

How to: MLOps

Experiment tracking 
& Deployment 





Yke Rusticus



Jeroen Overschie

Today we will:

- Learn how we see **MLOps in practice**
- Get hands-on with a *notebook* ML solution
- Step by step work towards a **production-ready application**

We will **not**:

- Cover machine learning itself in depth

All material is available on: xebia.ai/mlops

Schedule

- Introduction
- MLOps: what the fuzz?
- Experiment tracking
- Demo 
- Hands-on 
 - Train model
 - Track experiments
 - Register model
- 
- Model serving
- Containerizing
- Deployment
- Demo 
- Hands-on 
 - Run API
 - Run container
 - Register container
 - Deploy to cloud 

MLOps: what the fuzz?

DevOps

SecOps

MLOps ?

...Ops hype

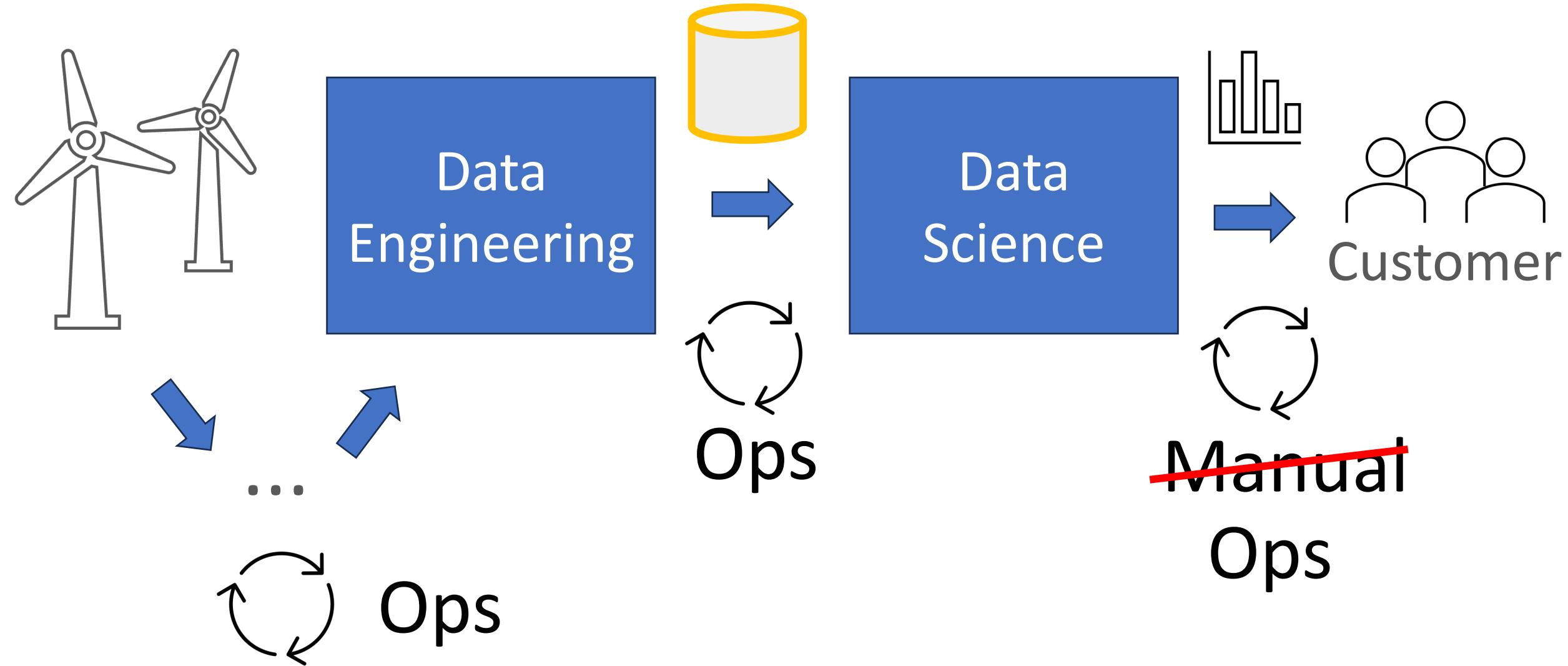
DevSecOps

LegOps

DataOps

LLMOps

Why MLOps?



Why MLOps?



Daisy Data Scientist @ TurbineDynamics

Task: help business improve generated power forecast.



Ideate with
business to define
use case & value



Explore data to
find possible
relationships



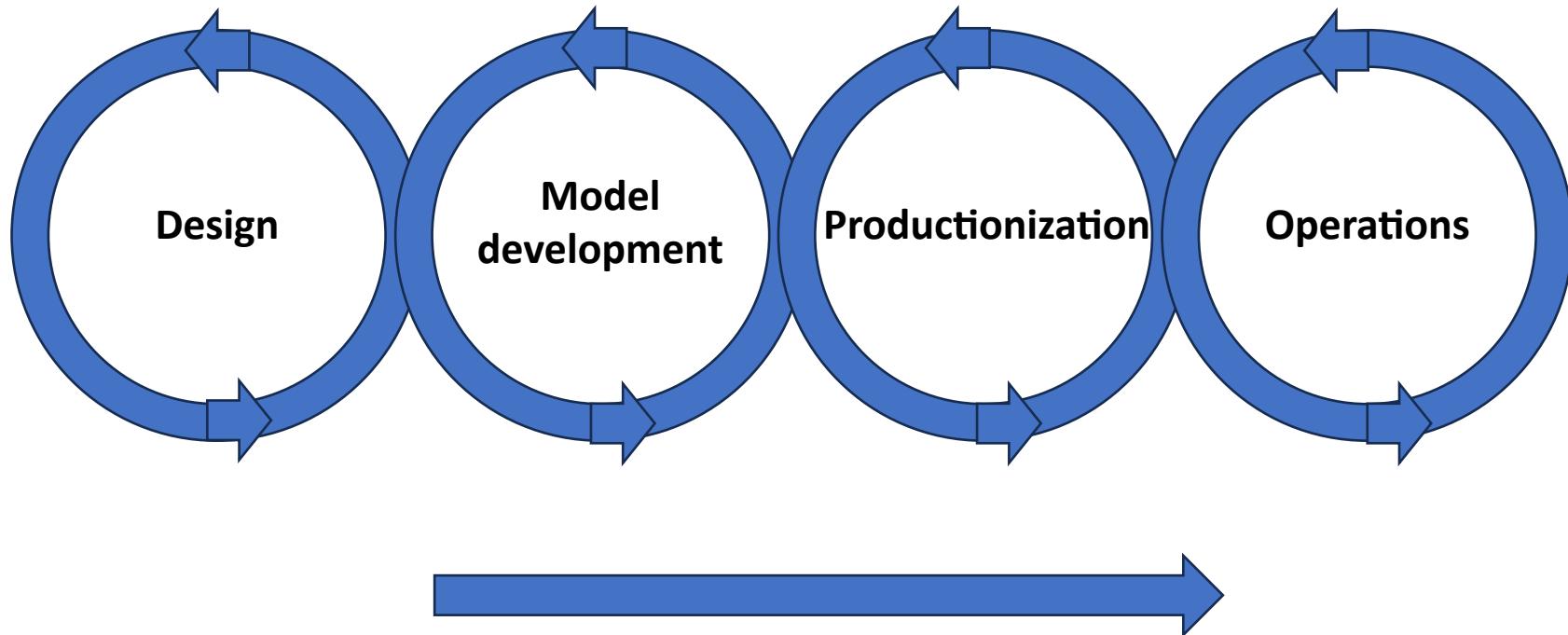
Create predictive
model in a
notebook



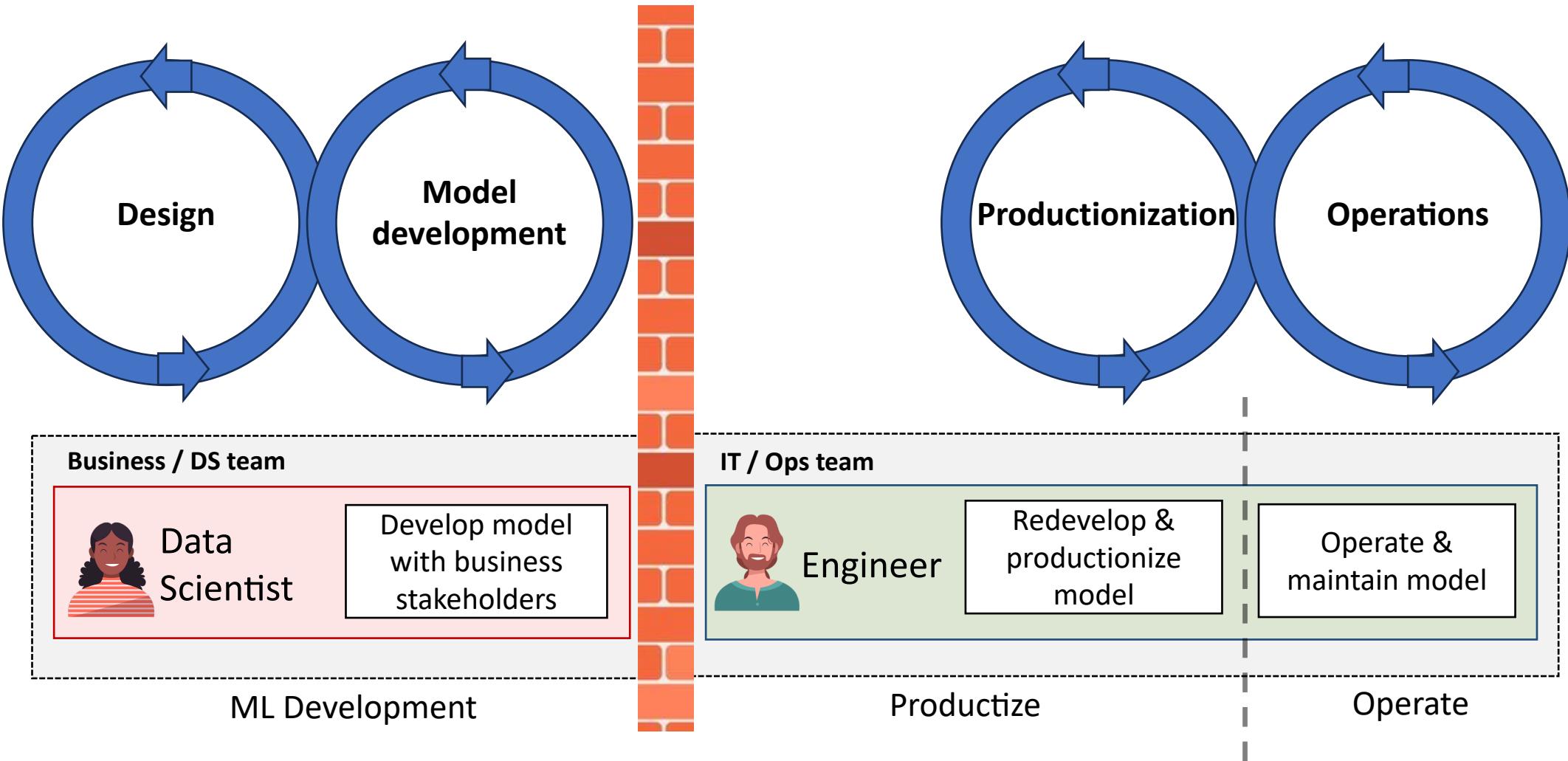
Now what?



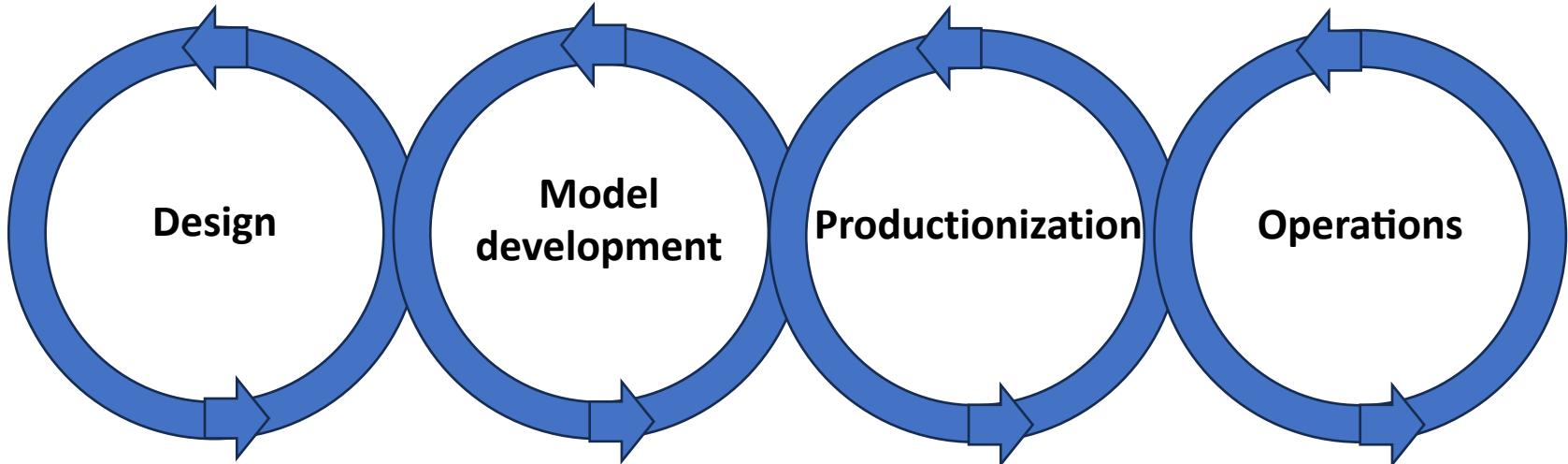
Ideally: “MLOps lifecycle”



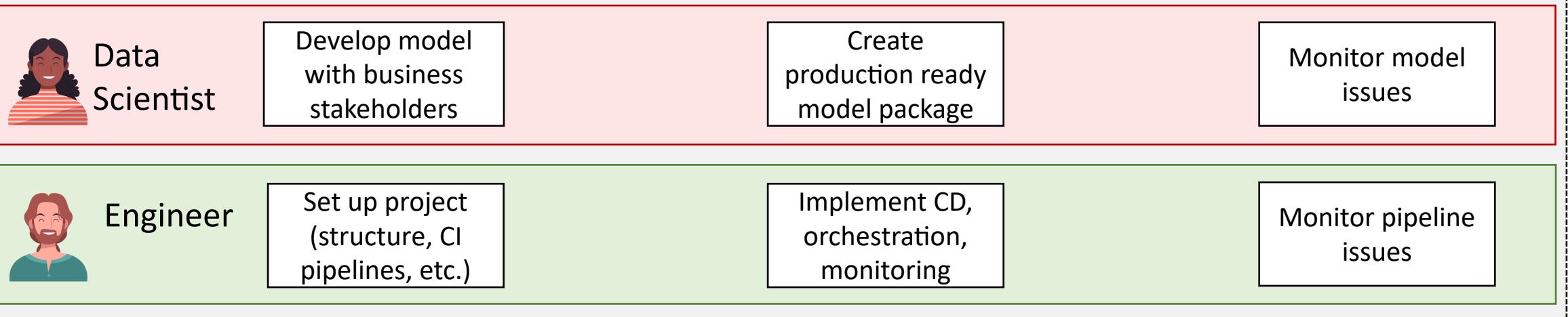
However, we often see a *handover*



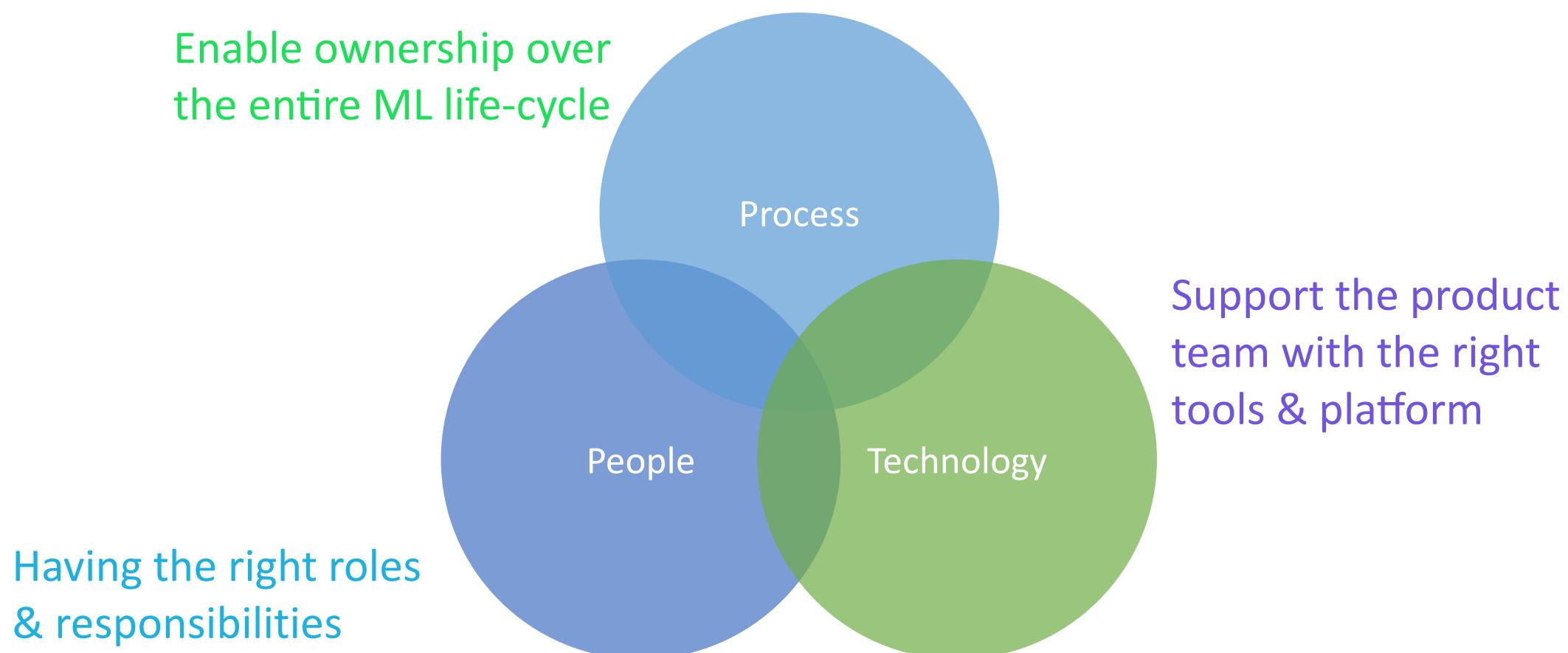
MLOps: close the gap



End-to-end DS product team



MLOps: close the gap by combining the right people, processes and technology



Experiment tracking with **MLflow**



DOCS



An open source platform for the
machine learning lifecycle

..



WORKS WITH ANY ML
LIBRARY, LANGUAGE &
EXISTING CODE

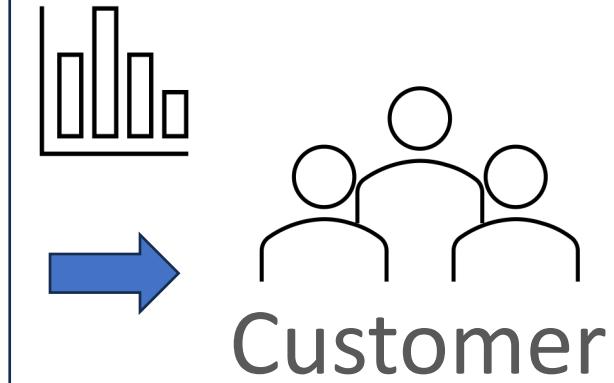
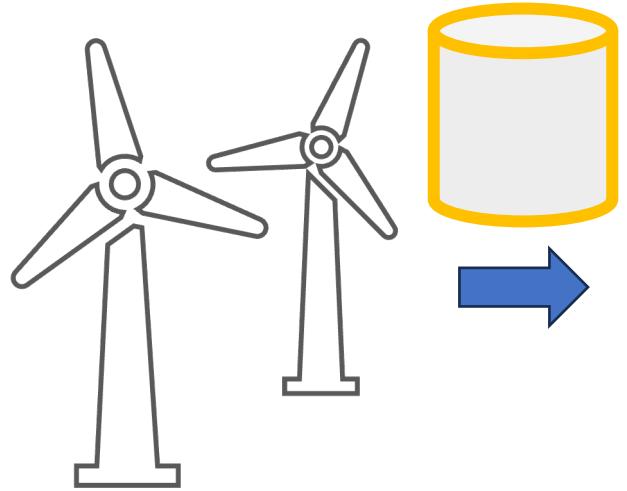


RUNS THE SAME WAY IN ANY
CLOUD

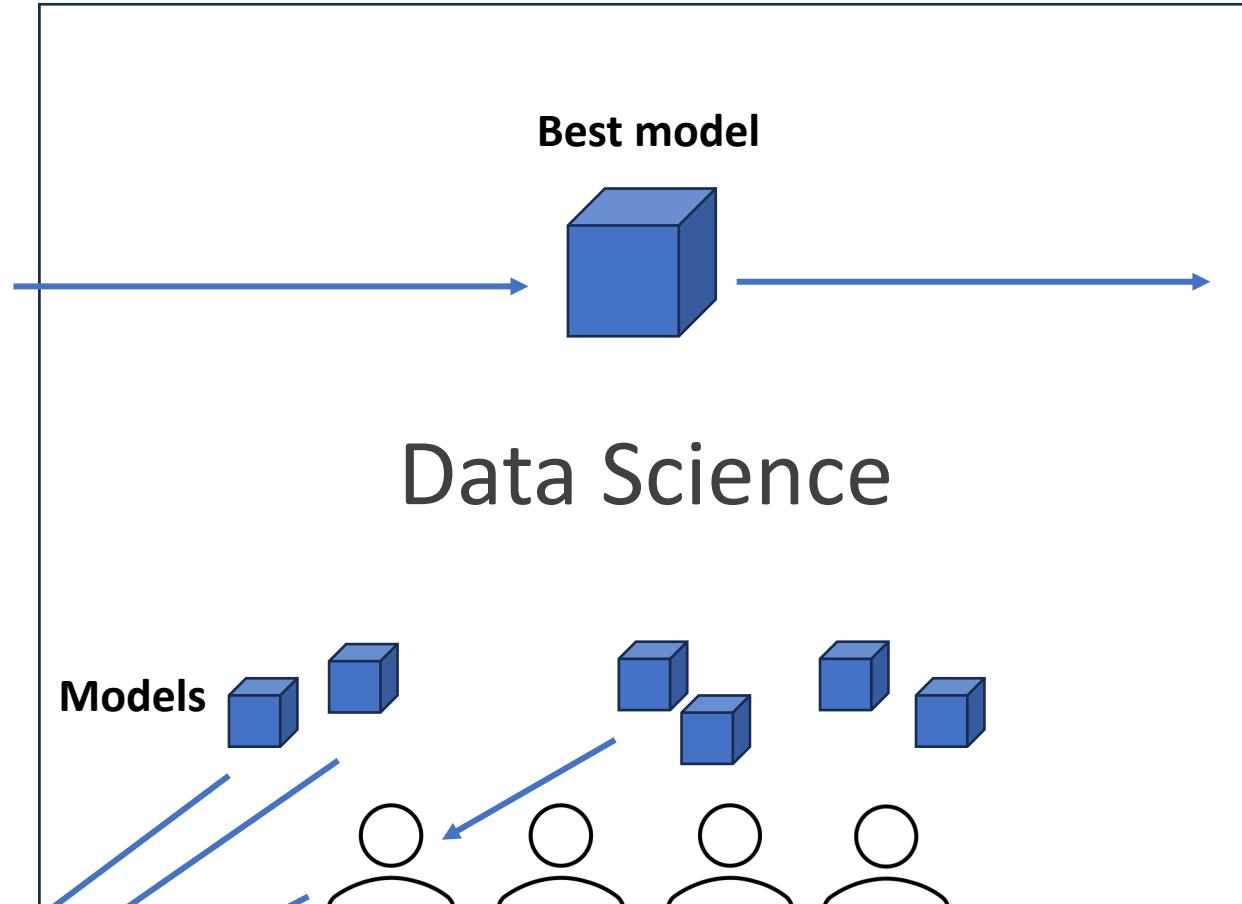
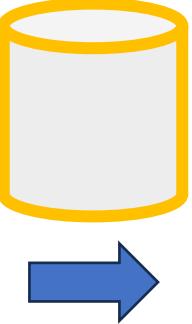
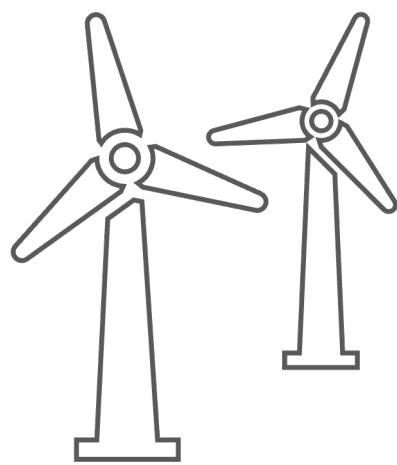


DESIGNED TO SCALE FROM
1 USER TO LARGE ORGS

Why
Experiment
tracking?



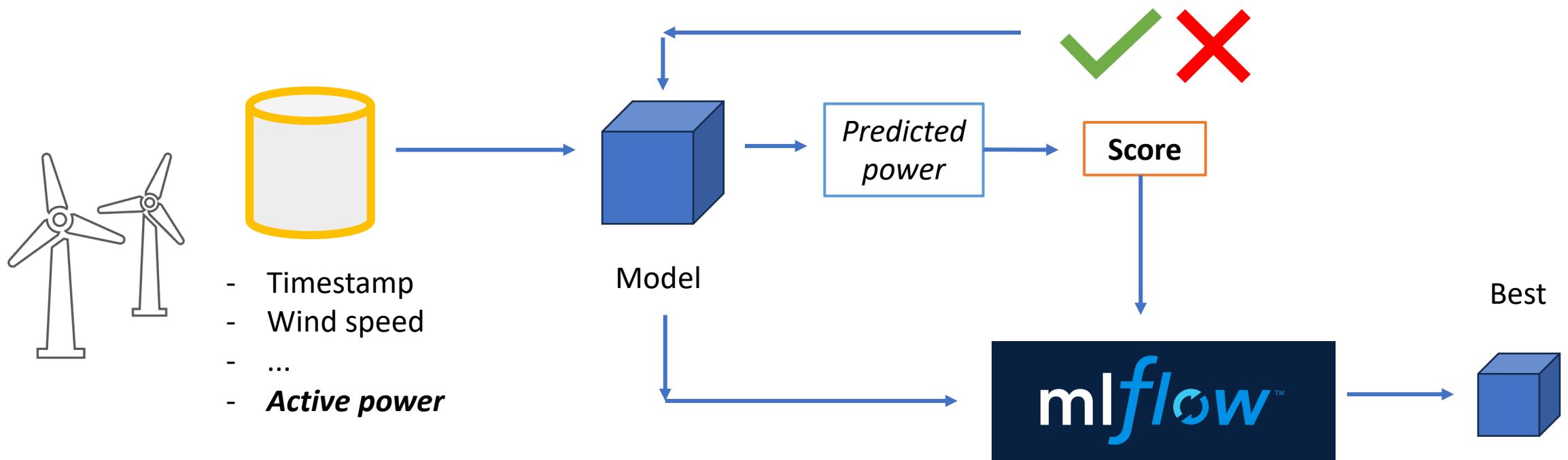
Why Experiment tracking?



Best model:
R2 score = 0.9

Demo 🧑: setup & experiment tracking

Demo 🧑: setup & experiment tracking



Hands-on 🧑💻: setup & experiment tracking

1. Navigate to xebia.ai/mlops
2. Follow the setup instructions in the **README**
3. Do exercises:
 - 01-explore-data.ipynb
 - 02-train-model.ipynb
 - 03-track-experiments.ipynb
 - 04-load-model-for-inference.ipynb

Schedule

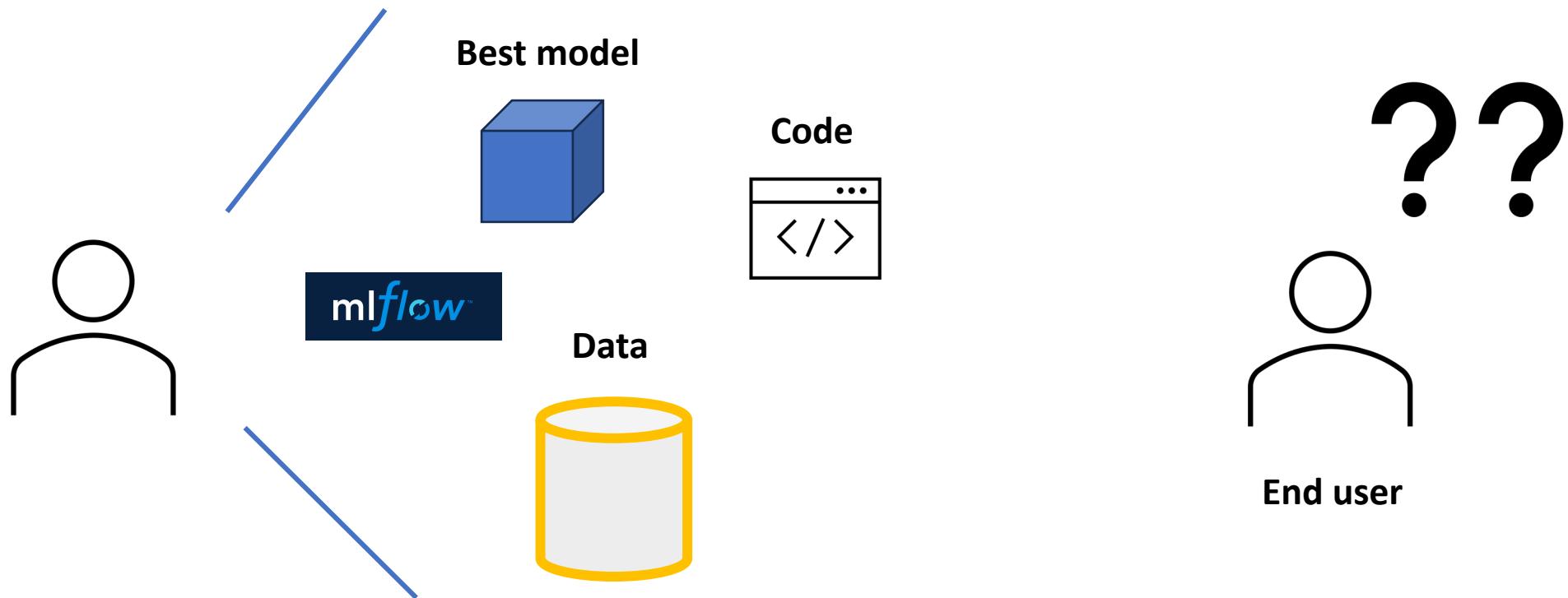
- Introduction
- MLOps: what the fuzz?
- Experiment tracking
- Demo 
- Hands-on 
 - Train model
 - Track experiments
 - Register model
- 
- Model serving
- Containerizing
- Deployment
- Demo 
- Hands-on 
 - Run API
 - Run container
 - Register container
 - Deploy to cloud 



Serving the model



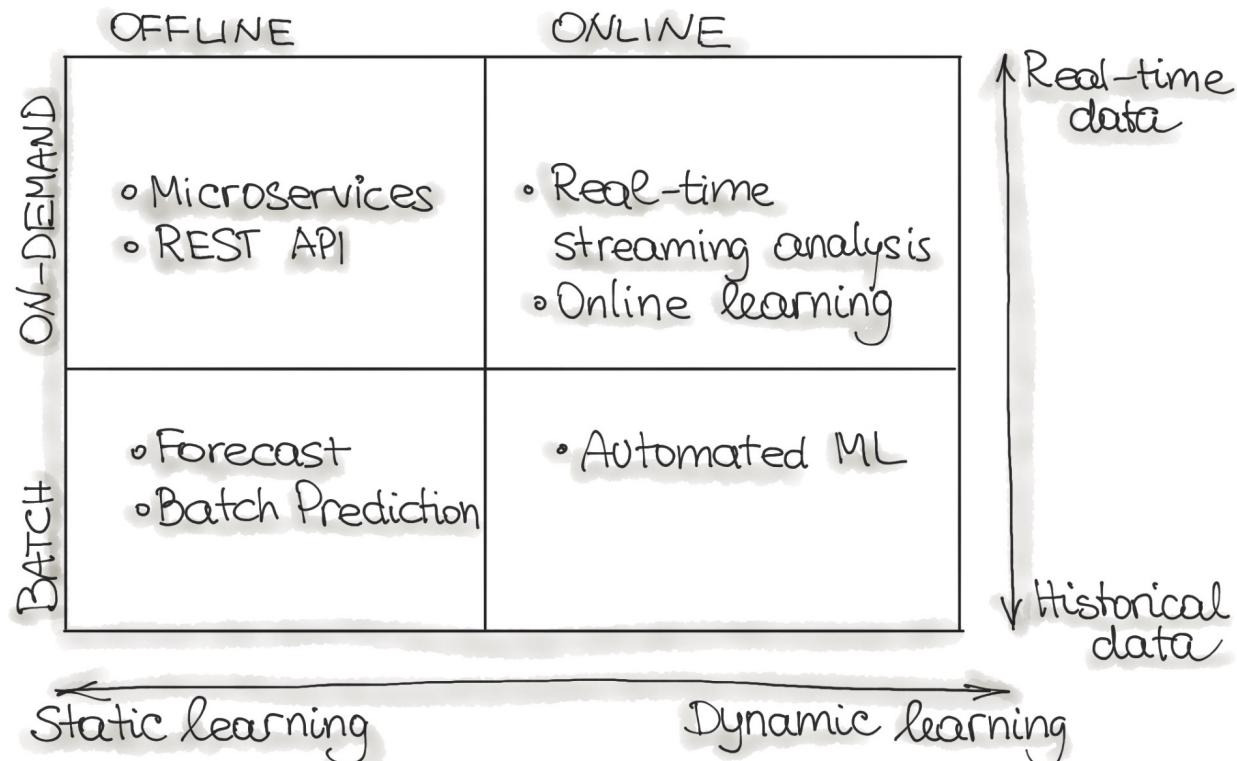
We cannot expect others to run our model...



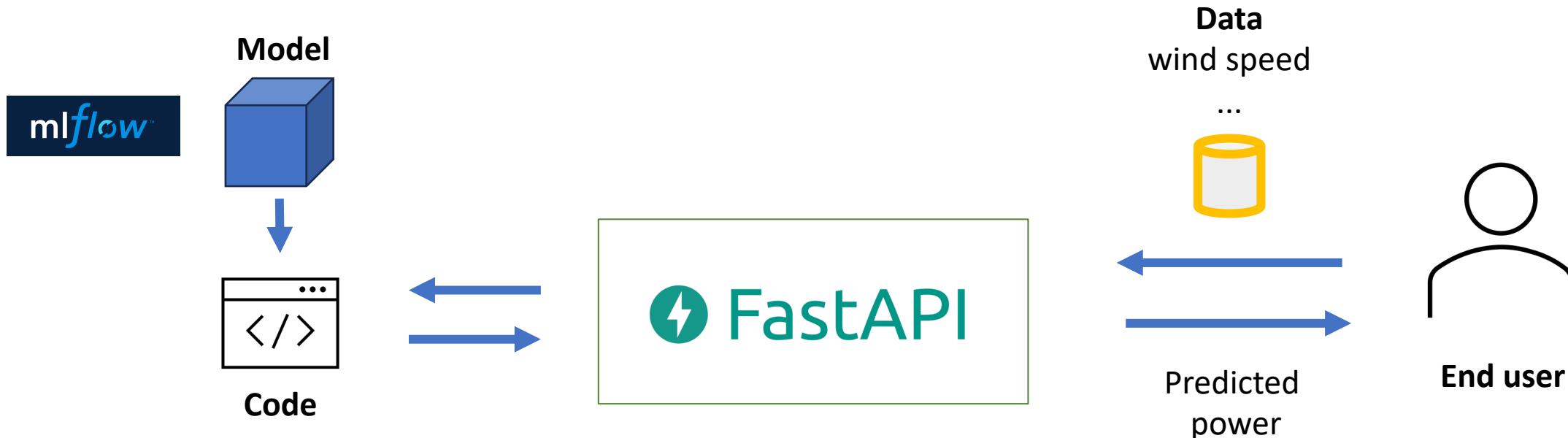
MODEL SERVING PATTERNS

MODEL LEARNING

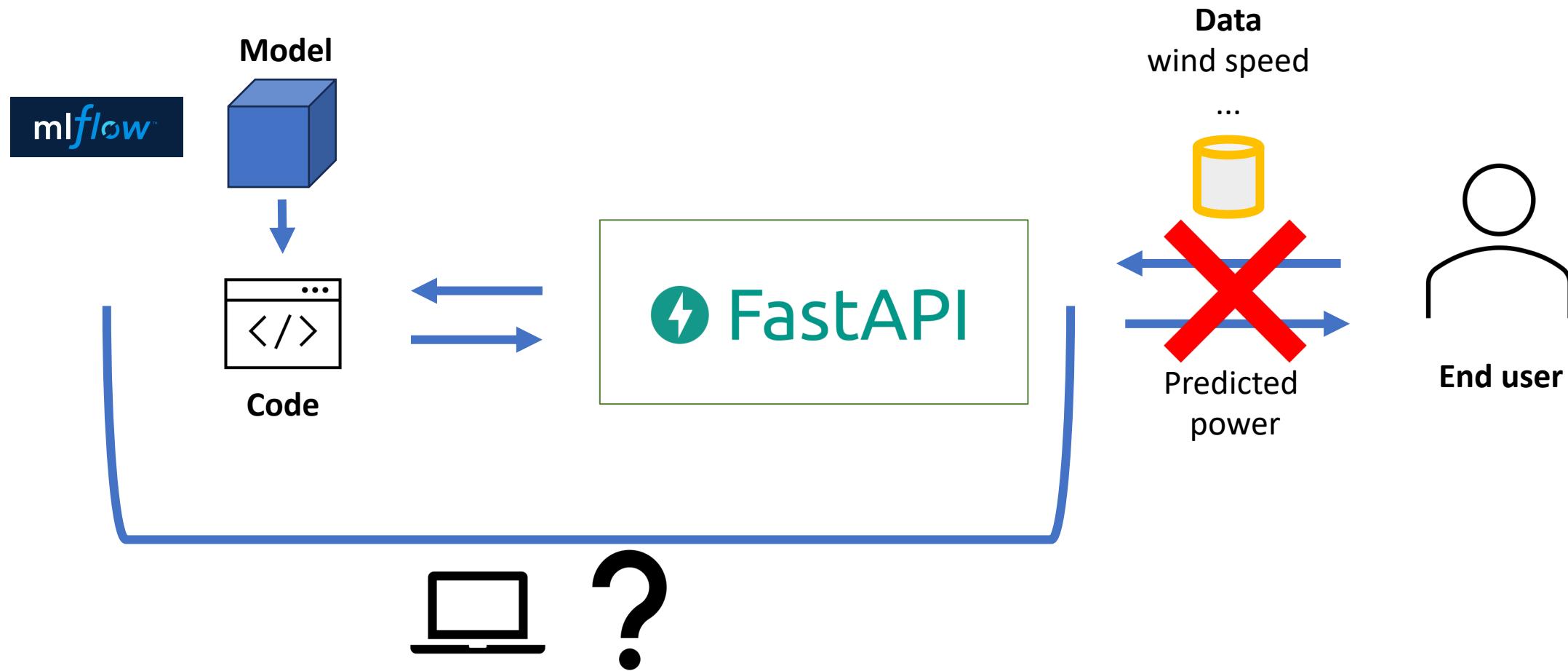
MODEL PREDICTION



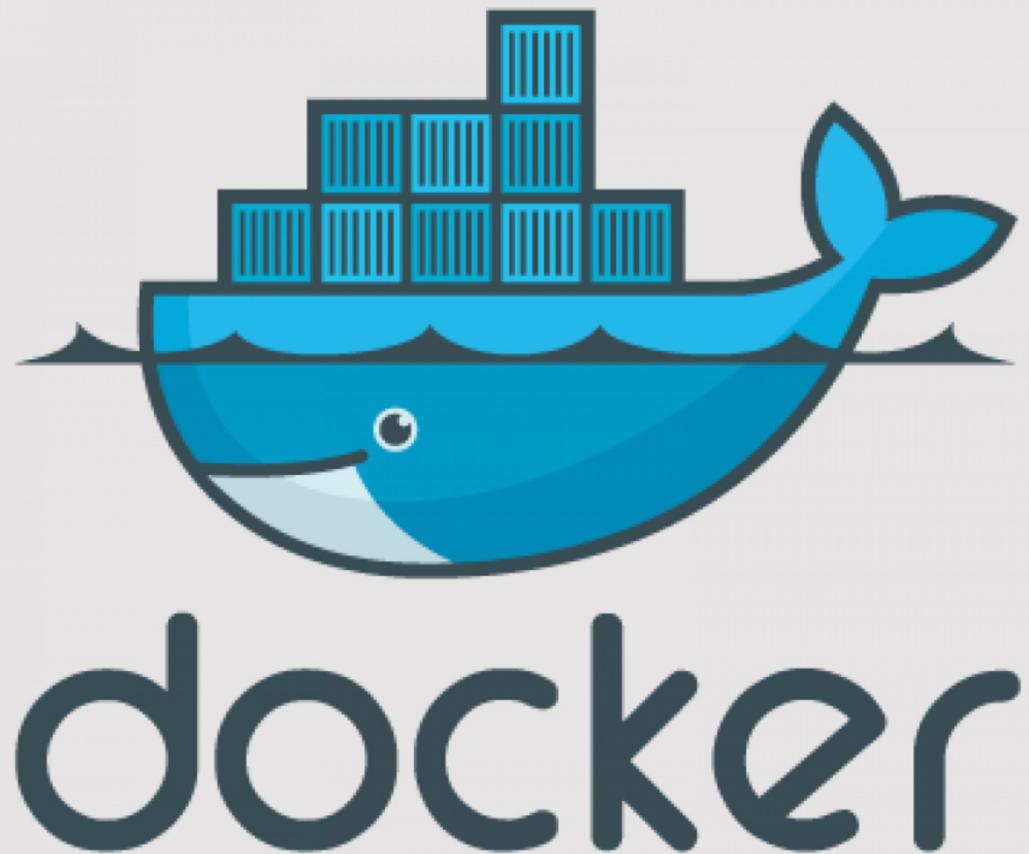
An API allows user to use our model without worrying about the logic behind



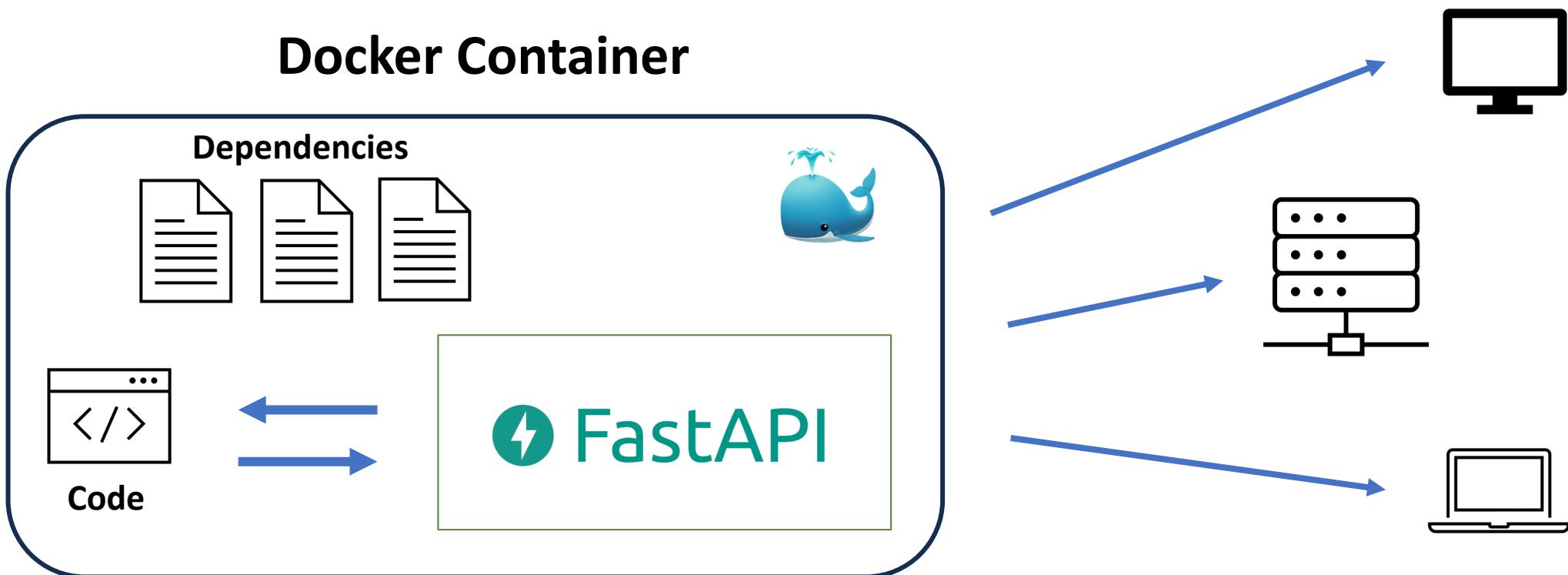
Where to run our API?



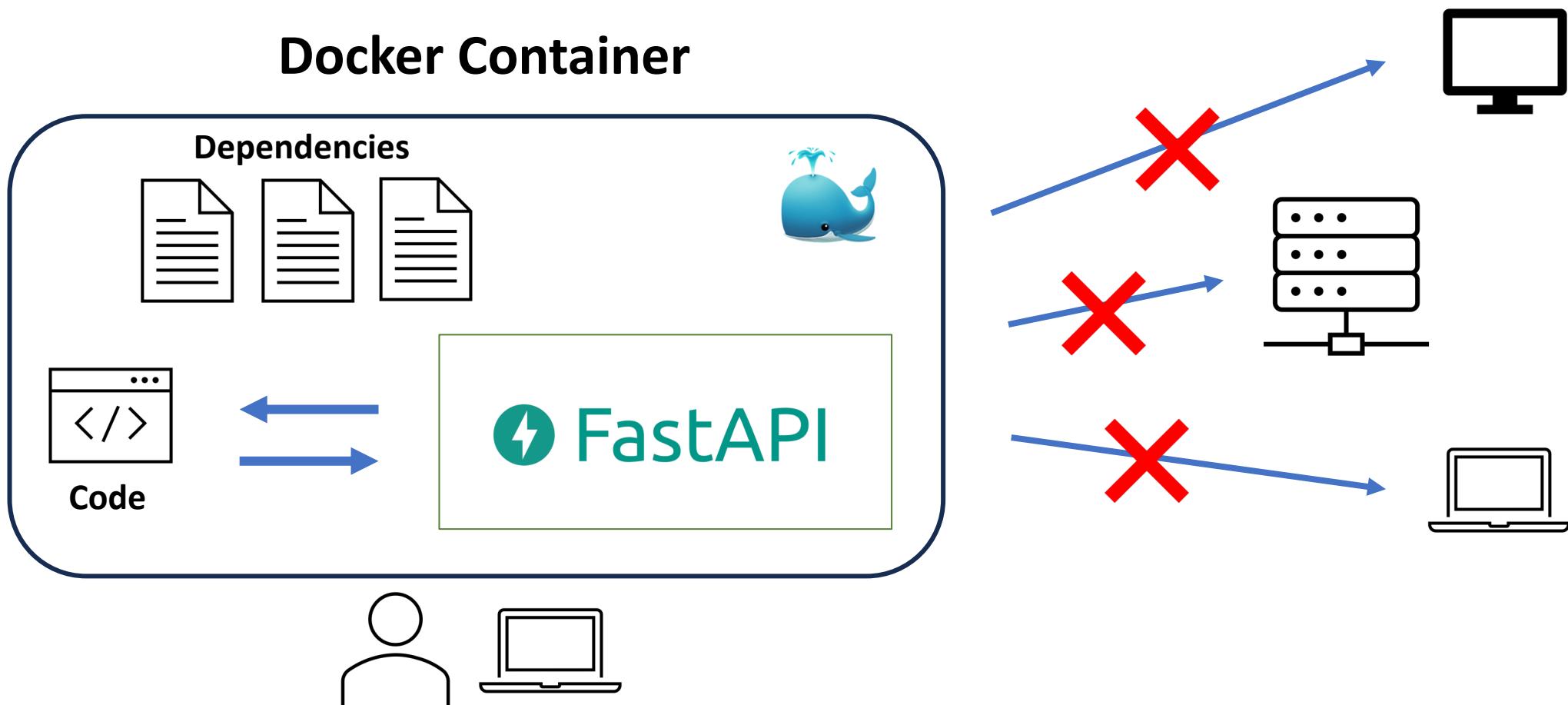
Containerizing our application



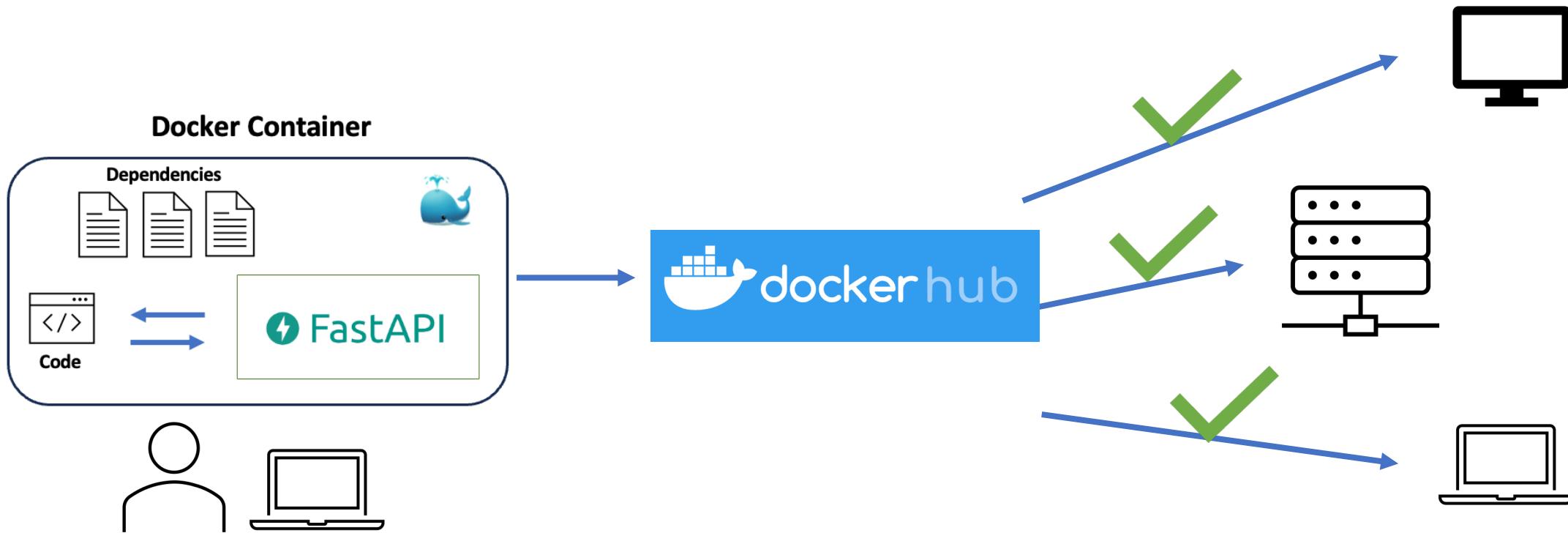
Container allows us to run it anywhere!



But, how do we get it there?



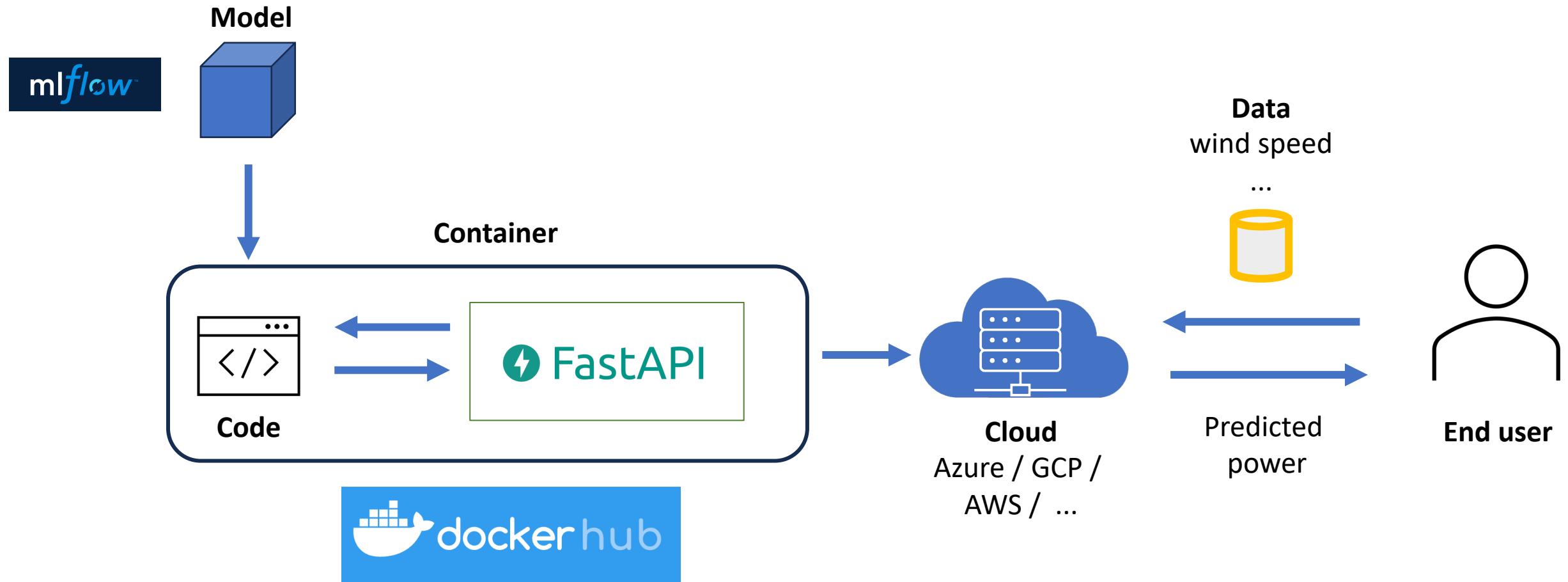
Register it on Docker Hub!



Deployment to the cloud



Running our container in the cloud allows users to access it

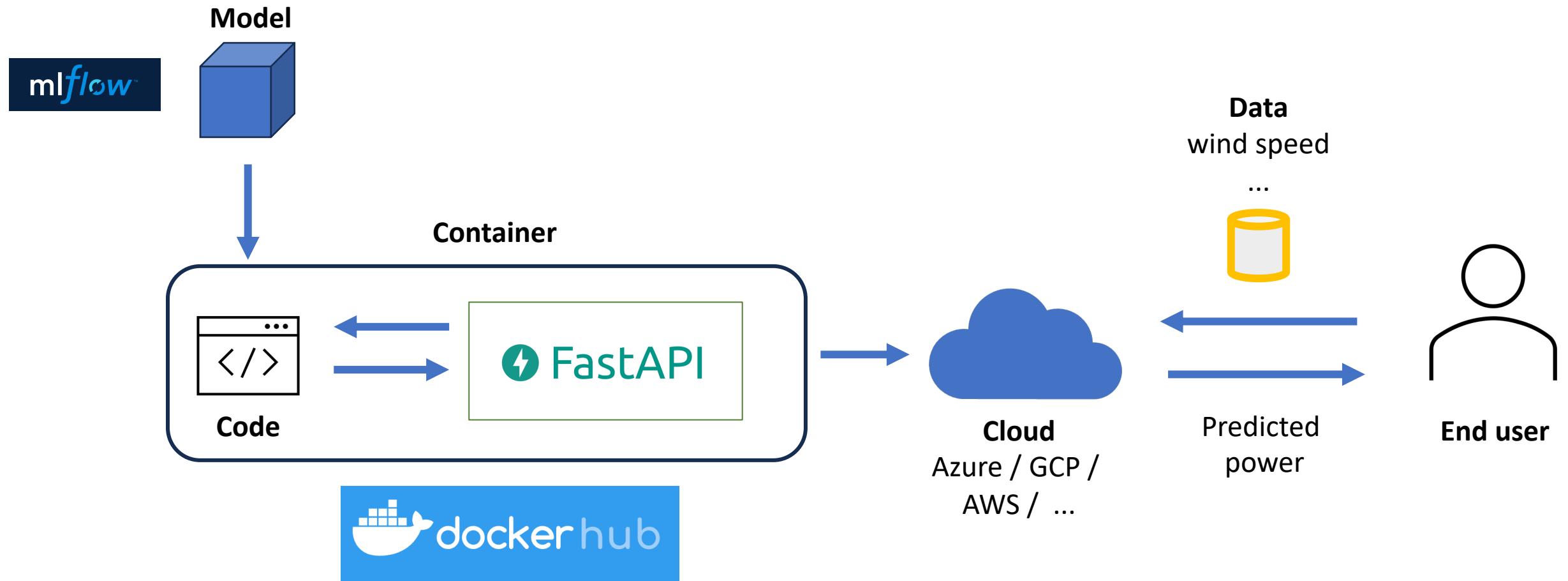


Demo 🧑: model serving & deployment

Hands-on 🧑💻: model serving & deployment

- Continue with the remaining exercises:
 - 05-create-and-run-api.md
 - 06-containerize-application.md
 - 07-register-on-dockerhub.md
 - 08-deploy-to-the-cloud.md
 - 09-(bonus)-automate-with-cicd.md

Started from notebook, ended with ML application





Thank you!