XFEL Offline Calibration and Correction

Provides an integrated command line calibration tool based on Docker and Karabo. The same pipelines as for online calibration are run.

Features

Automated, concurrent correction and calibration for WP-75 managed detectors.

Detectors

LPD AGIPD

Limitations

- Currently only a local calibration database is used.
- No geometry corrections are supplied.

Usage

The offline calibration runs inside a Docker container. In the following usage examples for the XFEL Maxwell environment will be given.

note

Docker access is not enabled on Maxwell by default. To have it granted send an email to maxwell.service@desy.de

First log onto the maxwell cluster and allocate an interactive resource to work on:

```
ssh username@max-exfl
salloc -p PARTITION -t DURATION
```

Here PARTITION should be either upex or exfel depending on your access rights. Often is is also good to give a DURATION in the form of hh:mm:ss as the default is one hour, which might not be sufficient.

Once on Maxwell you can copy everything you need from

/gpfs/exfel/data/scratch/example_data/offline_calibration

into a local directory. Then follow the instructions below.

Running Corrections

To run corrections run the calibrate.py script with the --type=correct option:

```
python calibrate.py --input /gpfs/exfel/data/scratch/example_data/\
                    r0283/RAW-R0283-AGIPD*0.h5 \
              --output ../offline_data/calibrated_agipd/ \
              --local-cal-store ../offline_ana/agipd_store.h5 \
              --mem-cells 30 --cores 16 \
              --instance SPB_DET_AGIPD1M-1 \
              --type correct --nodes 1 \
              --partition upex
```

Important arguments here are:

--input This should point to the files you would like to correct, *not* a directory, you can however use wildcards.

--output This should point to the directory you would like to output to. The same number of files as input will be created. **Be careful, existing data will be overwritten**.

--local-cal-store The location of the calibration store file.

--mem-cells The number of memory cells the detector was using.

--type Set this to correct if you want to perform correction

--partition Maxwell partition to run SLURM jobs on

--nodes Additional nodes to use on Maxwell. Files will be load-balanced on a per-module level.

Updating Calibration Data (Dark Images)

To update the dark image derived calibration constants use calibrate.py with
'–type char_dark':

```
python calibrate.py --input /gpfs/exfel/data/scratch/example_data/\
                          r0283/RAW-R0283-AGIPD*0.h5 \
                    --output ../offline_data/calibrated_agipd/ \
                    --local-cal-store ../offline_ana/agipd_store.h5 \
                    --mem-cells 30 --cores 16 \
                    --instance SPB_DET_AGIPD1M-1 \
                    --type char_dark --nodes 1 \
```

This will update your local calibration store, such that you can use the updated
calibration with the next correction run. It is recommended to run this only on
one node.

> **note**
>
> At the end of both task a zipped calibration report is generated in
> the output directory. Generating reports takes a while, but files are
> available before this.

Common Pitfalls

nothing seems to be processed check if you are actually pointing at files.
Right after starting calibrate.py you should see a message:

```
Total input: 16 files
Balanced into 1 nodes
Node 0: 16 files
```

which indicate that files were found. If zero files are listed something is
wrong with your input parameters.

access/permission errors from Docker Check that the paths you are pointing at do not contain softlinks, possibly masking your access rights.