NFJS: MLOps Half Day

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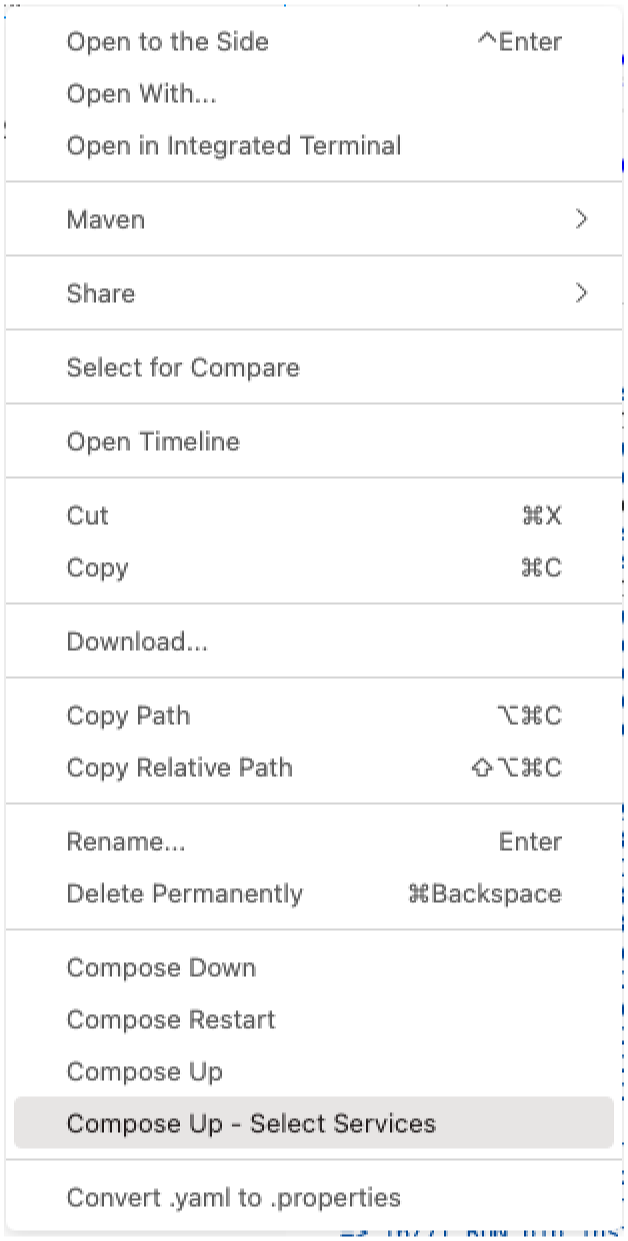
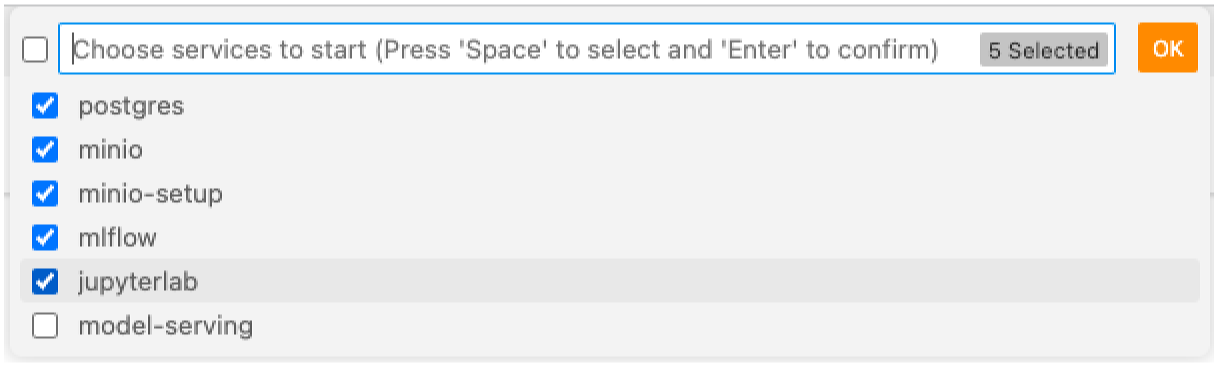
Table of Contents

MLFlow

1. When opening the project nfjs-mlops-half-day, you will see the docker-compose file in your application
2. Review the *docker-compose.yaml* and take a look at the components that we are using.
3. Right-click on the *docker-compose.yaml* file, and select *Compose Up - Select Services*

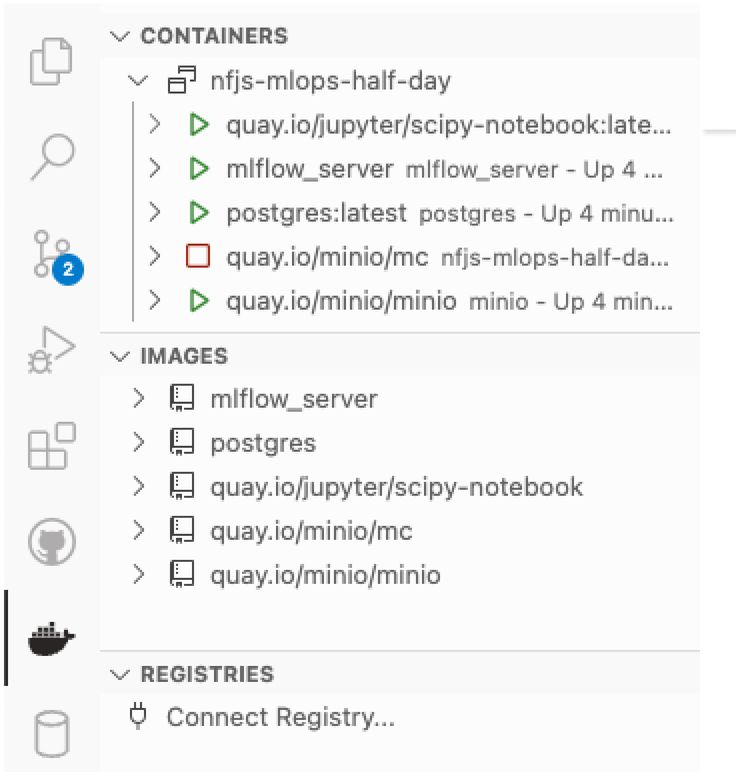


4. Select all except for *model-serving*. Note, if you wish to close this, hit Esc + Esc

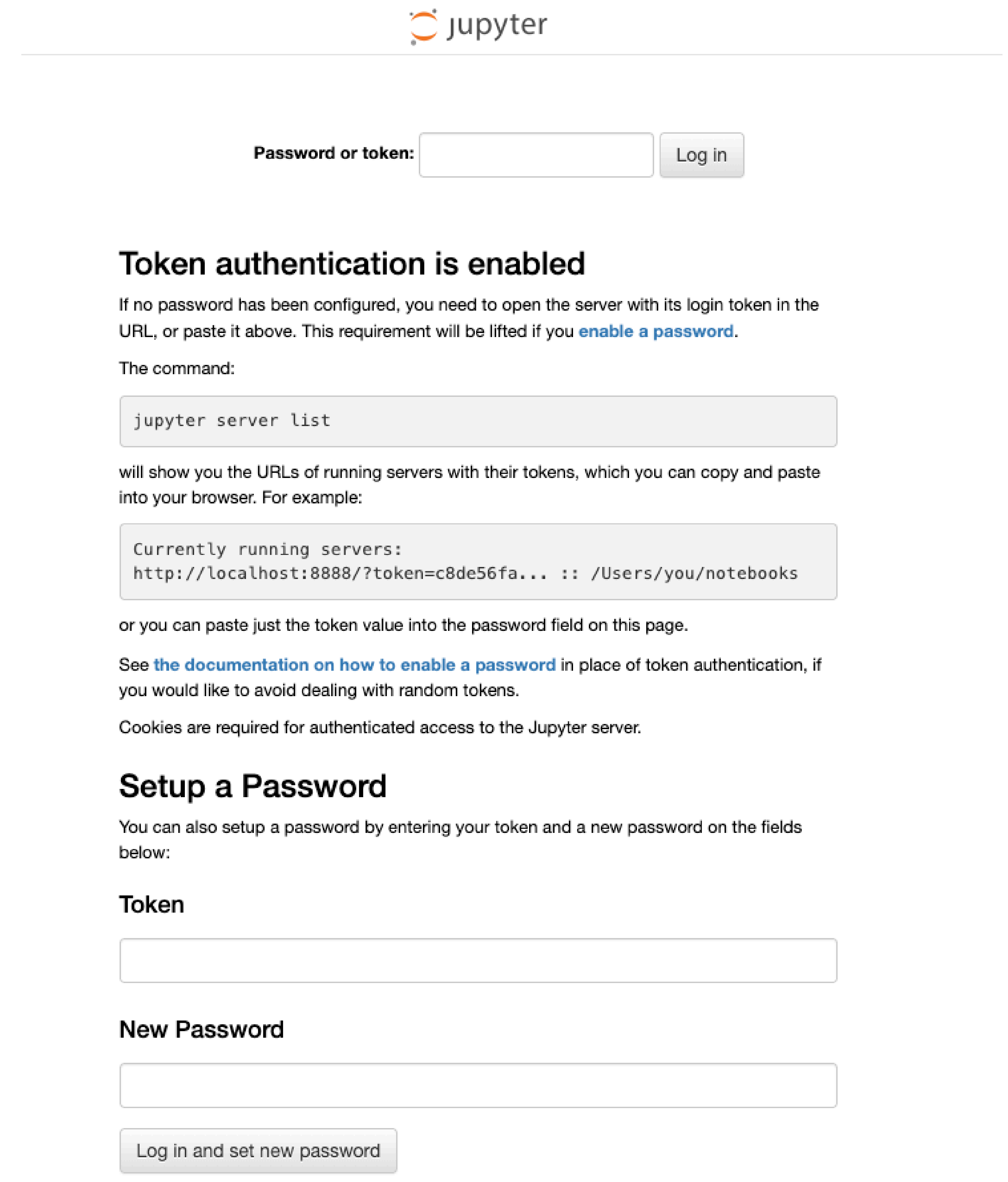

Choose services to start (Press 'Space' to select and 'Enter' to confirm) 5 Selected OK

- [x] postgres
- [x] minio
- [x] minio-setup
- [x] mlflow
- [x] jupyterlab
- [ ] model-serving

5. You can ignore the warning for mlflow, we are building the application from scratch.
6. When completed you can view the applications that are running at the docker window in your VSCode. The `mc` container is stopped because it was an initial container, used to load the data in the database.


CONTAINERS
nfjs-mlops-half-day
quay.io/jupyter/scipy-notebook:late...
mlflow_server mlflow_server - Up 4 ...
postgres:latest postgres - Up 4 minu...
quay.io/minio/mc nfjs-mlops-half-da...
quay.io/minio/minio minio - Up 4 min...
IMAGES
mlflow_server
postgres
quay.io/jupyter/scipy-notebook
quay.io/minio/mc
quay.io/minio/minio
REGISTRIES
Connect Registry...

7. Open the Jupyter Server notebook called *scipy-notebook* in the *Containers* box, right click and select "Open in Browser"



Token authentication is enabled

If no password has been configured, you need to open the server with its login token in the URL, or paste it above. This requirement will be lifted if you **enable a password**.

The command:

```
jupyter server list
```

will show you the URLs of running servers with their tokens, which you can copy and paste into your browser. For example:

```
Currently running servers:
http://localhost:8888/?token=c8de56fa... :: /Users/you/notebooks
```

or you can paste just the token value into the password field on this page.

See **the documentation on how to enable a password** in place of token authentication, if you would like to avoid dealing with random tokens.

Cookies are required for authenticated access to the Jupyter server.

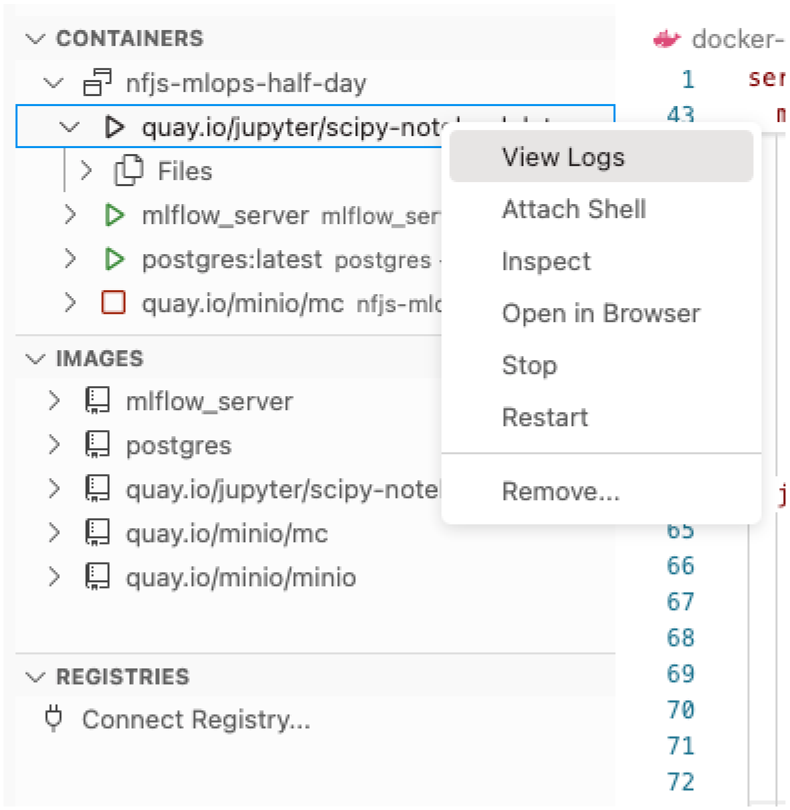
Setup a Password

You can also setup a password by entering your token and a new password on the fields below:

Token

New Password

8. The page will ask for a key, right-click on the *scipy-notebook* and select "View Logs"

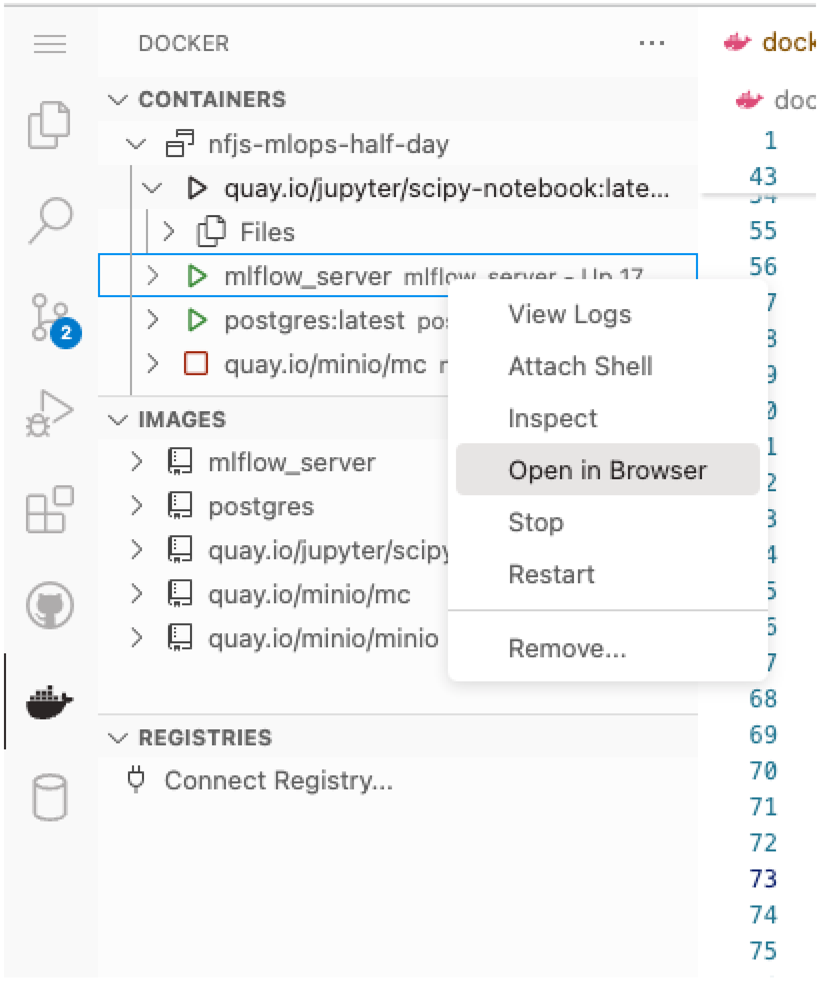


9. Locate the token in the logs, copy the token and use it in the notebook where it asks for the token

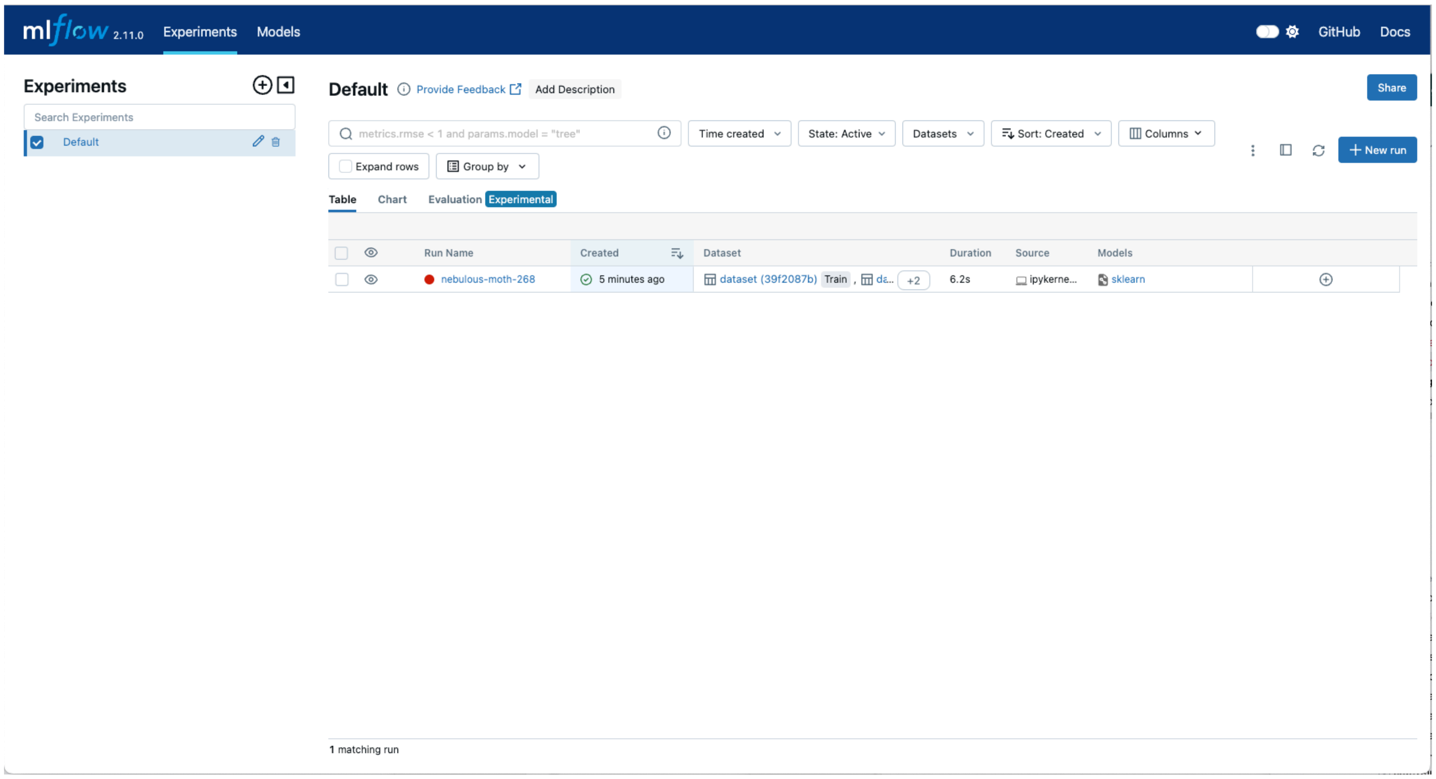
```
    To access the server, open this file in a browser:
        file:///home/jovyan/.local/share/jupyter/runtime/jpserver-1-open.html
    Or copy and paste one of these URLs:
        http://be85fe5932e7:8888/lab?token=35c975720527af87ef537d30a75bbe0e64f9d492b987684d
        http://127.0.0.1:8888/lab?token=35c975720527af87ef537d30a75bbe0e64f9d492b987684d
```

10. Open the *work* folder, and open the *LogisticRegression.ipynb*, and we will describe what we are doing in this particular notebook. Be sure to use `CTRL` + `ENTER` to run a cell.

11. Go back to gitpod environment and open the ML Flow Web Application

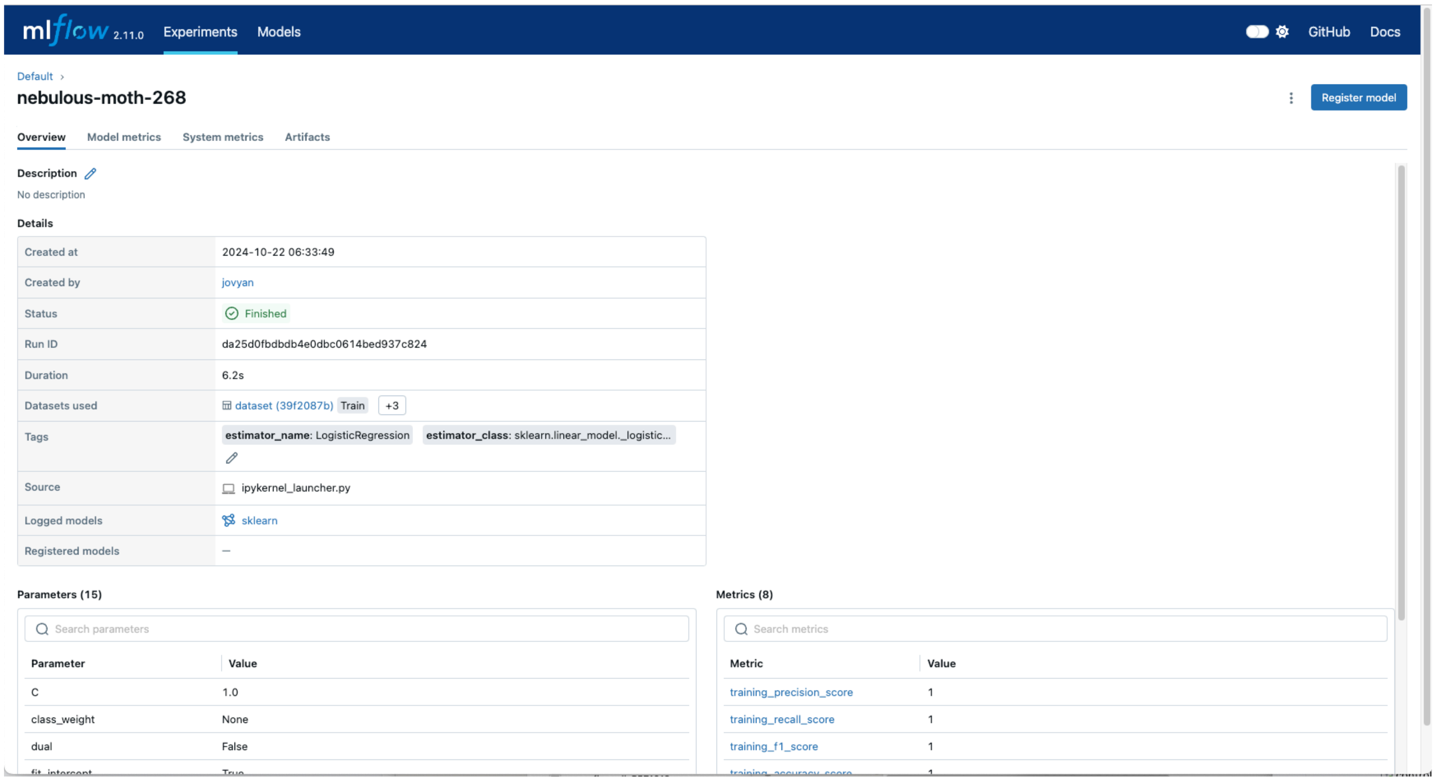


12. View the experiments in the MLFlow Website



Run Name	Created	Dataset	Duration	Source	Models
nebulous-moth-268	5 minutes ago	dataset (39f2087b) Train , da... +2	6.2s	ipykerne...	sklearn

13. Open the Experiment we just ran, yours may be in a different name and click on the run name. This will show the properties of the model. Look around



nebulous-moth-268

Description

No description

Details

Created at	2024-10-22 06:33:49
Created by	jovyan
Status	Finished
Run ID	da25d0fbdbdb4e0dbc0614bed937c824
Duration	6.2s
Datasets used	dataset (39f2087b) Train +3
Tags	**estimator_name**: LogisticRegression **estimator_class**: sklearn.linear_model._logistic...
Source	ipykernel_launcher.py
Logged models	sklearn
Registered models	—

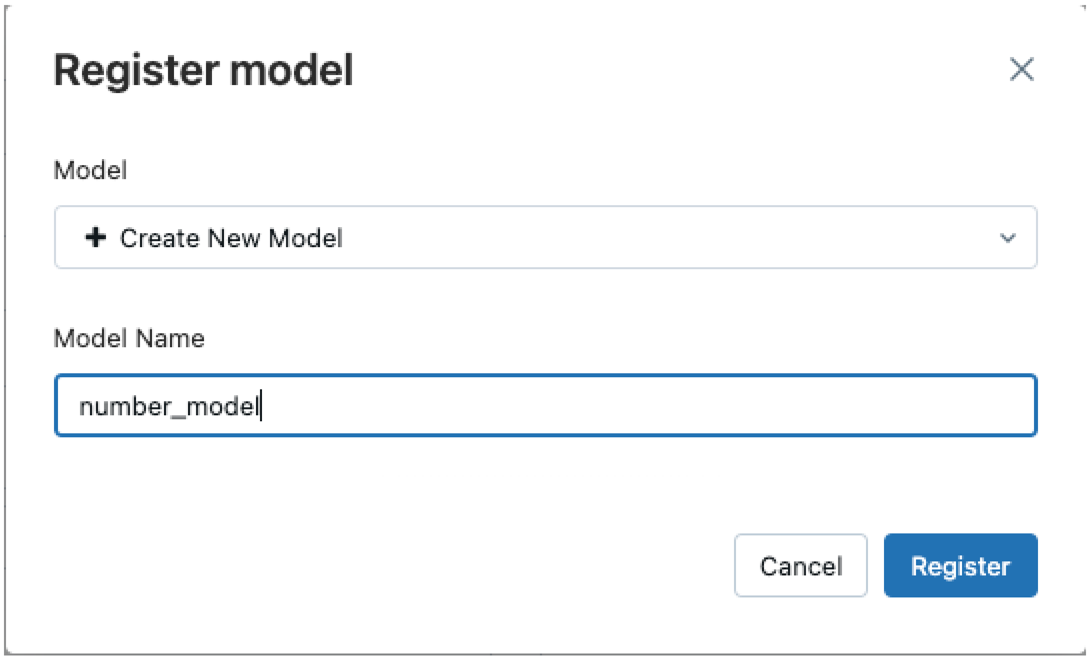
Parameters (15)

Parameter	Value
C	1.0
class_weight	None
dual	False

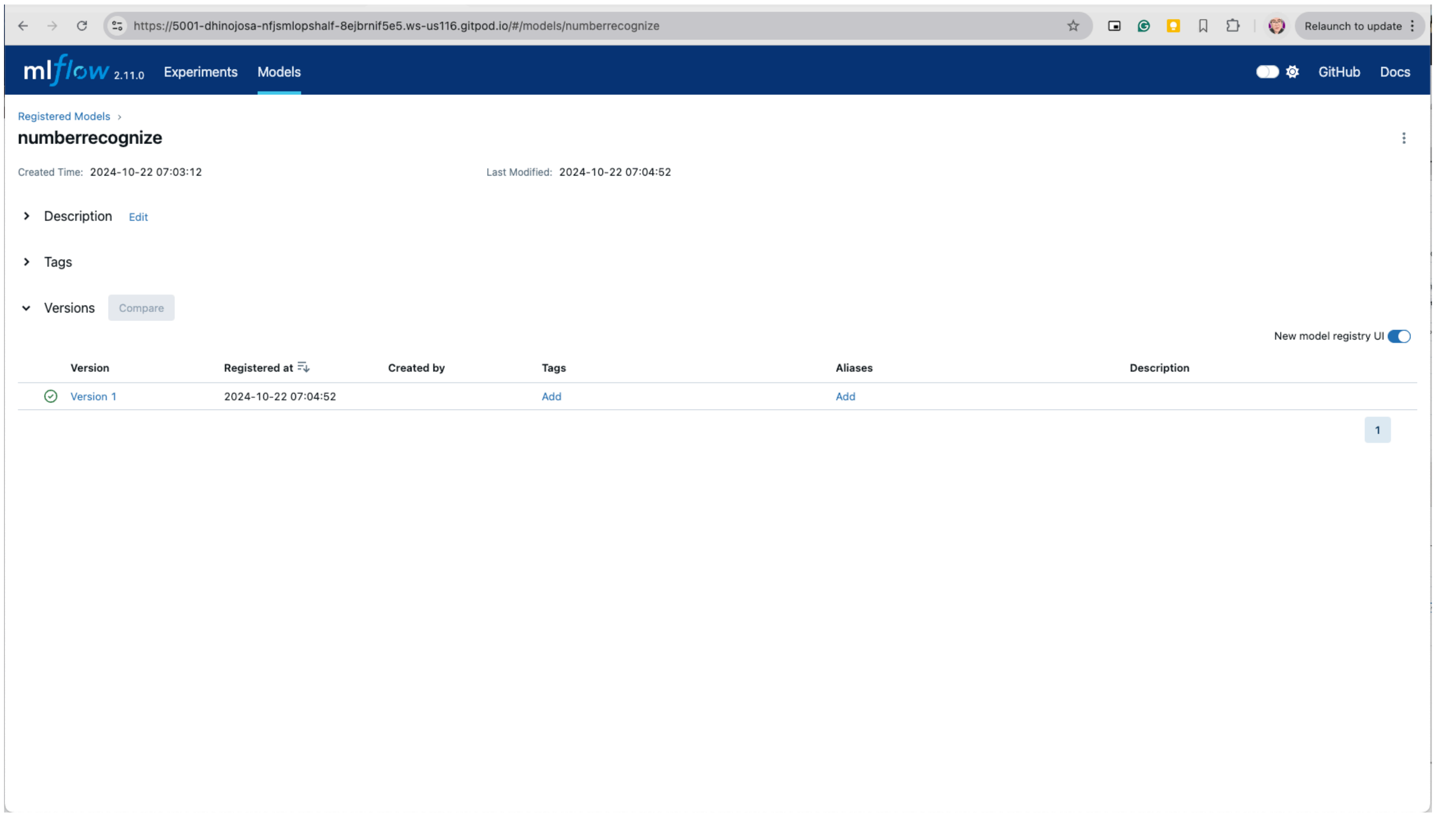
Metrics (8)

Metric	Value
training_precision_score	1
training_recall_score	1
training_f1_score	1

14. Click on Artifacts and you will see the model, at this point you can click on 【**Register Model**】 and enter information about your model.



15. You can now Click on the Models and view the model. You can even apply tags and identify model that are important or even broken.



https://5001-dhinojosa-nfjsmlopshalf-8ejbrnif5e5.ws-us116.gitpod.io/#/models/numberrecognize

Registered Models ›

numberrecognize

Created Time: 2024-10-22 07:03:12   Last Modified: 2024-10-22 07:04:52

› Description Edit

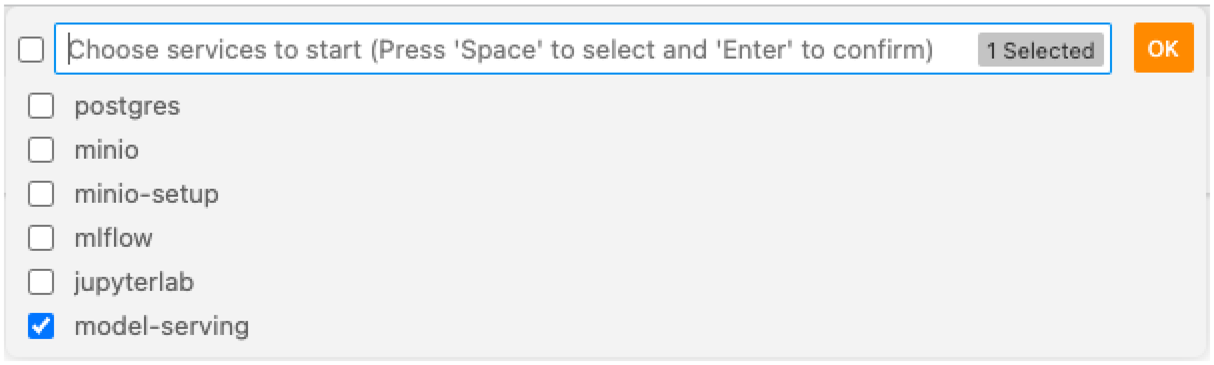
› Tags

⌄ Versions Compare

New model registry UI

Version	Registered at	Created by	Tags	Aliases	Description
Version 1	2024-10-22 07:04:52		Add	Add	

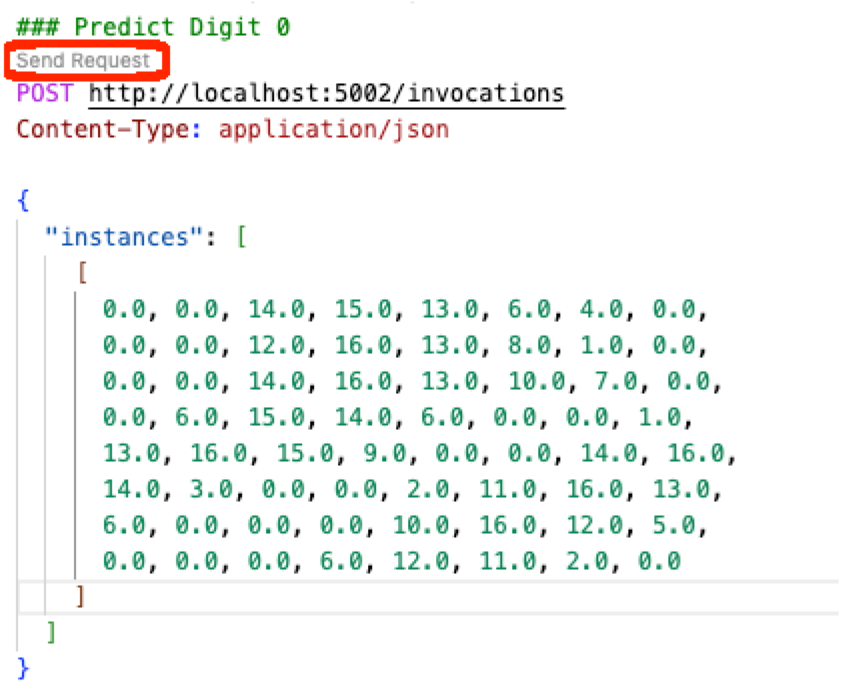
16. Now that it is registered, we can then perform a serve of our model.
17. Open *docker-compose.yaml*, and review the `model-serving` container, notice how that will correspond to the managed model from MLFlow.
18. Right-click on the *docker-compose.yaml* file, and select *Compose Up - Select Services*
19. Deselect and uncheck the containers that are not needed and select the *model-serving* container.



Choose services to start (Press 'Space' to select and 'Enter' to confirm) 1 Selected OK

- ☐ postgres
- ☐ minio
- ☐ minio-setup
- ☐ mlflow
- ☐ jupyterlab
- ☑ model-serving

20. Now run some HTTP requests by opening *http/invoke_model.http* in the editor.
21. Click on the *Send Request* above the `POST` commands.



```
### Predict Digit 0
Send Request
POST http://localhost:5002/invocations
Content-Type: application/json

{
  "instances": [
    [
      0.0, 0.0, 14.0, 15.0, 13.0, 6.0, 4.0, 0.0,
      0.0, 0.0, 12.0, 16.0, 13.0, 8.0, 1.0, 0.0,
      0.0, 0.0, 14.0, 16.0, 13.0, 10.0, 7.0, 0.0,
      0.0, 6.0, 15.0, 14.0, 6.0, 0.0, 0.0, 1.0,
      13.0, 16.0, 15.0, 9.0, 0.0, 0.0, 14.0, 16.0,
      14.0, 3.0, 0.0, 0.0, 2.0, 11.0, 16.0, 13.0,
      6.0, 0.0, 0.0, 0.0, 10.0, 16.0, 12.0, 5.0,
      0.0, 0.0, 0.0, 6.0, 12.0, 11.0, 2.0, 0.0
    ]
  ]
}
```

22. View and Check the Results

Last updated 2024-10-22 13:21:25 UTC