

HELMHOLTZ

MODEL ZOO

<https://hmz-hub.desy.de/>

Hans Werners, Engin Eren, Philipp Heuser



 HELMHOLTZ
IMAGING

 HAICORE
Helmholtz AI computing resources



CONNECT

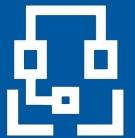


Software



Solutions

HELMHOLTZ IMAGING



Support Hub



Cloud



Collaborations



Training



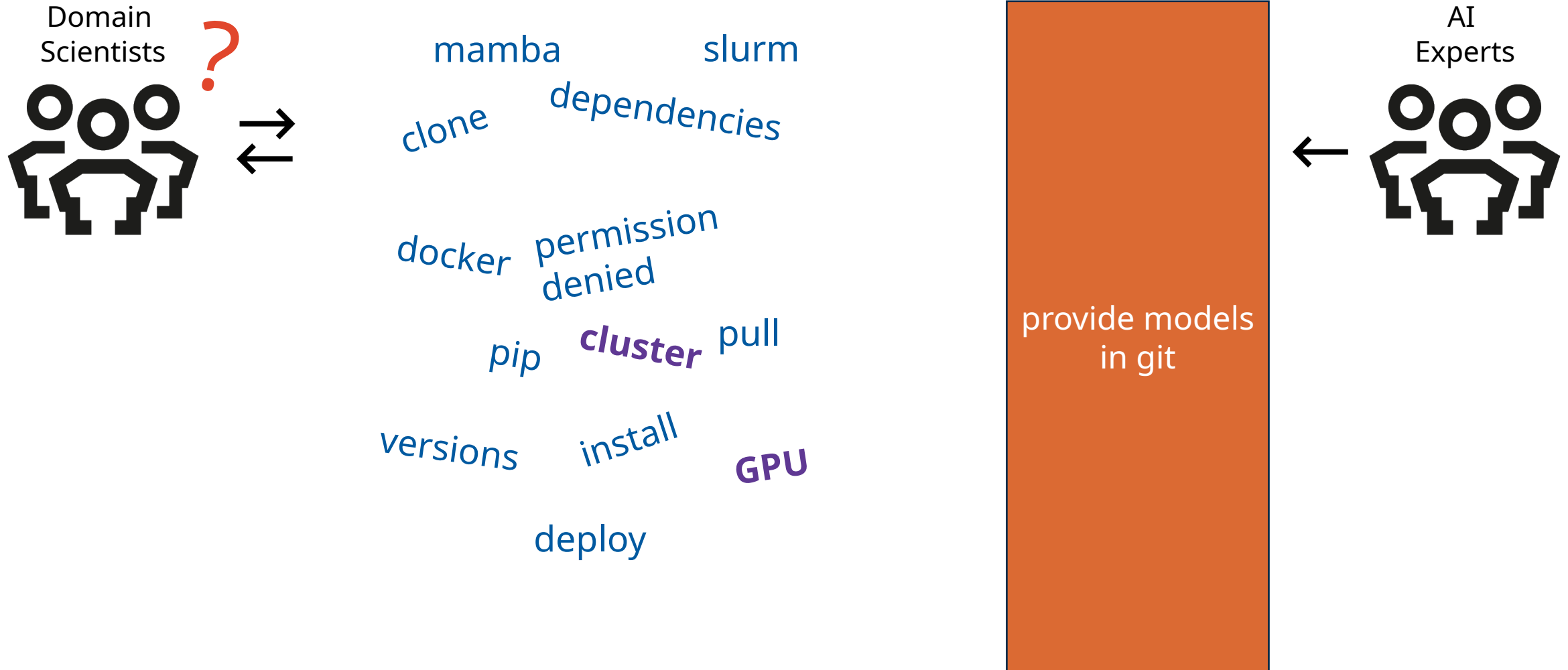
Projects

<https://helmholtz-imaging.de>

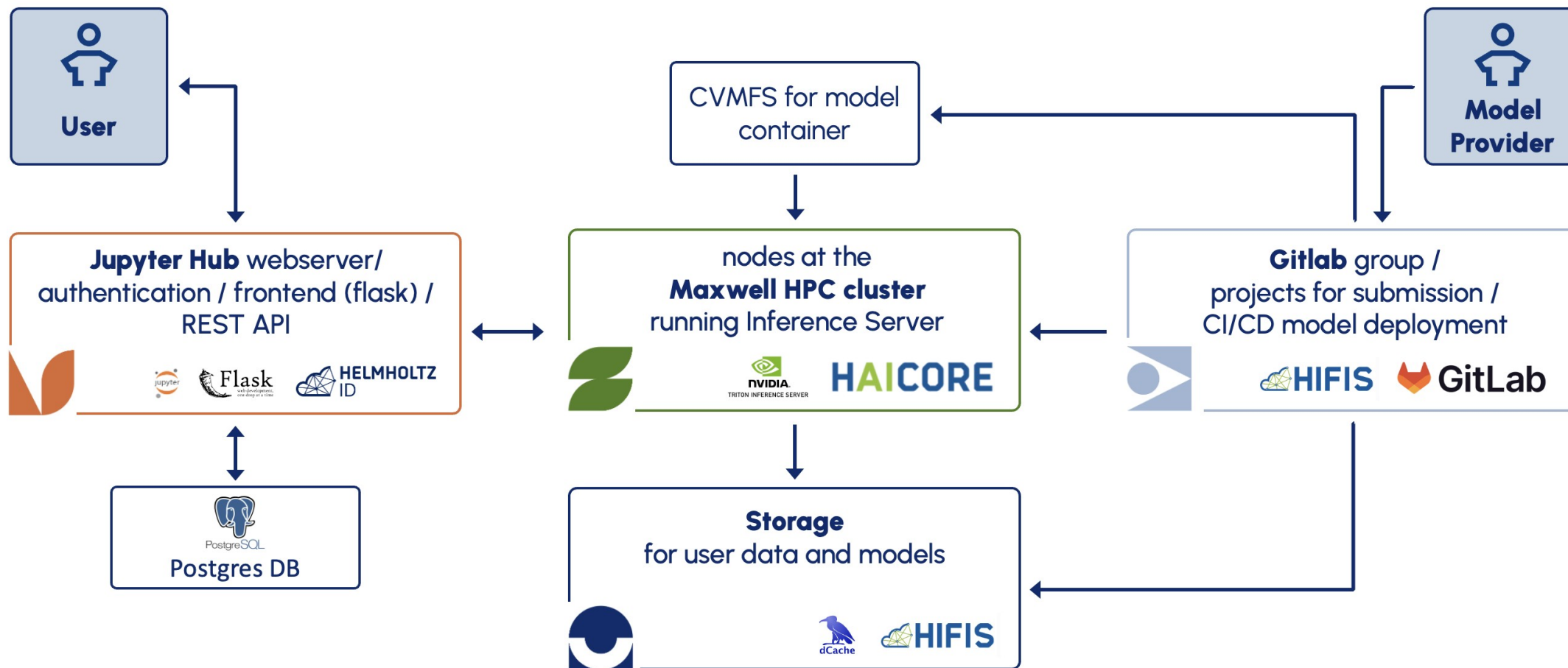
support@helmholtz-imaging.de



HELMHOLTZ MODEL ZOO



Helmholtz Model Zoo



Who can use the models?

Only colleagues from Helmholtz can use it (and members of a Helmholtz ID VO)

How can I run an inference?

- Use the webinterface.
- Use a REST API

What is about my data (user)?

- You upload the data to a folder owned by you in dcache via the webinterface.
- You own your data, and it does not leave Helmholtz.
- You can also use the documented ways to upload data to dcache via rclone, webdav, etc. (recommended for large datasets)
- You can upload a reasonable amount of data (probably not PB, but a few TB could be fine).
- We will delete all your data after 3 month, or so? (Not entirely defined yet)

Model Zoo for the User



Welcome to the Helmholtz Model Zoo. HMZ is offering scientific deep learning models for inference in the browser. Here you find the tools Helmholtz members trained to conduct the research for grand challenges.

The content of the Helmholtz Model Zoo is provided by experts from the association, and when you are affiliated to one of the Helmholtz Centers, you are invited to login with your institutional credentials and use them!

[Start](#)

For Model Providers

If you are a Machine Learning expert yourself, and are looking for a way to share your model in the Helmholtz Model Zoo, find a guide [here](#).



Model overview

Selecting a model redirects you to the model-specific input-page.

Mnist Demo
by Helmholtz Model Zoo Team

This is a demo model for the model zoo. It is a simple MNIST model. Don't judge about its...

[More →](#)

CaloClouds
by Anastoli Karol, Henry Day-Hall, Thorsten Buss, Frank Gaede, Erik Bußmann, Gregor Kasieczko, William Korcar, Katja Krüger, Peter McKeown

Accurate simulation of particle physics experiments is fundamental for comparing theoretical...

[More →](#)

inpainting-lama-onnx25
by Roman Suvorov, Elizaveta Logacheva, Anton Mashikhin, Anastasia Remizova, Arsenii Ashukha, Aleksei Silverstov, Naejin Kang, Harshith Goka, Kiwoong Park, Victor Lempitsky

Adaptation from HF --> <https://huggingface.co/Carve/LaMa-ONNX>

[More →](#)

YOLO at your fingertips
by Glenn Jocher

This YOLO model, trained on the COCO dataset, can be used to perform object classification and...

[More →](#)

ParticleSeg3D
by Karol Golikowski, Shivam Gupta, Jose R.A. Godinho, Camila G.S. Tochtrop, Klaus H. Maier-Hein, Fabian Isensee

ParticleSeg3D is an instance segmentation method that extracts individual particles from large...

[More →](#)

Noise2void
by

Noise2Void is a self-supervised denoising method that works by randomly masking pixels in an...

[More →](#)

Ltx-2
by Lightricks Ltd.

LTX-2 is a 19B parameter DIT-based audio-video foundation model developed by Lightricks. It...

[More →](#)

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Home Models My Jobs For Model Providers About

Input Form for inpainting-lama-onnx25

Description

Adaptation from HF --> <https://huggingface.co/Carve/LaMa-ONNX>

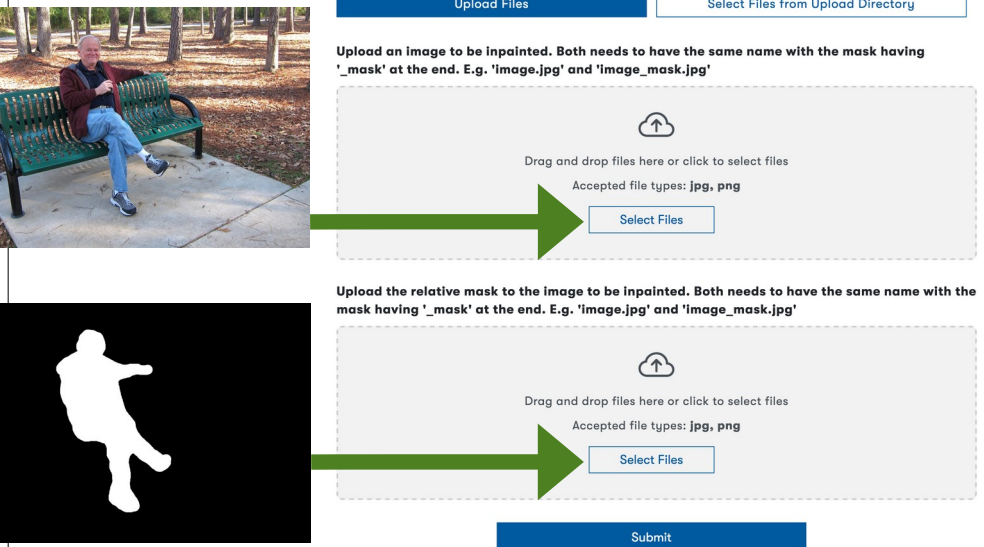
Upload Files

Upload an image to be inpainted. Both needs to have the same name with the mask having '_mask' at the end. E.g. 'image.jpg' and 'image_mask.jpg'

Drag and drop files here or click to select files
Accepted file types: jpg, png

Upload the relative mask to the image to be inpainted. Both needs to have the same name with the mask having '_mask' at the end. E.g. 'image.jpg' and 'image_mask.jpg'

Drag and drop files here or click to select files
Accepted file types: jpg, png



Input Form for CaloClouds

Description

Accurate simulation of particle physics experiments is fundamental for comparing theoretical predictions with experimental results. However, with planned high-luminosity upgrades to facilities like the Large Hadron Collider (LHC) and envisioned experiments such as those at the International Linear Collider (ILC), the volume of experimental data is rapidly increasing. Traditional Monte Carlo simulations, like Geant4, struggle to keep pace with these rates due to their computational intensity, posing a significant challenge to projected computing budgets. Specifically, detector simulations, especially for highly granular calorimeters (which can have millions of sensor cells), are computationally expensive. Prior efforts using generative machine learning (ML) models to accelerate these simulations often relied on fixed, regular detector readout geometries, representing showers as 3D images. This approach is inefficient given the sparsity of energy depositions in modern calorimeters. Building upon the original CaloClouds model, which generated calorimeter showers as geometry-independent point clouds, CaloClouds II offers substantial speed improvements and comparable fidelity to traditional Geant4 simulations. Key innovations include the adoption of continuous-time score-based modeling for faster sampling and, most notably, the first application of consistency distillation to calorimeter shower generation, enabling single-step sampling with a 46x speed-up over Geant4 on a single CPU. This work addresses the increasing computational demands of particle physics simulations, paving the way for more efficient and scalable detector simulations.

energy

50.00

Incoming energy of the particle

eta

60.00

the incidence angle of in the incoming particle

phi

0.00

Azimuthal angle

nshowers

100.00

Number of showers

For model providers

Who can provide models?



All scientists in Helmholtz can login via the Helmholtz ID and provide their models.

What kind of models?



ONNX



PyTorch



TensorFlow



Which hardware?

Our nodes are provided by HAICORE, run at DESY, each equipped with 4 Nvidia L40S & one Node with 2 Nvidia H100.

HAICORE
Helmholtz AI computing resources

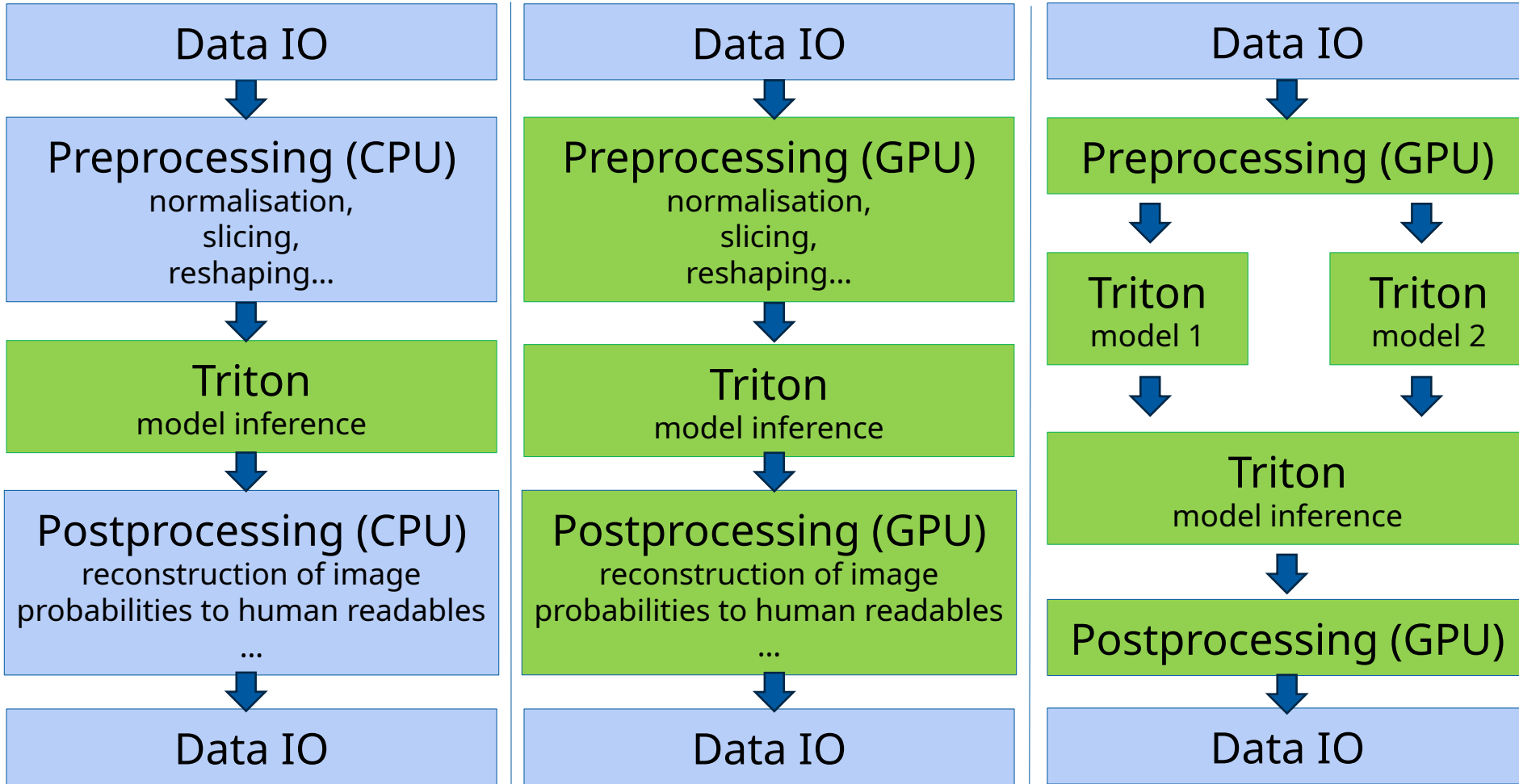
Can I make my model “private”?

Yes, you will be able to give the usernames of people who are entitled to use your model? (Via a Helmholtz ID VO)

What do I have to do?

- We provide you with a template in the (DESY)-Gitlab.
- We try to get as much as possible of your shoulders, keeping a maximum of flexibility
- You have to add your model and implement the necessary for pre- and postprocessing
- You have to fill in a form for the necessary meta data (some technical details, description, publication)

Pre/Post Processing & Triton

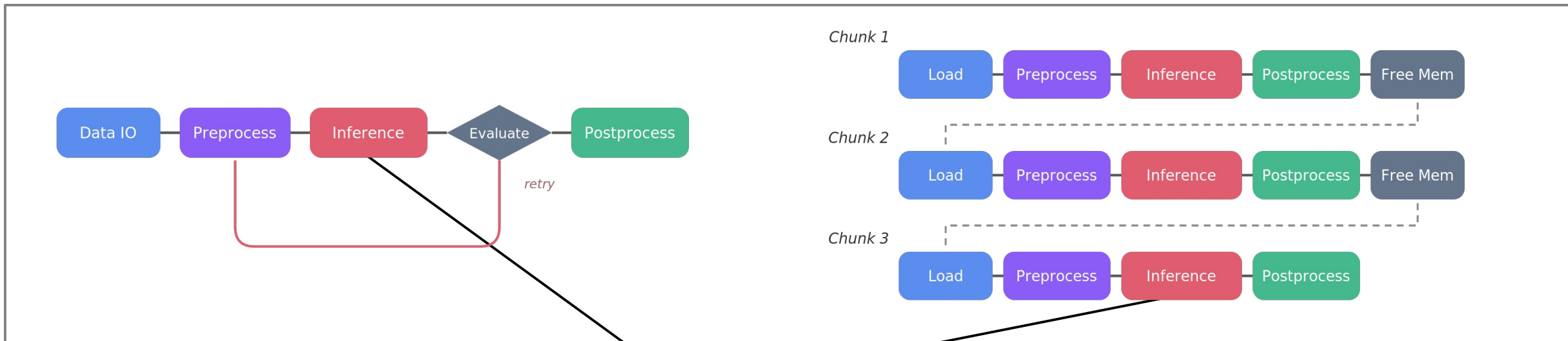


```
model > particleseg3d > particleseg3d_ensemble > config.pbtxt
1 name: "particleseg3d_ensemble"
2 platform: "ensemble"
3 max_batch_size: 8
4
5 input [
6   {
7     name: "input"
8     data_type: TYPE_FP32
9     dims: [ 1, 80, 192, 160 ]
10  }
11 ]
12
13 output [
14   {
15     name: "output"
16     data_type: TYPE_FP32
17     dims: [ 3, 80, 192, 160 ]
18   }
19 ]
20
21 ensemble_scheduling {
22   step [
23     {
24       model_name: "particleseg3d_fold0"
25       model_version: -1
26       input_map {
27         key: "input"
28         value: "input"
29       }
30       output_map {
31         key: "output"
32         value: "fold0_logits"
33       }
34     },
35     {
36       model_name: "particleseg3d_fold1"
37       model_version: -1
38       input_map {
39         key: "input"
40         value: "input"
41       }
42       output_map {
43         key: "output"
44         value: "fold1_logits"
45       }
46     }
47   ]
48 }
```

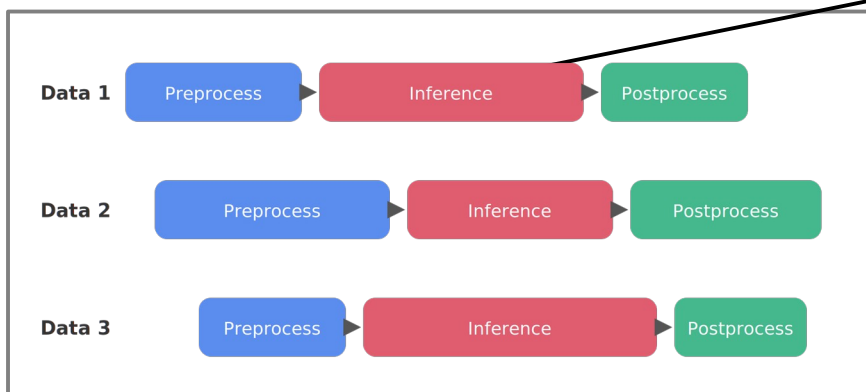
Templates and Benchmark(-ish)



FLOW - Flow-based Logical Orchestration Wrapper



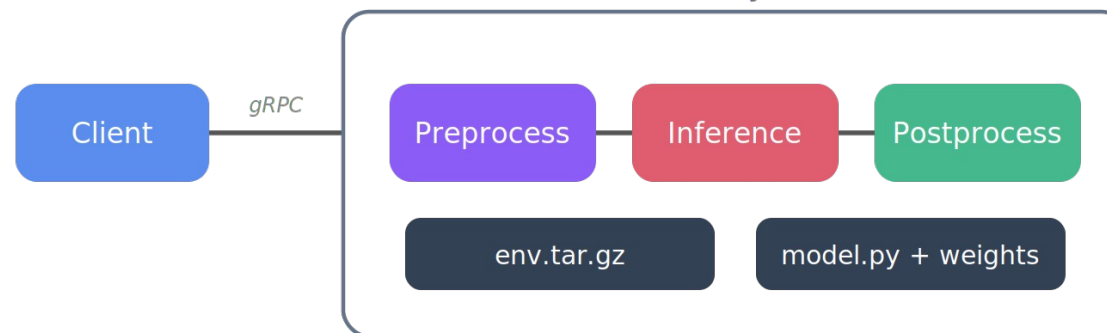
ASAP - Asynchronous Serving And Processing



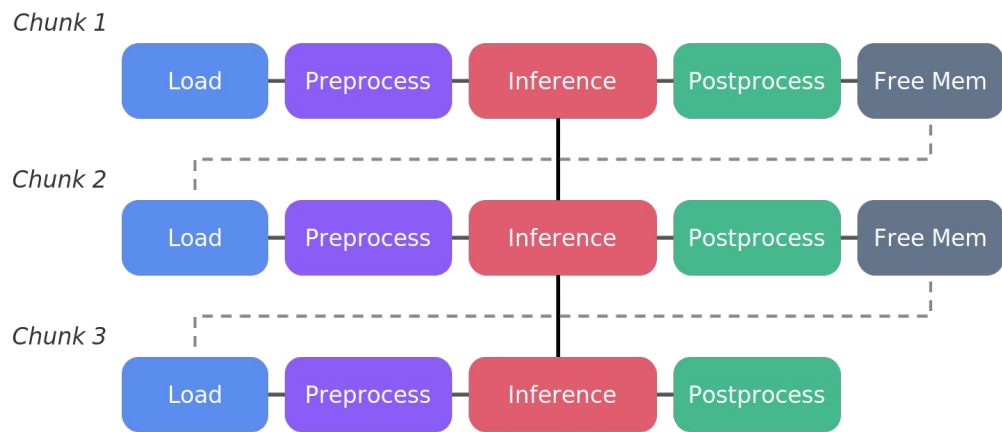
Model Weights
Deployed to dCache

Python Backend – Copy and Deploy

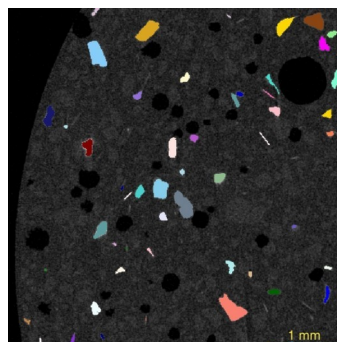
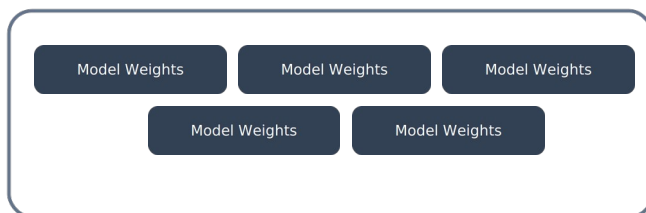
Triton Server - Python Backend



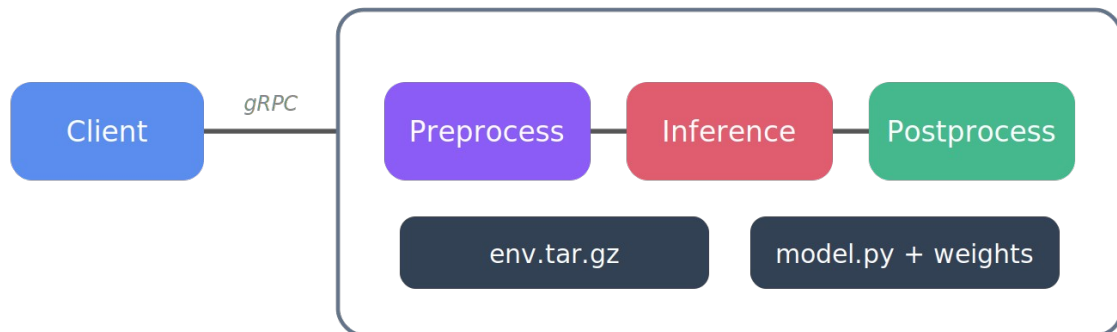
Templates and Benchmark(-ish)



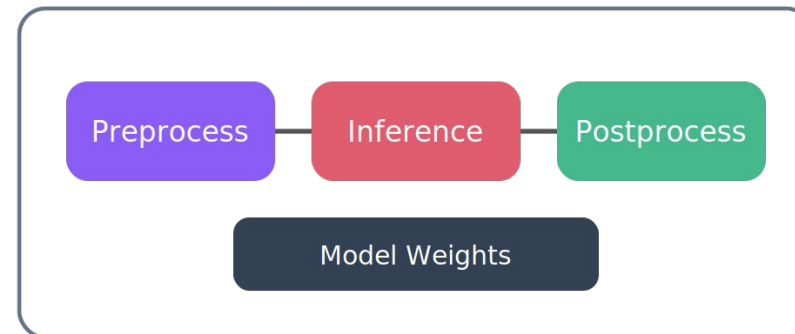
Onnx Backend



Triton Server - Python Backend



Python Environment



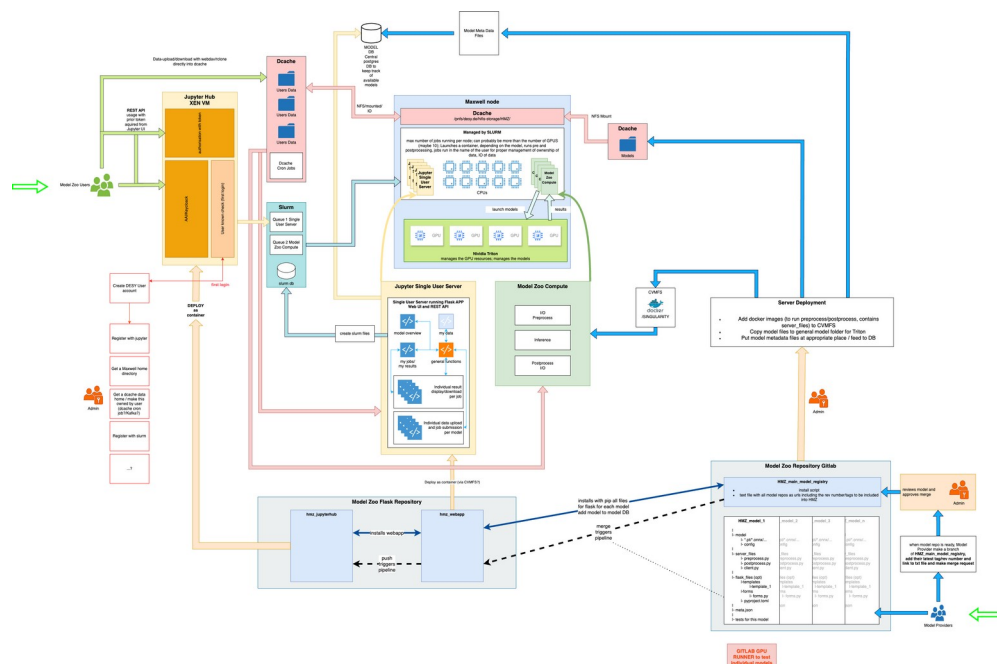
One Micro-CT 3D Volume Dataset @ 3GB

Native Install: 30.0 min \pm 1.0 min
@3.3GB VRAM

Python Backend: 29.5 min \pm 1.0 min
@3.3GB VRAM

Onnx Backend: 18.3 min \pm 0.3 min
@27GB VRAM

Helmholtz Model Zoo



Thanks to:

Christian Voss
 Elena Gapon
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 Lusine Yakovleva
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 Patrick Fuhrmann
 Sven Sternberger
 Thomas Hartmann
 Tim Wetzel
 Uwe Jandt
 Yves Kemp
 Alexander Trautsch
 Stefan Bujack
 Karol Szustakowski



Talk to us!



 support@helmholtz-imaging.de

<https://hmz-hub.desy.de>