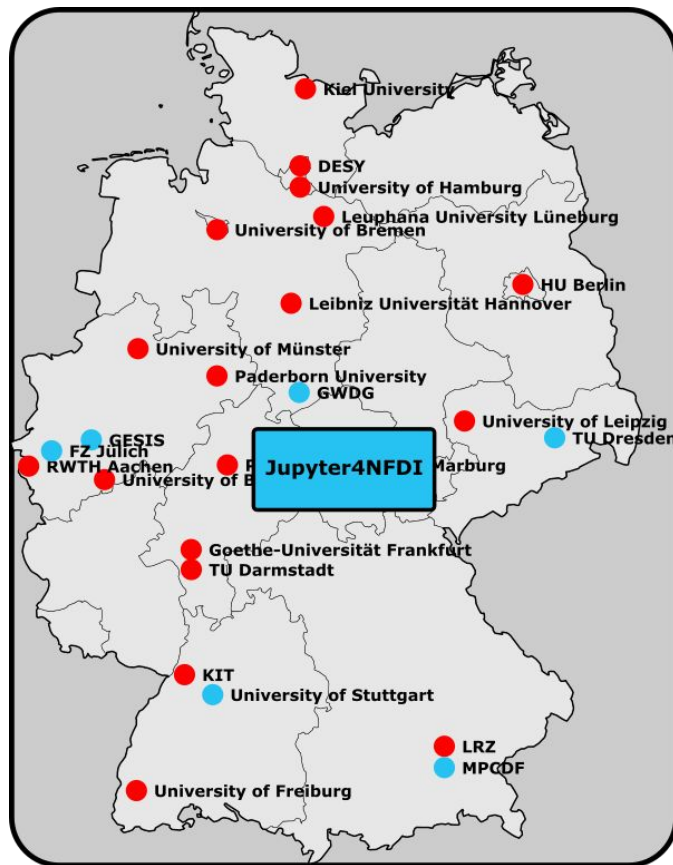
- Repo2Docker (Binder) integration into JupyterHub
- Shareable links support FAIR digital objects

Highly customizable

- Run your own Docker images
- Create your environment

Persistent storage

- Varies by provider
- Centralized storage is planned for the future



Jupyter4NFDI

Project phases and outlook

Initialisation

- Establish the central JupyterHub
- Provide a foundational set of resources
- Enhance the integration of external resources

Integration

- Integrate external resources seamlessly
- Provide resources tailored for training courses
- Utilize feedback to continuously improve the web service
- Promote the service to attract more users

Ramp-Up

- A mature web service accessible to all within NFDI
- Built to last

Jupyter4NFDI

<https://hub.nfdi-jupyter.de/>

The screenshot shows a web browser window with the address bar displaying `hub.nfdi-jupyter.de/hub/home`. The page content is a configuration form for a Binder lab. At the top, there is a header with a back arrow, a refresh icon, and the URL. Below the header, the configuration is organized into sections. On the left, there are three buttons: 'Lab Config' (dark blue), 'Logs' (light blue), and 'Start' (dark blue with a play icon). The main configuration area consists of several rows, each with a label on the left and a corresponding input field or dropdown menu on the right. The labels and their values are: 'Name' (binder example), 'Version' (Repo2docker (Binder) - beta), 'Repository' (GitHub), 'GitHub repository name or URL' (`https://github.com/binder-examples/requirements`), 'Git ref (branch,tag, or commit)' (HEAD), 'Path to a notebook file (optional)' (index.ipynb), 'Notebook Type' (File), 'System' (JSC-Cloud), and 'Flavor' (2GB RAM, 1VCPU, 5 days). In the top right corner of the configuration area, there is a 'Logs' button and a 'Start' button. The browser's address bar also shows a star icon and a user profile icon.

← → ↻ `hub.nfdi-jupyter.de/hub/home` ☆ 👤

System
JSC-Cloud
Flavor
m1nfdi

Logs **Start**

Lab Config Name binder example
Version Repo2docker (Binder) - beta
Logs Repository GitHub
GitHub repository name or URL `https://github.com/binder-examples/requirements`
Git ref (branch,tag, or commit) HEAD
Path to a notebook file (optional) index.ipynb
Notebook Type File
System JSC-Cloud
Flavor 2GB RAM, 1VCPU, 5 days

Jupyter4NFDI

<https://hub.nfdi-jupyter.de/>

Repository: GitHub

GitHub repository name or URL:

Git ref (branch):

Path to a notebook:

Notebook:

System:

Flavor:

Close

Available Flavors ■ = Free ■ = Used ■ = Limit exceeded

Flavor	Usage
2GB RAM, 1VCPU, 5 days ⓘ	2 / 48
4GB RAM, 1VCPU, 2 days ⓘ	0 / 20

Instructions:

Write down the letters in front of each correct answer! In the end, these letters will form a solution phrase.

How many of the existing JupyterHubs did we find inaccessible to a general audience?

I) 20

TW) 24

ME) 4



Participate in our Survey



<https://survey.hifis.dkfz.de/882875>

Thank you!
Questions?



 jupyter4nfdi@lists.nfdi.de

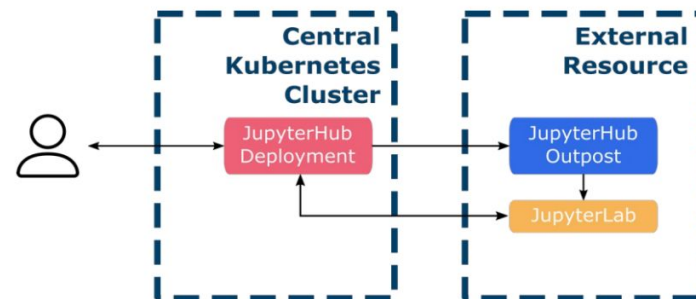
 base4nfdi-servicestewards@lists.nfdi.de for general inquiries

 <https://nfdi-jupyter.de>

Jupyter4NFDI

Technical concept

- The **central JupyterHub** acts as an **access point** to multiple resources in the background
- Resource providers can install a "JupyterHub Outpost" to **integrate their resources with the central JupyterHub** following general standards
- Throughout the project, additional resource providers will be integrated into the central service, expanding the available **resources, environments, features, and capabilities**
- Partners and Resources: Text+ (FZ Jülich, GWDG), NFDI4DS (GESIS, TU Dresden, Univ. of Stuttgart), FAIRmat (MPCDF)



Jupyter4NFDI

Technical concept

- **Landscape:** Low access barrier to distributed resources and flexible configuration options for Jupyter users and reduced maintenance for providers and users expected
- **Interoperability:** Team is active participant in JupyterHub ecosystem. Import of Binder based FAIR Digital Objects (FDOs) planned
- **Support:** Documentation, guides and monthly open team meetings for onboarding new users and for integration of further compute and data resources
- **Governance:** Business model in the long run to ensure coordination between consortia, resource and service providers
- **Networking:** Connection with international Jupyter community. Flexibility of Jupyter4NFDI's JupyterHub version to connect external resources is not standard.