Biweekly MSc Thesis Progress Presentation – Lukas Strebel

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Updates on open questions

- Stencil extent
  - minimum_halo from GT4Py was too simplified.
  - Pre-process / Source graph generation now needs calls to "add_stencil(*stencil*)" for each stencil.
  - *"stencil"* is a dictionary like:

```
{"fieldname": [[1],      # negative x-direction offsets
               [1],      # positive x-direction offsets
               [1, 2],   # negative y-direction offsets
               [],       # positive y-direction offsets
               [2, 4],   # negative z-direction offsets
               [2, 4]    # positive z-direction offsets
              ],
"next_field": [[…
}
```

Updates on open questions

- Stencil extent
  - Source graph generation concatenates access pattern lists of all fields for communication cost estimation.
    - Multiple access to the same offset in the same field counts only once for the estimation.
  - Need the stencil pattern also for halo creation.
  - Stencil input at the moment manual.

Working on

- Library design / implementation
  - Pre-process / source graph generation / domain decomposition
  - Runtime functions:
    - Load subdivisions / partitioning from pre-process output.
    - Register fields – Create them in subdivisions.
    - Register stencils – Create them in subdivisions.
    - Create halos for the stencils.
    - Provide access to fields for initial conditions / global boundary conditions.
    - Provide compute() for each stencil – execute on subdivisions.
    - Provide communicate() for each stencil – execute on subdivisions.

Next Milestone – July 15

- Done with incorporation of existing graph partitioning library and model implementation to produce a domain partitioning for a test case.
- Done with some basic measurements.
- Done with the design framework / API for the library.