Docker/Singularity usage for EUTelescope software

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General overview

As setting up the environment for EUTelescope and compiling it can be time consuming, we prepared a docker image where this has been done for you. It is available here. This image can be run using either Docker or Singularity. Once a container based on this image will be launched, it will provide a self-contained bare-bone operating system together with a running version of EUTelescope (and the libraries needed for it). Within this image we only provide the emacs text editor, and it can only be used in text mode (`-nw`).

As a container is by default self-contained, it is important to keep in mind that input and output directories should be binded while launching the containers, as will be explained later. If this is not done, all the work done within the container will be lost or the input data may not be accessible.

Running this image using Docker is particularly recommended when running on a personal computer, as it requires root access. On the other hand, Singularity is recommended for running on lxplus where it is the only available container solution.

Singularity - lxplus

Every lxplus node has Singularity available.

The first step will be to pull the image from Dockerhub. However as this image is quite space consuming, we recommend to create a directory on your work space, and to create a soft-link between the directory where singularity will download the image and your work space. This is achieved in the following way on lxplus :

```
cd ~
mkdir /afs/cern.ch/work/<u>/<user>/.singularity
ln -s /afs/cern.ch/work/<u>/<user>/.singularity
```

Then the image needs to be pulled from Dockerhub using the following command :
```
singularity pull docker://cbecot/eutel_bttb_tutorial
```

And it can afterward be run as :
```
singularity shell --writable --contain --bind /afs:/dummy --bind
/afs/cern.ch/user/c/cbecot:/output docker://cbecot/eutel_bttb_tutorial
```

The two bind allow to connect our container to the outside word to fetch our input data from afs and save the output of the analysis. The option writable ensures that the file system within the container will be writable.

This will open a shell within the container, within which the EUTelescope software and it environment can be found at the location below.
```
cd /ilcsoft/v01-19-02/Eutelescope/master/
source build_env.sh
```

Within your container, the examples are located at `/ilcsoft/v01-19-02/Eutelescope/master/jobsub/examples/`. All the output you may want to save should be copied to the `/output` directory. You can also create a soft link to /output just before running the jobsub command, using "ln -s /output" , in order to not have to worry about copying the output of this program.

Docker - your own laptop

Installations of Docker exist for linux, mac and windows. It will require root access to work properly. Once you have installed this tool you may pull the docker image using :
```
docker pull cbecot/eutel_bttb_tutorial:latest
```

And run it using :
```
docker run -i -v <YOUR_INPUT_DIRECTORY>:/input -v <YOUR_OUTPUT_DIRECTORY>:/output
-t cbecot/eutel_bttb_tutorial:latest
```

where `-i` is required to run interactively and `-t` specifies which image is

to be used. The two `-v` specify the input directory for the data, and the output where you will save your analysis.

In this case, as soon as the container is open the environment for EUTelescope will have been setup and you will be in the directory containing the examples. However, the user is there responsible for downloading the data that will be used and for modifying the examples accordingly.