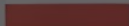


# Advancing Web-Based Modeling Tools with Sirius Web:

An Illustration with SysON

© Copyright 2024 Obeo



Cédric Brun  
Obeo - CEO

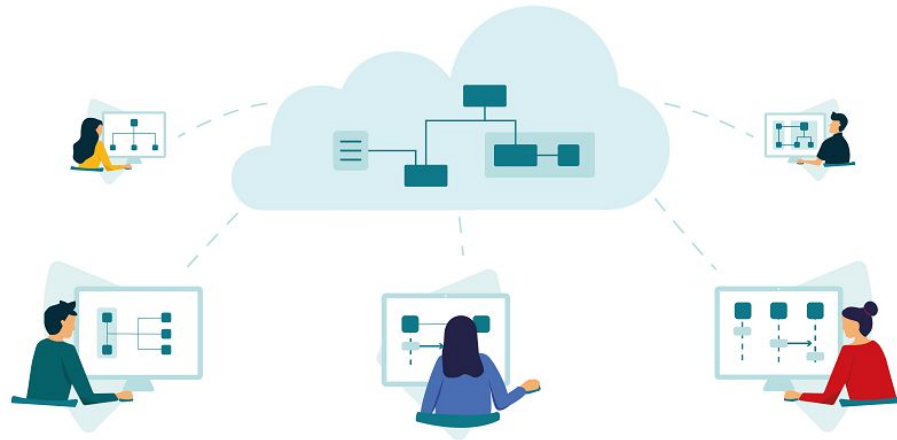
[cedric.brun@obeo-soft.com](mailto:cedric.brun@obeo-soft.com)

27<sup>th</sup> International Conference on  
Model Driven Engineering Languages and Systems

**MODELS 24**

22 - 27 September 2024  
Linz, Austria





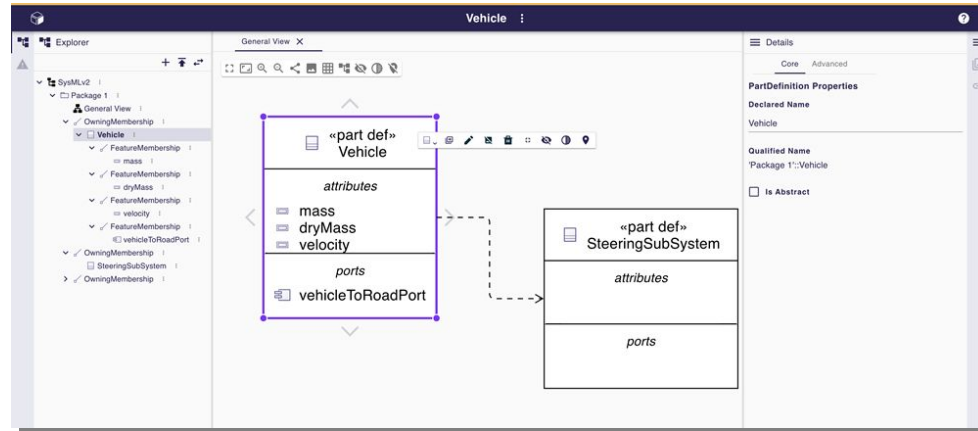
**EASILY CREATE AND DEPLOY  
MODERN MODELING TOOLS TO THE CLOUD**

# Our Throughline during this Presentation : SysON



<https://mbse-syson.org/>

## SysML v2 web-based authoring tool available as open-source



### Standard-Compliant

SysML v2 Language concepts,  
REST API, interoperability  
textual format



### Web-Based

Graphical, form-based and tabular  
structured editors in a web  
browser



### Open Source

Hosted in the Eclipse community,  
to catalyze industrial collaboration



BATTERIES INCLUDED

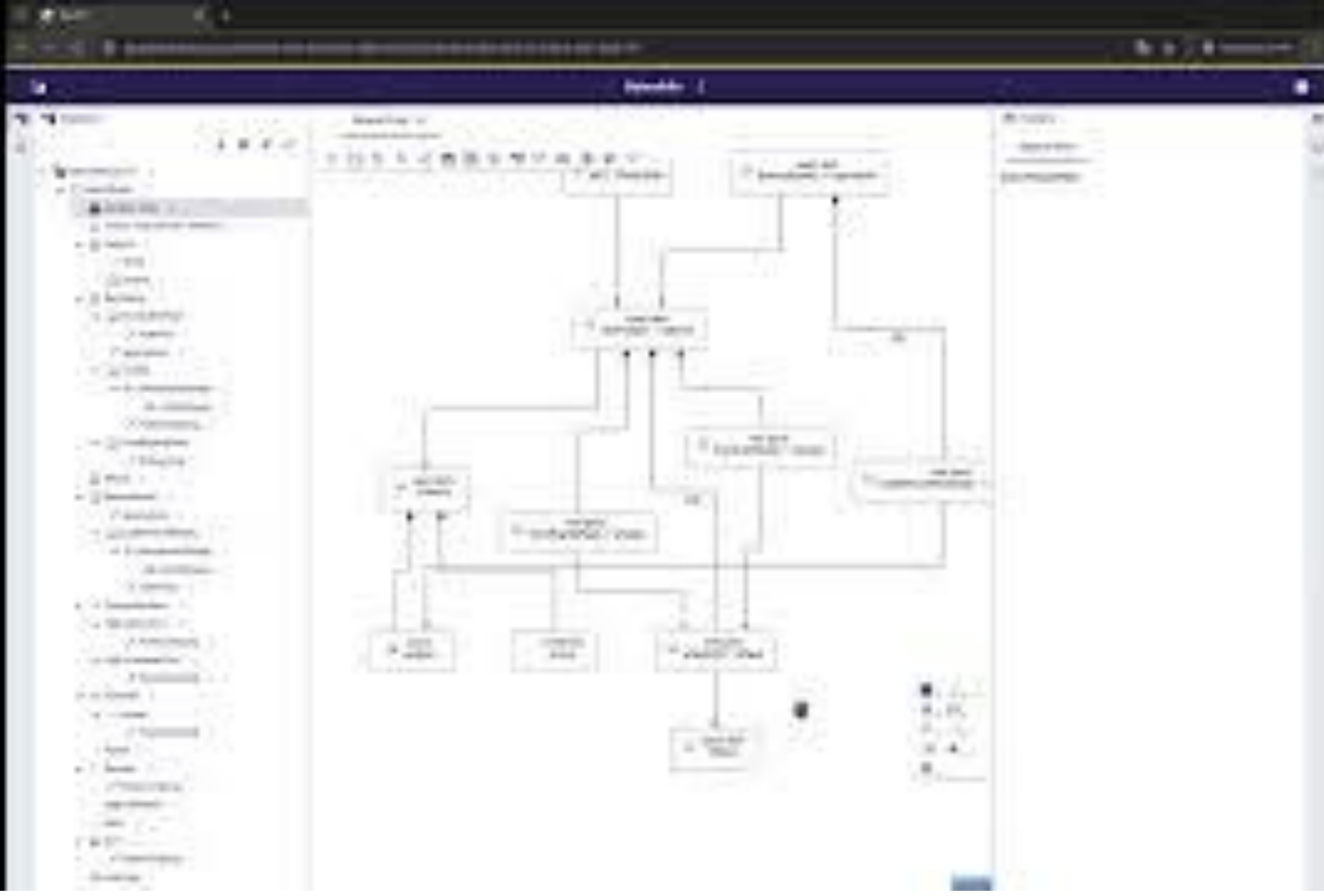
BATTERIES INCLUDED

BATTERIES INCLUDED

# Batteries Included

© Copyright 2024 Obéo

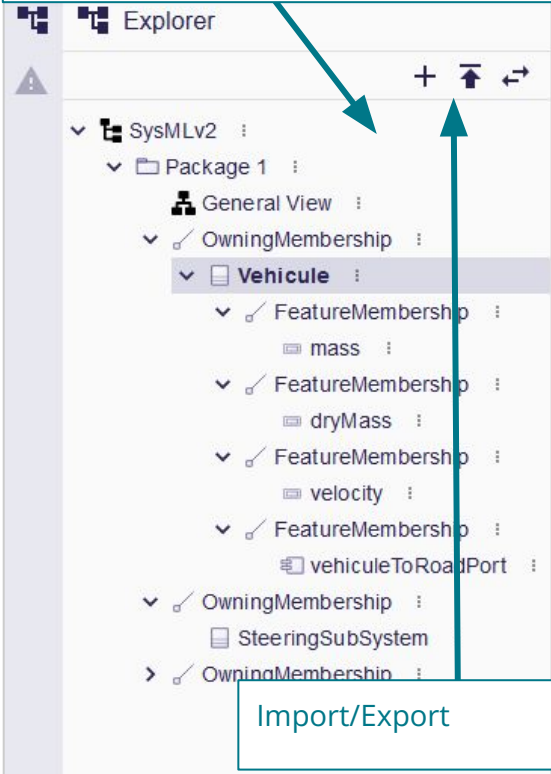




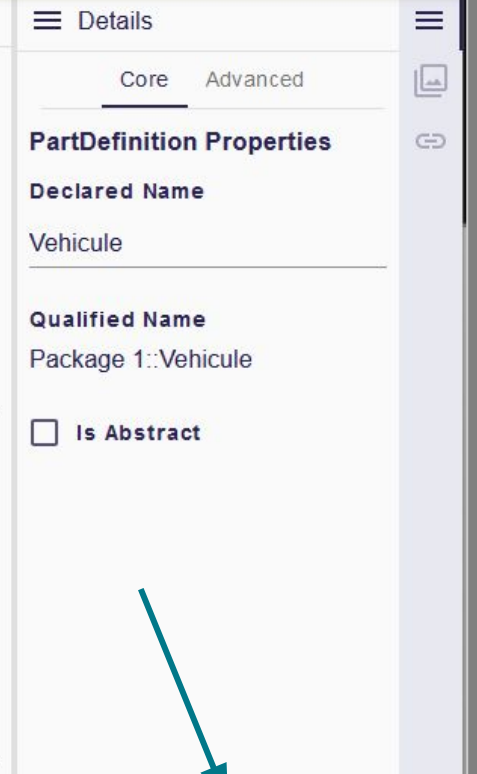
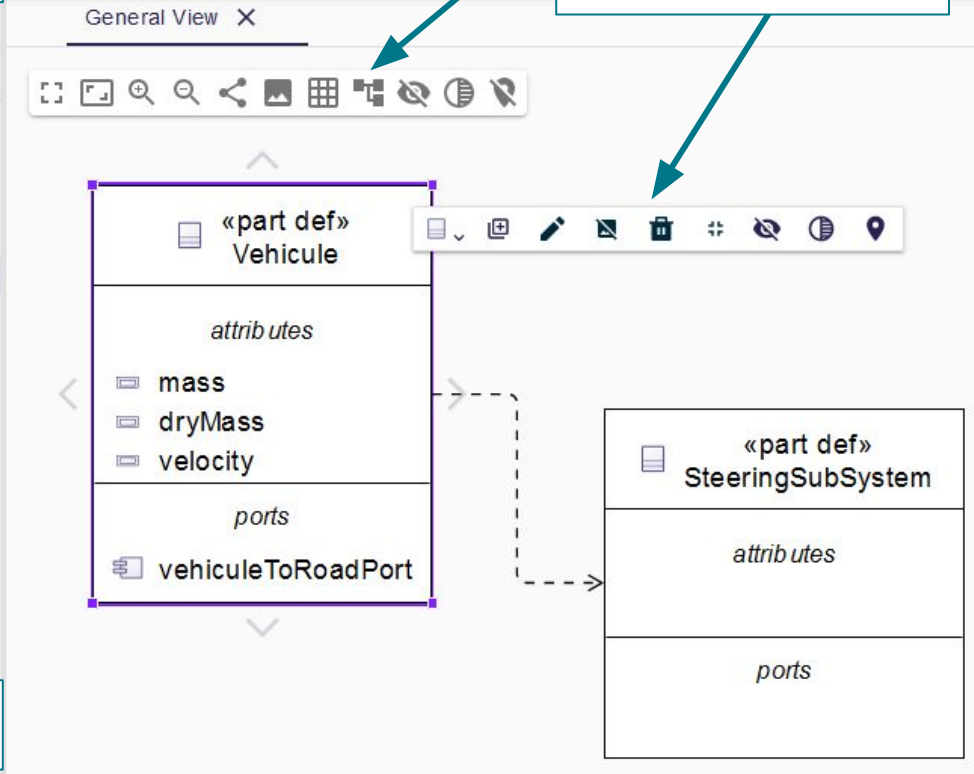
# Batteries Included | Fundamentals

Auto-Layout, Hide, Shade, Zoom, SVG ...

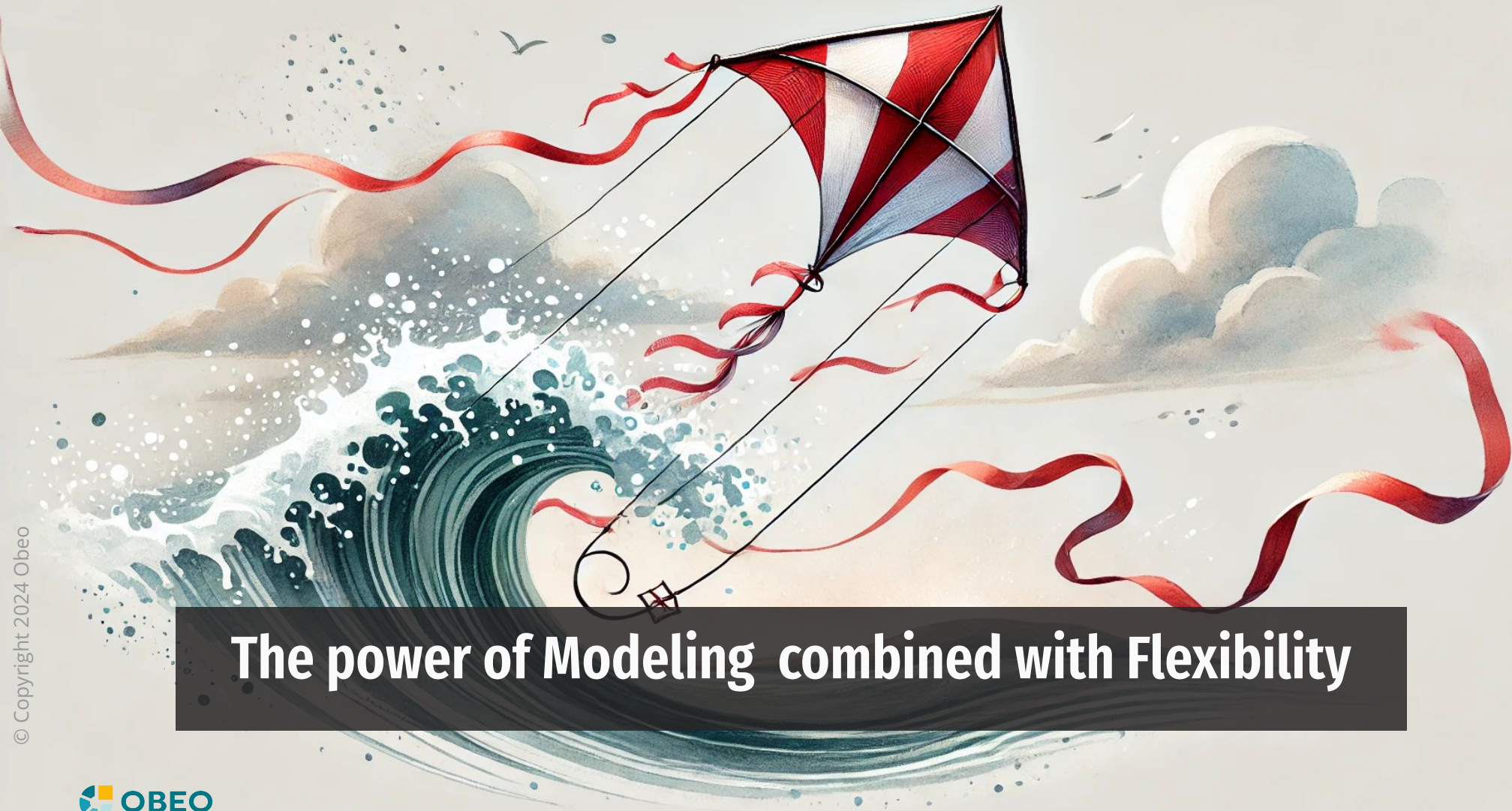
Model Explorer



Vehicle : Contextual palette



Rich Property View



**The power of Modeling combined with Flexibility**

# The power of Modeling + Flexibility | Fundamentals

*"Adapt the tooling to the goal, whatever the metamodel and its structure"*

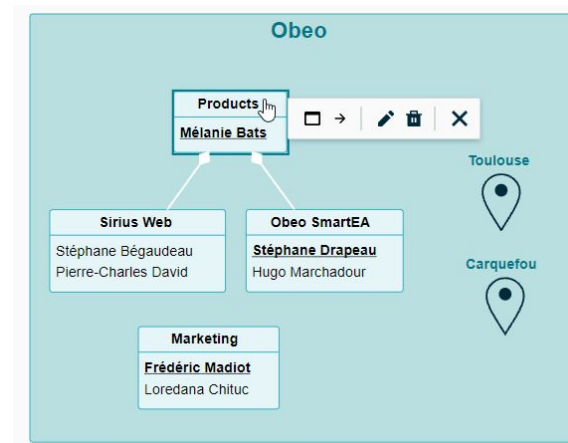
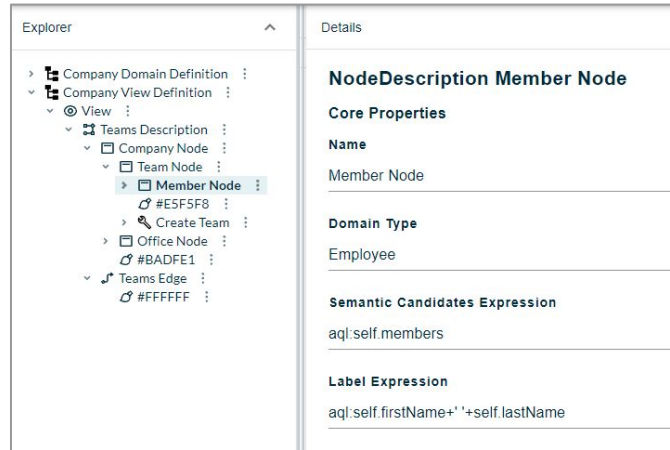
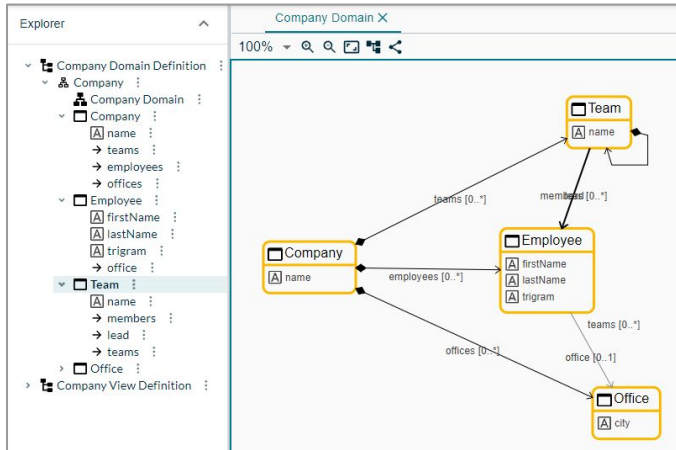
Domain/Ecore model

+

Editors specification  
(View Model)

=

Modeling Workbench

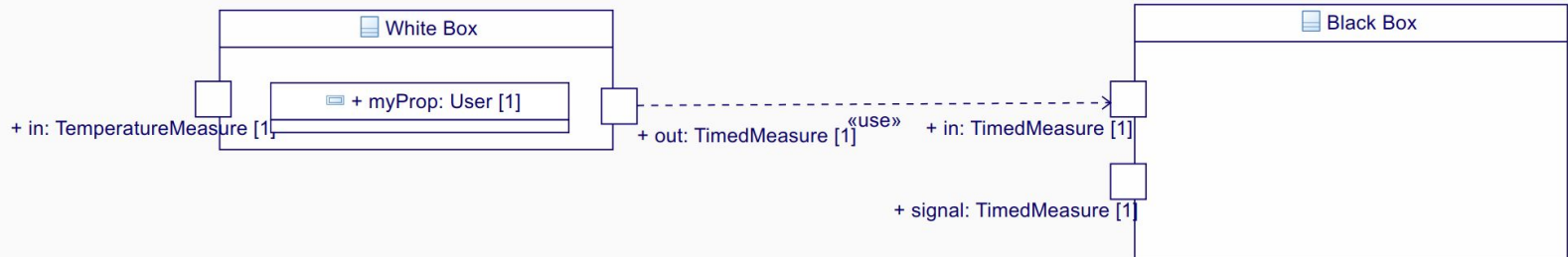
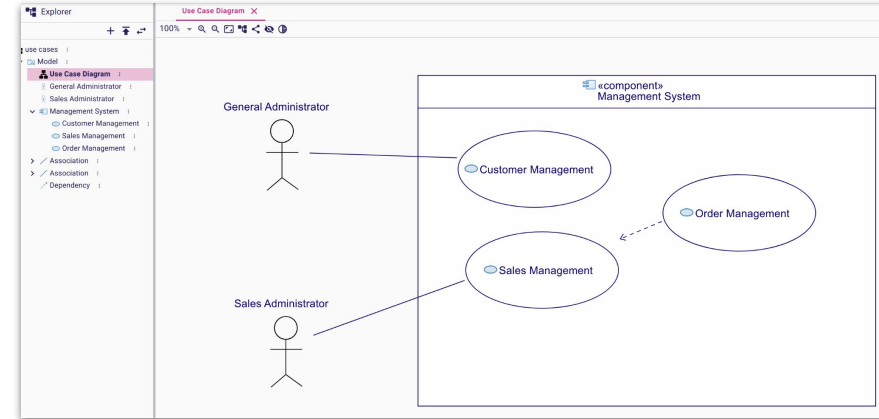
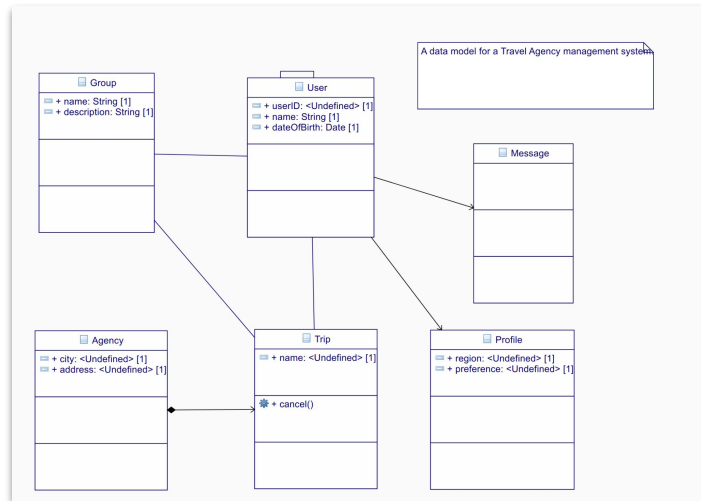




# Papyrus UML | The power of Modeling + Flexibility

## UML

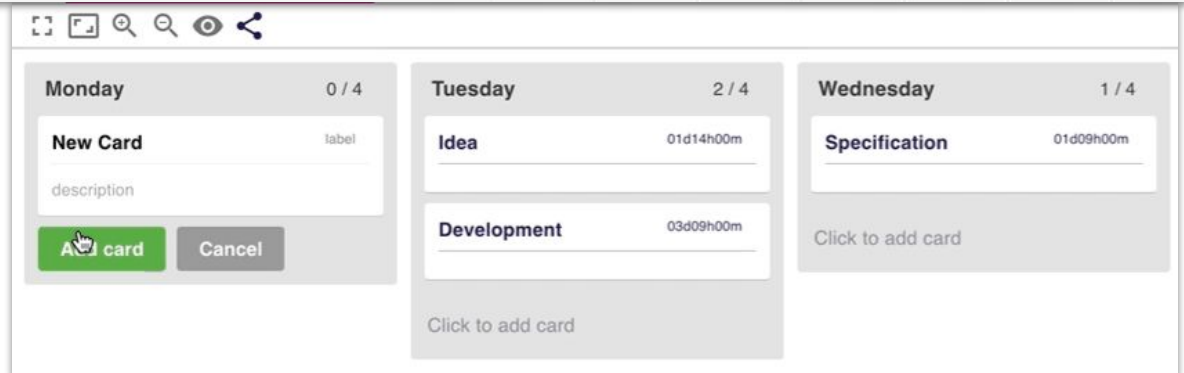
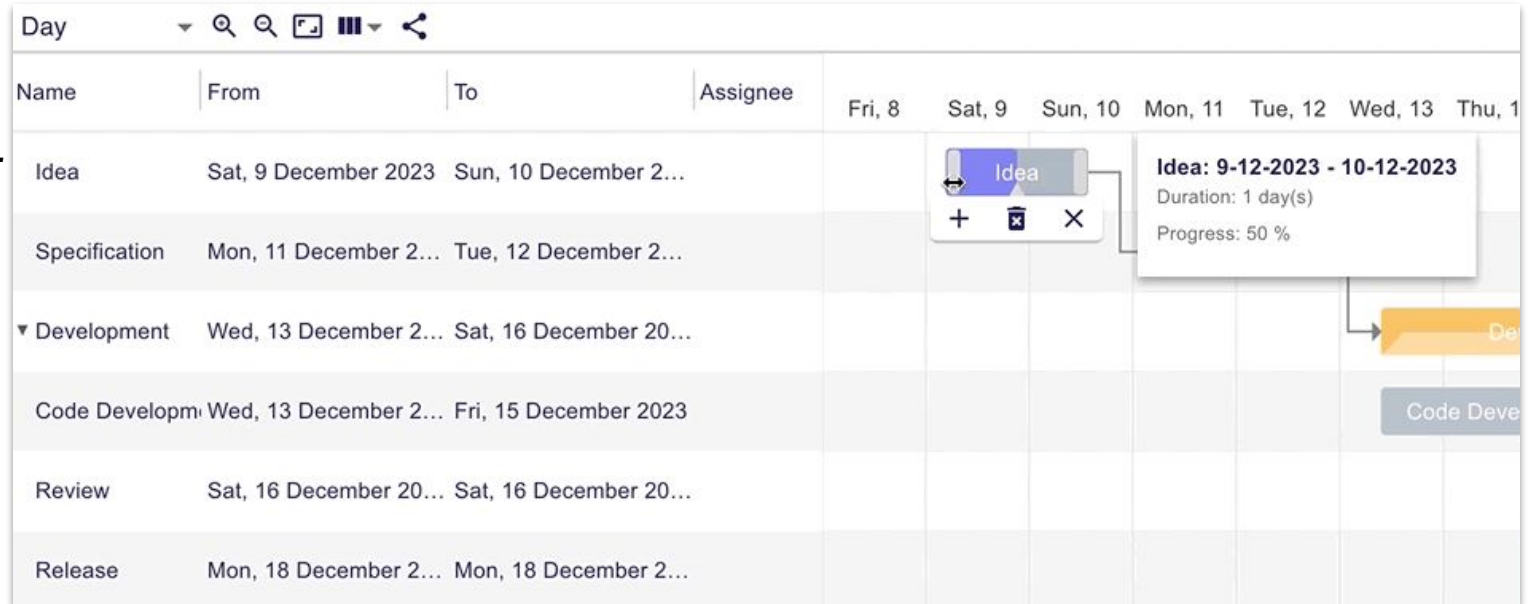
UML implementation  
from Eclipse  
Standard conformant  
Supports profiles



# "Projects" DSL | The power of Modeling + Flexibility

## Project Management DSL

Ecore Metamodel  
Uses Forms + Gantt



# Guesstimate DSL | The power of Modeling + Flexibility



## Monte-Carlo Simulations

Simple Ecore Model

Formulas with textual syntax

Uses Charts

Uses Apache Commons Maths

The screenshot displays the Guesstimate DSL interface for a model titled "How long it takes to get to work". The interface is divided into three main sections: Explorer, the main modeling canvas, and a Properties panel.

**Explorer:** Shows a tree view of the model's components, including "How long to get my coffee" and its sub-elements: "tPrep", "pOff", "tWarm", "tTotal", "sdfsdf", and "F".

**Main Canvas:** Displays a flowchart where variables are represented as boxes. The central variable is "tTotal : total time for me to get a coffee", which is highlighted with a red border. It is influenced by "tPrep : time for the machine to prepare my coffee", "pOff : probability for the machine to be off", and "tWarm : time for the machine to warmup". Additionally, "F : Time to say 'have a nice day!'" and "sdfsdf : Leave : time to leave the house" are shown as related variables.

**Properties Panel:** Provides details for the selected "tTotal" variable.

- Name:** tTotal
- Description:** total time for me to get a coffee
- Type of variable:** formula (selected), normal, uniform, lognormal, beta, triangular, binomial, poisson, exponential, gamma.
- Guide:** A variable which is defined by a formula using other variables.
- Parameters:**
  - formula:**  $tPrep + (pOff * tWarm)$
- Density:** A histogram showing the distribution of values for the variable, with the x-axis representing values (23 to 17) and the y-axis representing the number of samples (0 to 3000).
- Summary Statistics:**

Values	minimum value
mean value	53.885127107463624
maximum value	23.357866439192343
Standard deviation	172.20617839359952
Variance	10000.0
	225.2484154820245

# SysMLv2 a. k. a. SysON | The power of Modeling + Flexibility

## System Engineering

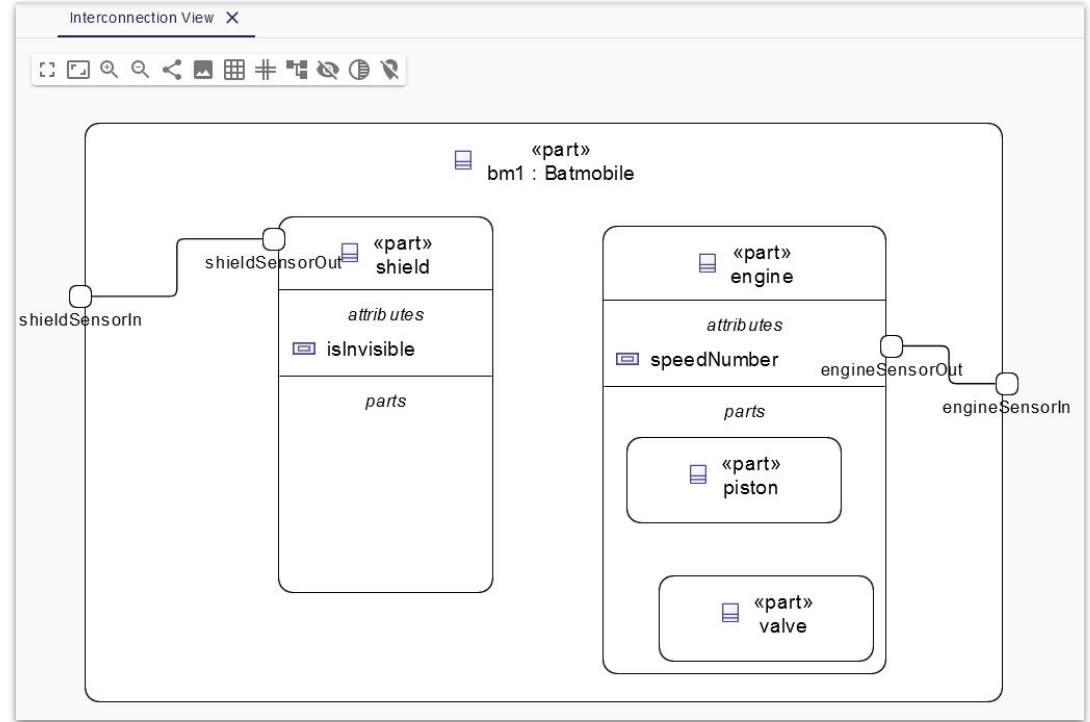
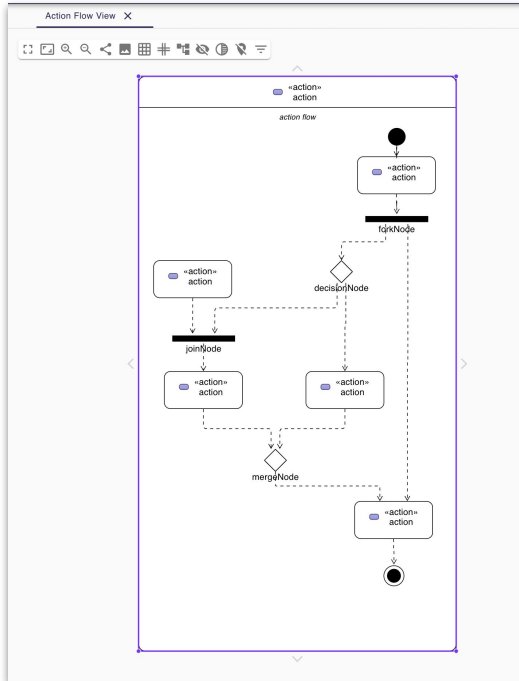
Ecore based Metamodel

Memberships and Typing management

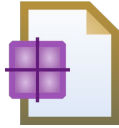
General View

Interconnection View

Action View



# Models in Different Shapes | The power of Modeling + Flexibility



Editors specification  
(View Model)



The screenshot shows a modeling tool interface with two main panes: 'Explorer' on the left and 'Details' on the right. The 'Explorer' pane displays a hierarchical tree structure of a model. The 'Details' pane shows the configuration for the selected 'Member Node'.

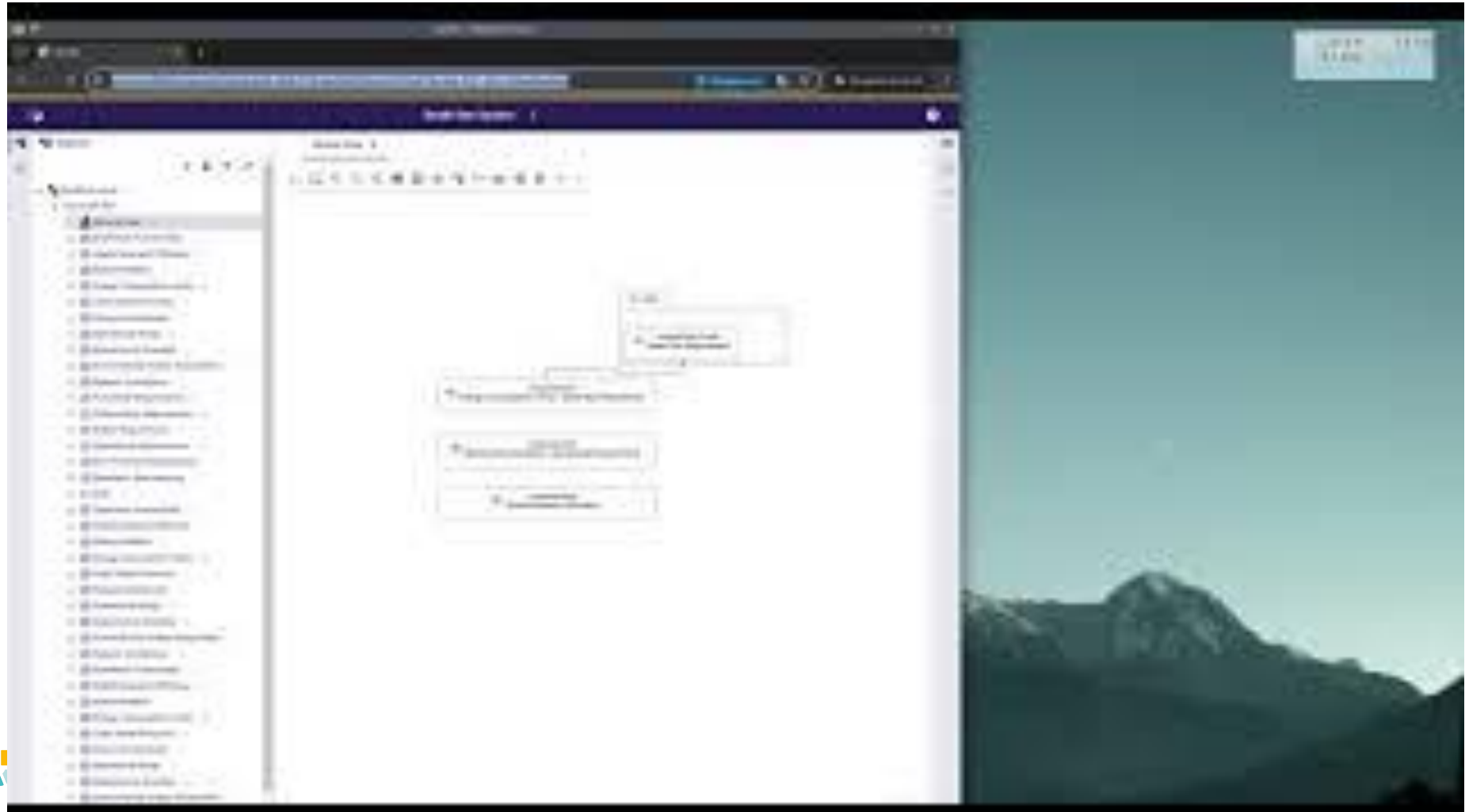
NodeDescription Member Node	
<b>Core Properties</b>	
<b>Name</b>	Member Node
<b>Domain Type</b>	Employee
<b>Semantic Candidates Expression</b>	aql:self.members
<b>Label Expression</b>	aql:self.firstName+' '+self.lastName

```
NodeDescription distributionMapping = b.newNodeDescription()
    .name("Variables")
    .domainType(typeName(domain.getVariable()))
    .defaultWidthExpression("80")
    .defaultHeightExpression("30")
    .insideLabel(b.newInsideLabelDescription()
        .labelExpression("aql:self.name + ' : ' + self.documentation")
        .position(InsideLabelPosition.TOP_LEFT)
        .style(b.newInsideLabelStyle()
            .labelColor(this.variableColor)
            .showIconExpression("true")
            .fontSize(8)
            .displayHeaderSeparator(true)
            .withHeader(true)
            .borderSize(0)
            .borderColor(this.variableColor)
            .build())
        .conditionalStyles(b.newConditionalInsideLabelStyle()
            .condition("aql:self.hasValidationError()")
            .style(b.newInsideLabelStyle()
                .labelColor(this.errorColor)
                .showIconExpression("true")
                .fontSize(8)
                .displayHeaderSeparator(true)
                .borderSize(0)
                .borderColor(this.errorColor)
                .build())
            .build())
        .build())
    .style(b.newRectangularNodeStyleDescription()
        .borderRadius(8)
        .borderSize(1)
        .borderColor(this.variableColor)
        .background(this.background)
        .borderLineStyle(LineStyle.SOLID)
        .build())
    .palette(b.newNodePalette()
        .labelEditTool(editLabel)
        .build())
    .build();
```



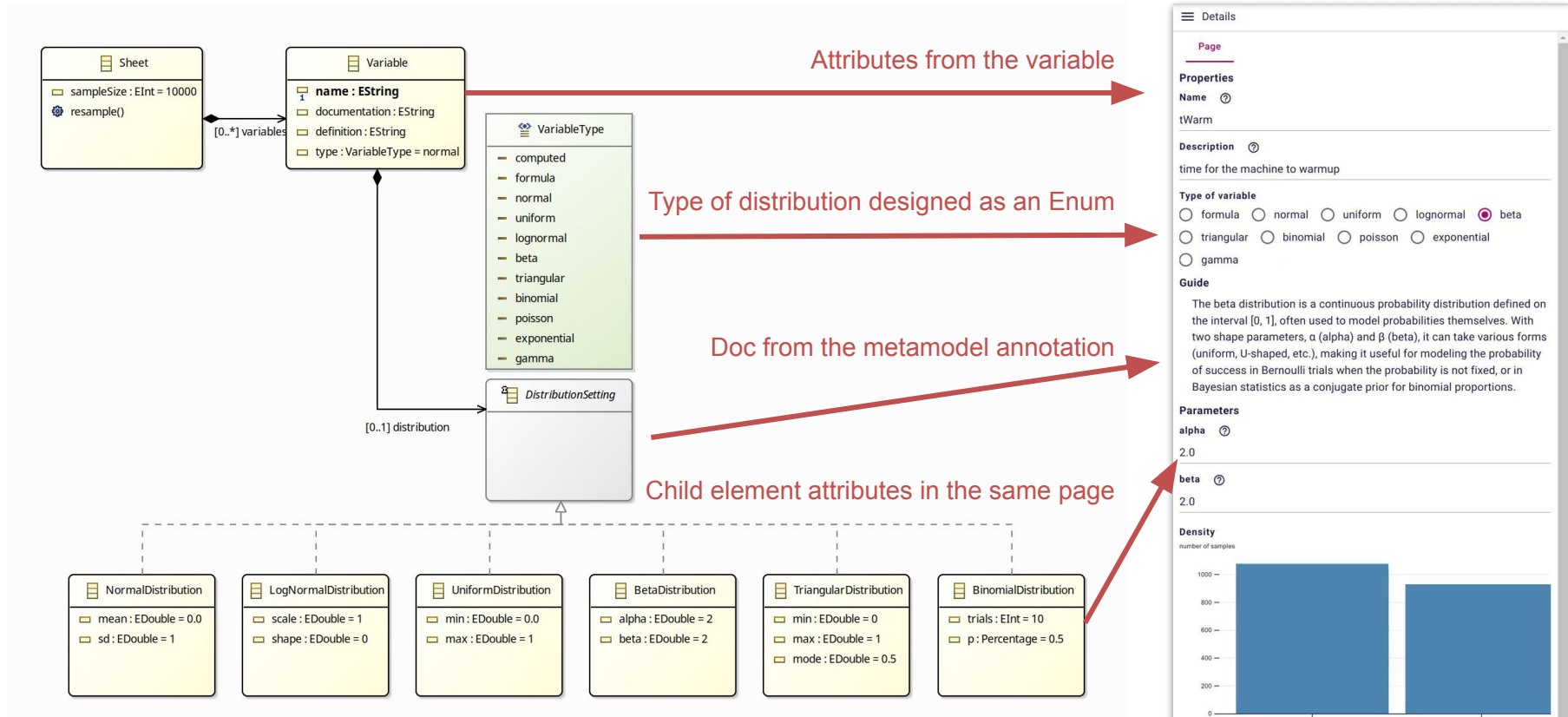
# Eased Adoption and User Experience

# One click Onboarding | Eased Adoption and User Experience



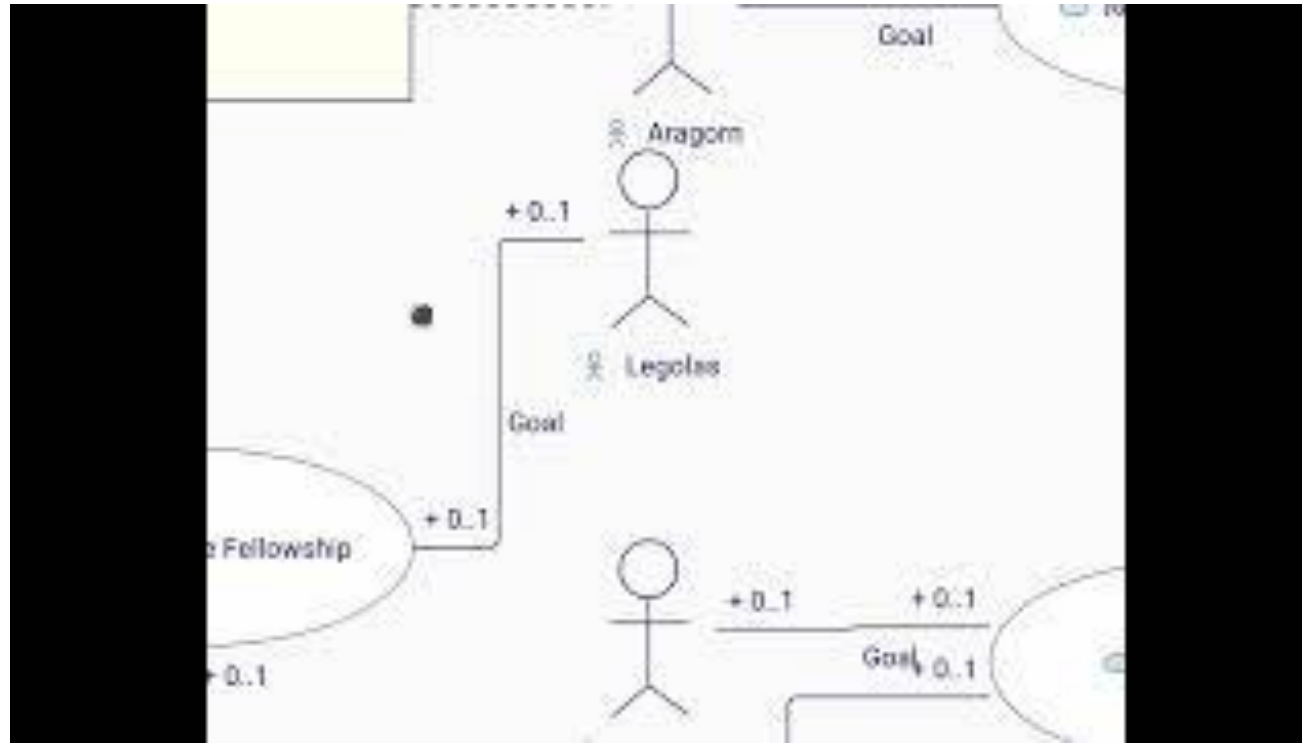
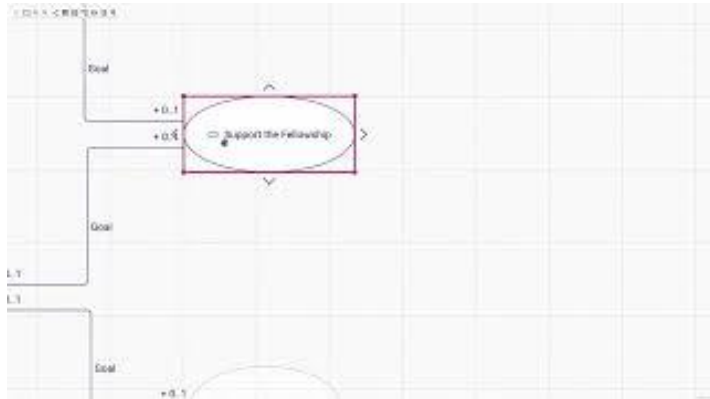
# Property Views | Eased Adoption and User Experience

Great by default and 100% customizable through the view model



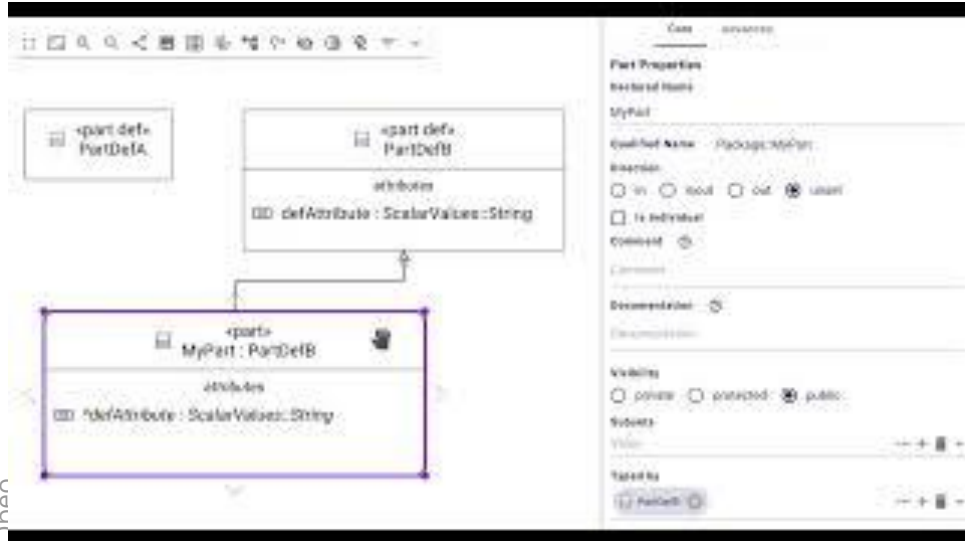


# Rendering Quality | Eased Adoption and User Experience

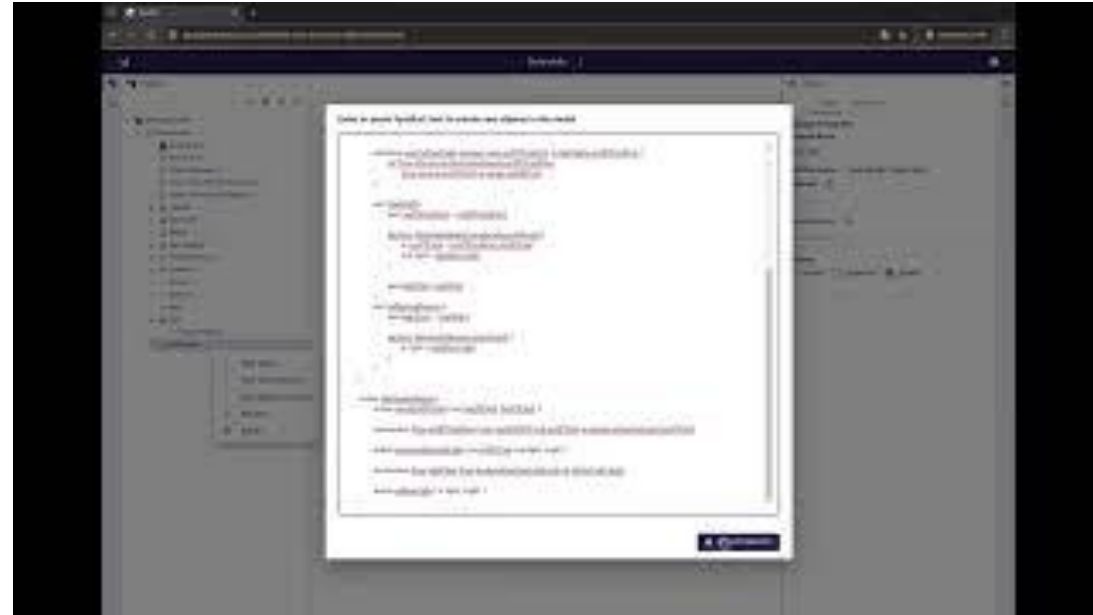


# Tailored Text editing | Eased Adoption and User Experience

“Smart” label edit



Import/export .sysml files.  
Import elements from sysmlv2 syntax:



# Extensibility



# Extensibility | Fundamentals

## Sirius Web

Modular platform to define visual modeling tools

## React + GraphQL

Huge ecosystem of widgets

## Spring Boot

Java back-end, Industry Standard



## View Model

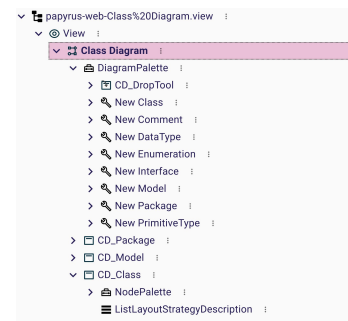
Define the graphical editors, forms, tables

## Java Services

Specific logic in the tool

## Third Party components

Through Maven (backend) or NPM (frontend)



# Backend Implementations | Extensibility

```
/**
 * Configuration of the EMF support for SysON (i.e. SysML metamodel).
 *
 * @author arichard
 */
@Configuration
public class SysMLv2EMFConfiguration {
    @Bean
    AdapterFactory sysmlAdapterFactory() {
        return new SysmlItemProviderAdapterFactory();
    }

    @Bean
    EPackage sysmlEPackage() {
        return SysmlPackage.eINSTANCE;
    }
}
```

Tells Spring Boot to scan and retrieve the instances to inject those

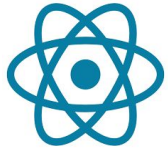
Declares an additional Adapter Factory

Spring will inject the known EPackages at init

```
@Component
public class MyService {

    @Autowired
    private List<EPackage> registeredPackages = Lists.newArrayList();
    // ...
}
```

# User Interface Contributions | Extensibility



Leverage the huge React eco-system for the frontend

Menu contributed with `NavigationBarMenuExtensionPoint`

Create a new project **Cards contributed with `CreateProjectAreaExtensionPoints`**

- + Blank Studio
- + Flow
- + Sirius Web
- + Blank project
- + Upload pro...
- Show all tem...

More details here :

<https://blog.obeosoft.com/sirius-web-2024-9>

Tree item context menu contributed with `TreeItemContextMenuEntryExtensionPoint`

java.base component diagram

Component

Panels contributed with `DiagramRendererExtensionPoints`

**Legend**

- 1 nodes
- 0 edges

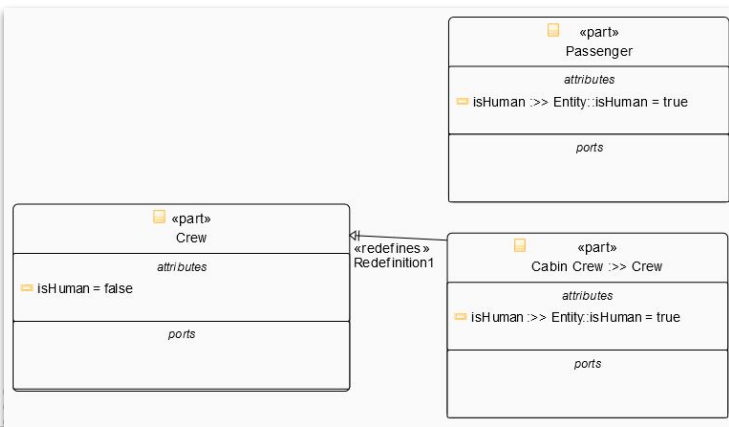
**Learn more**

Follow these links to view the code of this Sirius Web internal test project on Github.

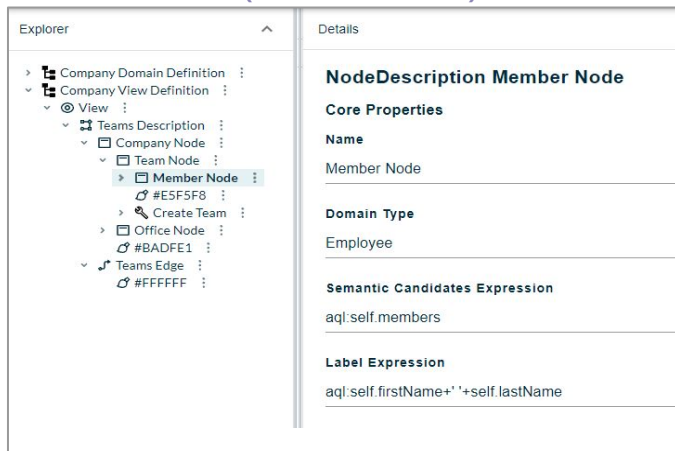
- Backend code
- Frontend code

# Model Based | Extensibility

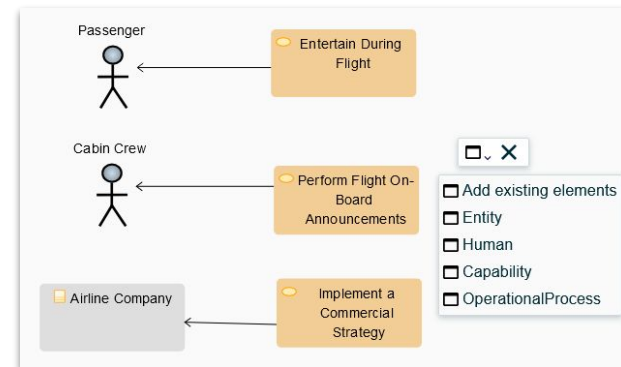
SysMLv2 library



+ Editors specification (View Model)



= Tailored Editor

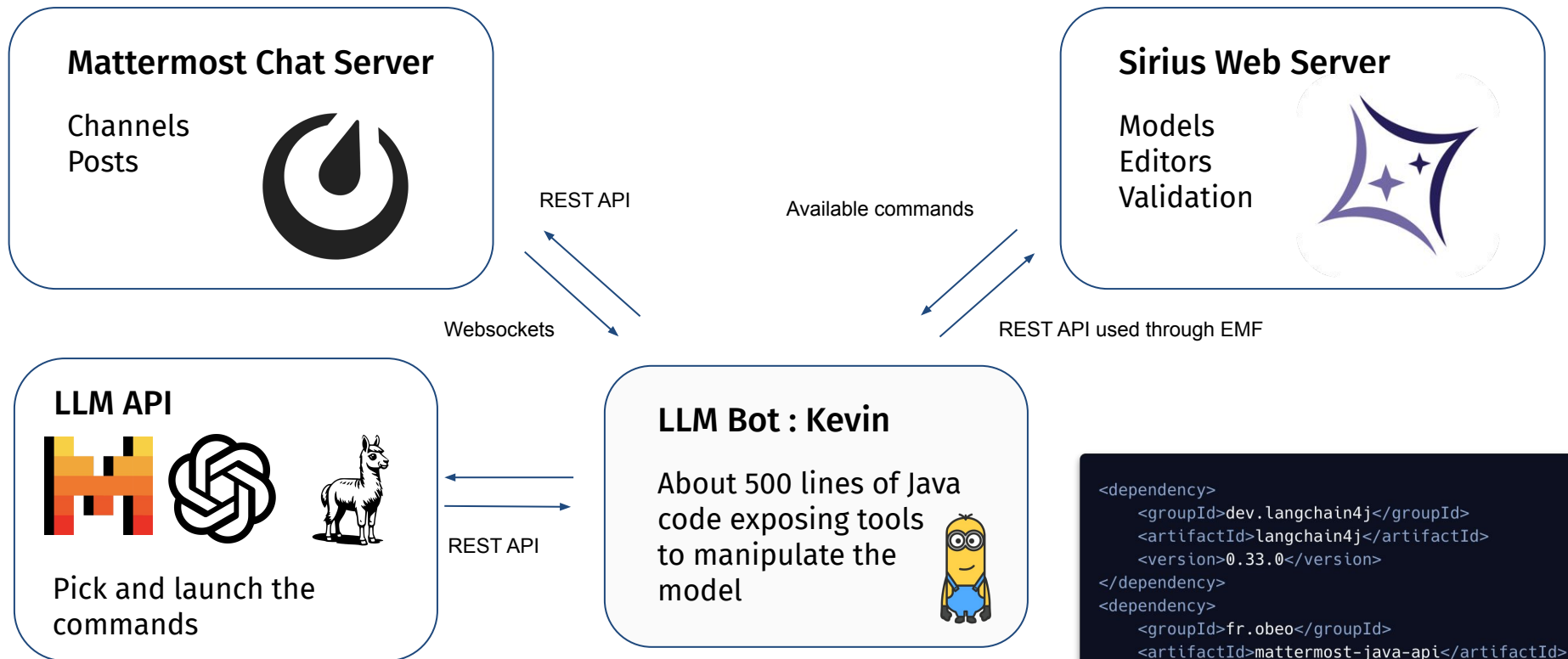


# Experimental Prototype





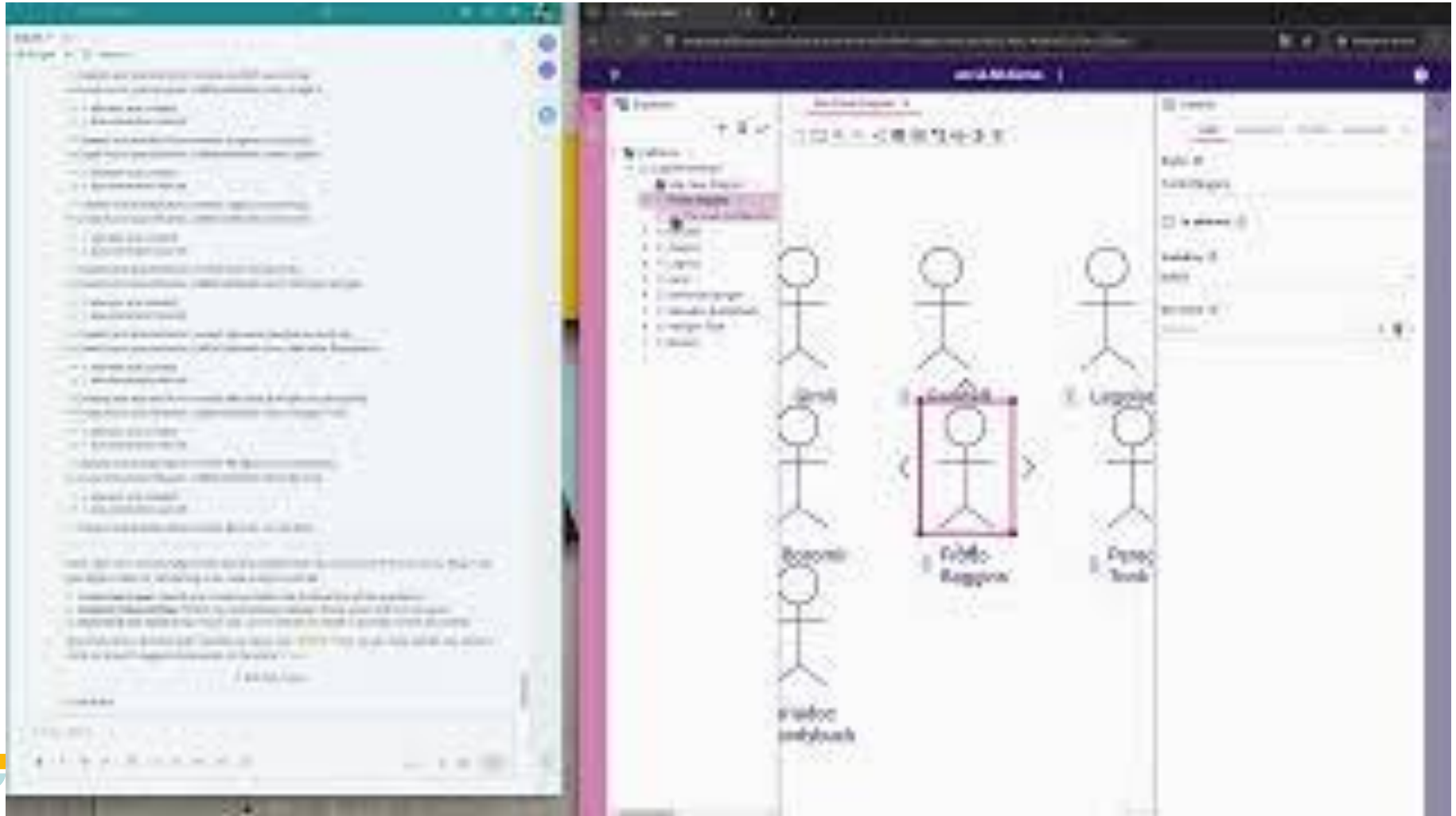
# LLM + Your Modeling Tool | Integration



```
<dependency>
  <groupId>dev.langchain4j</groupId>
  <artifactId>langchain4j</artifactId>
  <version>0.33.0</version>
</dependency>
<dependency>
  <groupId>fr.obeo</groupId>
  <artifactId>mattermost-java-api</artifactId>
  <version>0.0.1-SNAPSHOT</version>
</dependency>
```

This illustrates you can start your prototype early and easily. Iterate, evaluate and focus on the research.

# LLM + Your Modeling Tool | Integration



# Industrial Strength | Fundamental

1

**Strong, well known technological basis**  
Java, Spring Boot, Eclipse Modeling and React

2

**Obeo is here to support**  
Training, sponsored development, industrialization

In the context of R&D projects

**Trainings & on Demand Expertise**  
Pool of days to assist

**Sub contracting**  
Develop features and POCs in R&D project

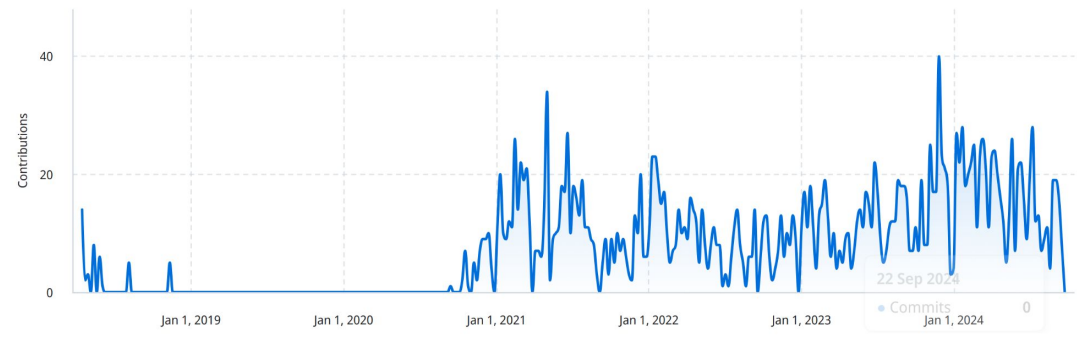
**Project Member**  
Obeo R&D initiative as part of the project

3

**Enterprise Commercial Offer : Obeo Cloud Platform**  
History and versioning, monitoring, team management ...

## Commits over time

From 15 avr. 2018 to 22 sept. 2024



# Release every 8 weeks



## Tell the community you are using it!

A screenshot of a GitHub discussion post. The header is purple and red. The post content says "Welcome to Sirius Web Discussions!" followed by "Announcements · pc david".

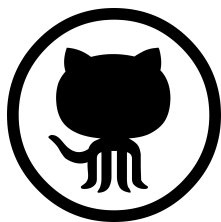
Search:  Sort by: Latest activity Label Filter: Open [New discussion](#)

### Categories

- View all discussions
- Announcements
- General
- Ideas
- Polls
- Q&A
- Show and tell

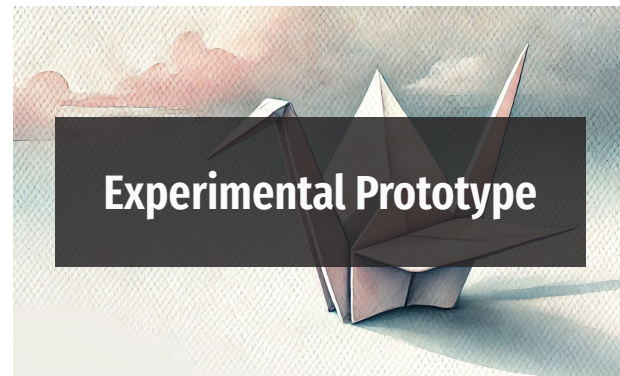
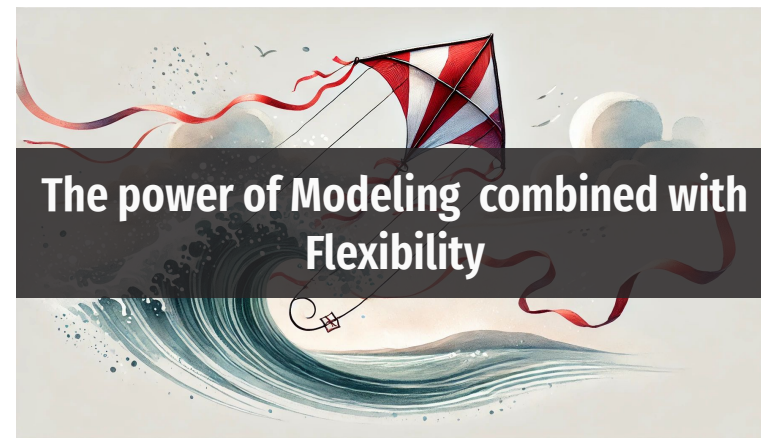
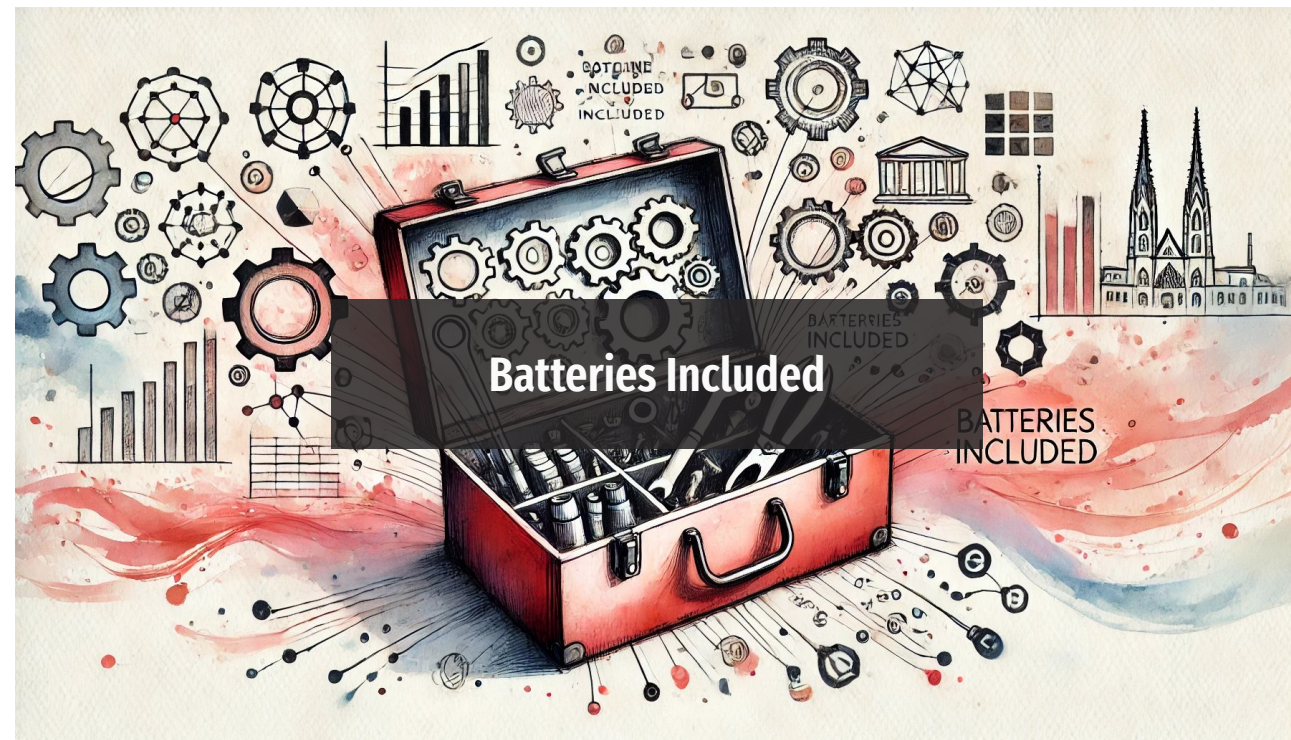
### Discussions

- 1 **.odesign file into sirius-web**  
belaboda-wecan asked 3 weeks ago in [Q&A](#) · **Answered** 3
- 1 **[Help Needed] How to integrate custom EMF Meta Model into Sirius Web**  
LeoWPereira asked last month in [Q&A](#) · **Unanswered** 1
- 1 **How to import project custom image related React components**  
tiboue asked on Aug 20 in [Q&A](#) · **Unanswered** 5
- 1 **Edges inside a node container**  
... asked on ... in [Q&A](#) · **Unanswered** 0



<https://github.com/eclipse-sirius/sirius-web>  
<https://github.com/eclipse-syson/syson>





<https://eclipse.dev/sirius/sirius-web.html>

<https://mbse-syson.org>