LIKWID
Hands-On Exercise

Profiling a code region of a MPI+X code

Setup

- Login to the cluster

  > `ssh -Y <login>@login23-[1-4].hpc.itc.rwth-aachen.de (claix)`

  > `ssh -Y <login>@login[1-4].barnard.hpc.tu-dresden.de (barnard)`

- Get an interactive job

  > `salloc –N <num_nodes> --exclusive –A supp0006 --reservation=vihps_tw44 –p c23test –`
    `-t 01:00:00`

- Load VIHPS (incl. LIKWID) environment

- Copy handson material to your WORK directory

  > `cd $VIHPS_WORKSPACE`

  > `tar xf $VIHPS_ROOT/hands-on/likwid/NPB.tar.bz2`

- (If not already done) Load LIKWID, compiler + MPI

  > `module load likwid/5.3.0 intel/2022b`

- `Make sure your environment is clean`

Compile code with LIKWID MarkerAPI

- Unpack code

  > `tar -xf NPB.tar.bz2`

  > `cd NPB`

- Select benchmark
  - bt-mz
  - sp-mz
  - mu-mz

- Compile

  > `make <benchmark> CLASS=<class> NPROCS=<mpi_procs>`

  > `ls bin.likwid`

Running

- Run application pinned to specific hardware threads

  > `likwid-mpirun –mpi slurm –np <mpi> -t <omp> bin.likwid/<exec>`

- Check available performance groups

  > `likwid-perfctr –a`

- Run application pinned and measure hardware performance counters

  > `likwid-mpirun –mpi slurm –np <mpi> -t <omp> -g <group> bin.likwid/<exec>`

(use only a few MPI processes and OMP threads, otherwise the output might not fit your terminal. Or use `<command> | less –S`)

Running and measuring a code region

- The codes contain already the calls to the MarkerAPI
  - BT-MZ: `bt_likwid.F` and `xsolve_likwid.F`
  - SP-MZ: `sp_likwid.F` and `adi_likwid.F`
  - LU-MZ: `lu_likwid.F` and `ssor_likwid.F`

- Run pinned and measure only the marked code region
  ```
  > likwid-mpirun –mpi slurm –np <mpi> -g <group> -m bin.likwid/<exec>
  ```
  (cannot use OpenMP due to SLURM config problem)