

OpenFOAM Tutorial

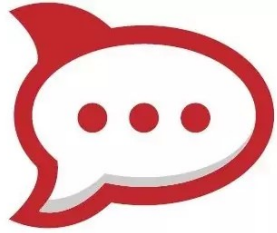
with Focus on HPC

Content

- Disclaimer
- Overview

Disclaimer

- I do not teach OpenFOAM®!
- I cannot give any guarantee that OpenFOAM® works (correctly)!
- I will not discuss models/solvers (correctness) ...!



Rocket Chat

ROCKET.CHAT



ROCKET.CHAT

- <https://138.246.237.92> (import **certificate** in browser)
- Register with Login name + Password (email unimportant)
- For Communication (also P2P)
- Video Conference/Screen sharing can be arranged

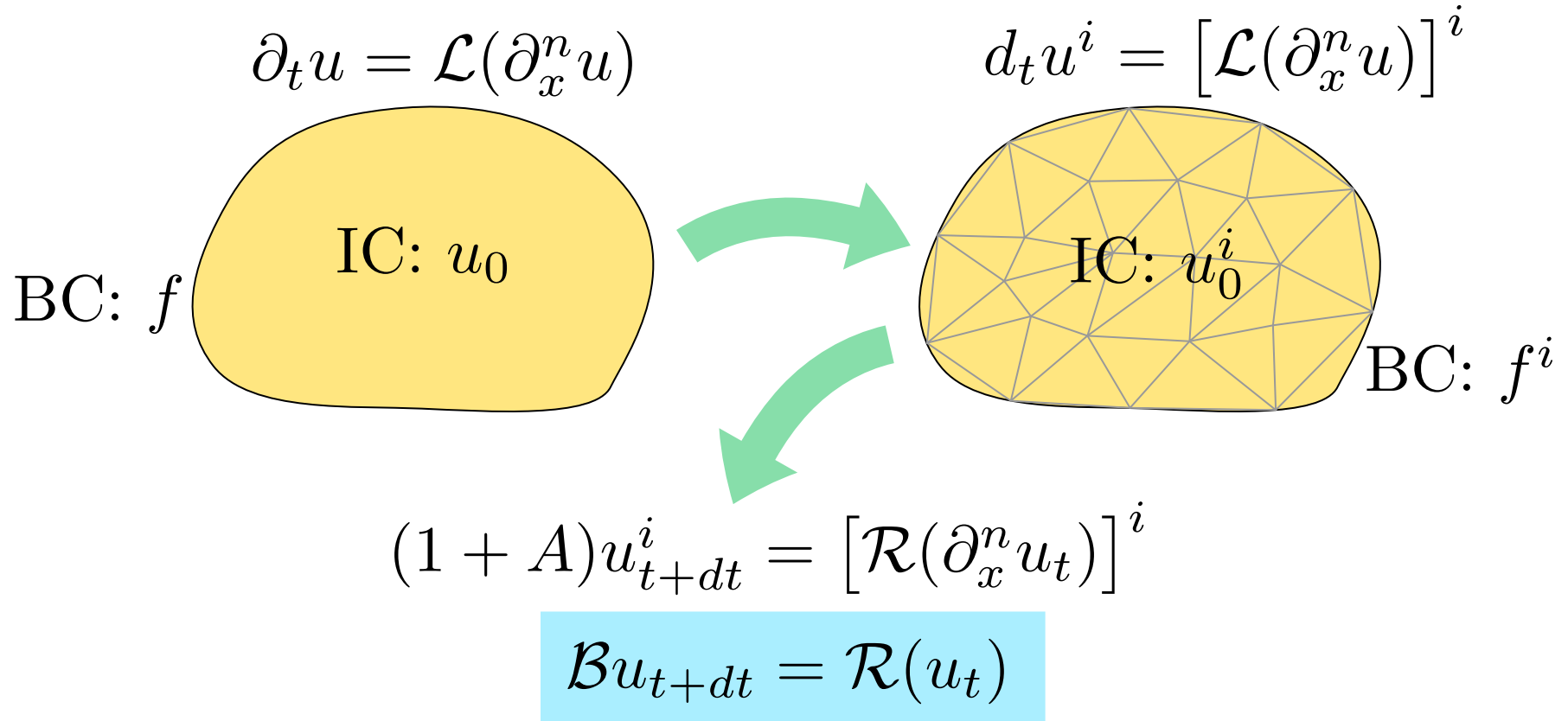
Overview

- Bird's Eye on OpenFOAM[®]
- Tutorial Outline

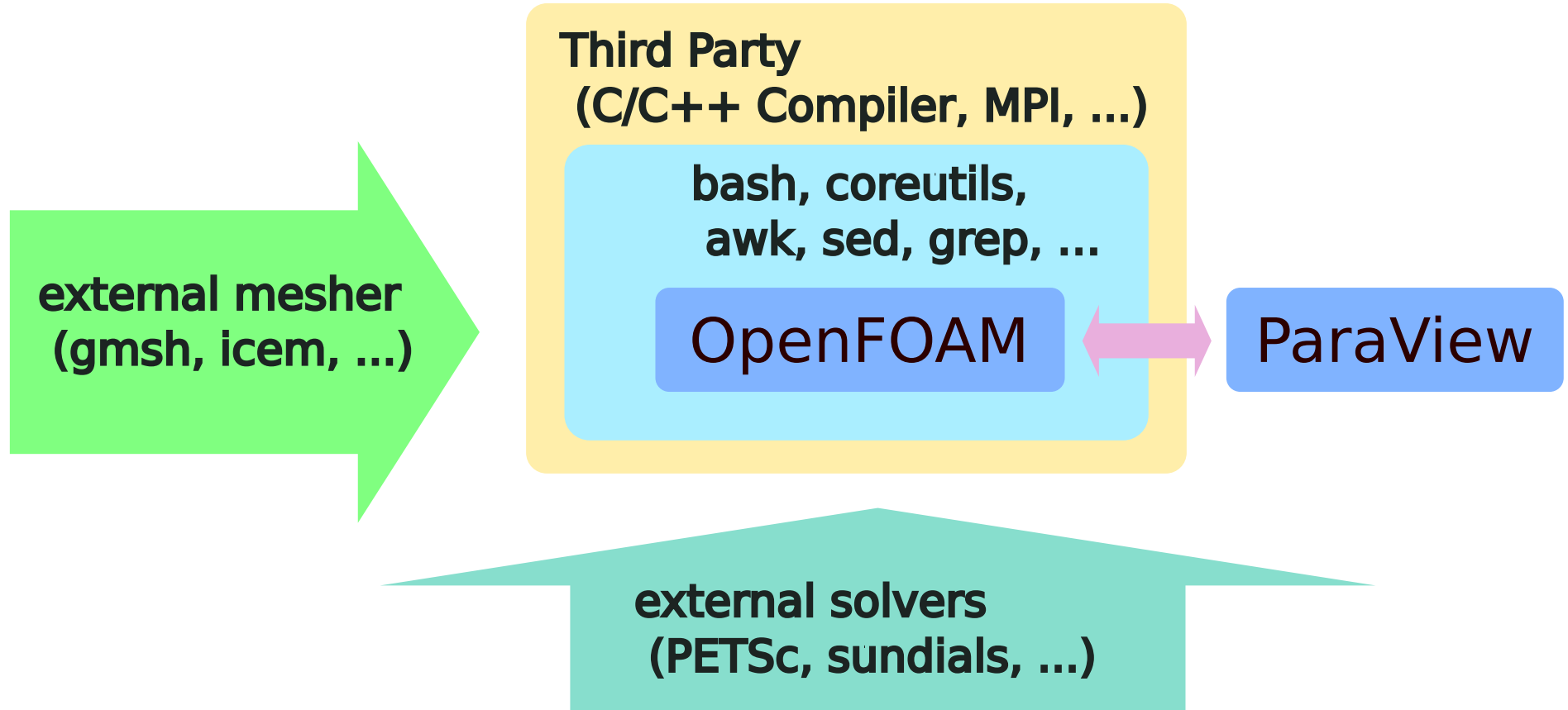
Bird's Eye on OpenFOAM®

- OpenFOAM® == C++ framework for solving PDEs computationally using Finite Volume Method (FVM)
- Currently 3 vendors: [OF Foundation](#) (CFD Direct), [ESI](#), [foam-extend](#)

Bird's Eye on OpenFOAM®



Bird's Eye on OpenFOAM[®]



Bird's Eye on OpenFOAM[®]

- Consists of **utilities**, solvers, **libraries**, ...
- Which PDE? => **solver** (check, which exist!)

Bird's Eye on OpenFOAM®

- Pose questions, formulate mathematical/physical problem (not OF)
- Pre-Processing (geometry setup, meshing, BC, IC)
- Simulation (solving the equations for time-/iteration evolution)
- Post-Processing (checking output correctness, answer questions); Visualization (e.g. ParaView)
- Iterate (is not a once-pass-through process)

Tutorial Outline

Coming Week (offline – with [PDF OF Tutorial](#) part 1/2):

1. Install OF on your local system!
2. Test OF tutorial cases! ([User Guide](#), [Tutorial Guide](#))
3. Visualize results with ParaView ([ParaView Tutorial](#))!
4. [Optional] Try MPI parallel workflow!
5. [Optional] Try own solver compilation! ([Ext. Code Guide](#))

Next week Wednesday [Optional]: Intro to HPC System @ LRZ (SSH, Bash, Module, Slurm, MPI) – Access to CoolMUC-2

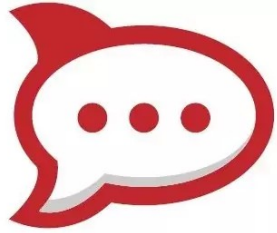
Next week Thursday: OF on HPC Systems
([PDF OF Tutorial](#) part 3)

Tutorial Outline

Installation:

1. Vendor? (com (ESI), org, extend)
2. OS? (Linux, Windows, Mac OS)
3. w/o MPI? (with: Which?)
4. w/o solver devel? (If yes: Compiler? → self-compiled)
5. Opt/Prof/Debug?

(ESI: Linux, Windows, MacOS, Source)



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