

Hands-On:

Federated Learning with FLAME

Analyst Guide

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1. General information

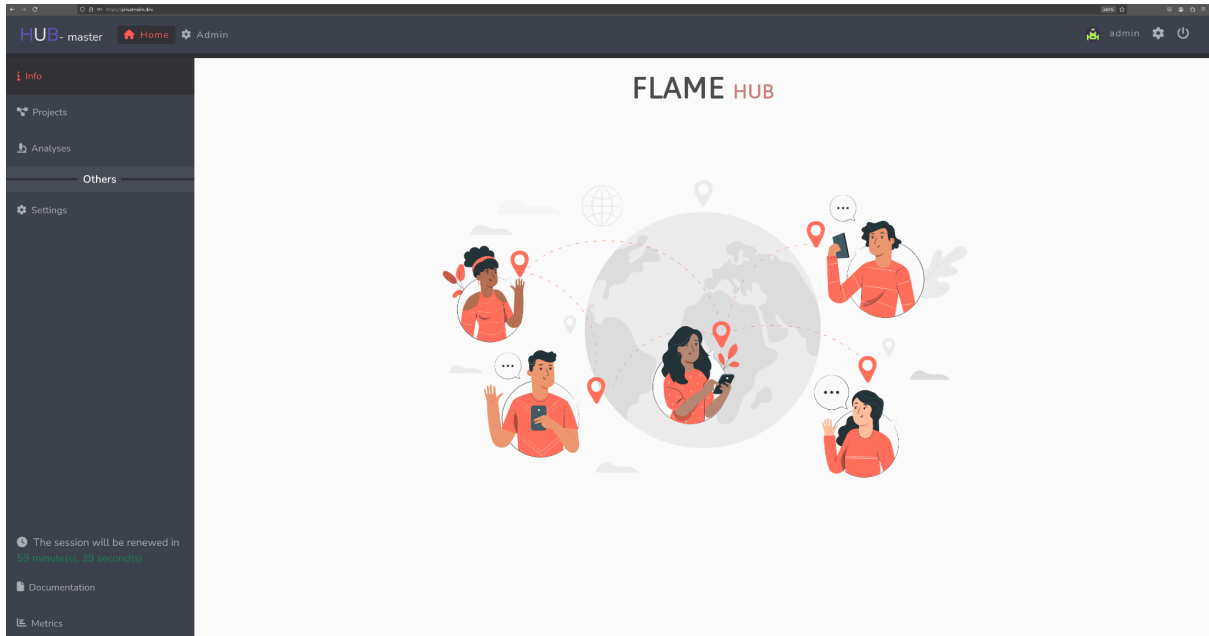
This demo will guide you as an analyst through all required configuring processes and starting analysis with FLAME. You will be introduced to all the concepts and services to execute federated analysis. After approval of your analysis of the node admins (other groups), you will submit the imaging data analysis. The other group will execute your submitted analysis so you can finally download the results. Furthermore, this demo exemplifies how the Python-SDK library can easily be extended with custom privacy methods.

- Separate into groups and works on the tasks in teams
- Tasks:
 - Sign in to the hub UI and create a proposal
 - Submit a FLAME analysis and monitor how it runs
 - Receive results
- After the coffee break, both groups will switch.

2. Hub interface

1. First, log in to the [FLAME DEV hub UI](#). The organizer will share with you usernames and passwords in the beginning of the session.

Login into the UI and get familiar with it by clicking around.



3. Create an analysis proposal

- Now, wait until all other analysts and station groups are ready

Choose one analyst group and write the following proposal together:

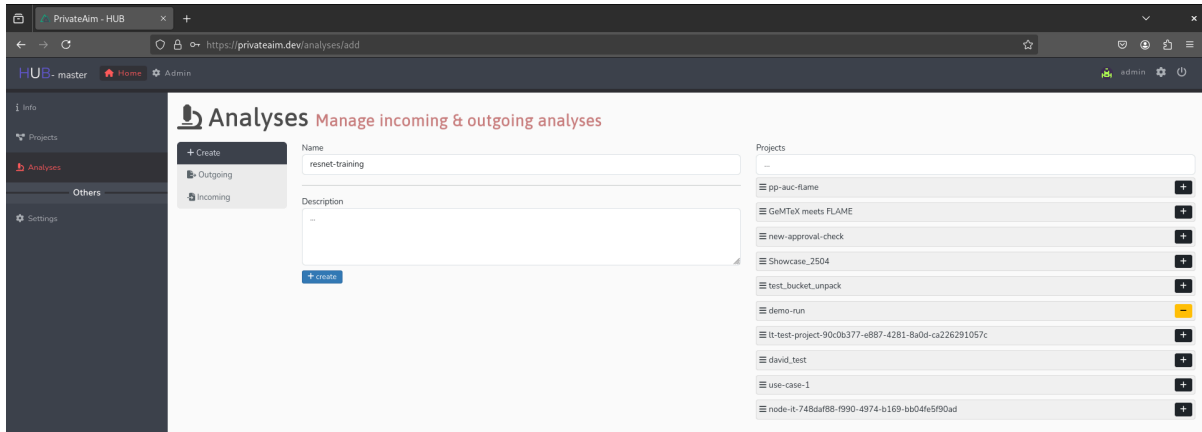
```
Title:      Herrsching-demo
Group:      python -> pytorch
Nodes:      node-dev-1, node-dev-2, node-dev-6, default-aggregator
```

The screenshot shows the 'HUB master' interface for managing projects. The left sidebar contains navigation links: Info, Projects (active), Analyses, Others, and Settings. The main content area is titled 'Projects Manage incoming & outgoing projects'. It features a 'Create' button and a form for adding new projects. The form includes fields for 'Name' (demo-run), 'Description' (empty), 'Group' (python), and 'Image' (pytorch). On the right, there is a 'Nodes' list with various nodes and their status (indicated by green '+' or red '-' buttons). The nodes listed are: amilo, ChariteTestNode01, david_test, FLAME-t, max-it-test-node, new-approval-check, node-dev-1, node-dev-2, node-dev-3, and node-dev-5. Below the nodes list, there is a pagination control showing '1 2 >' and a message 'Chose a arbitrary amount of target nodes.' with a '+ create' button.

Node Name	Status
amilo	+
ChariteTestNode01	+
david_test	+
FLAME-t	+
max-it-test-node	+
new-approval-check	+
node-dev-1	-
node-dev-2	-
node-dev-3	+
node-dev-5	+

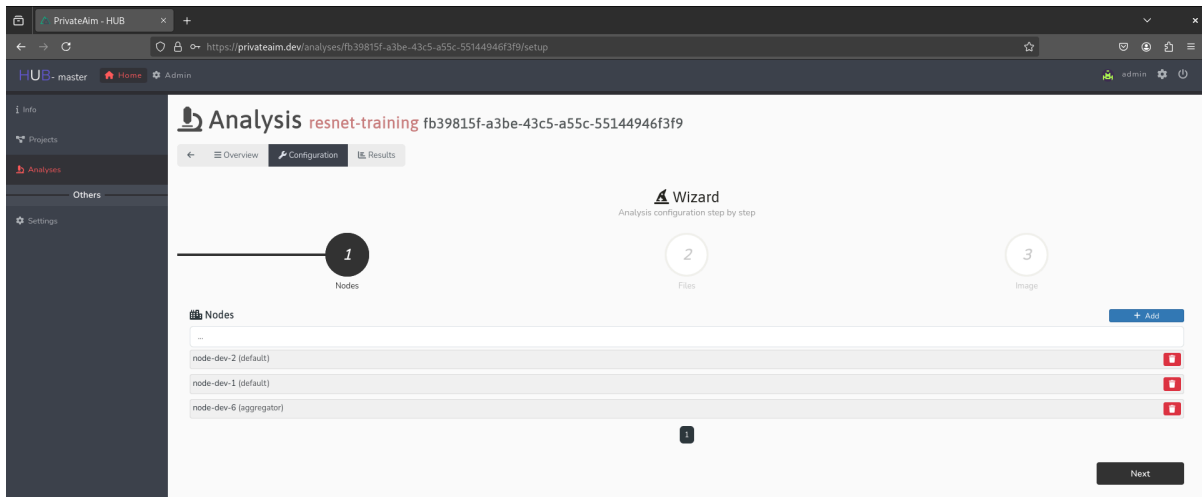
4. Create and start an analysis

1. In the UI you can create analysis under **Analysis** > **Create**.
2. To better recognize the analysis in the UI, you can give the analysis an individual display name here (e.g. **resnet-training**). If the name field is left blank, the analysis will be displayed only with an UUID (Universally Unique Identifier).
3. An analysis must always be a part of a proposal. Select your previously created proposal (if approved) and create a new analysis
4. Start the **Analysis Wizard**, and press the **+Create** button.

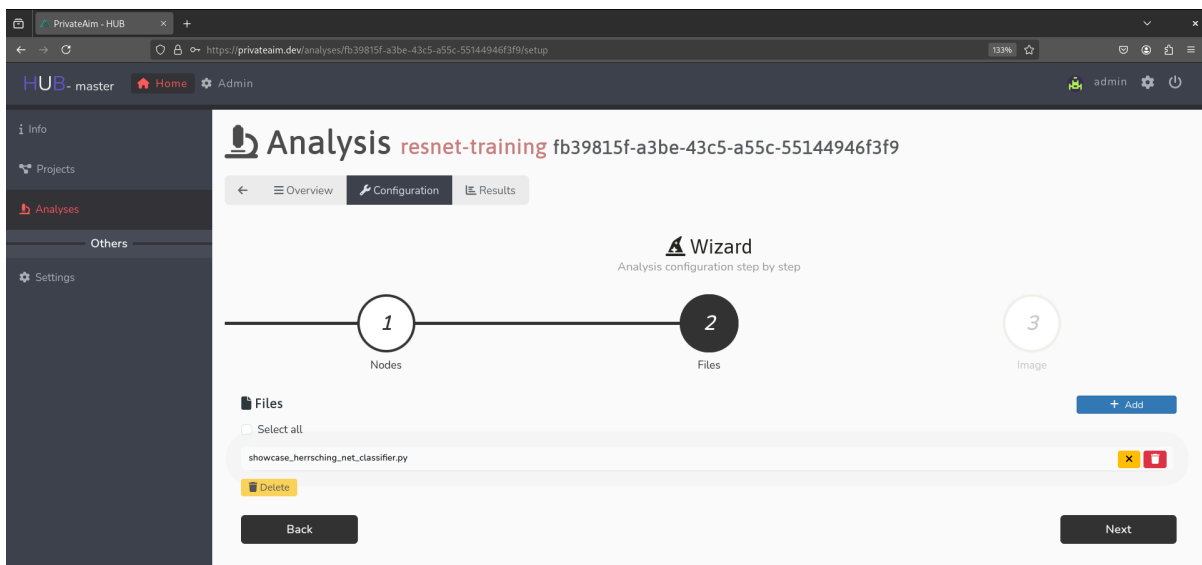


5. You will automatically be taken to the **Analysis Wizard**. In the first step you have to select nodes where the analysis will run.
Under **Nodes** you can see all the sites in the proposal. With the **+** you can add the station to the history of your analysis. So that all nodes are equally utilized, please select the stations stored in the table for the groups

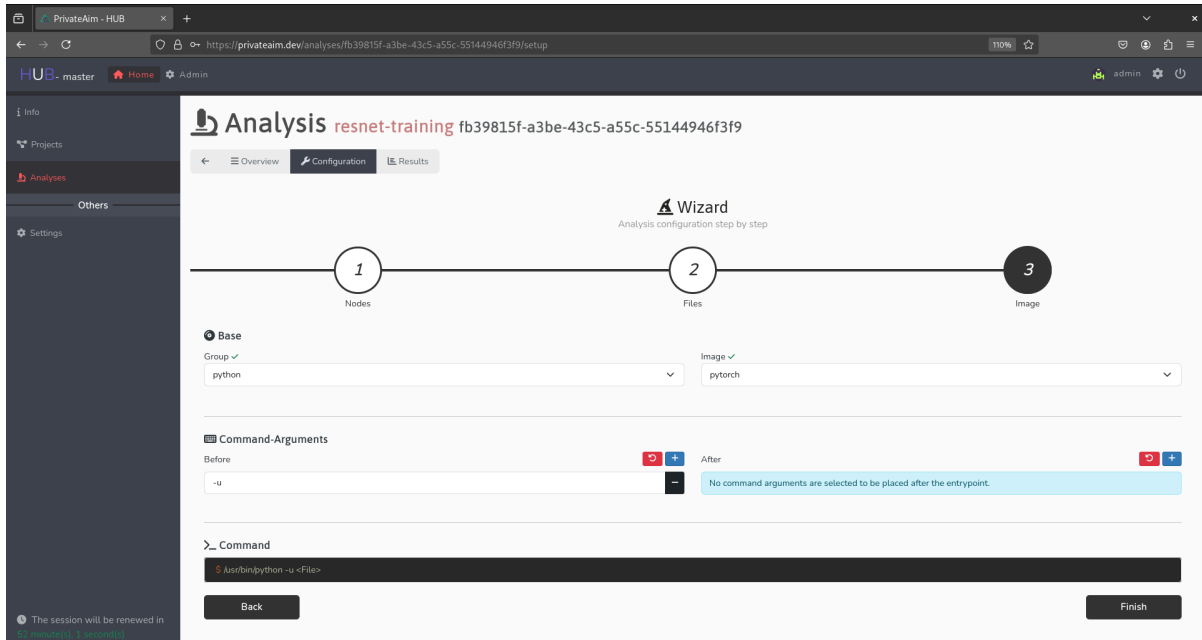
Group	1 Node	2 Node	Aggregator
1	node-dev-2	node-dev-3	default-aggregator
2	node-1	node-dev-3	default-aggregator
3	node-dev-2	node-1	default-aggregator



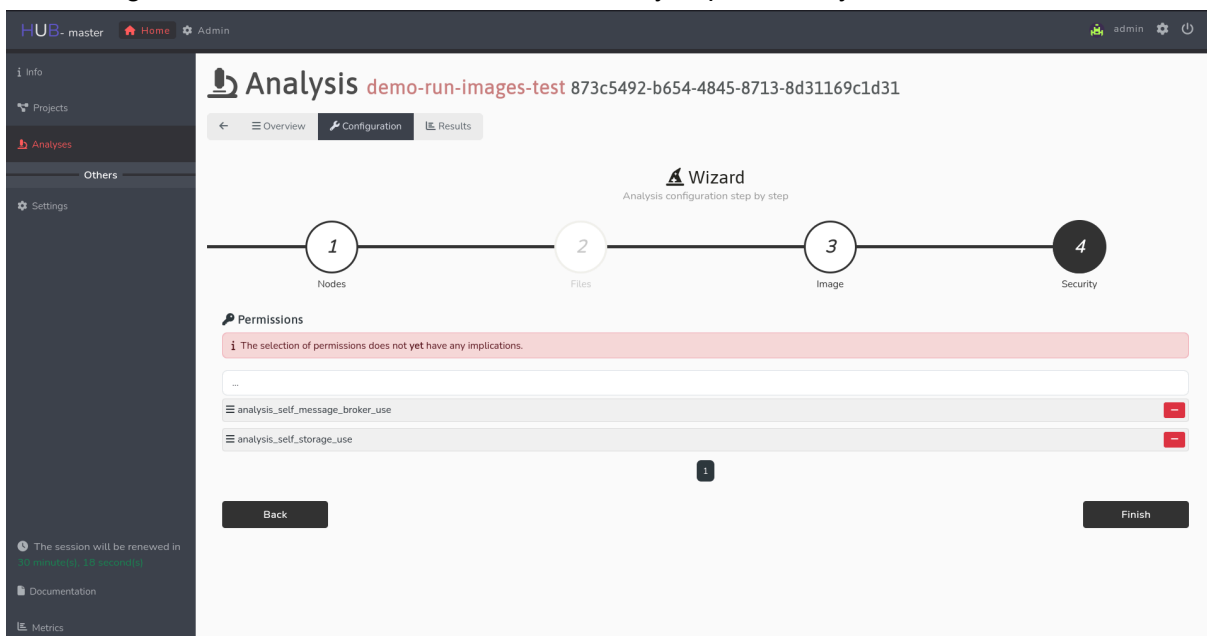
6. The second step is to upload the scripts for the analysis. We have prepared an analysis demo that you need to download from Github repository (https://github.com/PrivateAIM/showcases/tree/main/image-classifier/Image_analysis_on_flame_cuda.py) or from the following Gist if the repository is not accessible - <https://gist.github.com/Demokritus/a52abbb0ec83b805c110a9c3850006f9> . If you have the algorithm files downloaded, you can select it using the Directories /Files upload field. Toggle **Directory mode** allows you to select entire folders (including subfolders). Toggling off allows single file upload. The specified files can be seen under **Files in Memory** (bottom left). You can unselect files here. With a click on upload the selected files are uploaded and appear in **Files uploaded** (bottom right). One of the uploaded files must now be selected as an **entrypoint** (start script to be executed).

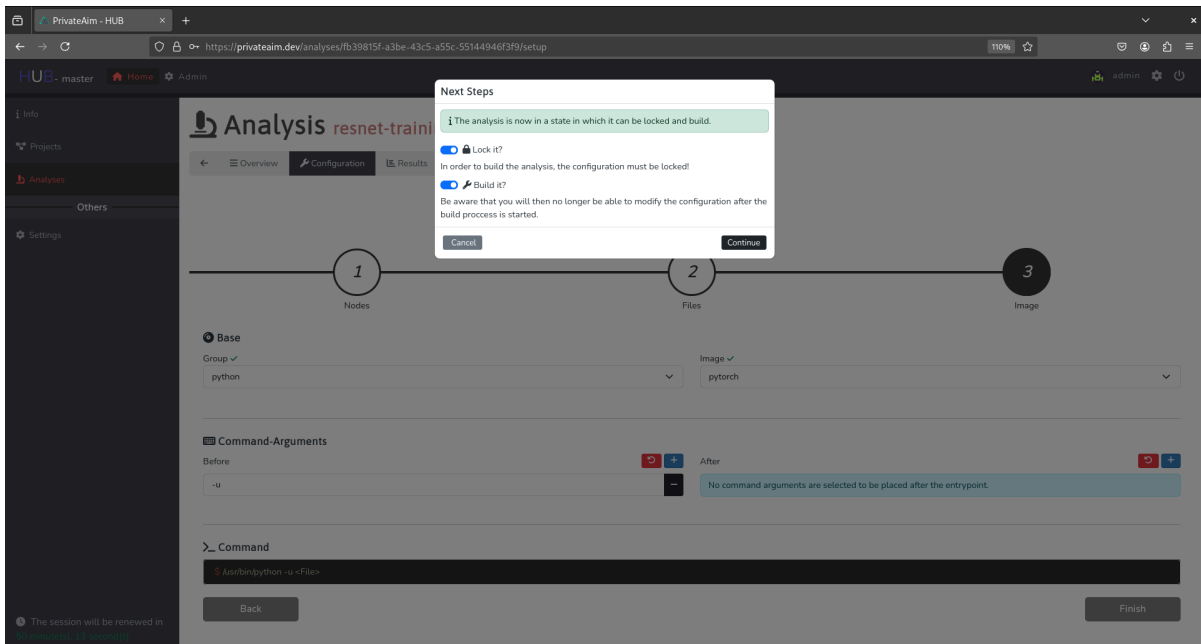


- At the last step you can select the master image used for running the script (you do not have to change anything here, since the correct master image has already been selected in the proposal).

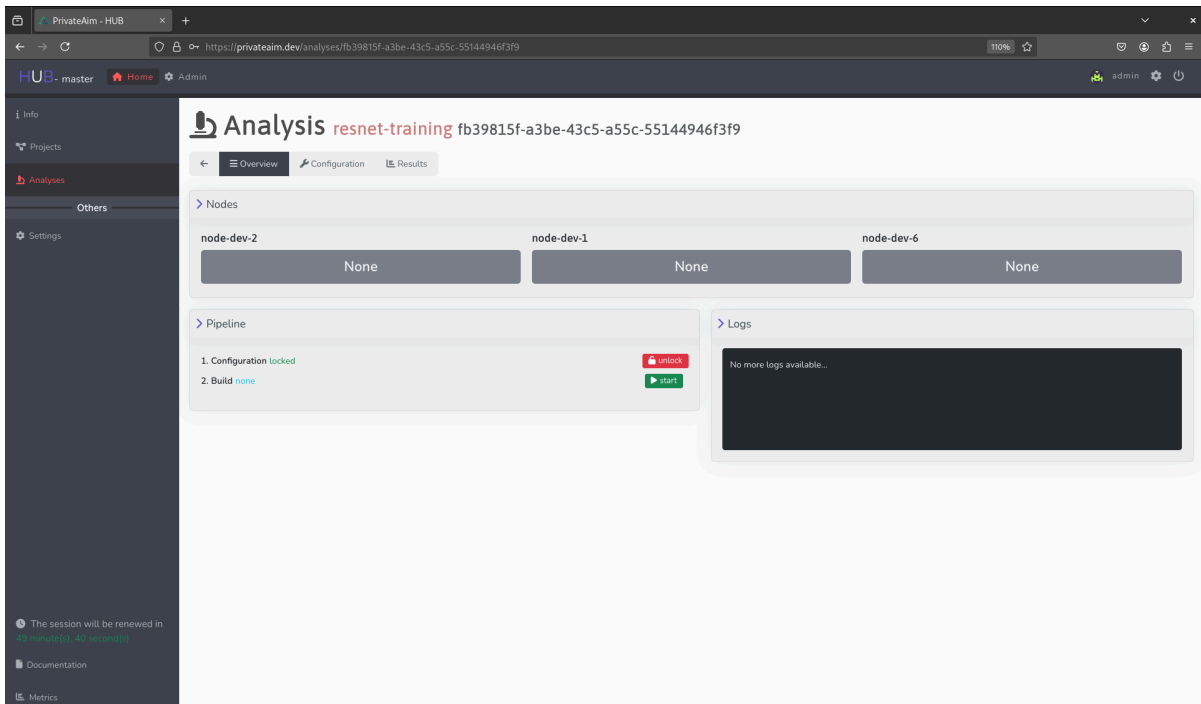


At the last step you could choose the permissions for an analysis to utilize a message broker or a storage service. However, it does not have any implications yet.

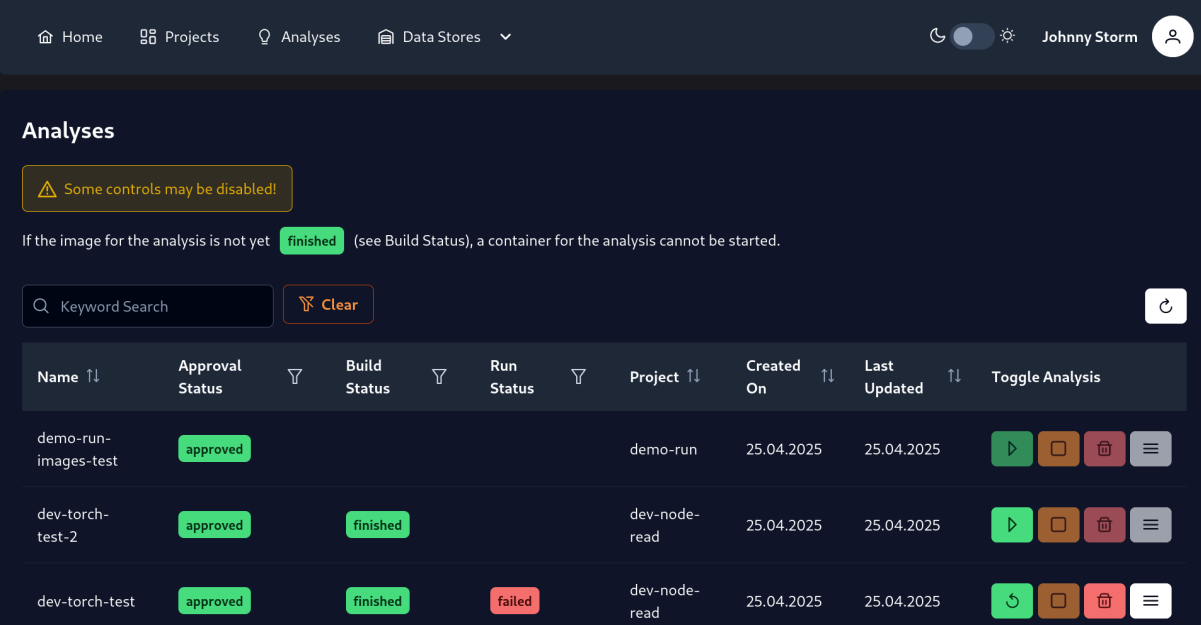







8. The Analysis is now fully configured. If you go to **Overview** you can lock the configuration and build the container with uploaded script. After the analysis is locked, the nodes can approve it, and the container building processes can start.



After that you go to a website of each node selected in the analysis proposal.
The URL is <https://node6.privateaim.dev/analyses>, replace the digit with the number of a corresponding node. There in the section “analyses” you will find the list of built containers. On the right side there will be a start button, press it on all involved nodes.

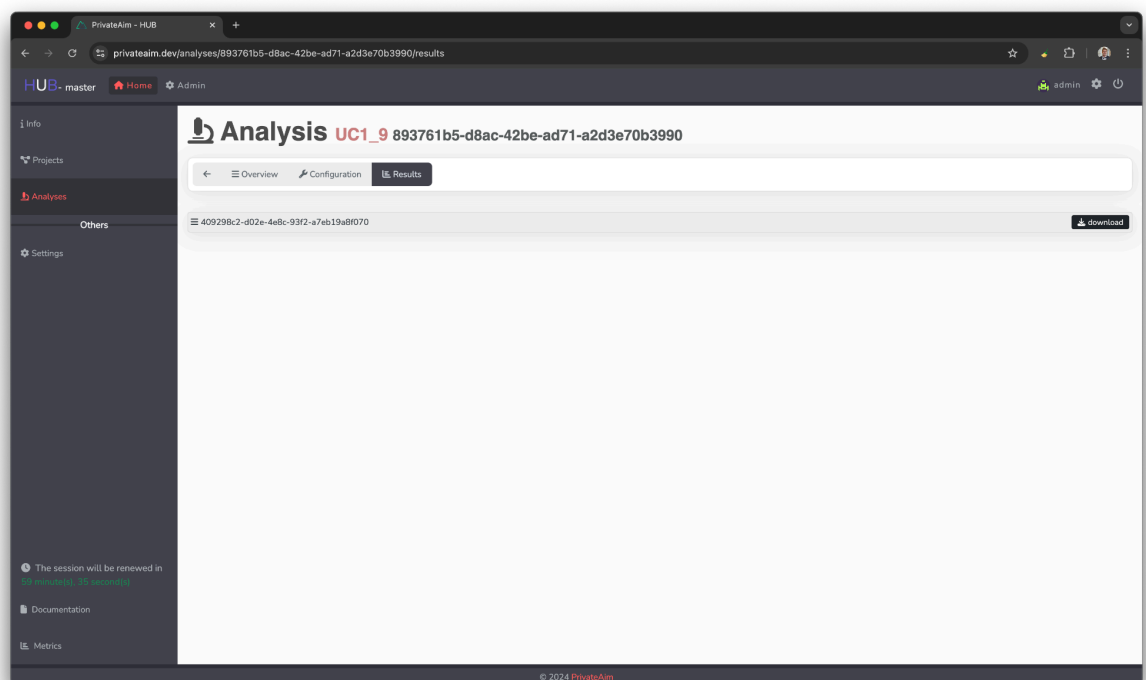


Name ↑↓	Approval Status	Build Status	Run Status	Project ↑↓	Created On	Last Updated	Toggle Analysis
demo-run-images-test	approved			demo-run	25.04.2025	25.04.2025	
dev-torch-test-2	approved	finished		dev-node-read	25.04.2025	25.04.2025	
dev-torch-test	approved	finished	failed	dev-node-read	25.04.2025	25.04.2025	

Once it has been launched, you might view the logs from a running analysis pod. For that click the rightmost button on the same page.

5. Receive results

1. The result can be downloaded once the analysis has been run at all nodes.



2. The file in the results - the weights of trained ResNet18. They can be loaded using Torch code.

Feedback

Please use this form to provide us feedback:

https://docs.google.com/forms/d/e/1FAIpQLSdS_q8oeXVhYLSq058BwYqLr5CTaqLGOq6c27u4-E8AFbIU4g/viewform?usp=sharing