

Arrhenius Technical

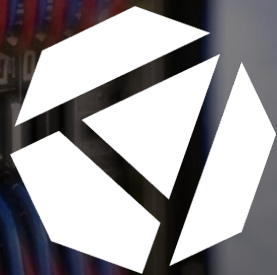
NAISS User Forum

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Technical Director

NAISS



ARRHENIUS

Arrhenius – The project

Many thanks to the Arrhenius project leader and former NAISS Deputy Technical Director Gert Svensson for ensuring that the installation project was so successful



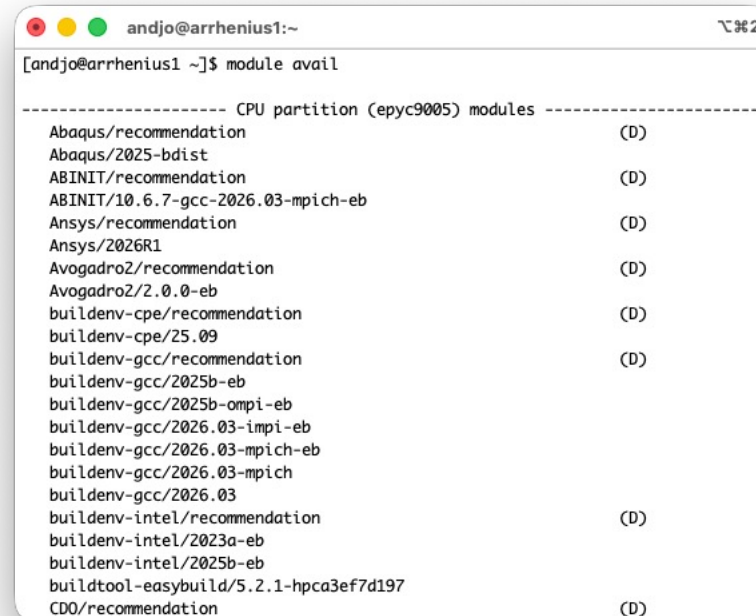
Arrhenius – A multifaceted system

There are multiple parts to the system to accommodate needs of different user communities

- Arrhenius High-Performance Computing
- Arrhenius Persistent Compute and Data
- Arrhenius Sensitive Data

But the system also looks quite different depending on your perspective

Arrhenius – What the users see



```
andjo@arrhenius1:~  
[andjo@arrhenius1 ~]$ module avail  
  
----- CPU partition (epyc9005) modules -----  
Abaqus/recommendation (D)  
Abaqus/2025-bdist  
ABINIT/recommendation (D)  
ABINIT/10.6.7-gcc-2026.03-mpich-eb  
Ansys/recommendation (D)  
Ansys/2026R1  
Avogadro2/recommendation (D)  
Avogadro2/2.0.0-eb  
buildenv-cpe/recommendation (D)  
buildenv-cpe/25.09  
buildenv-gcc/recommendation (D)  
buildenv-gcc/2025b-eb  
buildenv-gcc/2025b-mpi-eb  
buildenv-gcc/2026.03-mpi-eb  
buildenv-gcc/2026.03-mpich-eb  
buildenv-gcc/2026.03-mpich  
buildenv-gcc/2026.03  
buildenv-intel/recommendation (D)  
buildenv-intel/2023a-eb  
buildenv-intel/2025b-eb  
buildtool-easybuild/5.2.1-hpca3ef7d197  
CD0/recommendation (D)
```

Arrhenius – What the users see

Is this the user expectation? Please attend the user support sessions for tips!



Arrhenius – What the system admins see



Arrhenius – What the facility managers see



Arrhenius HPC



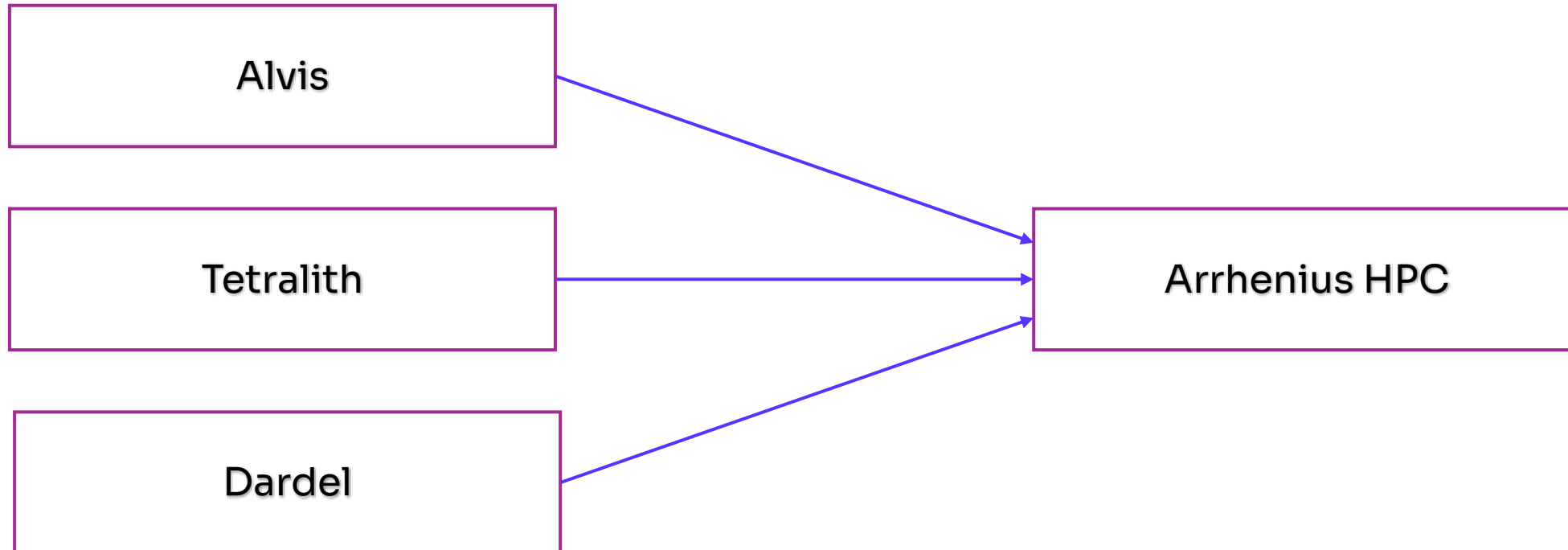
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Arrhenius HPC – Purpose

- Provide compute resources for FP64 simulations
- Traditional batch system, not a very interactive or pure AI system
- Optimised for efficient resource utilisation

Arrhenius HPC – Continuity

Consolidation of earlier national systems



Arrhenius HPC – Basic specifications

- A mid-range GPU-heavy HPC system delivered by HPE
- CPU and GPU partition based on the HPE Cray EX4000 DLC chassis
- Installed Dec 2025–Feb 2026 at NAISS, the National Academic Infrastructure for Supercomputing in Linköping, Sweden
- Concentrates and replaces compute capacity currently geographically distributed across Sweden
- Funded by the Swedish Research Council (65%) and EuroHPC JU (35%) with EUR60 million over 5 years
- HPC CPU and GPU partition operational since Jun 2026

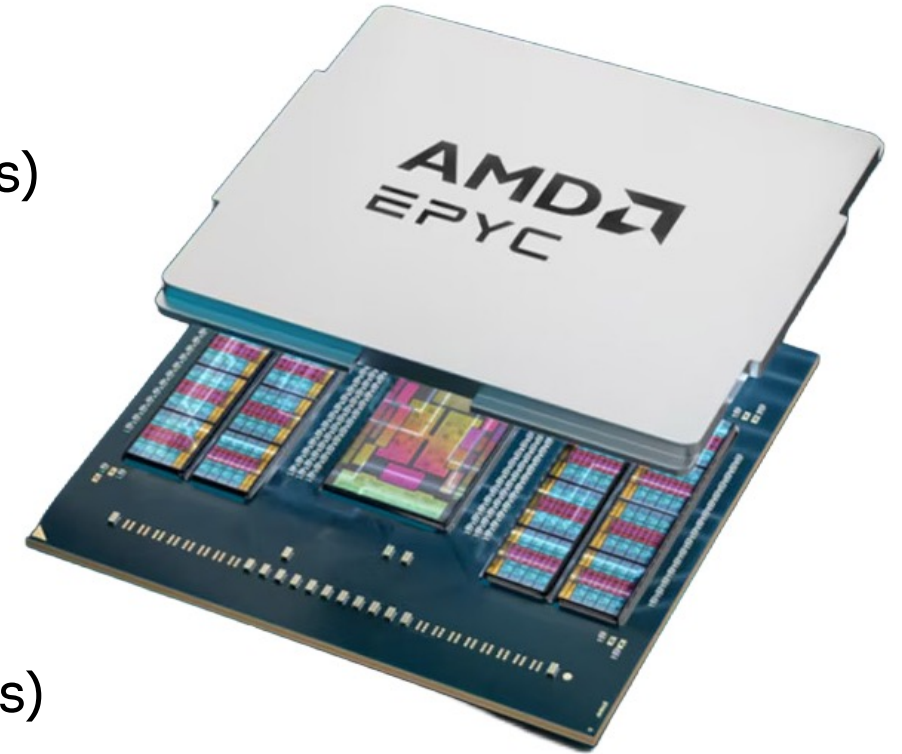
Arrhenius HPC – CPU partition

Thin nodes, 192 nodes, each with:

- CPU: 2x AMD EPYC 9755 Turin 2.7 GHz (128 cores)
- RAM: 768 GB DDR5
- Interconnect: 1x Slingshot 200 GB
- Local Storage: 1.8 TB NVME

Fat nodes, 20 nodes, each with:

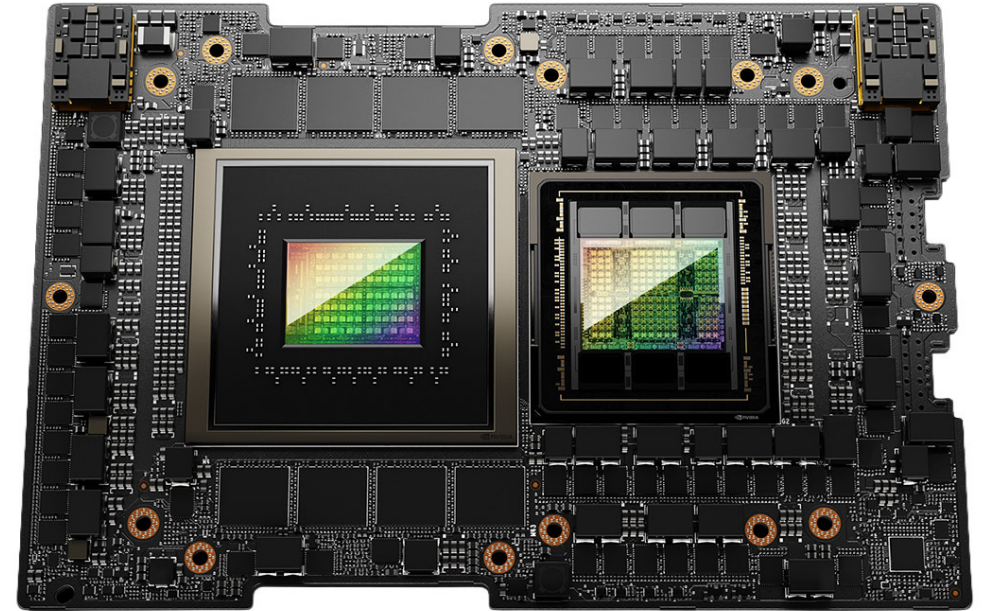
- CPU: 2x AMD EPYC Turin 9745 2.4 GHz (128 cores)
- RAM: 3 TB DDR5
- Interconnect: 1x Slingshot 200 GB
- Local Storage: 1.8 TB NVME



Arrhenius HPC – GPU partition

GPU nodes, 382 nodes, each with:

- CPU: 4x NVIDIA GH200 superchips
72 core ARM
- GPU: 4x NVIDIA GH200 96 GB HBM
128 GB LPDDR Modules
- Interconnect: 4x Slingshot 200 GB
- Local Storage: 1.8 TB NVME



HPL performance: **66.8 PFLOPS** (#42 on TOP500 and #24 Green500 in June 2026)

Arrhenius HPC – Status

- Operational since 2026-06-01
- More than 2,000 accounts activated
- To prepare for the Dardel migration, the entire system is not allocated. Now is the time to use the system heavily
- File system issues have caused some outages
 - Lustre client mitigation required 4k page size (fixed now)
 - Crash bug on storage server caused two total outages

Arrhenius Persistent Compute and Data



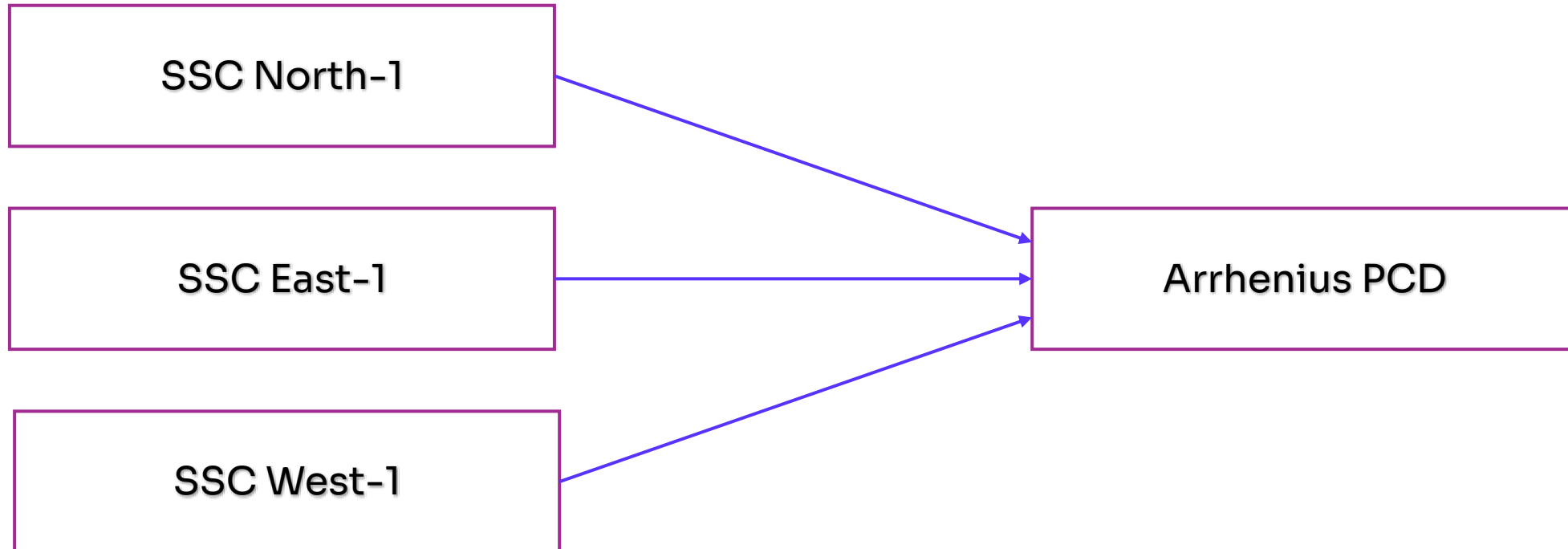
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Arrhenius Persistent Compute and Data – Purpose

- Provide a way to run persistent services to support computational projects
- Not a batch system, services can be running continuously with external access
- Dimensioned for web services, databases, etc.

Arrhenius PCD – Continuity

Consolidation of earlier Swedish Science Cloud regions



Arrhenius PCD – Basic specifications

- Features a CPU compute module, a small three-node GPU module with NVIDIA L40S 48GB GPUs for specialised GPU workloads, and a CEPH storage module offering 2.5 PB of raw storage
- In total over 4,000 CPU cores connected by high-speed Ethernet
- Supplies persistent compute resources as virtual machines via a virtualisation platform, with plans to add container-based services

Arrhenius PCD – Status

- Operational since June

Arrhenius SENS



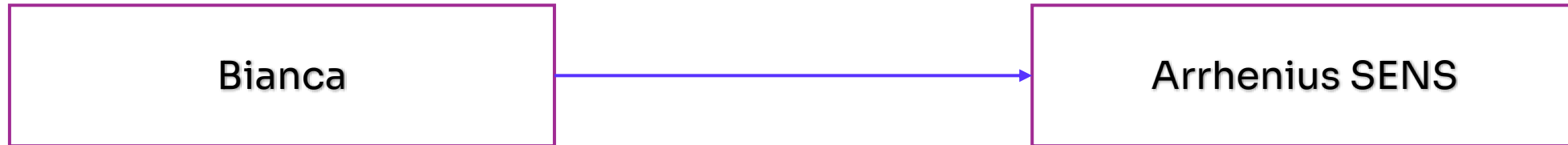
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Arrhenius SENS – Purpose

- Dedicated HPC partition for sensitive personal data, optimised for isolation
- Meets strict security requirements for large-scale data storage and handling, in full compliance with EU laws and regulations, without significantly compromising usability or performance
- Includes ISO 27000 series-based measures such as isolated user environments, strong authentication, restricted Internet access, and enhanced activity logging
- Provides a typical HPC environment with SLURM job management, and supports both terminal and graphical logins

Arrhenius SENS – Continuity

Continuation of earlier system for sensitive data



Arrhenius SENS – Basic specifications

- 3 Small CPU nodes, each with 2x 128-core AMD EPYC 9745 at 2.4 GHz and 768 GB RAM
- 17 Large CPU nodes, each with 2x 128-core AMD EPYC 9745 at 2.4 GHz and 3072 GB RAM
- 20 Small GPU nodes, each with 4x Nvidia L40S 48GB GPUs and 2x 32-core AMD EPYC 9335 at 3.0 GHz and 384 GB RAM
- 1 Large GPU node with 4x Nvidia H100 80GB and 2x 32-core AMD EPYC 9335 at 3.0 GHz and 768 GB RAM
- VAST Storage 10 PB

Arrhenius SENS – Status

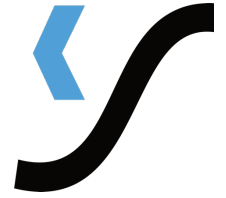
- Not operational yet, targeting opening the system for users in November

Sweden AI Factory system Boestad Sneak peak



Sweden AI Factory system Boestad

Basic specifications



- An AI-optimised system to be delivered by Bull
- Based on the Bull Sequana XH3500 DLC racks with 100 NVL4 nodes for a total of 400 GB200 GPUs
 - Small CPU partition with 30 Grace CPU nodes
 - IBM ESS storage with S3 interface
 - Nokia Ethernet network
 - Red Hat OpenShift + BullSequana Pro AI
- Will be Installed in early 2027 at NAISS in Linköping, Sweden
- Funded by the Swedish Research Council (50%) and EuroHPC JU (50%) with EUR40 million over 5 years

Thank you for listening
Questions?