

LUMI AI Factory

LUMI AI containers

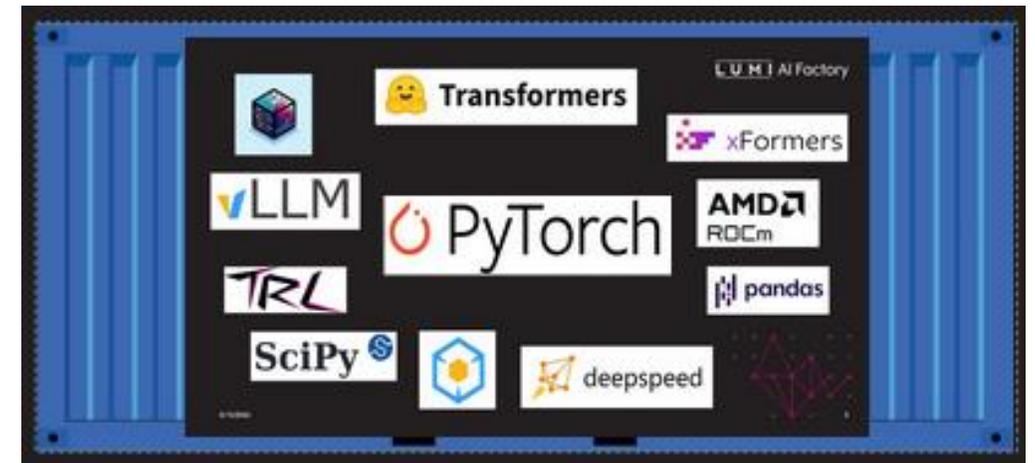
Presenters: Mitja Sainio & Marlon Tobaben (CSC)

Content

1. Containers and why to use them
2. Available containers
3. Where to find
4. How to use
5. How to extend
6. Support
7. What comes next
8. Questions

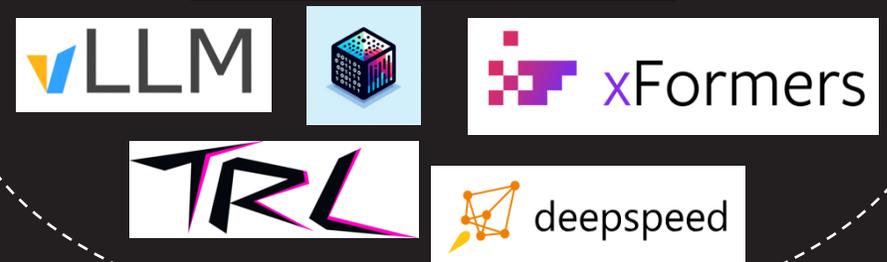
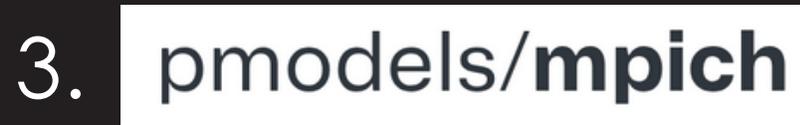
Introduction to containers

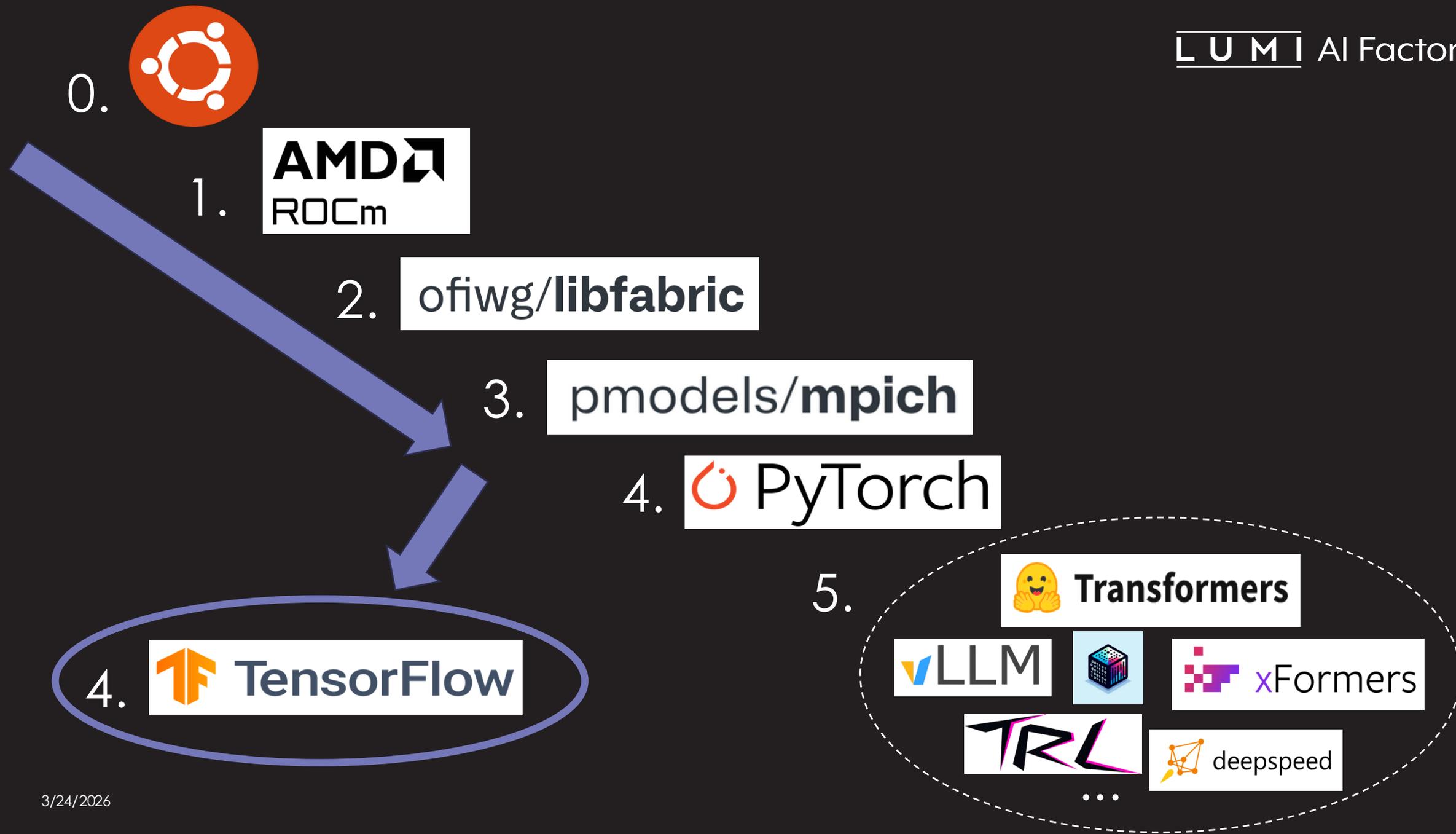
- We are not going to cover that today
- <https://coderefinery.github.io/hpc-containers/>
- <https://docs.lumi-supercomputer.eu/software/containers/singularity/>



Why to use (LUMI AI Factory) containers on LUMI

- Optimized for LUMI's MI250x GPUs and Slingshot interconnect
- Enables full RDMA support for MPI and RCCL using open-source components
- Fast communication between nodes and within a node from GPU-to-GPU
- You do not need to worry about installing PyTorch or other libraries on LUMI





Where to find the containers on



```
mitjasai@uan01:~> ls /appl/local/laifs/containers
archive                               lumi-multitorch-u24r64f21m43t28-20251128_145346
laifs-lumi-multi-20250728_103251.sha256  lumi-multitorch-u24r64f21m43t29-20251209_134408
laifs-lumi-multi-20250728_103251.sif     lumi-multitorch-u24r64f21m43t29-20260124_092648
laifs-lumi-multi-latest.sif             lumi-multitorch-u24r64f21m43t29-20260216_093549
lumi-multitorch-latest.sif              lumi-multitorch-u24r64f21m43t29-20260225_144743
```

```
mitjasai@uan04:/appl/local/laifs/containers/lumi-multitorch-u24r64f21m43t29-20260225_144743> ls *.sif
lumi-multitorch-full-u24r64f21m43t29-20260225_144743.sif
lumi-multitorch-libfabric-u24r64f21m43t29-20260225_144743.sif
lumi-multitorch-mpich-u24r64f21m43t29-20260225_144743.sif
lumi-multitorch-rocm-u24r64f21m43t29-20260225_144743.sif
lumi-multitorch-torch-u24r64f21m43t29-20260225_144743.sif
```

```
module purge
module use /appl/local/laifs/modules
module load lumi-aif-singularity-bindings
export SIF=/appl/local/laifs/containers/lumi-multitorch-u24r64f21m43t29-20260124_092648/lumi-multit
srun -A <your-project-id> -p small-g -n 1 --gpus-per-task=1 singularity run $SIF python -c "import
```

Where to find the containers on



<https://hub.docker.com/r/lumiaifactory/lumi-multitorch>

lumiaifactory/lumi-multitorch
By [lumiaifactory](#) · Updated 15 days ago
LUMI AI Factory provided Pytorch images for LUMI supercomputer

IMAGE

MACHINE LEARNING & AI

☆0 ↓ 285

TAG
● full
Last pushed 15 days by [mitjasai](#)

```
docker pull lumiaifactory/lumi-multitorch:full
```

Digest	OS/ARCH	Vulnerabilities	Last pull	Compressed size ⓘ
c2707fb447aa	linux/amd64	Security unknown	less than 1 day	13.49 GB

```
Bootstrap: docker
From: docker.io/lumiaifactory/lumi-multitorch:torch

%post
. /opt/venv/bin/activate
pip install scikit-learn
```

```
Bootstrap: docker
From: docker.io/lumiaifactory/lumi-multitorch:full

%post
apt-get install -y nvidia
```

GitHub page

- Subscribe to releases
- See known issues
- More information
 - Detailed description of contents
 - Build logs
 - Container files
 - Test results

<https://github.com/lumi-ai-factory/laifs-container-recipes>

The screenshot shows the GitHub repository page for `lumi-ai-factory / laifs-container-recipes`. The repository is public and has 9 stars and 2 forks. The main branch is `main`. The repository contains several files and folders, including `.github/workflows`, `builds`, `containerfiles`, `recipes`, `scripts`, `.gitignore`, `README.md`, and `requirements.txt`. The most recent commit is by `ccn-0` with the message "Fix Package version diff script" and a commit hash of `368469b`, made last month. The repository also has 5 releases, with the latest one being `lumi-multitorch-u2...` from 3 weeks ago.

File/Folder	Commit Message	Commit Date
<code>.github/workflows</code>	GH workflow: package ve...	last month
<code>builds</code>	Initial commit	5 months ago
<code>containerfiles</code>	Change to Bitsandbytes f...	last month
<code>recipes</code>	Change to Bitsandbytes f...	last month
<code>scripts</code>	Fix Package version diff s...	last month
<code>.gitignore</code>	Add gitignore	5 months ago
<code>README.md</code>	Update REDME.md	3 months ago
<code>requirements.txt</code>	Add GH workflow for ima...	4 months ago

How does this affect you?

```
81 - module use /appl/local/containers/ai-modules
```

```
82 - module load singularity-AI-bindings
```

```
99 + module use /appl/local/laifs/modules
```

```
100 + module load lumi-aif-singularity-bindings
```

```
83 - export SIF=/appl/local/containers/sif-images/lumi-pytorch-rocm-6.2.1-python-3.12-pytorch-20240918-  
vllm-4075b35.sif
```

```
101 + export SIF=/appl/local/laifs/containers/lumi-multitorch-u24r64f21m43t29-20260225_144743/lumi-multitorch-  
full-u24r64f21m43t29-20260225_144743.sif
```

```
94 - singularity exec $SIF bash -c '$WITH_CONDA && source h5-env/bin/activate && python my-script.py'
```

```
112 + singularity run $SIF bash -c 'source h5-env/bin/activate && python my-script.py'
```

Examples for using the container images

LUMI Documentation

AI Software Environment

Examples for using the container images ¶

This list only includes some examples for using the container images. More examples can be found in the LUMI AI guide.

lumi-aif-singularity-bindings module

To give LUMI containers access to the file system of the working directory, some additional bindings are required. As it can be quite cumbersome to set these bindings manually, we provide a module that does this for you. You can load the module with the following commands:

```
module purge
module use /appl/local/laifs/modules
module load lumi-aif-singularity-bindings
```

If you prefer to set the bindings manually, we recommend taking a look at the [Running containers on LUMI lecture](#) from the LUMI AI workshop material.

Run PyTorch using the container

```
module purge
module use /appl/local/laifs/modules
module load lumi-aif-singularity-bindings
export SIF=/appl/local/laifs/containers/lumi-multitorch-u24r64f21m43t29-20260124_0926
srun -A <your-project-id> -p small-g -n 1 --gpus-per-task=1 singularity run $SIF pyth
```

<https://docs.lumi-supercomputer.eu/laif/software/ai-environment>

LUMI AI Guide

Lumi-supercomputer / LUMI-AI-Guide Public

Code Issues 6 Pull requests Actions Projects Security Insights

main Go to file Code

3 people feat: update AI Guide to use LUMI AIF containers (#77) f60c8e2 · last week

1-quickstart	feat: update AI Guide to use LUMI AIF ...	last week
2-setting-up-environment	feat: update AI Guide to use LUMI AIF ...	last week
3-file-formats	feat: update AI Guide to use LUMI AIF ...	last week
4-data-storage	feat: update AI Guide to use LUMI AIF ...	last week
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9-Wandb-visualization	feat: update AI Guide to use LUMI AIF ...	last week
assets/images	Update screenshot of TensorBoard w...	9 months ago
resources	feat: update AI Guide to use LUMI AIF ...	last week

About

The LUMI AI Guide is designed to assist users in migrating their machine learning applications from smaller-scale computing environments to the LUMI supercomputer.

ai deep-learning-tutorial lumi

Readme

Unknown, Unknown licenses found

Cite this repository

Activity

Custom properties

64 stars

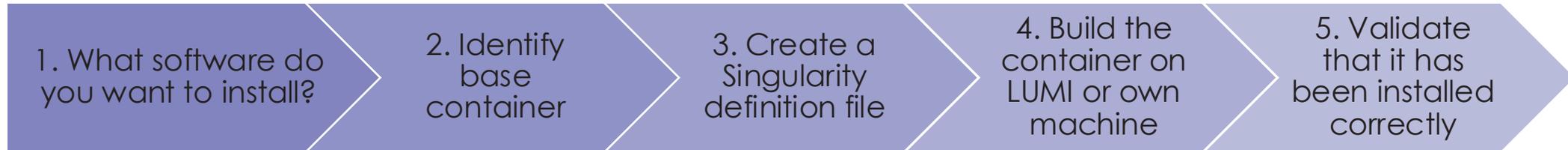
6 watching

16 forks

Report repository

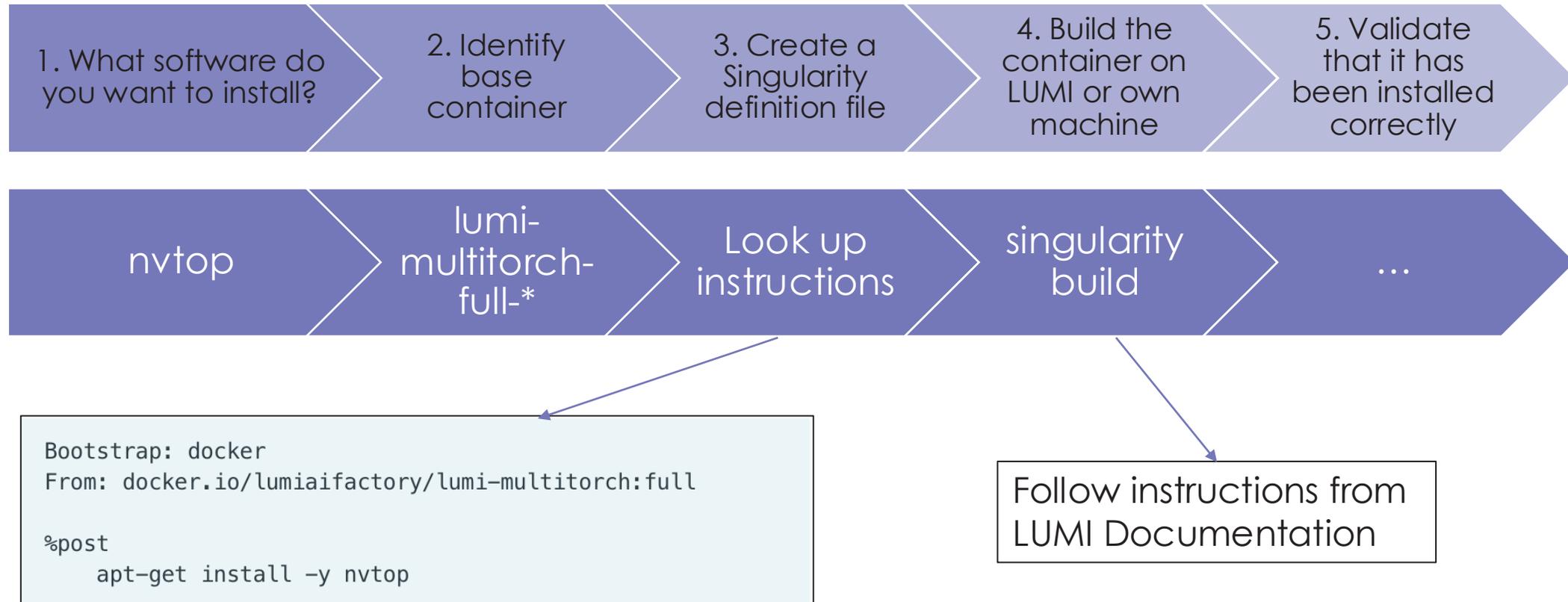
<https://github.com/Lumi-supercomputer/LUMI-AI-Guide>

Build new containers based on the images



<https://docs.lumi-supercomputer.eu/laif/software/ai-environment/#build-new-containers-based-on-the-images>

Example: Build new containers based on the images



<https://docs.lumi-supercomputer.eu/laif/software/ai-environment/#build-new-containers-based-on-the-images>

Support

- LUMI User Support (LUST) is the first contact point
 - LUST knows about the system status and other issues
 - LUST can escalate tickets to container maintainers
 - A potential problem with the containers could be an issue that is independent of the containers

<https://lumi-supercomputer.eu/user-support/need-help/>

LUMI Documentation

Home First steps Hardware Compute Software Developing Storage Tutorials Help desk LUMI AI Factory

Help desk
[Help desk](#)
 Training and events
 Known issues
 LUMI service status
 Mailing list archive

Help Desk

The LUMI User Support Team (LUST) is here to help!

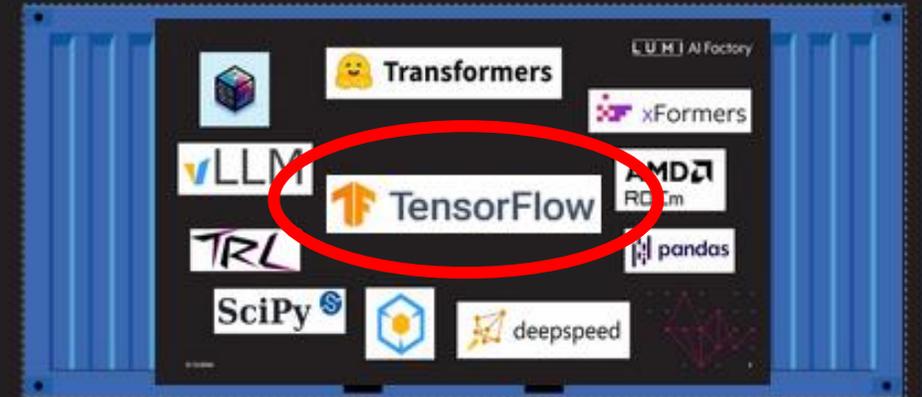
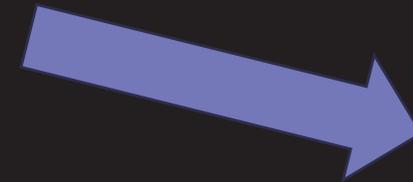
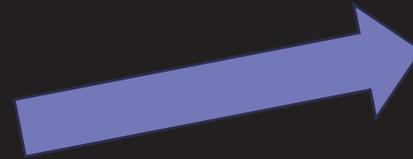
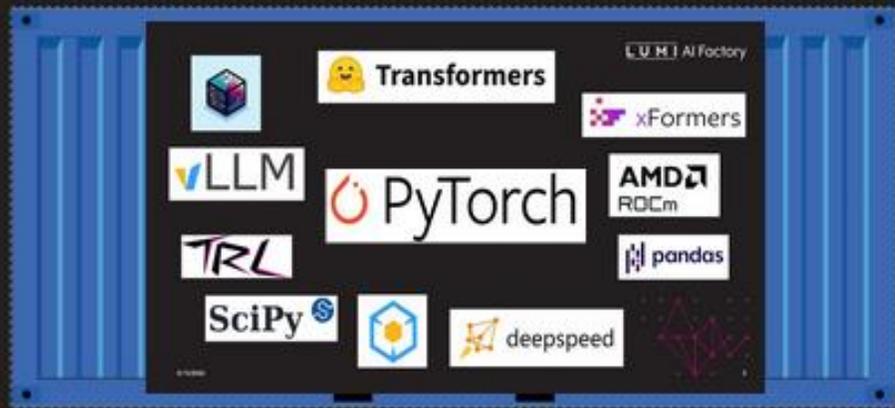
If you have any questions or problems using LUMI, please do not hesitate to contact us. You may find our contact forms for different issues by clicking the 'Contact us' button:

[Contact us](#)

The LUMI helpdesk is open every weekday from Monday to Friday except during [Finnish bank holidays](#):

	CE(S)T	EE(S)T	UTC (Summer)
Start	8:00 AM	9:00 AM	7:00 AM (6:00 AM)
End	6:00 PM	7:00 PM	5:00 PM (4:00 PM)

?



Questions?

LUMI Documentation

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LUMI AI Guide

Lumi-supercomputer / LUMI-AI-Guide (Public)

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ai deep-learning-tutorial lumi

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Custom properties

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16 forks

Report repository

<https://github.com/Lumi-supercomputer/LUMI-AI-Guide>

The logo for LUMI AI Factory is centered on a blue background. The word 'LUMI' is in a white, bold, sans-serif font, with a thin white horizontal line above and below it. To the right of 'LUMI' is the text 'AI Factory' in a white, regular-weight sans-serif font. The background features a low-poly, geometric pattern of blue triangles and a faint, repeating pattern of small red and white dots, suggesting a digital or data environment.

LUMI AI Factory