Share, integrate and resolve conflicts among your heterogeneous models

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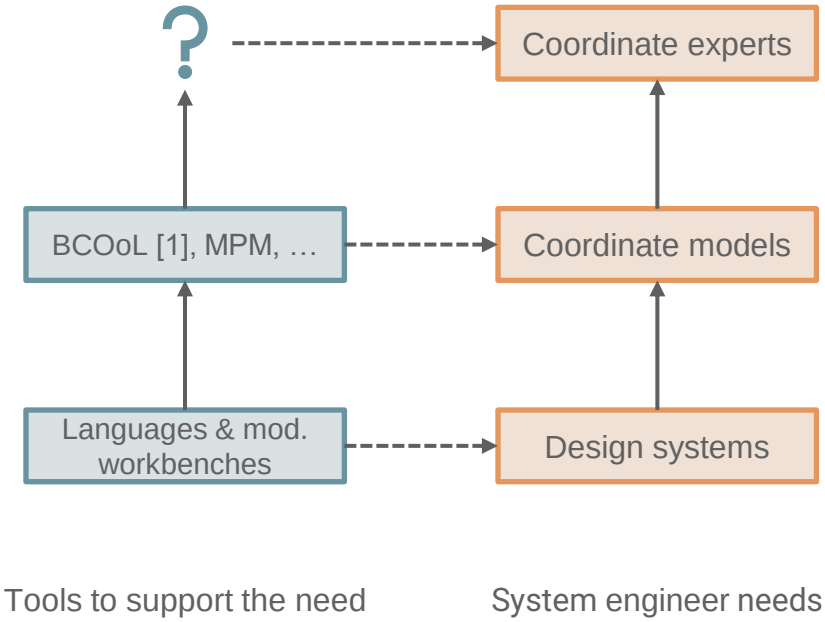
Introduction

- MDE increases the abstraction level to facilitate the design of the systems thanks to DSLs
- Domain experts can use these DSLs to model their own concerns
- In heterogeneous modeling domains, new needs are emerging: coordination between models and between experts



[1] M. E. Vara Larsen, J. DeAntoni, B. Combemale, et F. Mallet, « A Behavioral Coordination Operator Language (BCOoL) », in 2015 ACM/IEEE 18th International Conference on Model Driven Engineering Languages and Systems (MODELS), Ottawa, ON, Canada: IEEE, sept. 2015, p.186-195. doi: 10.1109/MODELS.2015.7338249.

Introduction

- Need to coordinate experts (social collaboration)

Intra model

Model elements locking

Viewpoint

Transparent interactions

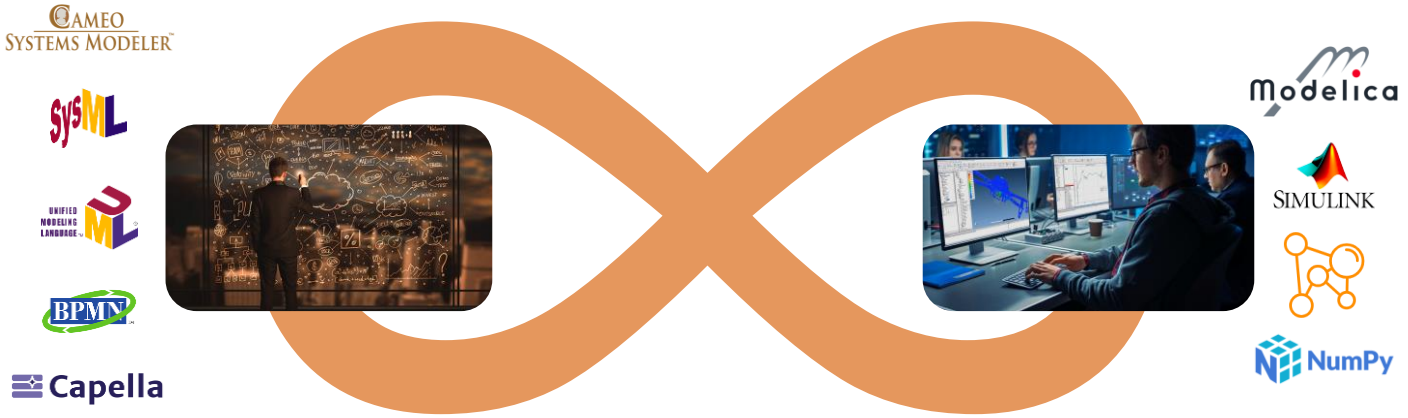
Between models

Versioning

Integration

Contradictory injunctions

Motivation



System architects

Design the global system

Simulation engineers

Design the different simulation models and their validity range

Integrators

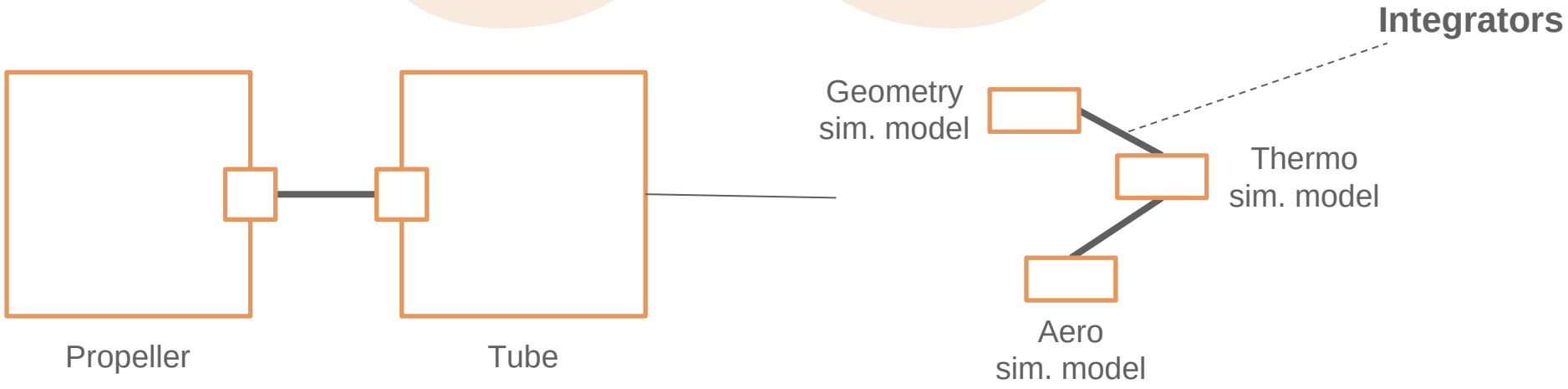
Integrate the simulation models together

Motivation

poorly tooled collaboration: source of conflict

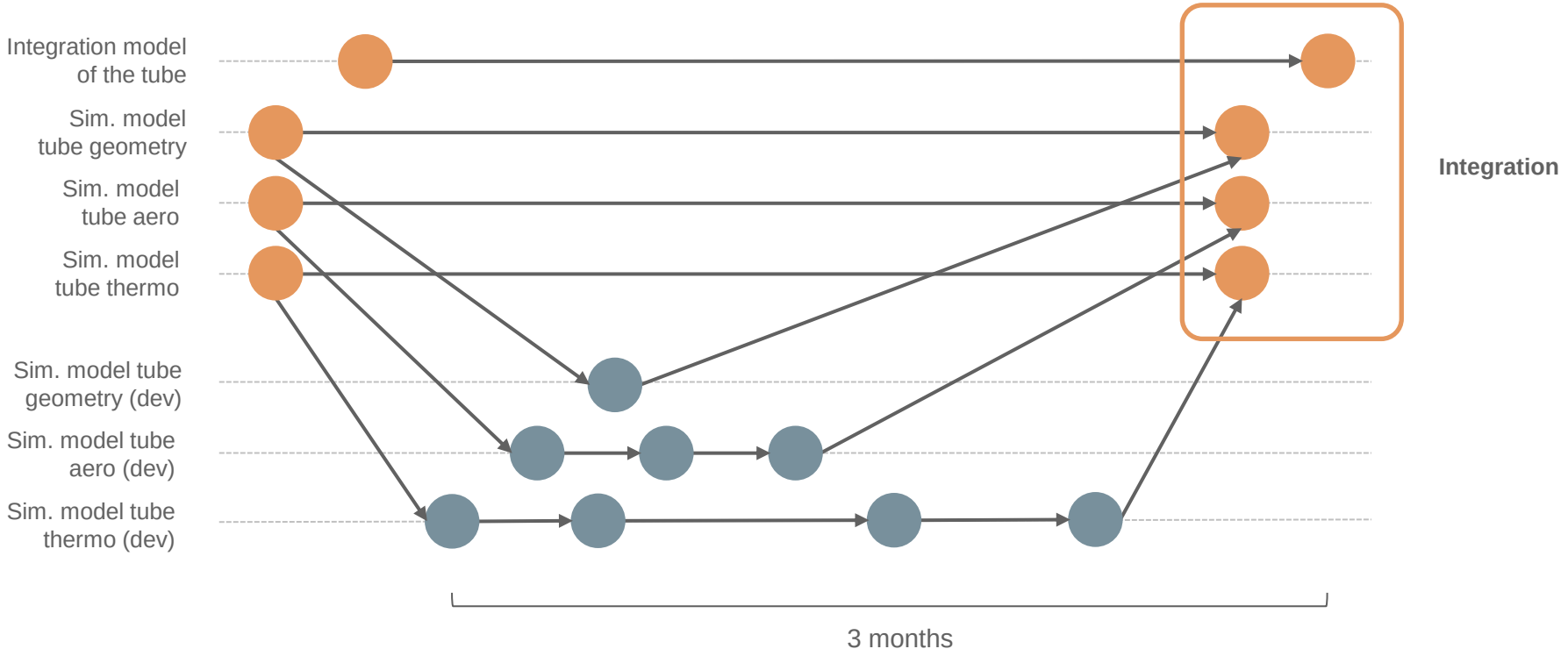
System architects

Simulation engineers



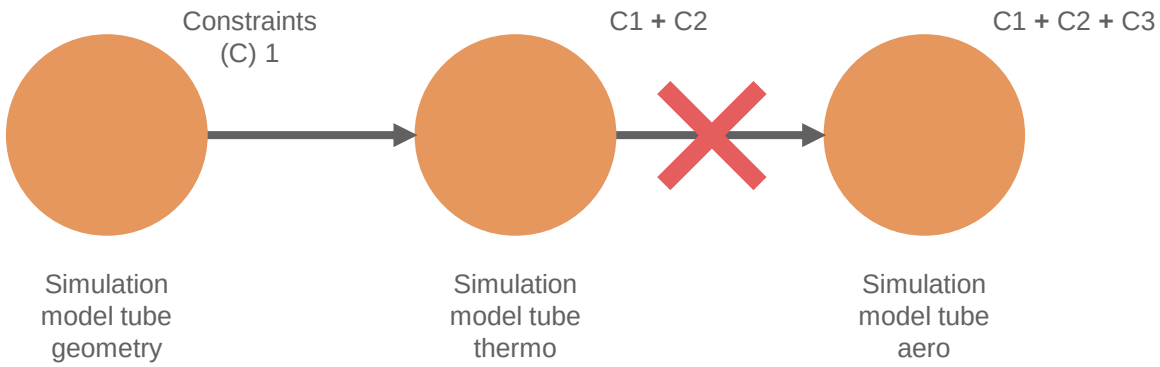
Motivation

- Integration only at the end of long iterations → being confronted with contradictory injunctions at the last minute, especially if the constraints changed during the iteration



Motivation

- Sequential integration
- First model that contradicts previous constraints must be adapted to resolve them, even if the optimal solution is maybe to modify a previous integrated model

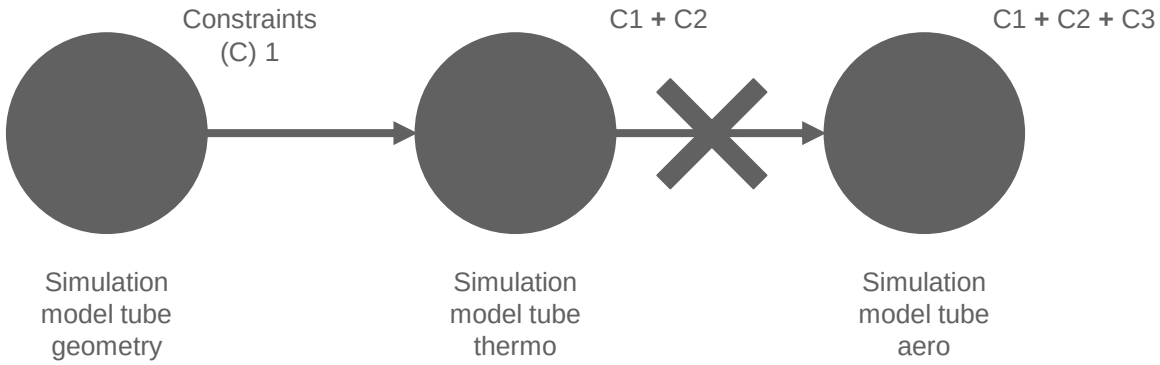


Integration process

Motivation

- Sequential integration
- First model that contradicts previous constraints must be adapted to resolve them, even if the optimal solution is maybe to modify a previous integrated model

CI PIPELINE



Integration process

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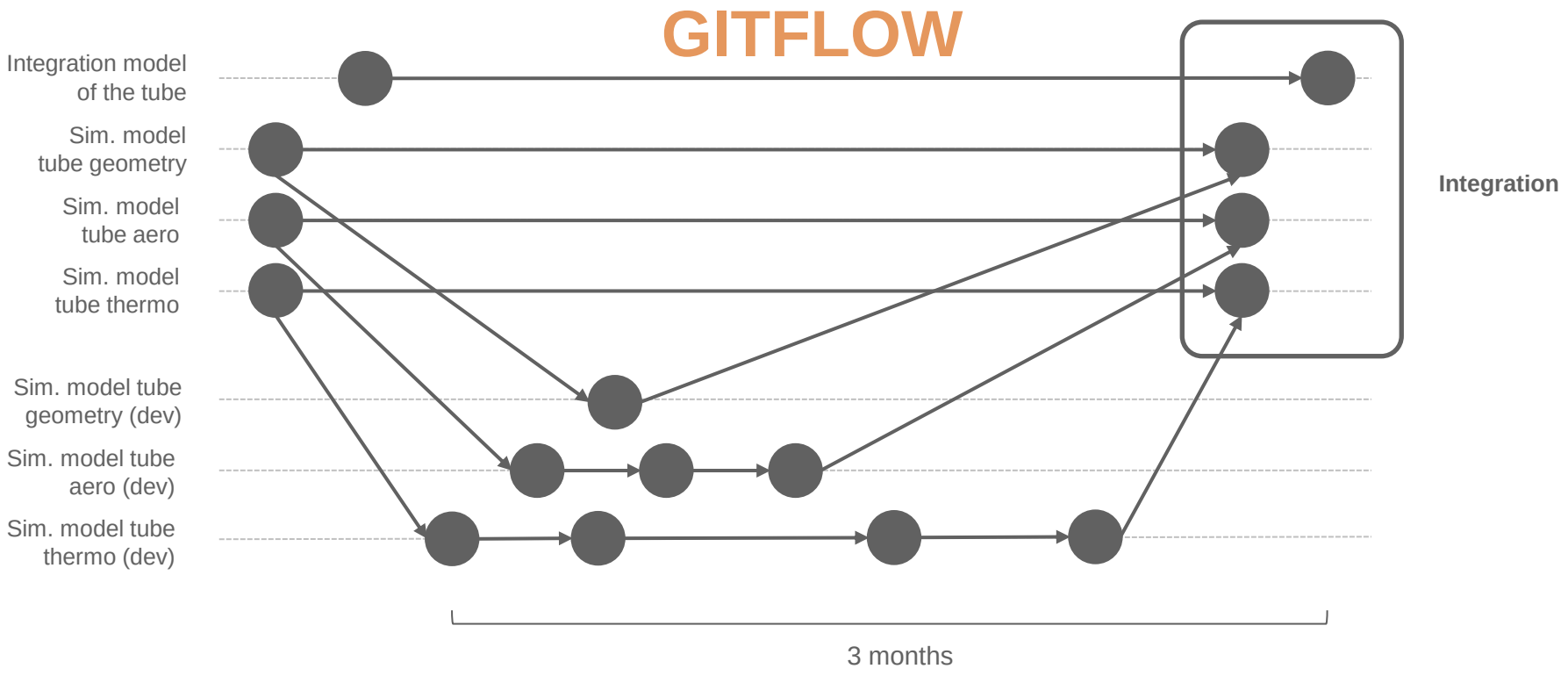
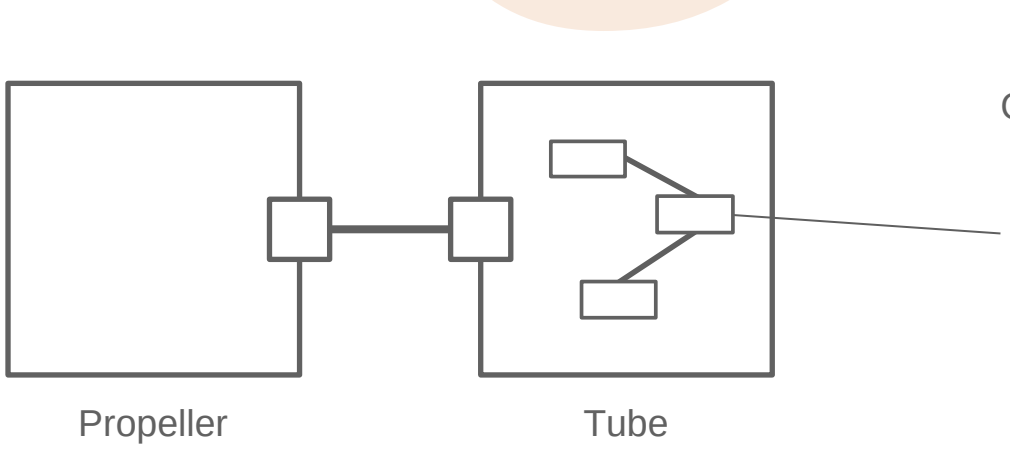


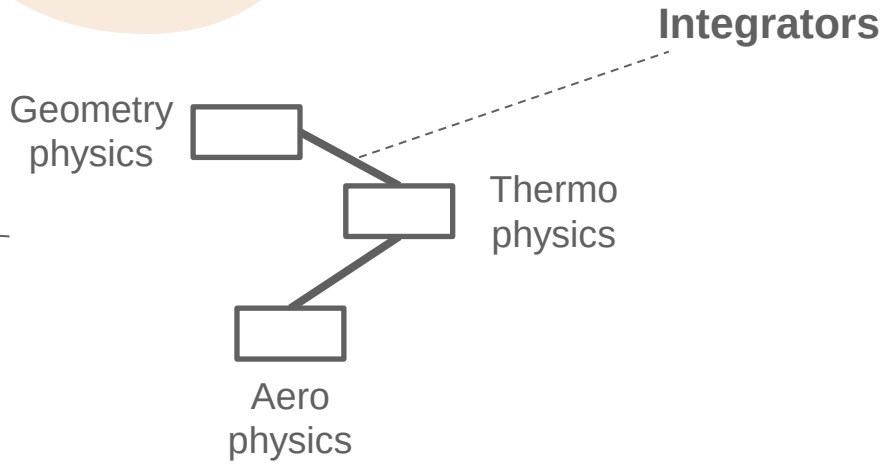
Motivation

poorly tooled collaboration : source of conflict

System architects

Simulation engineers





DEVOPS, AGILE METHODS

Research questions

- How to model the collaboration between experts?
- How to report this collaboration through a tool support?

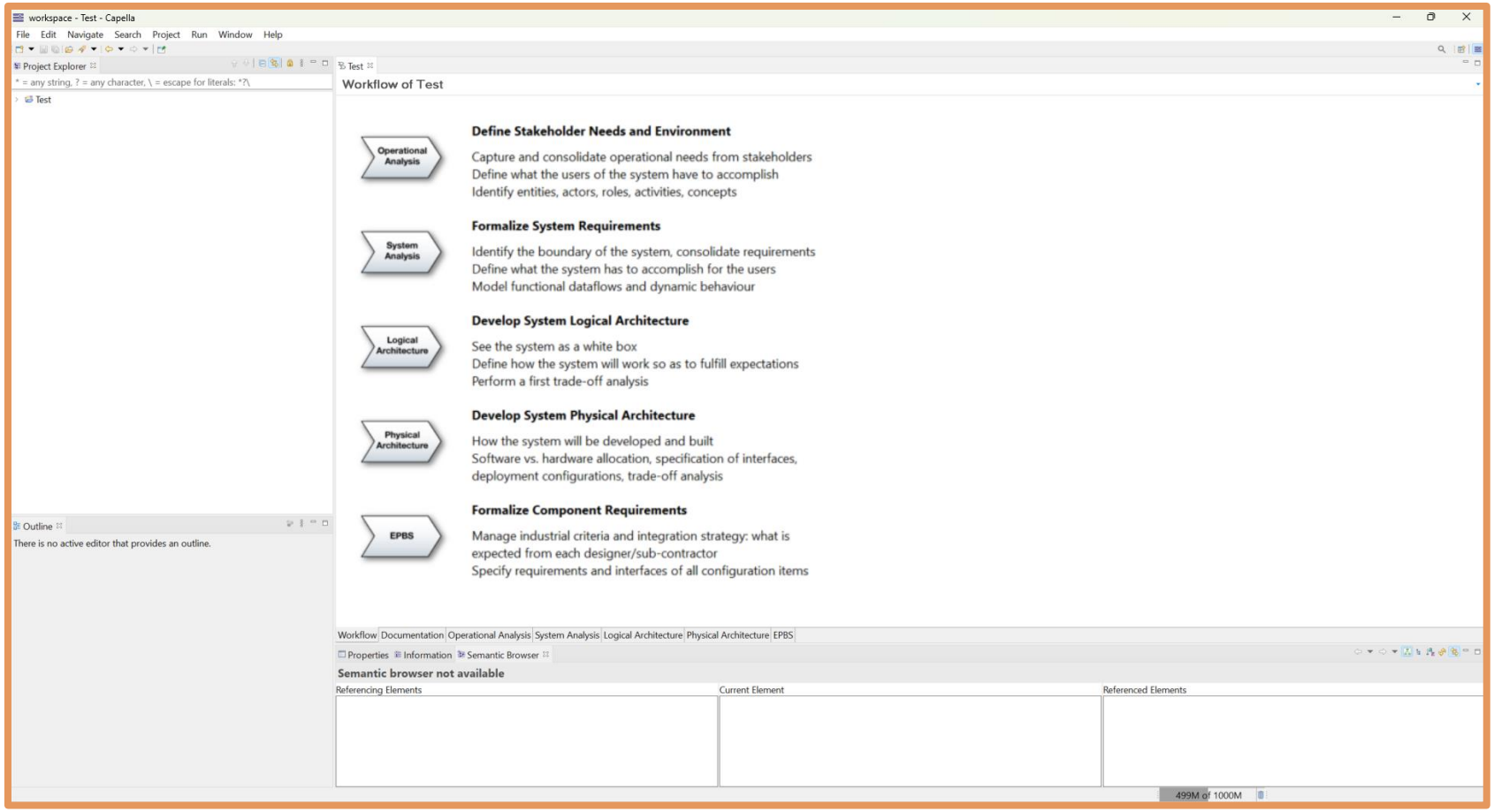
How to model the way the experts work together?

- Currently, we identified three workflows:

Contribution workflow
(gitflow)

Design workflow

Integration workflow
(CI/CD)



Screenshot of the design workflow in the modeling workbench Capella

How to model the way the experts work together?

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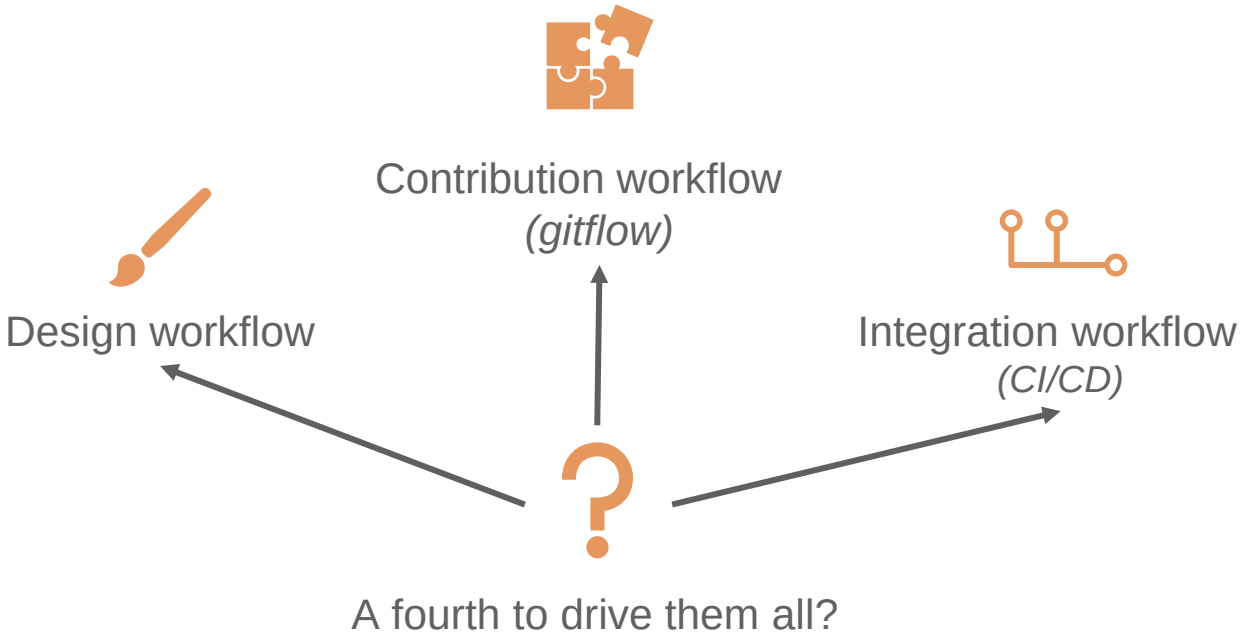

How to model the way the experts work together?

- For the contribution and integration workflows, we have two main goals:
  - Evaluate automatically the impact of local changes on the whole system and propagate the information to the stakeholders
  - In case of contradictory injunctions when integrating local changes, report them and trigger discussions between the experts involved

How to report this collaboration through a tool support?

- The goal is to adapt all the tooling to the different workflows
  - Tooling: Notification system, maybe (part of) the modeling workbench itself?
- Currently, we started to work on the adaptation of interactive tools for modeling workbenches through a DSL
- Ultimately, we want to design this DSL for the forge itself, we think we have common concepts between these two orthogonal approaches
- The two approaches may be linked by the fourth workflow, for instance, to trigger a notification directly inside the modeling environment

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Research questions

How to model the way the experts work together?

- Evaluate automatically the impact of local changes on the whole system
- Report these and trigger discussion between the experts involved

How to report this collaboration through a tool support?

- Adapt all the tooling to the different workflows
- The modeling workbench could be considered as a part of the tooling