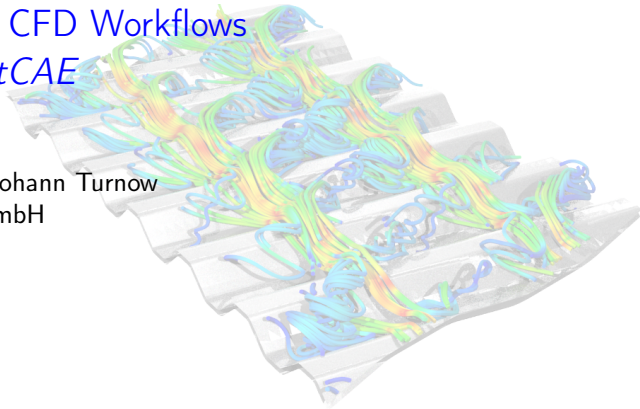# silentdynamics

Automated CFD Workflows with *InsightCAE*

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Software package for engineering analysis (CFD, FEM)

- ▶ simple and quick setup of analysis

- ▶ avoid errors in (OpenFOAM) setup

- ▶ quick repetition of analysis after geometry or BC change
  ⇒prerequisite for optimization

- ▶ quick and reliable documentation of results
- ▶ Flexibility
- ▶ Customisation

Can we achieve efficient workflows using OpenSource Software for complex analysis?

- ▶ Yes it is possible, because:

- ▶ OSS has an open architecture with many possibilities for automation
- ▶ Many independent software tools for similar tasks are available but with different strengths and weaknesses
- ▶ Need to combine and support multiple tools
- ▶ One quickly ends up in complicated workflows
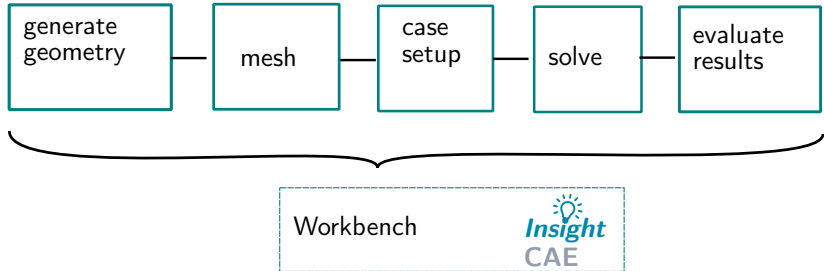- ▶ $\Rightarrow$ Automation can hide complexity of the workflow

What is the idea/aim of "InsightCAE"?

▶ Conduct an "analysis" as much automated as possible

pre-processing → solution → post-precessing → documentation

▶ Take a minimum of necessary parameters which need to be changed
▶ Standardization / best practice / testsuites for a given analysis/task
▶ Bundle addons, extensions and interfaces for all required external software utilities
▶ Automatic computation of many variants
▶ Fast case building
▶ Deployment: Provide one installation package for all workflow-related software components
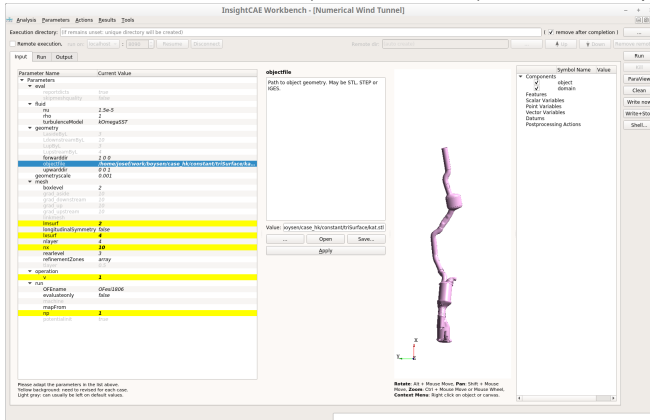▶ `sudo apt install insightcae-base`

Workflow steps as analysis module

InsightCAE provides:
- ▶ Defined input parameters for simulation
- ▶ GUI for parameter editing
  ⇒helpful for unexperienced users

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GUI for editing parameters / run analyses / view results ("workbench")

Alternative: Command line tool to perform analyses ("analyze")

```
$> analyze --double LaheadByL:2.3 inputfile.ist
```
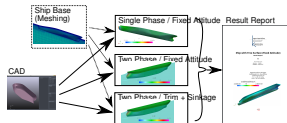
Motivation

simple generic
analyses for validation

▶ channel flow

▶ flat plate

▶ 2D airfoil

▶ ...
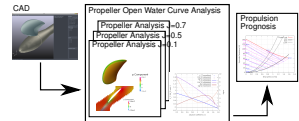
CFD of ship resistance

▶ single phase
▶ two phase fixed
▶ two phase with trim
and sinkage

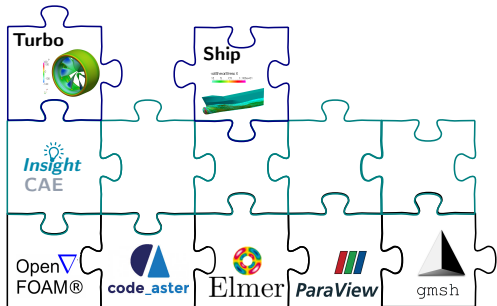

propeller and
turbomachinery analyses

▶ free propeller
▶ ducted propeller
▶ axial pump
▶ optimal diameter,
optimal rpm,
propulsion prognosis

Summary

- ▶ Efficient and automated computations using insightCAE
- ▶ InsightCAE connects different OSS using predefined interfaces
- ▶ Standardized simulations / reducing of time consuming user mistakes
- ▶ Quality is ensured
- ▶ Fast workflow!

Thank you very much!

silentdynamics GmbH

http://silentdynamics.de

```
$ sudo add-apt-repository http://downloads.silentdynamics.de/ubuntu
$ sudo apt-key adv -recv-key -keyserver keys.gnupg.net 79F5CBA4
$ sudo apt-get update
$ sudo apt-get install insightcae-base
```