Instruction to install Firedrake in a Singularity docker on ARC4.

1. Make directories to save a Singularity docker.

$cd

  $mkdir  /nobackup/cscmaw

  $mkdir  /nobackup/cscmaw/$USER

  $touch  .singularity

  $ln -s /nobackup/cscmaw/$USER/  .singularity

$ mkdir /nobackup/cscmaw/firedrake

1. Load modules required for installation.

$ module swap openmpi mvapich

 $ module add apptainer

 $ module add anaconda

1. Install Firedrake using Singularity

$ cd /nobackup/cscmaw/firedrake

$  apptainer pull docker://firedrakeproject/firedrake

1. When finishing the installation, a Firedrake image named firedrake\_latest.sif is made.

After that, move the Firedrake image into a directory where you want to compute.

$mv firedrake\_latest.sif /home/home02/$USER

1. Now, the installation ends. To run a Firedrake code, there are two ways.
2. Command directly at a linux window. First, load Singularity as

$ module add singularity/3.6.4

And then, command the follows

$singularity exec --env 'PATH=/home/firedrake/firedrake/bin:$PATH' -B /run -B /nobackup -B ~/.cache:/home/firedrake/firedrake/.cache firedrake\_latest.sif python BL\_test.py

1. Submit a job script to job scheduler of ARC4. An example of a job script is attached.

For more detail about a job script, refer to [Batch jobs — ARC Documentation (leeds.ac.uk)](https://arcdocs.leeds.ac.uk/usage/batchjob.html)