



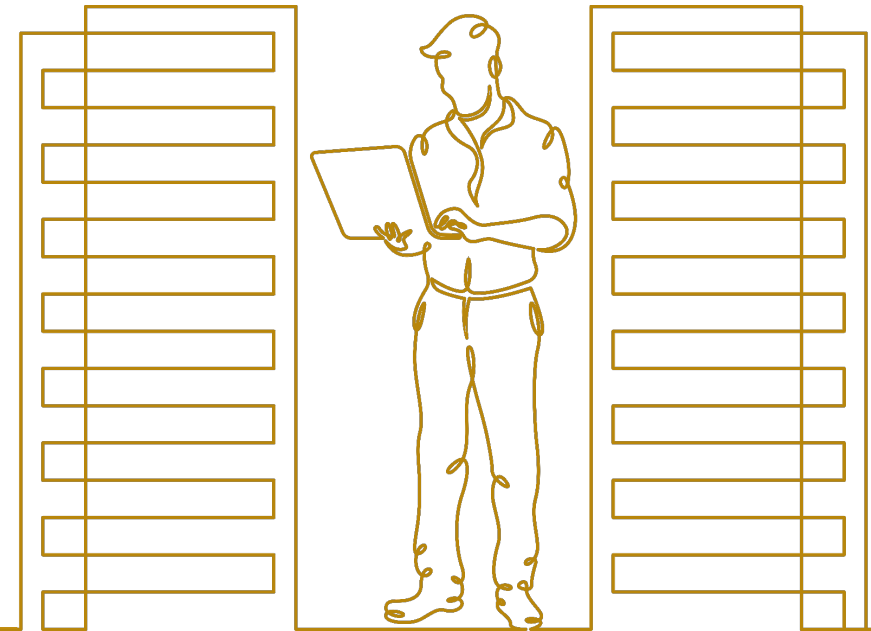
by



MUSICA

Open Test Phase for OeAW

9 December 2025
ONLINE



Agenda & Content

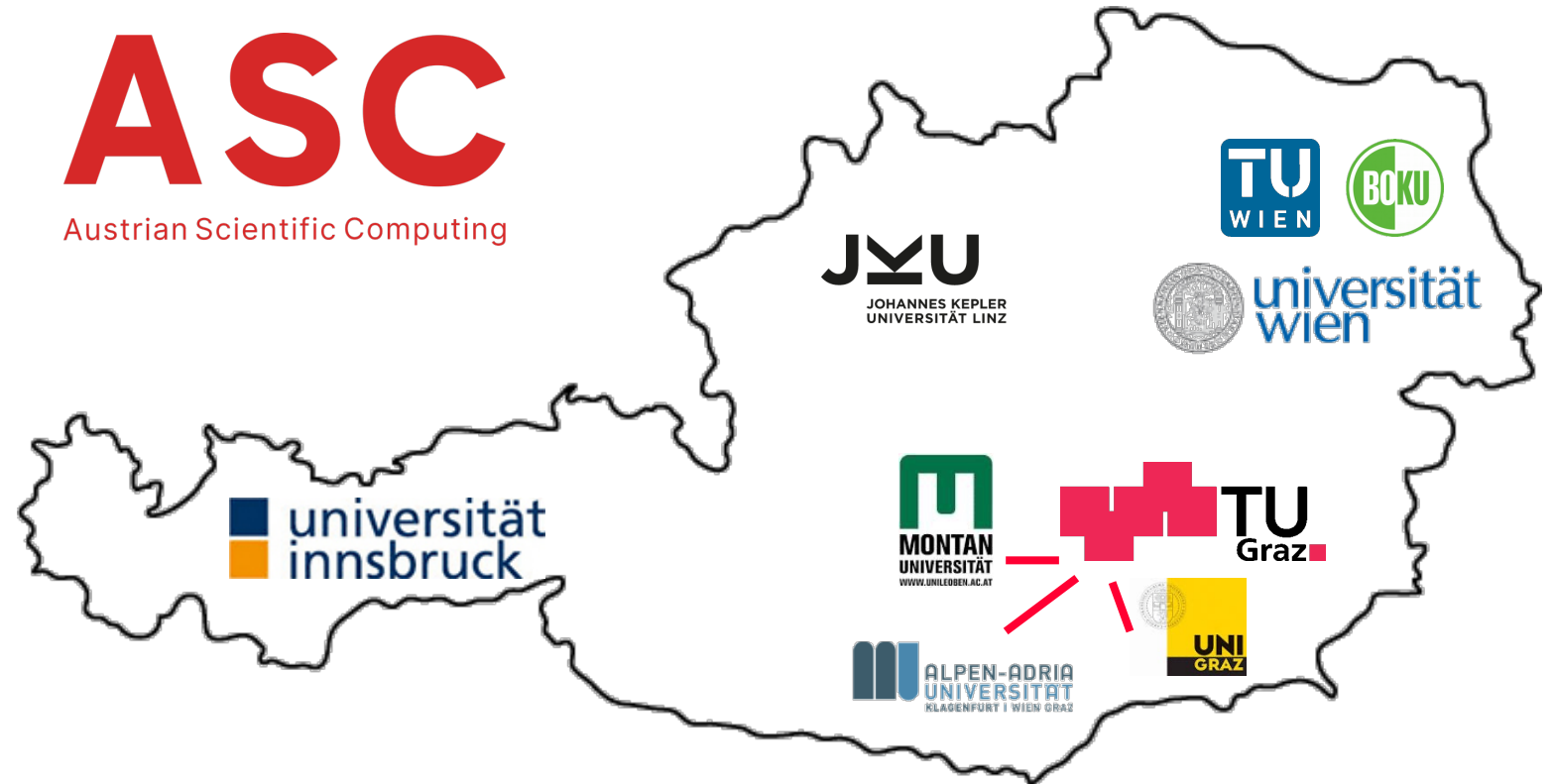
10:00	Welcome & Introduction	<i>Bernd Wachmann (OeAW)</i>
10:05	MUSICA and ASC – joined forces in Austrian HPC & AI	<i>Claudia Blaas-Schenner (ASC)</i>
10:10	Projects and admin basics	<i>Florian Goldenberg (ASC)</i>
10:20	OeAW – open test phase and regular user operation	<i>Claudia Blaas-Schenner (ASC)</i>
10:25	Logging in	<i>Katrin Muck (ASC)</i>
10:35	Filesystems	<i>Markus Hickel (ASC)</i>
10:40	Modules	<i>Adam Mc Cartney (ASC)</i>
10:45	Conda	<i>Adam Mc Cartney (ASC)</i>
10:50	Containers	<i>Adam Mc Cartney (ASC)</i>
10:55	Submitting Slurm jobs	<i>Jan Zabloudil (ASC)</i>
11:05	Support / writing tickets	<i>Jan Zabloudil (ASC)</i>
11:10	Support and training offers in HPC & AI, European HPC	<i>Claudia Blaas-Schenner (ASC)</i>
11:25	Q & A	

WHO's WHO **ASC – Austrian Scientific Computing**

ASC is a joint high-performance computing (HPC) facility of **Austrian universities**.
Within the limits of available resources we satisfy the **HPC needs of our users**.

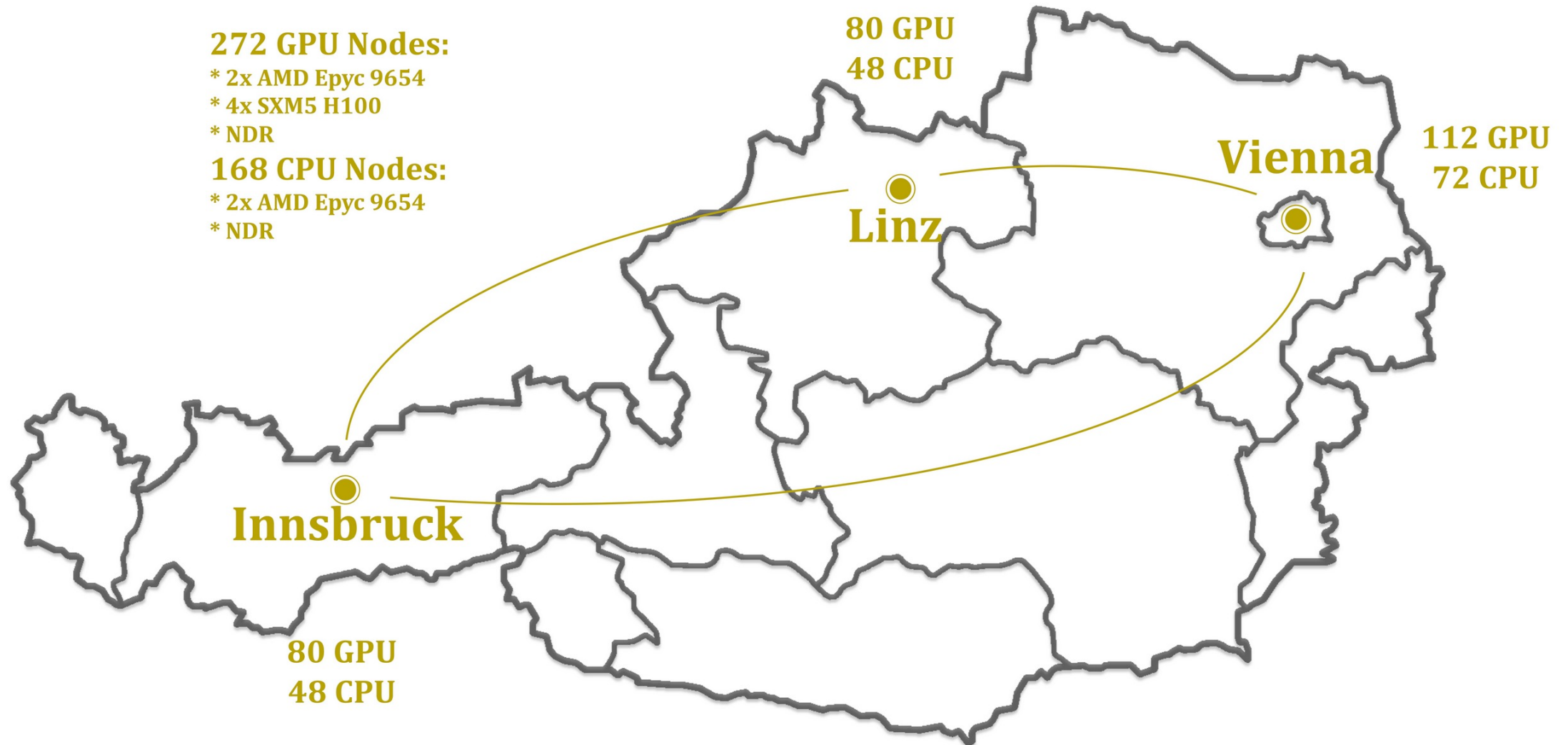
- asc.ac.at
- asc.ac.at/access
- asc.ac.at/training

ASC is primarily
devoted to research.



WHO's WHO

MULTI-Site Computer Austria (MUSICA)





MUlti-**SI**te Computer **A**ustria (**MUSICA**)

Projects/Admin

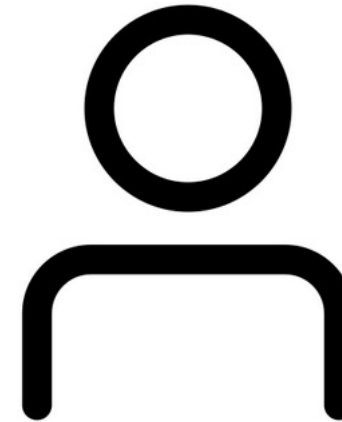
Two use cases

Project manager



-> Create new account (Sign Up)

User



-> Get Invited

Projects/Admin



Creating a new account:

- (Only PM) Click “Sign up” button at <https://auth.asc.ac.at>



Welcome to ASC!

Select one of the options below to continue.

 Login via AConet Federation

ASC Login with Local ASC Account



Need an account?

[Sign up.](#)

Projects/Admin



Creating a new account:

- (Only PM) Click “Sign up” button at <https://auth.asc.ac.at>
- Select Identification Method
Preferably “ACOnet Identity Federation”



Identify locally or via ACOnet

Create Account via *

- ☒ ACOnet Identity Federation
☐ Local Account

Continue

Projects/Admin



Creating a new account (ACOnet):

- (Only PM) Click “Sign up” button at <https://auth.asc.ac.at>
- Select Identification Method
Preferably “ACOnet Identity Federation”
- (ACOnet) Select organization and continue login

Select your organisation

In order to access the service **Austrian Scientific Computing (ASC)** please select or search the organisation you are affiliated with.



☐ Remember selection for this web browser session.

Projects/Admin



Creating a new account (ACOnet):

- (Only PM) Click “Sign up” button at <https://auth.asc.ac.at>
- Select Identification Method
Preferably “ACOnet Identity Federation”
- (ACOne

If your organization is not listed:

Please restart sign up from the beginning
and select „Local Account“

Projects/Admin



Creating a new account (ACOnet):

- (Only PM) Click “Sign up” button at <http>
- Select Identification Method
Preferably “ACOnet Identity Federation”
- (ACOnet) Select organization and continue
- Verify Details and “Continue”



Finish account creation at ASC!

Name *

E-Mail *

Organisation(s)

Departments

Username

Continue

Projects/Admin



Creating a new account (ACOnet):

- (Only PM) Click “Sign up” button at <https://auth.asc.ac.at>
- Select Identification Method
Preferably “ACOnet Identity Federation”
- (ACOnet) Select organization and continue login
- Verify Details and “Continue”
- Click link in Verification Mail

Projects/Admin



Creating a new account (ACOnet):

- (Only PM) Click “Sign up” button at <https://auth.asc.ac.at>
- Select Identification Method
Preferably “ACOnet Identity Federation”
- (ACOnet) Select organization and continue to
- Verify Details and “Continue”
- Click link in Verification Mail
- **Setup Multi-Factor Authentication (MFA)**



Welcome to ASC!



[Not you?](#)

Select an authentication method.

WebAuthn device
WebAuthn Authenticator

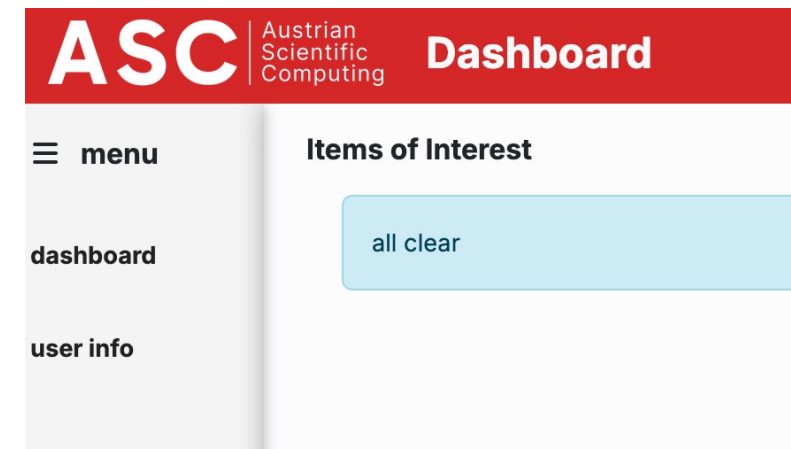
TOTP Device
TOTP Authenticator

Projects/Admin



Creating a new account (ACOnet):

- (Only PM) Click “Sign up” button at <https://auth.asc.ac.at>
- Select Identification Method
Preferably “ACOnet Identity Federation”
- (ACOnet) Select organization and continue login
- Verify Details and “Continue”
- Click link in Verification Mail
- Setup Multi-Factor Authentication (MFA)
- You should get redirected to <https://projects.asc.ac.at>



Projects/Admin



Creating a new account (Local):

- (Only PM) Click “Sign up” button at <https://auth.musica.at>
- Select Identification Method
Preferably “ACOnet Identity Federation”
- (Local) Fill in the details

Local User Creation

Password *

Password (repeat) *

Email *

Firstname *

Lastname *

Domain of Organisation *

Department *

Continue

Projects/Admin



Creating a new account (Local):

- (Only PM) Click “Sign up” button at <https://auth.asc.ac.at>
- Select Identification Method
Preferably “ACOnet Identity Federation”
- (Local) Fill in the details
- Verify Details and “Continue”

Projects/Admin



Creating a new account (Local):

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Preferably “ACOnet Identity Federation”
- (Local) Fill in the details
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Projects/Admin



Creating a new account (Local):

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- (Local) Fill in the details
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- Setup Multi-Factor Authentication (MFA)



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Select an authentication method.

WebAuthn device
WebAuthn Authenticator

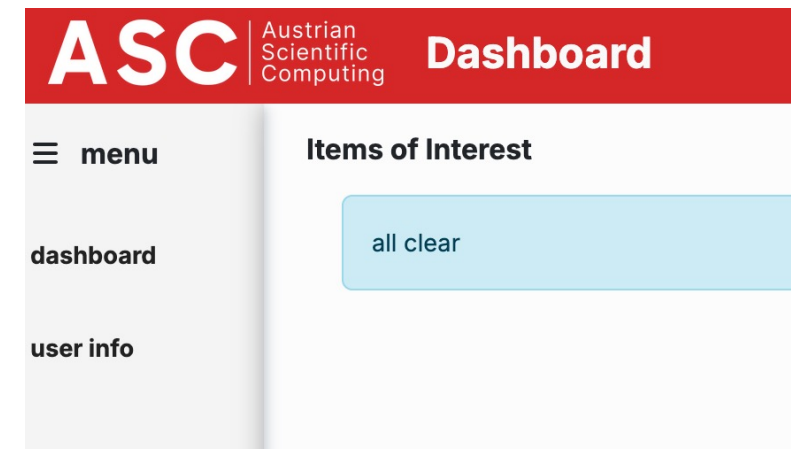
TOTP Device
TOTP Authenticator

Projects/Admin



Creating a new account (Local):

- (Only PM) Click “Sign up” button at <https://auth.asc.ac.at>
- Select Identification Method
Preferably “ACOnet Identity Federation”
- (Local) Fill in the details
- Verify Details and “Continue”
- Click link in Verification Mail
- Setup Multi-Factor Authentication (MFA)
- You should get redirected to <https://projects.asc.ac.at>



Projects/Admin

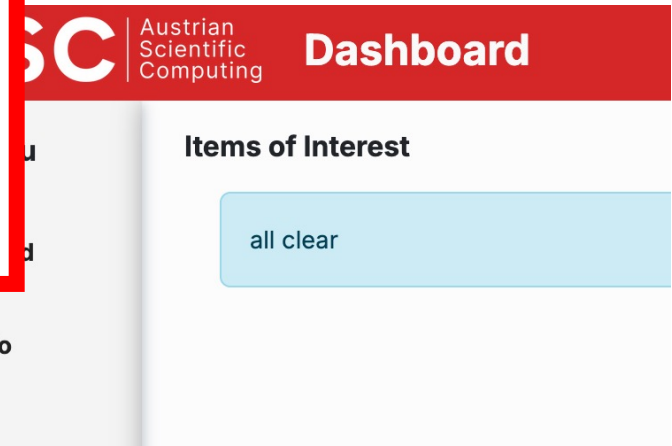


Creating a new account (Local):

- (Only PM) Click “Sign up” button at <https://auth.asc.ac.at>
- Select Identification Method
- Preferably “AASnet Identity Federation”
- (Local) I
- Verify D
- Click lin
- Setup M
- You sho
- <https://>

If organisation is not known to us you won't be allowed to login to the projects website

Please write to support@asc.ac.at for further instructions



Projects/Admin



Managing project
- Request Project Creation Rights



Projects/Admin



Managing project

- Request Project Creation Rights
- 1 test project / manager



Projects/Admin

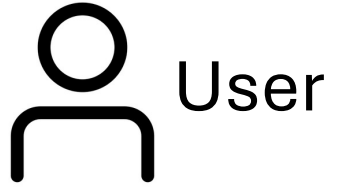


Managing project

- Request Project Creation Rights
- 1 test project / manager
- Requesting resources
 - Start date will be grant date
 - Description & Used Software
 - Site, Hardware preference & Typical Job Usage
 - Token Budget and Project duration (days)
 - Fixed for test projects
 - For other project types: Funding proofs/documents/reviewer list
 - **Not billed in open test phase**



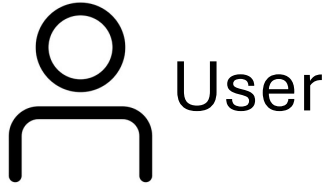
Projects/Admin



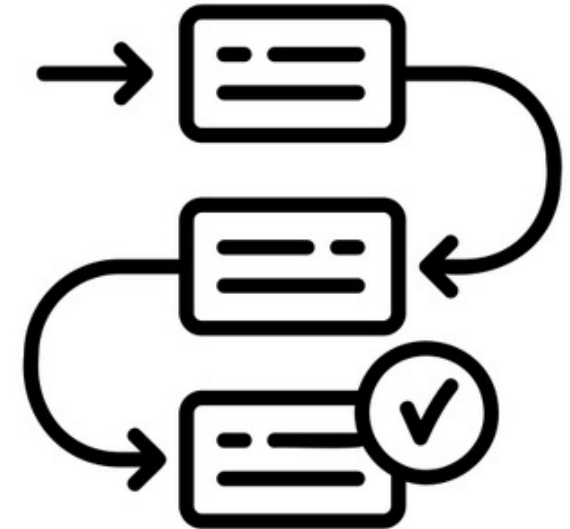
- Get invited by project manager



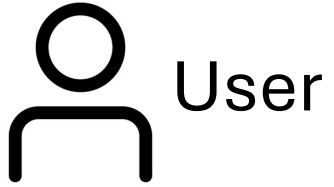
Projects/Admin



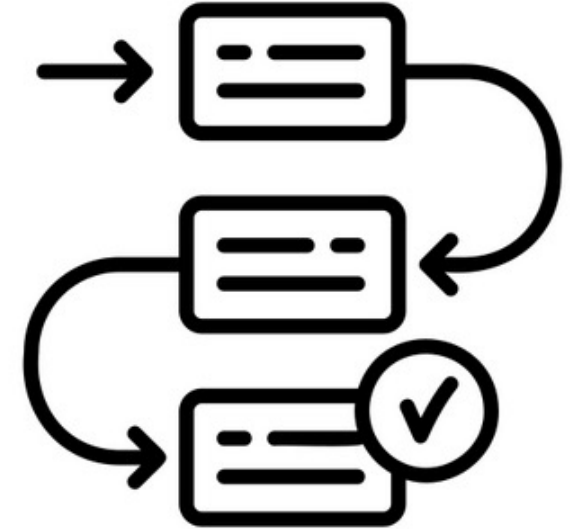
- Get invited by project manager
- Follow steps to complete account creation



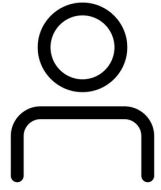
Projects/Admin



- Get invited by project manager
- Follow steps to complete account creation
- Login to project website to complete account creation.

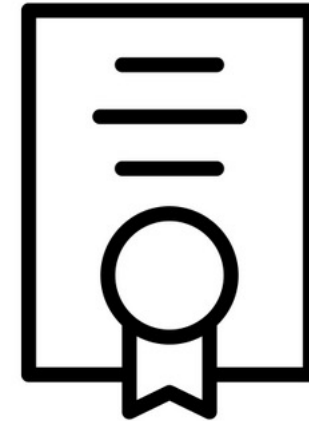


Login

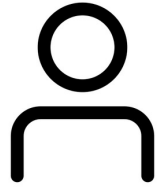


SSH – Device-auth flow

- authenticate certificate on your system

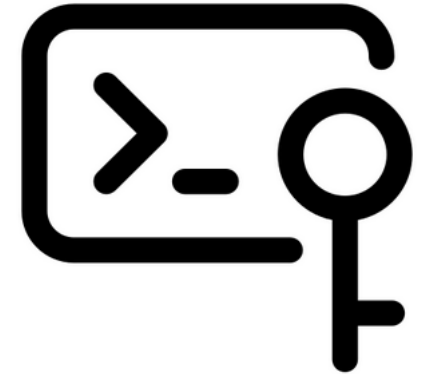


Login

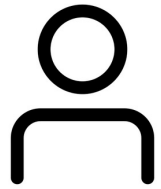


SSH – Device-auth flow

- authenticate certificate on your system
- `ssh -x <username>@musica.vie.asc.ac.at`



Login

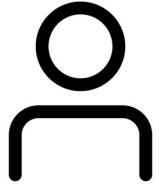


SSH – Device-auth flow

- authenticate [certificate](#) on your system
- `ssh -x <username>@musica.vie.asc.ac.at`
- Scan QR or click link to redirect to Authentik



Login



SSH – Device-auth flow

- authenticate [certificate](#) on your system
- ssh -x <username>@musica.vie.asc.ac.at
- Scan QR or click link to redirect to Authentik
- Pick login used during account creation



Welcome to ASC!

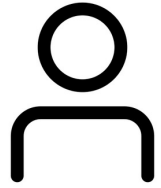
Login to continue to Step SSH CA.

Select one of the options below to continue.

 Login via ACONet Federation

ASC Login with Local ASC Account

Login

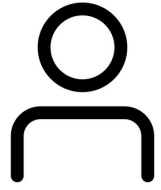


SSH – Device-auth flow

- authenticate [certificate](#) on your system
- ssh -x <username>@musica.vie.asc.ac.at
- Scan QR or click link to redirect to Authentik
- Pick login used during account creation
- Complete 2FA check



Login



SSH – Device-auth flow

- authenticate [certificate](#) on your system
- ssh -x <username>@musica.vie.asc.ac.at
- Scan QR or click link to redirect to Authentik
- Pick login used during account creation
- Complete 2FA check
- Authentik Success!



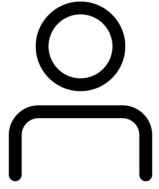
Redirecting to SSH Device Auth



You may close this page now.

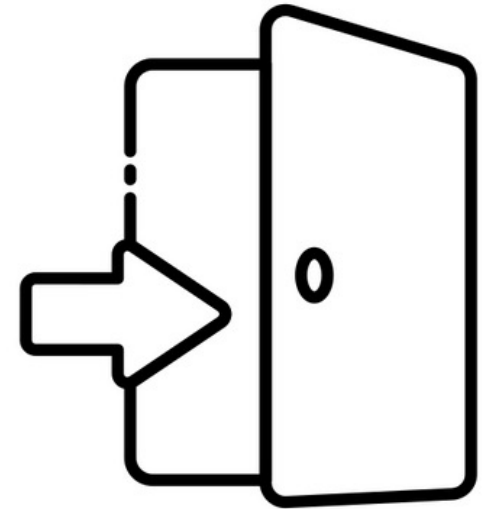
You've successfully authenticated your device.

Login

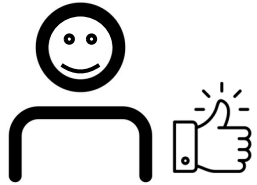


SSH – Device-auth flow

- authenticate [certificate](#) on your system
- `ssh -x <username>@musica.vie.asc.ac.at`
- Scan QR or click link to redirect to Authentik
- Pick login used during account creation
- Complete 2FA check
- Authentik Success!
- Pressing enter in the terminal logs you in.



Login



```
Welcome to the MUSICA Cluster Open Testphase!
=====

User documentation can be found at https://docs.vsc.ac.at/musica\_test/index.html

-----

To see available partitions:      sinfo
To submit jobs type:             sbatch job_script
To view the job status type:     squeue
Slurm documentation:             http://slurm.schedmd.com/

Available QoS:

partition                        QoS
-----
zen4_0768                        zen4_0768
zen4_0768_h100x4                zen4_0768_h100x4
Last login: Fri Nov 14 16:26:13 2025 from 128.130.233.44
Module for EESSI/2023.06 loaded successfully (requires '--force' option to unload or purge)
Module for ASC/2023.06 loaded successfully (requires '--force' option to unload or purge)

=====

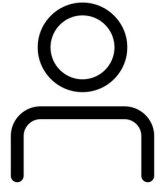
Your jobs can run with the following account(s) and quality of service (QoS):

                        default account      p201001
                        accounts              p201001

                        default qos           zen4_0768
                        qos                   zen4_0768
                                           zen4_0768_h100x4

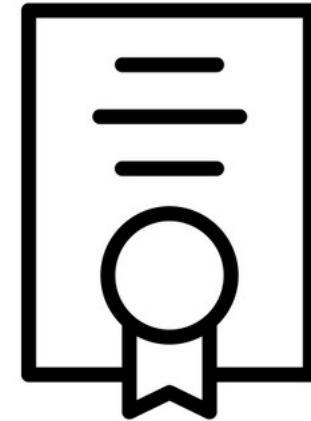
$DATA set to "/data/fs201001/as42958"
$SCRATCH set to "/scratch/fs201001/as42958"
```

Login

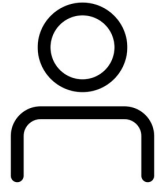


SSH – using step SSH

- Install [Step CLI client](#) (if not already)

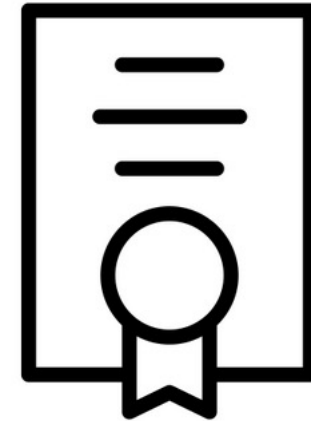


Login

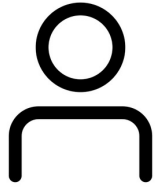


SSH – using step SSH

- Install [Step CLI client](#) (if not already)
- authenticate [certificate](#) on your system

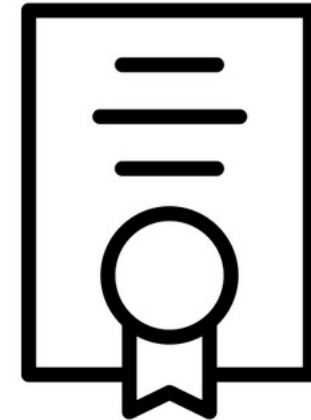


Login

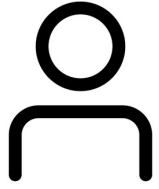


SSH – using step SSH

- Install [Step CLI client](#) (if not already)
- authenticate [certificate](#) on your system
- Set [step ssh](#)
i.e. run `<step ca bootstrap>` command

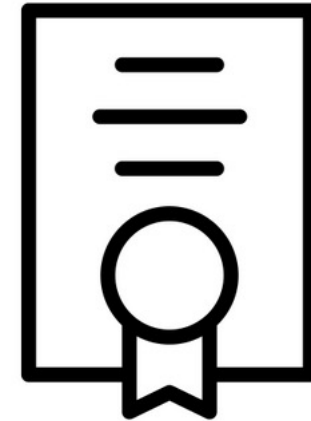


Login

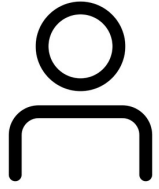


SSH – using step SSH

- Install Step CLI client (if not already)
- authenticate certificate on your system
- Set step ssh
i.e. run `<step ca bootstrap>` command
- `step ssh login [--context asc]`



Login



SSH – using step SSH

- Install Step CLI client (if not already)
- authenticate certificate on your system
- Set step ssh
i.e. run `<step ca bootstrap>` command
- `step ssh login [--context asc]`
- Step opens a browser redirecting to login:
<https://auth.asc.ac.at>

Welcome to ASC!

Login to continue to Step SSH CA.

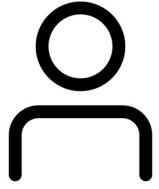
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ASC Login with Local ASC Account

Need an account? [Sign up.](#)

Login



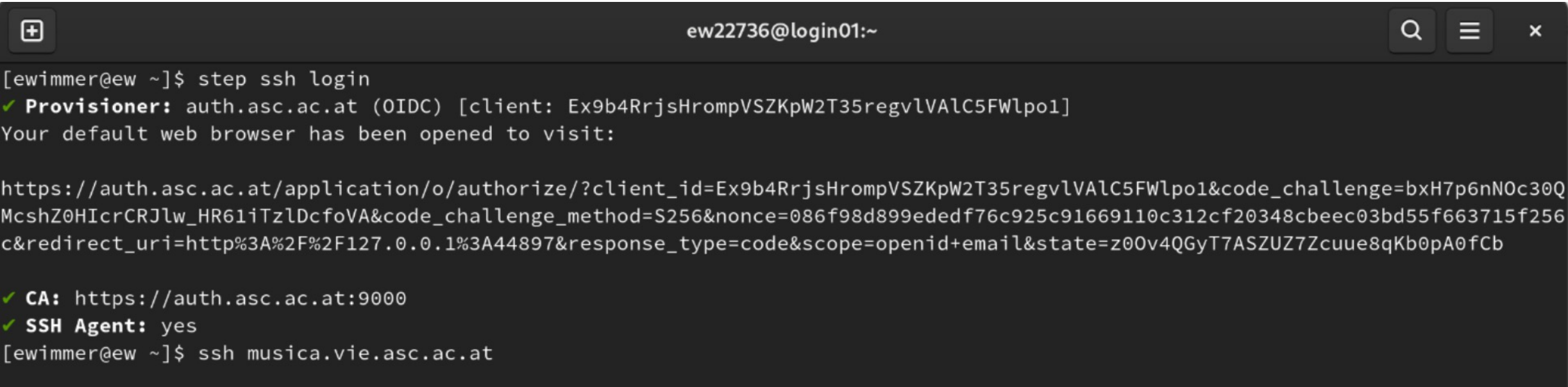
SSH – using step SSH

- Install Step CLI client (if not already)
- authenticate certificate on your system
- Set step ssh
i.e. run `<step ca bootstrap>` command
- `step ssh login [--context asc]`
- Step opens a browser redirecting to login:
<https://auth.asc.ac.at>
- Once logged in to auth, you can then ssh into the login node

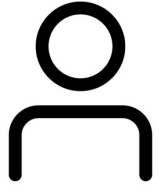


Success

OAuth Request Successful.
Look for the token on the command line.

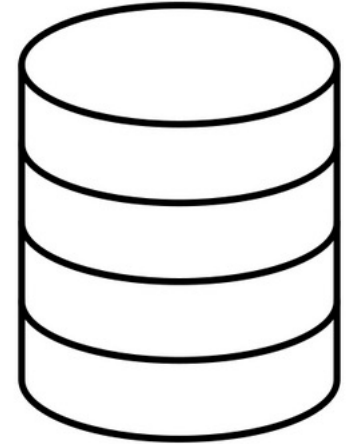


Filesystem

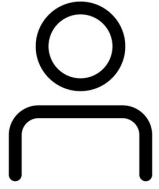


- Essentials

- Where to store data?
- Limits?
- Backup?

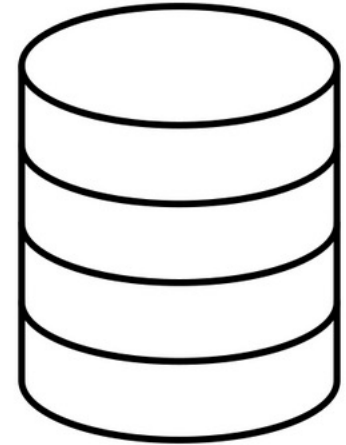


Filesystem



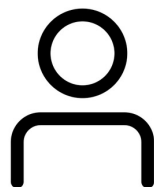
- Where?

- IBM Storage Scale
 - \$HOME -> /home/username
 - \$DATA -> /data/fsXXXXXX/username
- WekaFS
 - \$SCRATCH -> /scratch/fsXXXXXX/username

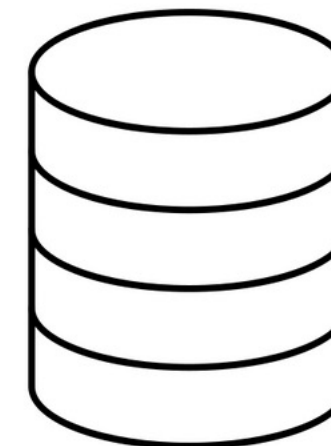


XXXXXX = project number

Filesystem

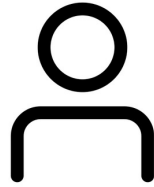
 - Limits?

Storage	Limit	Inode limit	Extendable?	Upto?
\$HOME	50 GB	1M	No	
\$DATA	10 TB	10M	Yes	100TB
\$SCRATCH	5 TB	None	Yes	

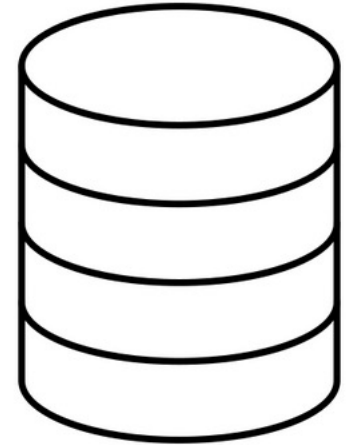


1PB = 1000TB

Filesystem

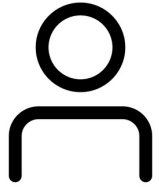
 - For jobs

Storage	Recommended use
\$HOME	Custom configurations, code and scripts and custom software
\$DATA	Main project volume for research, input and output data
\$SCRATCH	Temporary data created by jobs. Fast R/W



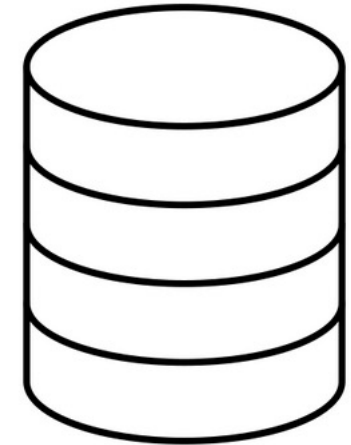
1PB = 1000TB

Filesystem



- Backups are performed on a **best effort** basis

Storage	Backup
\$HOME	Yes
\$DATA	Yes, can be opt-out
\$SCRATCH	No

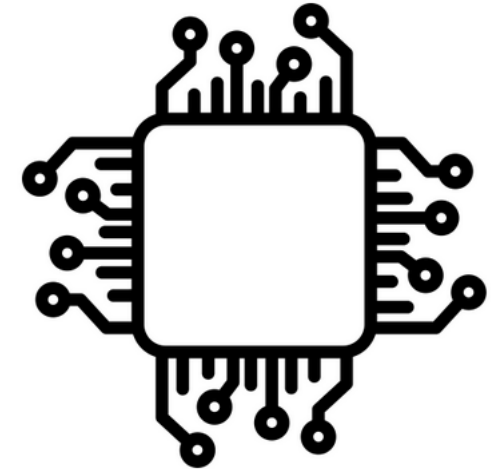


1PB = 1000TB

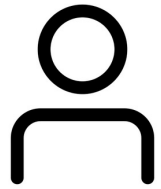
Software

- Essentials

- Modules
- CONDA
- SLURM
- Containers

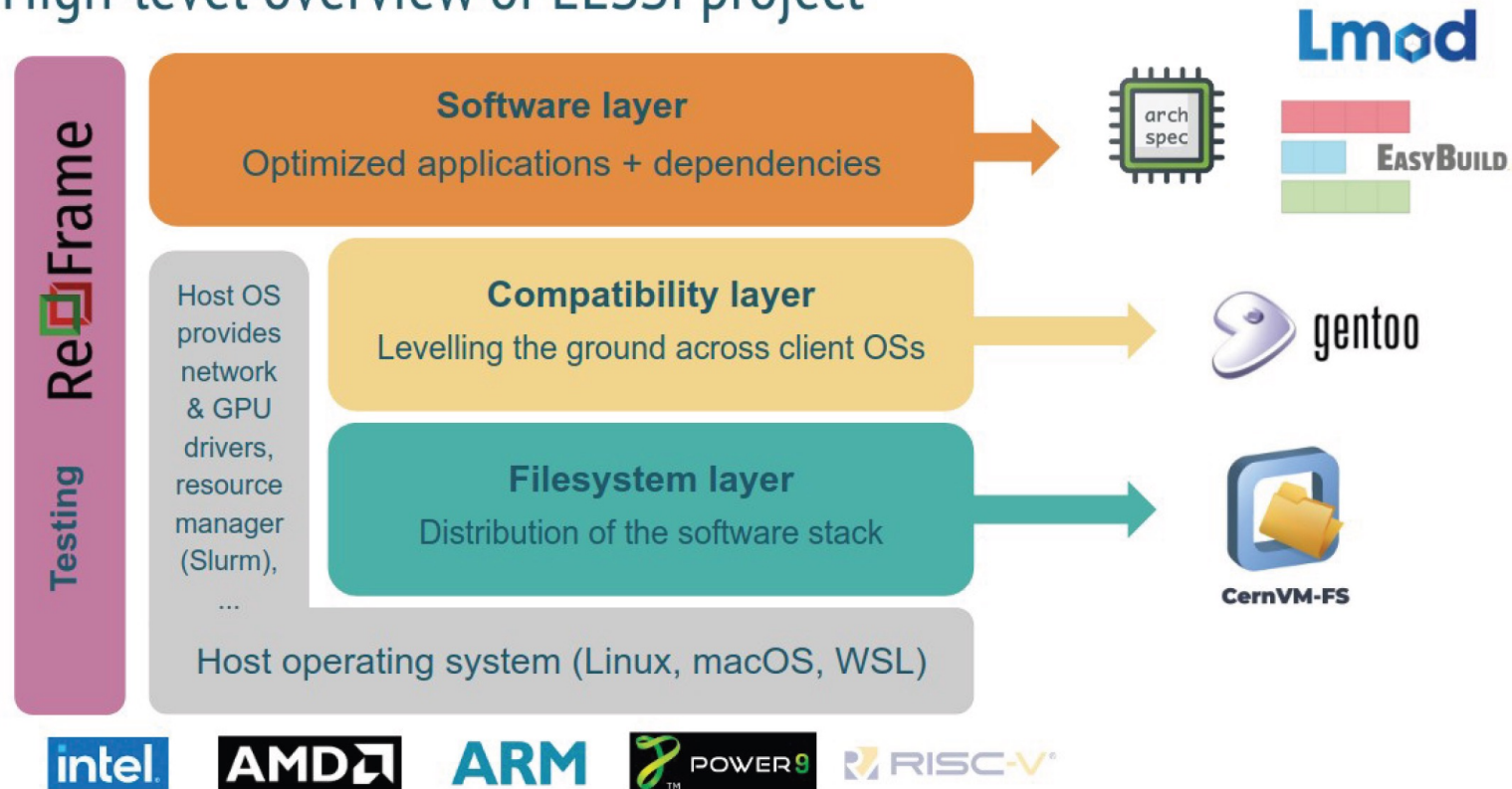


Software

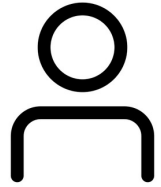


- Essentials – EESSI (European Environment for scientific software installations)

High-level overview of EESSI project

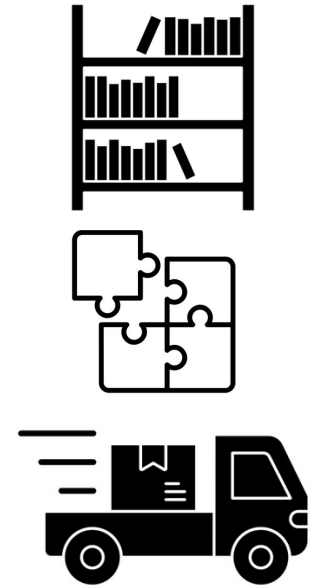
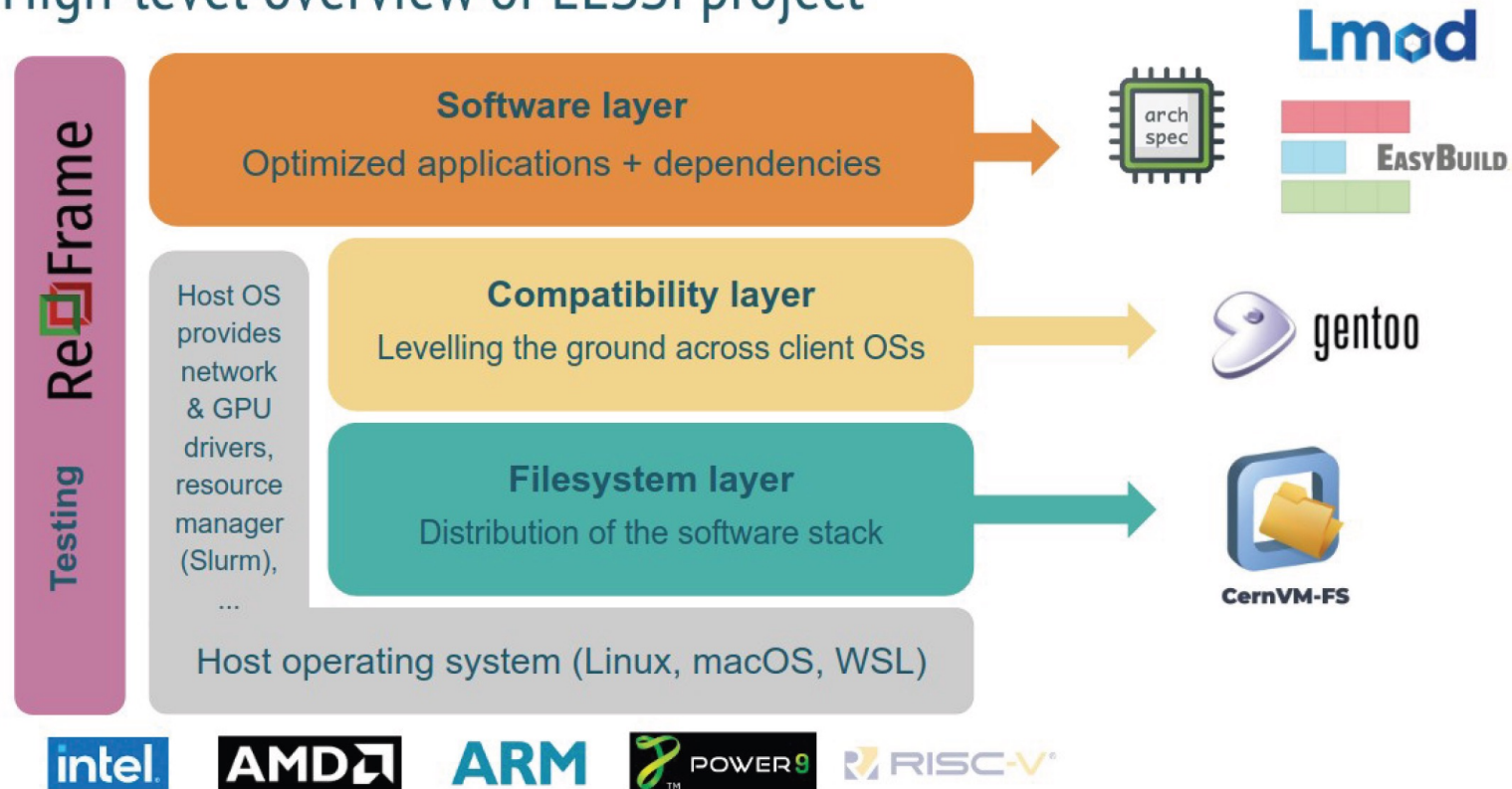


Software

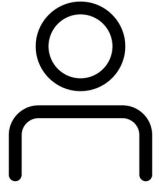


- Essentials – EESSI (European Environment for scientific software installations)

High-level overview of EESSI project



Software



- Modules

- software stack in versioned releases
- default pre-loaded

```
> module list
```

```
...
```

```
Currently Loaded Modules:
```

```
1) EESSI/2023.06 (S) 2) ASC/2023.06 (S)
```

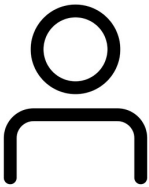
- other available versions

```
> module --force purge && module avail
```

```
...
```

```
ASC/2023.06 (D:23)    ASC/2025.06 (25)    EESSI/2023.06 (D:23)    EESSI/2025.06 (25)
```

Software



- Modules

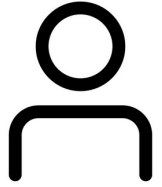
- module overview (or ml ov)
- Gives overview of “all” available modules.

----- System -----							
CUDA (4)	GnuTLS (2)	hwloc (2)	libdeflate (2)	libgcrypt (1)	libgpg-error (1)	libpciaccess	
----- Mathematics -----							
ArviZ (1)	CoinUtils (2)	GMP (2)	KaHIP (1)	MathWorksServiceHost (1)	MPFR (2)	Par	
Cbc (2)	Eigen (2)	gmpy2 (2)	libcerf (1)	MATLAB (1)	MUMPS (2)	pyst	
Cgl (2)	ELPA (1)	gmsh (1)	libxsmm (1)	METIS (2)	Octave (1)	Qhu	
Clp (2)	GEOS (2)	ISL (1)	magma (1)	MPC (2)	Osi (2)	Sca	
----- CAE -----							
occt (1)	OpenFOAM (5)	STAR-CCM+ (1)	Zoltan (1)				
----- Tools -----							
ANSYS (1)	EasyBuild (10)	googletest (2)	jupyter-server (1)	MLflow			
archspec (3)	ecBuild (1)	groff (1)	JupyterLab (1)	ncdu			

...

⋮

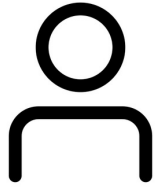
Software



- Configure view of modules

- LMOD_AVAIL_STYLE -> topics | system | arch | vendor
 - topics -> Scientific domains (system, cae, math etc)
 - system -> topics by vendor
 - vendor -> repository (ASC/EESSI)
 - arch -> CPU/GPU modules (n.b.: archdetect)

Software



- CONDA

- module load MiniForge3

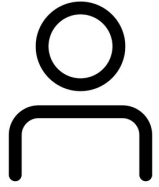
```
[as42958@login02 custkern]$ module load Miniforge3
```

```
[as42958@login02 custkern]$ module list
```

Currently Loaded Modules:

1) EESSI/2023.06 (S) 2) ASC/2023.06 (S) 3) Miniforge3/24.11.3-0

Software

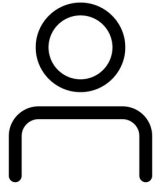


- CONDA

- module load MiniForge3
- eval “\$(conda shell.bash hook)”

```
[as42958@login02 custkern]$ eval "$(conda shell.bash hook)"  
(base) [as42958@login02 custkern]$
```

Software



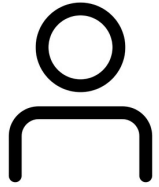
- CONDA

- module load MiniForge3
- eval “\$(conda shell.bash hook)”
- conda env create --file myenv.yaml

```
name: myenv
channels:
  - conda-forge
dependencies:
  - python=3.10
  - tensorflow=2.15.0
```

```
(base) [as42958@login02 custkern]$ conda env create --file myenv.yaml
Retrieving notices: done
Channels:
  - conda-forge
Platform: linux-64
Collecting package metadata (repodata.json): | █
```

Software



- CONDA

- module load MiniForge3
- eval “\$(conda shell.bash hook)”
- conda env create --file myenv.yaml
- conda activate myenv

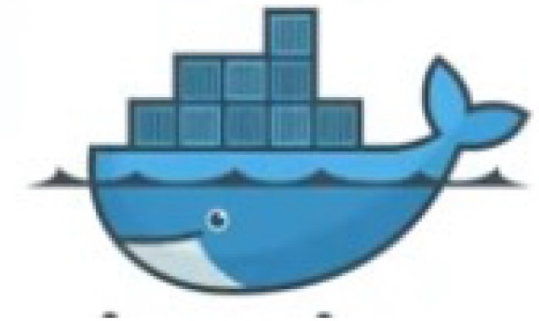
```
name: myenv
channels:
  - conda-forge
dependencies:
  - python=3.10
  - tensorflow=2.15.0
```

```
(base) [as42958@login02 custkern]$ conda activate myenv
(myenv) [as42958@login02 custkern]$
```

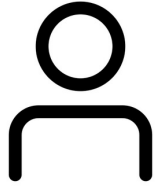
Software

- Containers

- Default containers
- Building your own containers
- Containers with EESSI



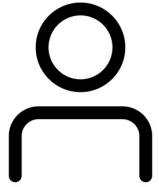
Software



- Default containers

- Same as VSC-5
- `apptainer pull pytorch-gpu.sif \`
`docker://nvcr.io/nvidia/pytorch:25.04-py3`
- `apptainer shell --containall --nv pytorch-gpu.sif`

Software

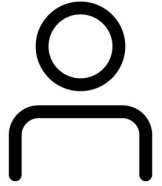


- Default containers

- Same as VSC-5
- `apptainer pull pytorch-gpu.sif \`
`docker://nvcr.io/nvidia/pytorch:25.04-py3`
- `apptainer shell --containall --nv pytorch-gpu.sif`

Bind the NVIDIA drivers to the container.
(nvidia-smi will not work without this)

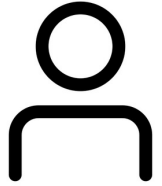
Software



- Building your container

Will need two files

- .yaml file (containing packages/channels/name)
- .def file (containing the commands to build container)



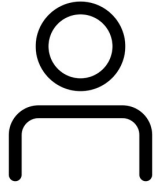
- Building a container

- .def file (containing the commands to build container)
- Read the docs!

[<https://apptainer.org/docs/user/main/build_a_container.html>](https://apptainer.org/docs/user/main/build_a_container.html)

```
> apptainer build <container_name>.sif <def_filename>.def  
> apptainer shell <container_name>.sif
```

Software



- Containers with SLURM

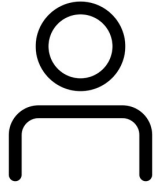
- Goal: run a program that uses the GPUs to generate music

- Steps:

- define a container image with the necessary tools
- write a script that leverages the tools
- submit the job via slurm
- try to enjoy the musical slop

- Caveat: AI was used to help generate the following examples!!!

Software



- Containers with SLURM

- define the container

```
> cat pytorch_gpu.def
Bootstrap: docker
From: pytorch/pytorch:2.3.0-cuda11.8-cudnn8-runtime
```

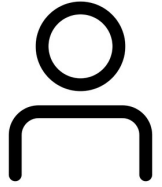
```
%post
```

```
-      pip install --no-cache-dir mido python-rtmidi
```

– build the container

```
> apptainer build pytorch_gpu.sif pytorch_gpu.def
```

Software



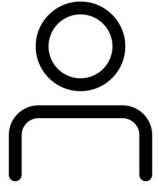
- Containers with SLURM
- Define the program to run

```
> cat music_gen_midi.py
import torch
import torch.nn as nn
import torch.optim as optim
from mido import Message, MidiFile, MidiTrack
```

```
# ----- Model -----
...
```

```
# ----- Main -----
```

```
def main():
    device = "cuda" if torch.cuda.is_available() else "cpu"
    print("Using device:", device)
    ...
```



- Containers with SLURM
- Define the sbatch script

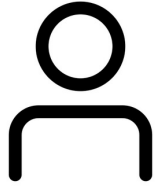
```
> cat run_music_midi.sbatch
#!/bin/bash
#SBATCH --job-name=music_midi
#SBATCH --partition=zen4_0768_h100x4
#SBATCH -N 1
#SBATCH --time=00:05:00
#SBATCH --output=music_midi_%j.out

echo "Host: $(hostname)"
echo "CUDA devices: $CUDA_VISIBLE_DEVICES"
```

```
apptainer exec --nv pytorch_gpu.sif python music_gen_midi.py
```

```
echo "Job completed. MIDI file should be in the working directory."
```

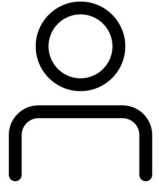
Software



- Containers with SLURM
- Schedule the job via sbatch

```
> sbatch run_music_midi.sbatch
```

Software



- Containers using SLURM
- Watch the output as the job runs

```
> tail -f music_midi_480896.out
```

```
CUDA devices: 0,1,2,3
```

```
Using device: cuda
```

```
Training...
```

```
Epoch 1, loss=4.8532
```

```
Epoch 2, loss=4.8434
```

```
Epoch 3, loss=4.8334
```

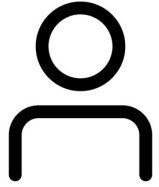
```
Generating MIDI...
```

```
Saved MIDI file: output.mid
```

```
Done. Generated notes: [60, 43, 126, 115, 45, 11, 74, 120, 12, 93, 29, 96, 41, 27, 23, 125,  
32, 2, 63, 27, 13, 12, 21, 94, 54, 22, 0, 71, 119, 92, 77, 114, 93, 15, 44, 121, 42, 72, 52,  
26, 58, 120, 110, 102, 39, 77, 110, 102, 75, 81, 104, 92, 71, 80, 50, 0, 20, 99, 44, 107, 43]
```

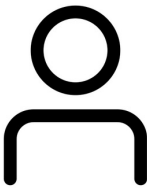
```
Job completed. MIDI file should be in the working directory.
```

Software



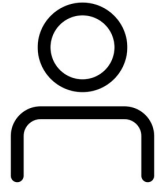
- POLICY ! (a note)

- \$USER installs software in \$HOME or \$DATA
- No Python/R packages installed centrally.
- Cyclic releases provide stable versions, older v available.
- New versions in next cycle release.
- Software obsolete after 3 years. (later loaded via profile)
- Software removed at hardware end of life.
- Reasonable support whenever possible.

 - Partitions

- Currently 2

Name	#Nodes	#cores / with HT	GPU	USE	Max run time
zen4_0768	72	192/384	-	Default partition	3 days
zen4_0768_h100x4	112	192/384	4x Nvidia H100	GPU Partition	3 days

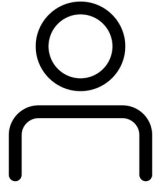


- Modes – Comfort mode

- similar to VSC4/VSC5
- “Automatically” sets suitable values to SLURM variables.

(only) Specified	Allocated
- N 1	1 Node, with 190 tasks, 1CPU/task, single threaded, all memory, exclusive.
- N 1 -- gres=gpu:4	1 Node, with 4 tasks, 22 CPUs/task, single threaded, all memory, exclusive.

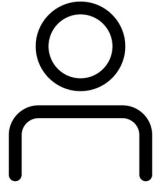
SLURM



- Modes – Vanilla mode

- “Vanilla” SLURM
- Customize variables as needed.

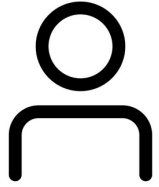
```
#!/bin/bash
#ASC --vanilla
#SBATCH --job-name "myjob"
#SBATCH -N 1
#SBATCH --gres=gpu:4
#SBATCH --ntasks-per-node=4
#SBATCH --cpus-per-task=22
#SBATCH --threads-per-core=1
#SBATCH --qos zen4_0768_h100x4
#SBATCH -p zen4_0768_h100x4
#SBATCH --time=01:00:00
```



- Node configuration (nice-to-know)

- 8 NUMA nodes per node
- 24 cores per NUMA node (=192 cores/node)

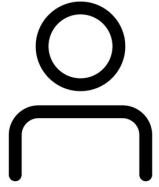
```
$ lscpu | grep NUMA
NUMA node(s):                        8
NUMA node0 CPU(s):                   0-23,192-215
NUMA node1 CPU(s):                   24-47,216-239
NUMA node2 CPU(s):                   48-71,240-263
NUMA node3 CPU(s):                   72-95,264-287
NUMA node4 CPU(s):                   96-119,288-311
NUMA node5 CPU(s):                   120-143,312-335
NUMA node6 CPU(s):                   144-167,336-359
NUMA node7 CPU(s):                   168-191,360-383
```



- Node configuration (nice-to-know)

- 8 NUMA nodes per node
- 24 cores per NUMA node (=192 cores/node)
- GPU nodes: only 22 available due to WEKA filesystem.

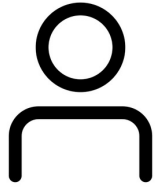
```
$ lscpu | grep NUMA
NUMA node(s):                        8
NUMA node0 CPU(s):                  0-23,192-215
NUMA node1 CPU(s):                  24-47,216-239
NUMA node2 CPU(s):                  48-71,240-263
NUMA node3 CPU(s):                  72-95,264-287
NUMA node4 CPU(s):                  96-119,288-311
NUMA node5 CPU(s):                  120-143,312-335
NUMA node6 CPU(s):                  144-167,336-359
NUMA node7 CPU(s):                  168-191,360-383
```



- Node configuration (nice-to-know)

- 8 NUMA nodes per node
- 24 cores per NUMA node (=192 cores/node)
- CPU nodes: cores 190 and 191 are reserved for WEKA filesystem.

```
$ lscpu | grep NUMA
NUMA node(s):                        8
NUMA node0 CPU(s):                   0-23,192-215
NUMA node1 CPU(s):                   24-47,216-239
NUMA node2 CPU(s):                   48-71,240-263
NUMA node3 CPU(s):                   72-95,264-287
NUMA node4 CPU(s):                   96-119,288-311
NUMA node5 CPU(s):                   120-143,312-335
NUMA node6 CPU(s):                   144-167,336-359
NUMA node7 CPU(s):                   168-191,360-383
```

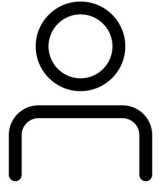


- Node configuration (nice-to-know)

- See the rest SLURM config with command

```
# scontrol show node n3014-001
NodeName=n3014-001 CoresPerSocket=24
  CPUAlloc=0 CPUEfctv=380 CPUTot=384 CPULoad=0.00
  AvailableFeatures=nogpu,hca_mlx5_0
  ActiveFeatures=nogpu,hca_mlx5_0
  Gres=np_zen4_0768:380
  NodeAddr=n3014-001 NodeHostName=n3014-001
  RealMemory=770000 AllocMem=0 FreeMem=N/A Sockets=8 Boards=1
  CoreSpecCount=2 CPUSpecList=380-383 MemSpecLimit=7000
  State=DOWN+NOT_RESPONDING ThreadsPerCore=2 TmpDisk=0 Weight=1 Owner=N/A MCS_label=N/A
  BootTime=None SlurmdStartTime=None
  LastBusyTime=2025-10-21T11:46:18 ResumeAfterTime=None
  CfgTRES=cpu=380,mem=770000M,billing=380,gres/np_zen4_0768=100
```

SUPPORT



- Contact points

- support@asc.ac.at
- Documentation: https://docs.asc.ac.at/musica_test/index.html
- Matrix channel at #asc-musica-open-testphase:tuwien.ac.at

$\frac{1}{\sqrt{\pi}} \int_{-\infty}^{\infty} f(x) e^{-x^2} dx = \frac{1}{\sqrt{\pi}} \int_{-\infty}^{\infty} f(x) e^{-x^2} dx$

[illegible]