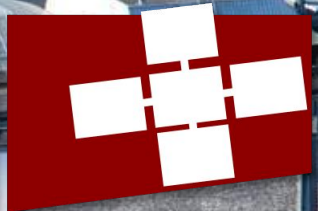


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Student Cluster Competition 2022

Reproducibility Challenge: NPBench



Productivity, Portability, Performance: Data-Centric Python

<http://spcl.inf.ethz.ch/Publications/index.php?pub=433>

DaCe

<https://github.com/spcl/dace>

Don't forget submodules:

```
git clone --recursive
           or
git clone
cd dace
git submodule update --init
```

Python versions 3.7-3.10 supported

You may (should) use a Python virtual environment.

For performance reasons, you should have a BLAS/LAPACK library installed (e.g., MKL, OpenBLAS).

Suggested to install in development mode:

```
cd dace
python -m pip install --editable .
```

You may also want to install requirements for testing:

```
python -m pip install .[testing]
```

Run something simple to verify installation:

```
python samples/simple/axpy.py
```

<https://spcl.dace.readthedocs.io/en/docs/index.html>

NPBench

<https://github.com/spcl/npbench>

```
python -m pip install -r requirements.txt  
python -m pip install .
```

```
python run_framework.py -f numpy -p paper  
python run_framework.py -f dace_cpu -p paper  
python plot_results.py -p paper
```

Set OMP_NUM_THREADS to number of physical cores, e.g.:

```
OMP_NUM_THREADS=32 python run_framework.py -f dace_cpu -p paper
```

This may help:

```
export OMP_NUM_THREADS=$(lscpu -p | egrep -v '^#' | sort -u -t, -k 2,4 | wc -1)
```

Distributed

Required components:

- MPI (we suggest MPICH, but any MPI should work)
- ScaLAPACK (can be MKL or reference/self-compiled)
- Python module mpi4py

```
cd dace  
git checkout update-pblas-library  
mpirun -n <num-processes> python samples/distributed/polybench.py
```

You can use the validation flag to run multiple MPI processes on a single node but with smaller dataset sizes and validate the results:

```
mpirun -n <num-processes> python samples/distributed/polybench.py --validate 1
```

Artifact

<https://spclgitlab.ethz.ch/tim0s/ddace-lite-sc21>

For the competition you **will not** use the DaCe versions from the original artifact but the latest version. However, you are free to adapt and use any of the scripts provided in the artifact.