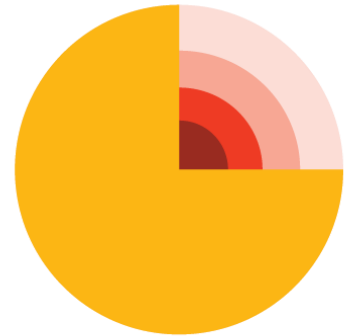


T2.1 and T2.2 Activities and highlights

Flagship code Elmer/Ice extended team

31/10/2023



ChEESE-2P





❑ **Code audit status:** *analysing*

❑ Machine(s) used for the code audit: L U M I - C

❑ POP tools used: Extrae and MPIP

❑ Code version: MPI + OpenMP SIMD (OMP_NUM_THREADS=1)

❑ Highlights:

- ❖ All traces transferred to Jose
- ❖ Systematic small load imbalance imposed by geometry (consistent over all problem sizes) due to domain decomposition
- ❖ Intentionally chose not too simple geometry and general Poisson-type solver (will be optimized and ported using OpenMP)



- ❑ T2.2 **workplan status**: *not-available* (but work in progress)
- ❖ Using **solver from audit** and augmenting matrix assembly part with **OpenMP-offload** directives
- ❖ Existing **mesh coloring** in Elmer (from OMP SIMD) seems to be usable for GPU offloading (avoid race conditions)
- ❖ Compilation Elmer with **Cray compiler** (no support for GPU offloading in GNU on LUMI-G!) – issues with compiler directives, OMP ATOMIC in combination with ALLOCATABLE – need to **port 500k line code** (unexpected road block)
- ❖ Successful **functionality testing of ROCalution** with exported large matrix system from Elmer/Ice using Cray Fortran – working on ROCalution interface for GPU solution of linear system in Elmer in close future