

Instructions to install ASPECT on a Centos8 cluster

This is the description of how me and my colleague installed ASPECT on our Centos8 cluster. We describe two ways to do it: local installation on the cluster and installation through a virtual machine with Centos 8.

Local installation on the cluster

1. Download candi

```
git clone https://github.com/dealii/candi
```

2. After downloading candi, we edited the candi/candi.cfg file and uncommented the line

```
PACKAGES="${PACKAGES} once:openblas".
```

and commented all the packages that are not strictly necessary (i.e opencascade, parmetis, petsc, slepc and symengine).

3. We edited the file candi/deal.II-toolchain/packages/trilinos.package and set the trilinos version to 12.10 by commenting the lines:

```
#VERSION=12-18-1
```

```
#CHECKSUM=9c1d151169949bca6cf203831e4d6aee
```

And uncommenting:

```
VERSION=12-10-1
```

```
CHECKSUM="667333dbd7c0f031d47d7c5511fd0810  
40f28628b63310f9bd17c26d9ebe32b1"
```

4. We set the compilers variables by typing:

```
export CC=mpicc; export CXX=mpicxx; export FC=mpif90; export  
FF=mpif77
```

5. We ran the candi installer using the CentOS7 platform file

6. After candi's installation was complete we ensured that the environment was properly configured by running

```
source INSTALL_PATH/configuration/enable.sh
```

7. Finally, we installed ASPECT as normally.

Of course, each cluster is different, and it is likely that the above instructions don't work on other clusters. For that reason, another solution (not the best but it has worked for us) would be to install ASPECT in a virtual machine with centos8 replicating a user identical to the one we have in the cluster and then copy the aspect and dealii-candi directories from the virtual machine to the cluster. The way to do this is explained in the following section.

installation through a virtual machine with Centos 8.

First, we must create a virtual machine with centos8. The easiest way to do this is by using vagrant (<https://www.vagrantup.com/>), an easy tool for building and managing virtual machine environments in a single workflow. The prerequisites for using vagrant are installing the latest version of Vagrant and installing a virtualization product such as VirtualBox (<https://www.virtualbox.org/>). After installing vagrant and VirtualBox, the next steps are as follows:

1. First, ensure that your cluster is using Centos 8 by looking at the "redhat-release" file:

```
cat /etc/redhat-release
```

2. Create a directory on your computer in which you will store a "Vagrantfile" with the configuration of the virtual machine we are going to create. Attached is a Vagrantfile with the settings that we used for Centos 8. As you can see, the machine uses 4GB of RAM. Less amount will force the machine to use swap during compilation, which will make it much slower. You can simply download that file and store it in the directory just created.
3. Now move into the terminal to the directory created and init the virtual machine (at the first time, Vagrant will download the Centos image automatically) by typing:

```
vagrant up centos8
```

4. Open an SSH session on the new Centos8 machine:

```
vagrant ssh centos8
```

5. Replicate the same directory hierarchy on the virtual machine as on the cluster for the user "home" folder. For example, If on the cluster our user folder (on which we have writing permissions) is "/home/DEPARTMENT/user/" then on the virtual machine we run:

```
sudo mkdir -p /home/DEPARTMENT/user
```

6. Change the owner of the new folder to be writable by the "vagrant" user (default user):

```
sudo chown -R vagrant.vagrant /home/DEPARTMENT/user/
```

7. Access the new folder and perform **all subsequent operations** (repository cloning, compilation, etc.) in that directory (IMPORTANT):

```
cd /home/DEPARTMENT/user/
```

8. Add the EPEL repository to have access to many development packages that are not found by default in Centos 8. We followed these steps: <https://www.cyberciti.biz/faq/how-to-enable-and-install-epel-repo-on-centos-8-x/>

Once you have completed the above steps, compile the Aspect dependencies with candi by following the instructions at the top of this document.

Note:

At candi startup, you will see a list of packages to install, you will not be able to install all of them, as this list is for Centos version 7, and some packages will not exist. Install the ones that are available and move on.

When you finish compiling Aspect, ensure that everything works correctly, and then upload the directories (dealii-candi by default and the aspect directory) to the cluster, for example, via SCP.

Finally, Aspect should work the same as in the virtual machine.