



# Introduction to PDC

Centre for high performance computing

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# What is PDC?

- A supercomputing centre founded in 1990
  - SNIC centre(SNIC > Swedish National Infrastructure for Computing)
  - Under administration of School of Electrical Engineering and Computer Science (EECS) at KTH
- Providing high performance computing (HPC) services for academic and business/industrial research.
  - Services include HPC systems for performing computations and simulations (as well as pre- and post-processing of data), short- and long-term data storage, and assistance from application and systems experts

# HPC Systems

- Beskow:
  - Cray XC40 system
  - Intel Haswell and Broadwell processors
  - Designed for running large parallel jobs
- Tegner
  - Pre and post processing system for Beskow
  - Intel CPUs + NVIDIA Tesla GPUs
  - 24 cores per node
  - Has large memory nodes: 0.5-1-2 TB
  - Will be used for OpenFOAM training
- Dardel
  - New system of PDC arrived a few months ago!
  - Dual AMD EPYC™ 2.25 GHz 64 core processor
  - AMD Instinct™ MI200 GPUs

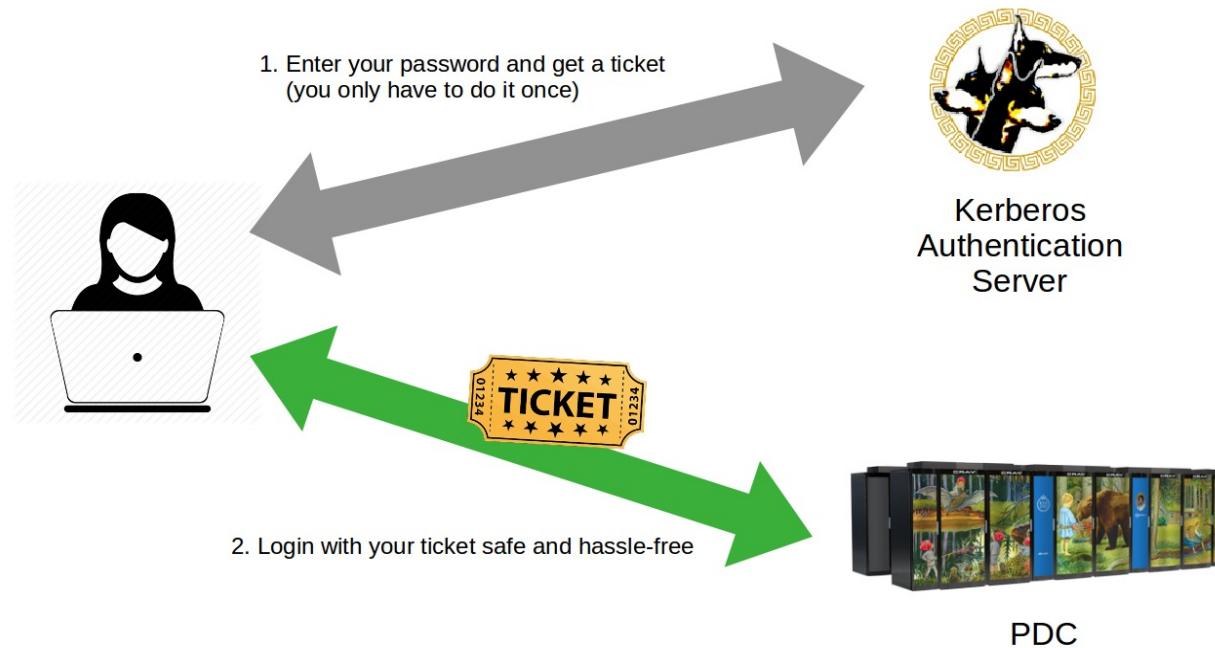


# Dardel Compute nodes

Number of nodes	RAM (GB)	Name
488	256	Thin
20	512	Large
8	1024	Huge
2	2048	Giant
36	256	Business

# Getting started with Tegner

How to login: two step login using Kerberos ticket



```
Kinit -f <username>@NADA.KTH.SE  
ssh -X <username>@tegner.pdc.kth.se
```

# Getting started with Tegner

## How to login

- Apply for a PDC account!
  - <https://pdc-web.eecs.kth.se/accounts/>
  - Receive your password by SMS
- Follow steps in:  
<https://www.pdc.kth.se/support/documents/login/login.html#step-by-step-login-tutorial>
- Contact PDC support in case of login issues:  
[support@pdc.kth.se](mailto:support@pdc.kth.se)

# OpenFOAM on Tegner

- Once logged in, you will be on your home directory:  
`/afs/pdc.kth.se/home/<letter>/<username>`

```
[arash2@tegner-login-1 ~]$ pwd  
/afs/pdc.kth.se/home/a/arash2  
[arash2@tegner-login-1 ~]$
```

All the operations will be performed on your home directory

- All the software on Tegner are available through modules
- You need to load a module to your environment to access it

# OpenFOAM on Tegner

- Run '**module avail openfoam**' to see which versions are available:

```
[arash2@tegner-login-1 ~]$ module avail openfoam  
  
----- /pdc/modules/system/base -----  
openfoam/1612+ openfoam/1712 openfoam/1812 openfoam/2.3.1 openfoam/5.0 openfoam/7  
openfoam/1706 openfoam/1806 openfoam/1912 openfoam/4.1 openfoam/6
```

- Run '**module load openfoam/1912**'
- Run 'module list' to see the loaded modules and make sure OpenFOAM is loaded:

```
[arash2@tegner-login-1 ~]$ module list  
Currently Loaded Modulefiles:  
  1) gcc/7.2.0          2) openmpi/3.0-gcc-7.2  3) openfoam/1912  
[arash2@tegner-login-1 ~]$
```



# OpenFOAM on Tegner

- Now you have access to OpenFOAM on Dardel!
- You need to run a script to set some environment variables and paths for OpenFOAM:
  - > . \$FOAM\_BASHRC
- Copy OpenFOAM tutorials to your home directory:
  - cp -r \$WM\_PROJECT\_DIR/tutorials .

Now You're ready for the analysis! You have Necessary files on your home directory

# How to run OpenFOAM on Tegner

- You are already on the 'login node' and do not have access to the compute resources. You need to request a compute node:

- Request a compute node using 'salloc' command

```
> salloc -N 1 -t 03:00:00 -A edu21.opfm
```

Number of nodes

Time

Account

15 nodes are reserved for this course. Each compute node has 24 cores

- You should see Something like this once you're granted a compute node:

```
salloc: Pending job allocation 63554
salloc: job 63554 queued and waiting for resources
salloc: job 63554 has been allocated resources
salloc: Granted job allocation 63554
```

# How to run OpenFOAM on Tegner

- To run your job you use **srun** command:

```
> srun -n 32 icoFoam -parallel
```

Number of cores      OpenFOAM binary      OpenFOAM option

- Important note: You should always use 'srun' command to run your job otherwise it will run on the login node and makes troubles for the system.

Good luck with the computations!