Advancing Web-Based Modeling Tools with Sirius Web:

An Illustration with SysON

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Model Driven Engineering Languages and Systems
MODELS 24
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Linz , Austria

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Sirius WEB

EASILY CREATE AND DEPLOY MODERN MODELING TOOLS TO THE CLOUD

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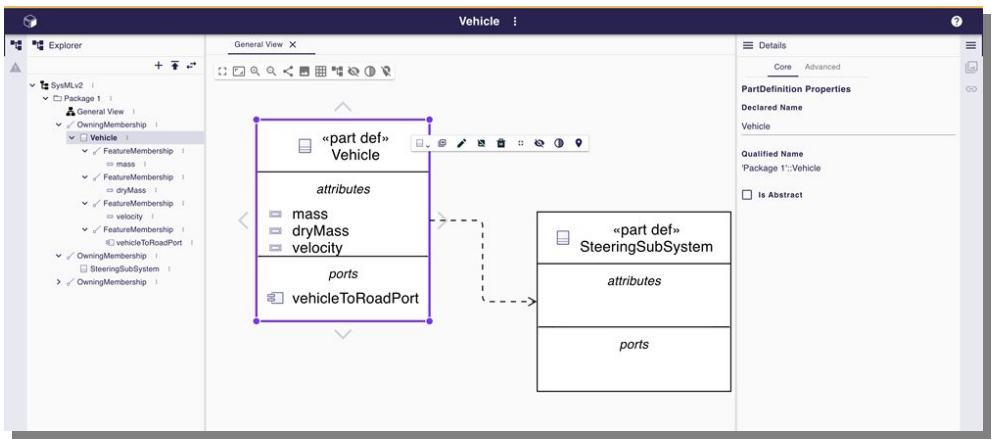
Our Throughline during this Presentation : SysON

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

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Batteries Included

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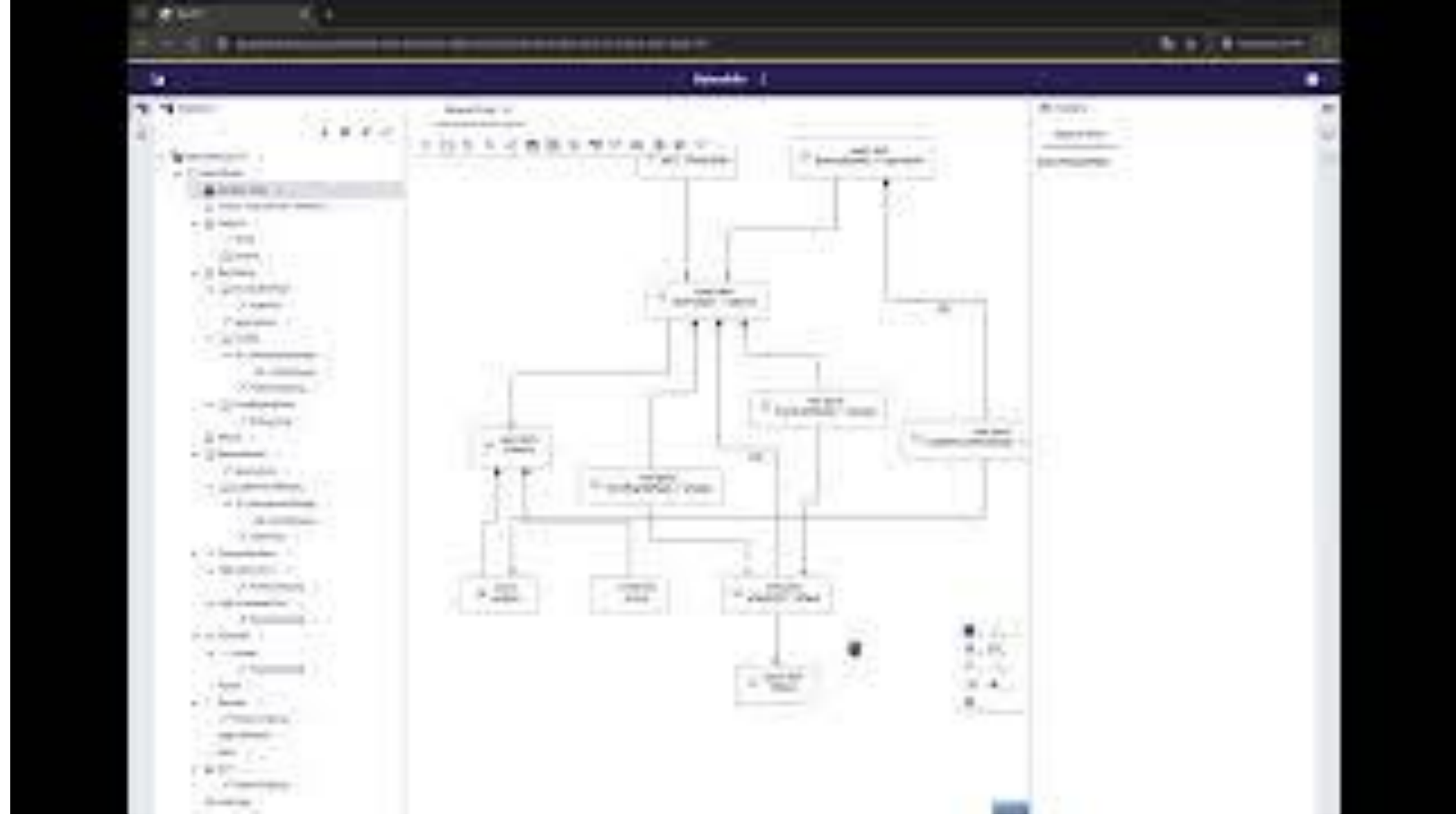
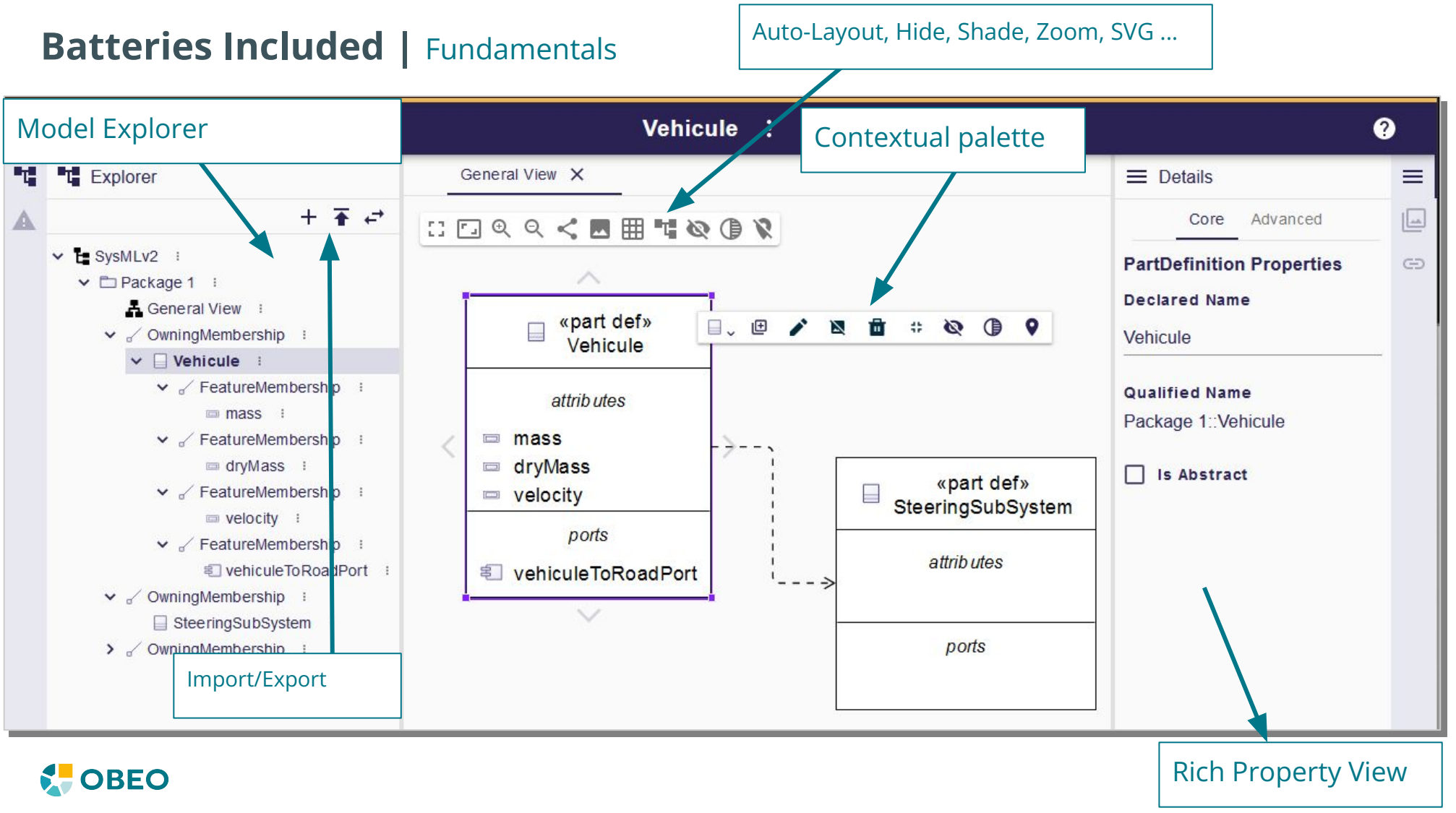


Batteries Included | Fundamentals



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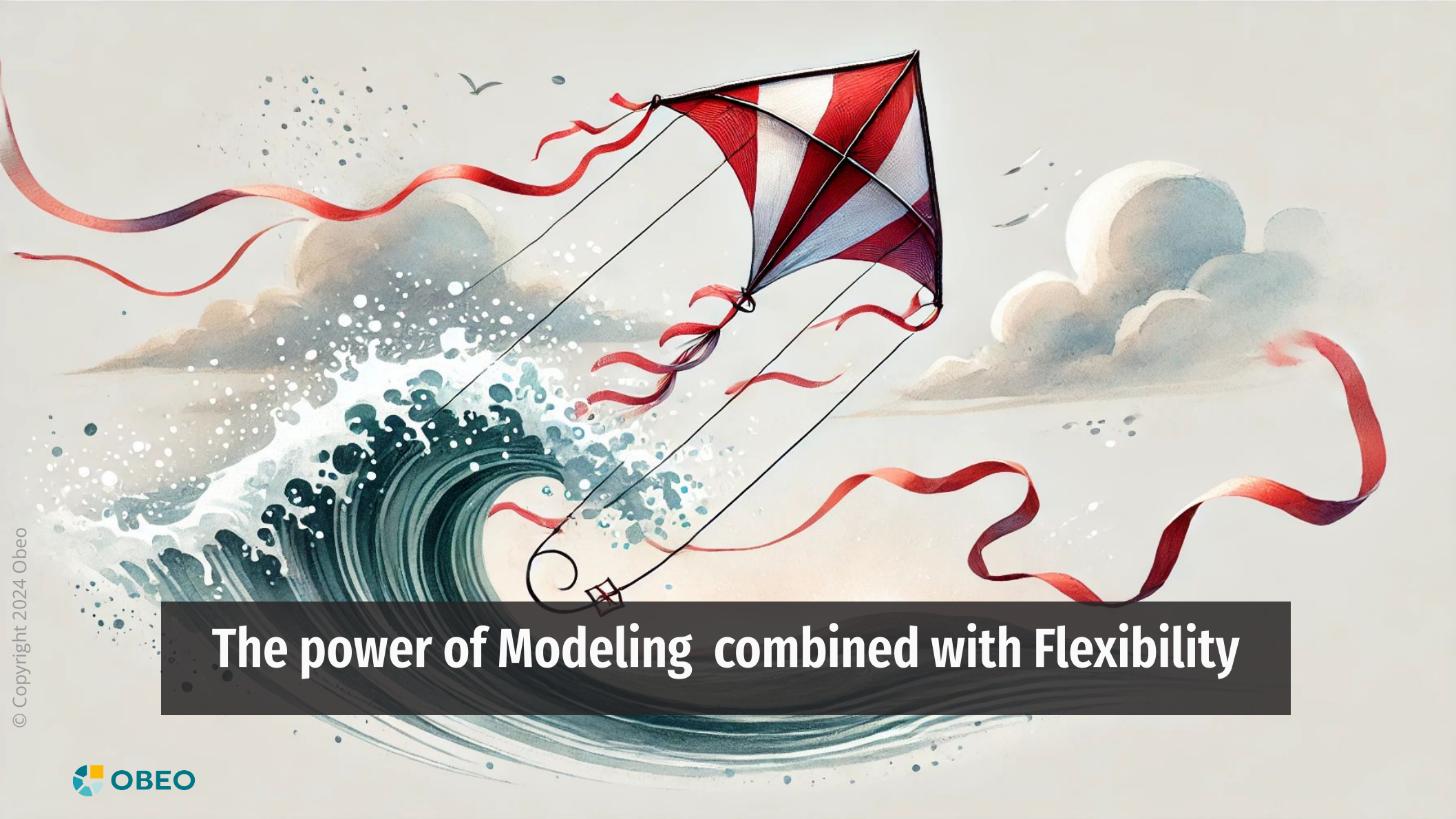

The power of Modeling combined with Flexibility

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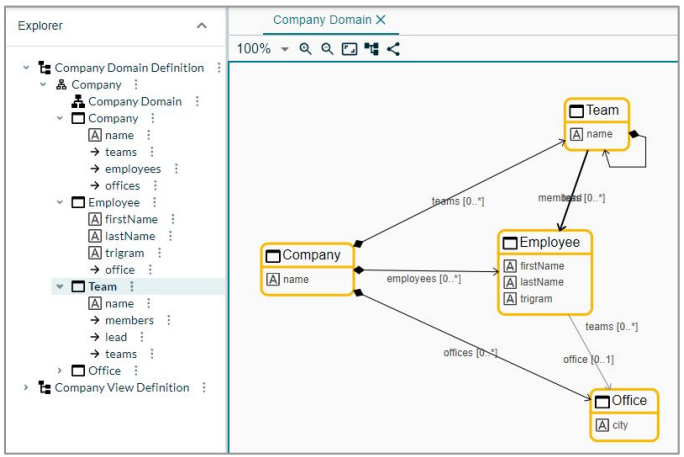
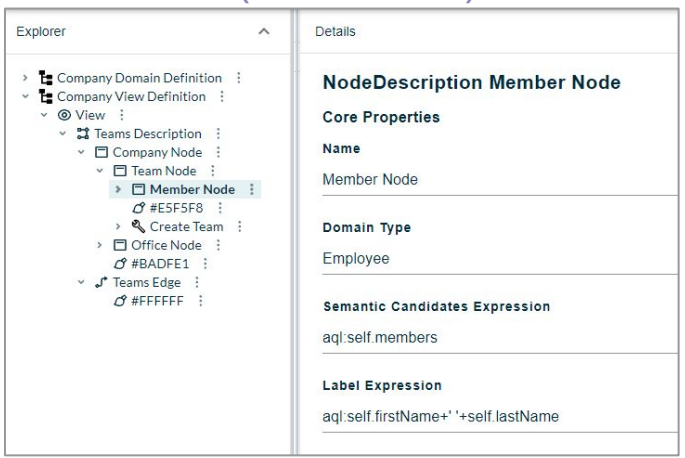
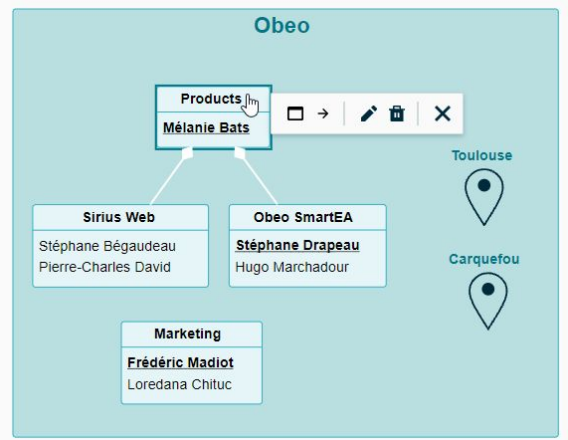
The power of Modeling + Flexibility | Fundamentals

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

Domain/Ecore model + Editors specification (View Model) = Modeling Workbench







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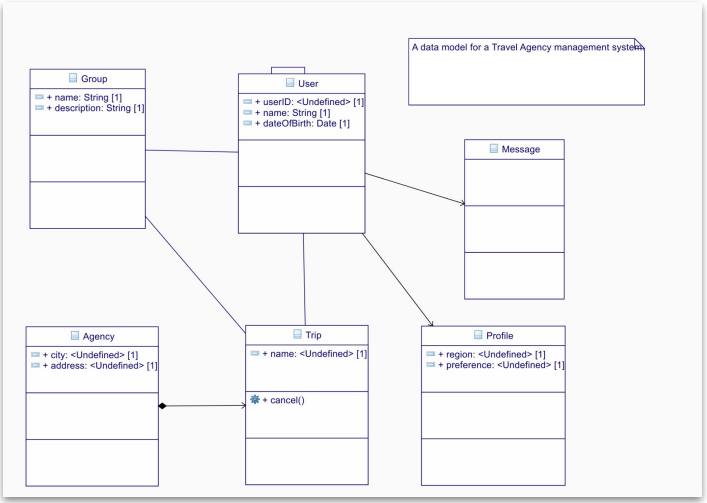
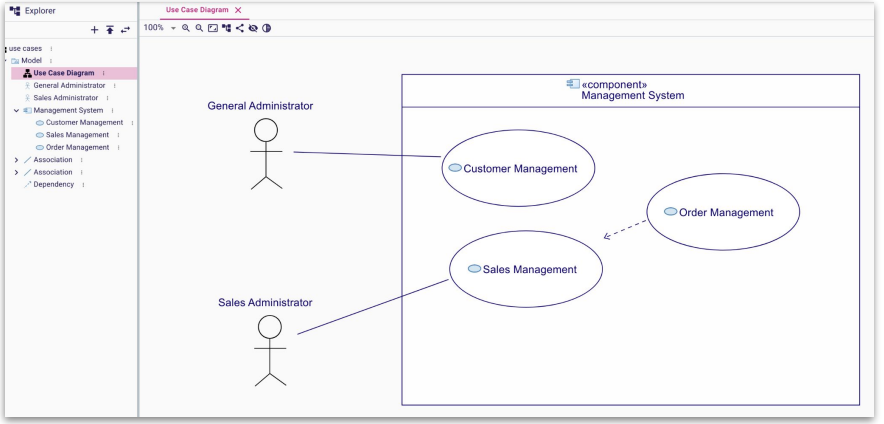
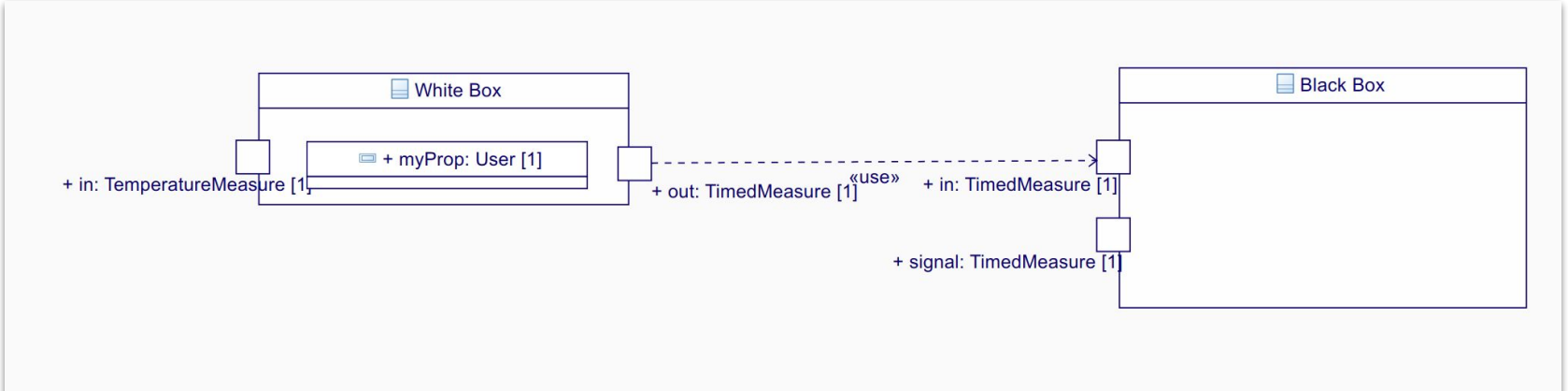
Papyrus UML | The power of Modeling + Flexibility

UML

UML implementation
from Eclipse
Standard conformant
Supports profiles







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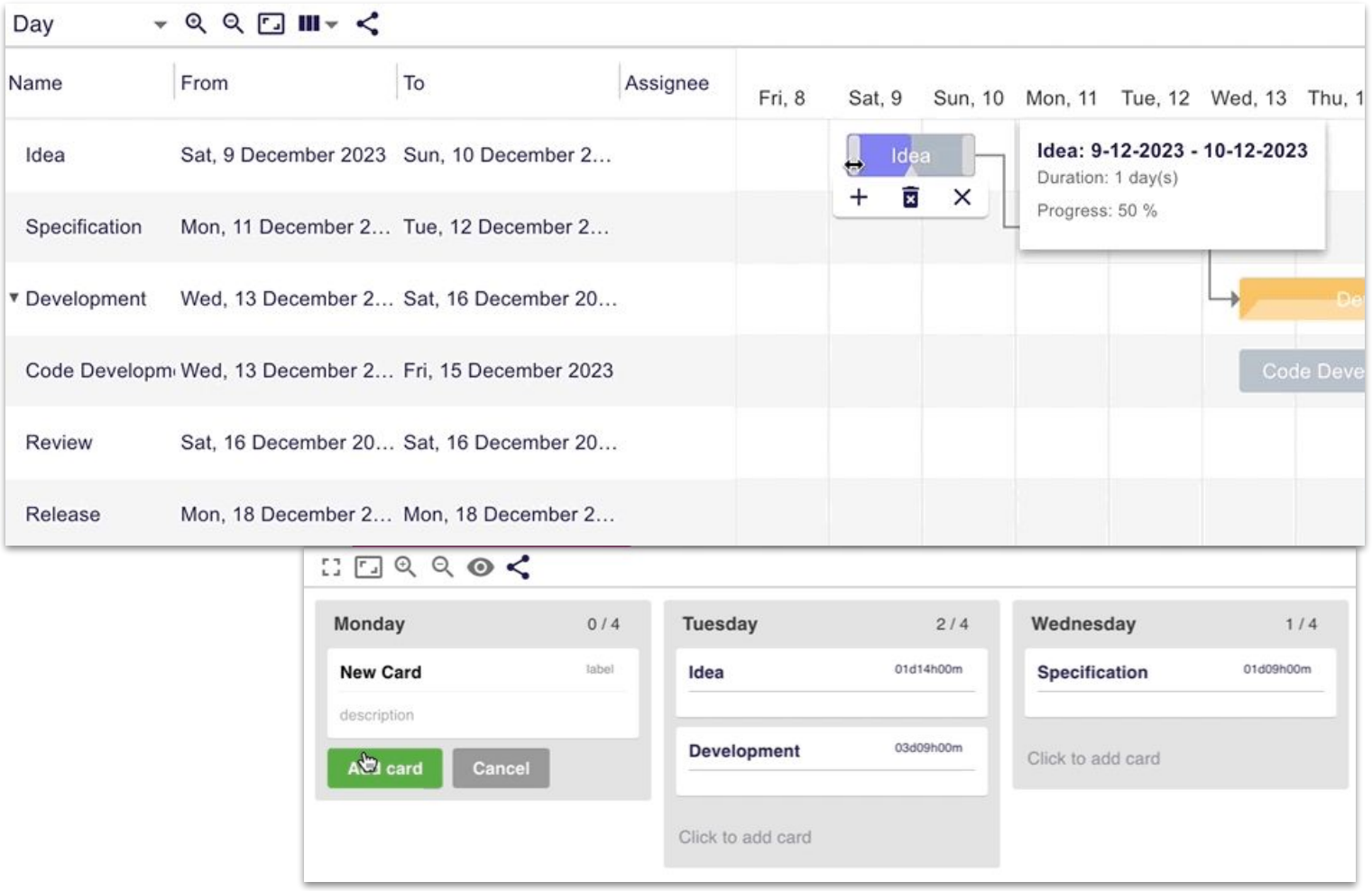
“Projects” DSL | The power of Modeling + Flexibility

Projet Management DSL

Ecore Metamodel
Uses Forms + Gantt



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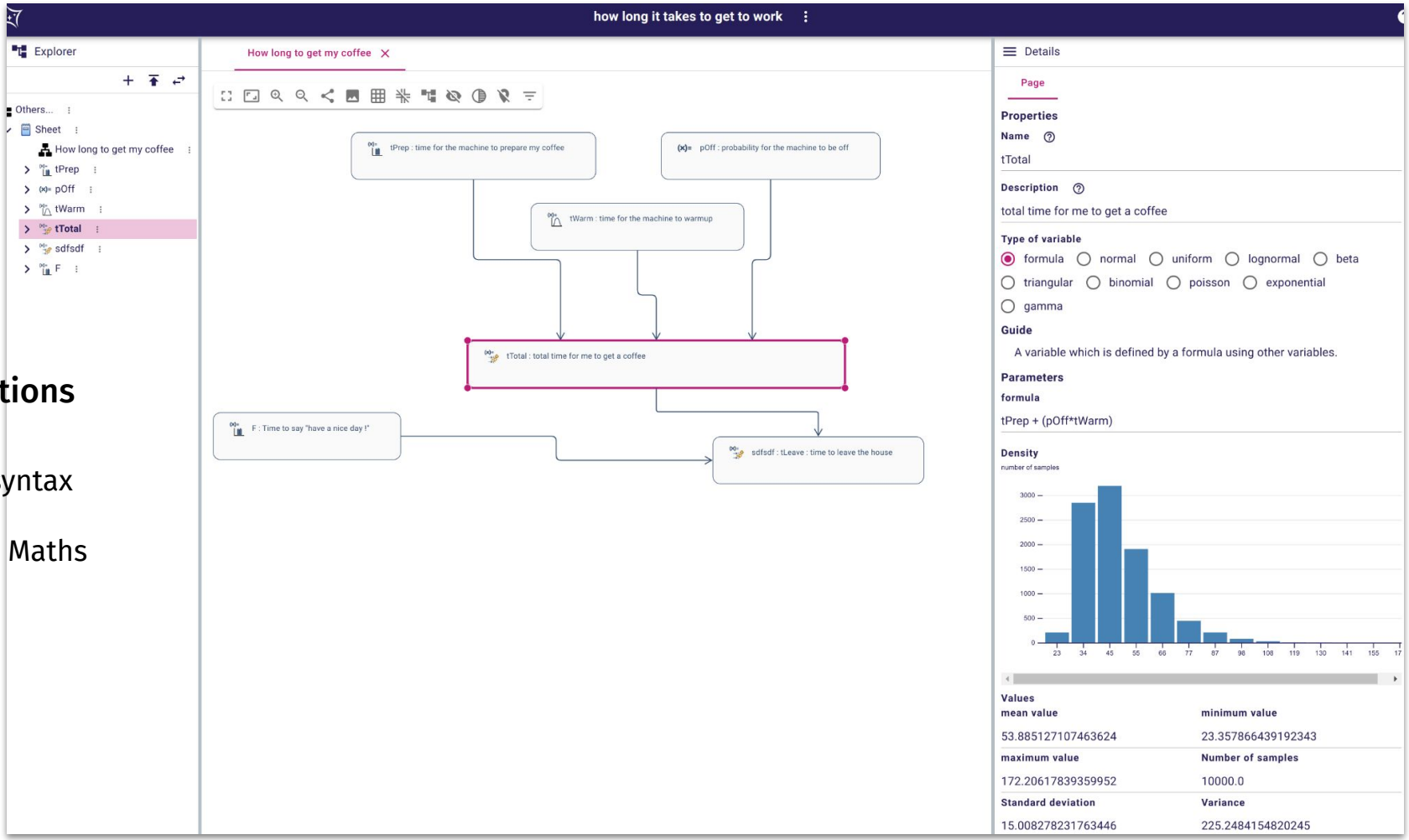
Guesstimate DSL | The power of Modeling + Flexibility

Monte-Carlo Simulations

Simple Ecore Model
Formulas with textual syntax
Uses Charts
Uses Apache Commons Maths



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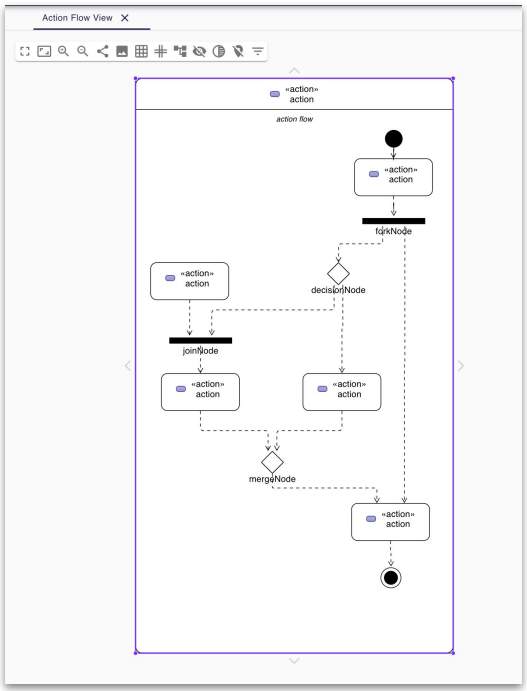
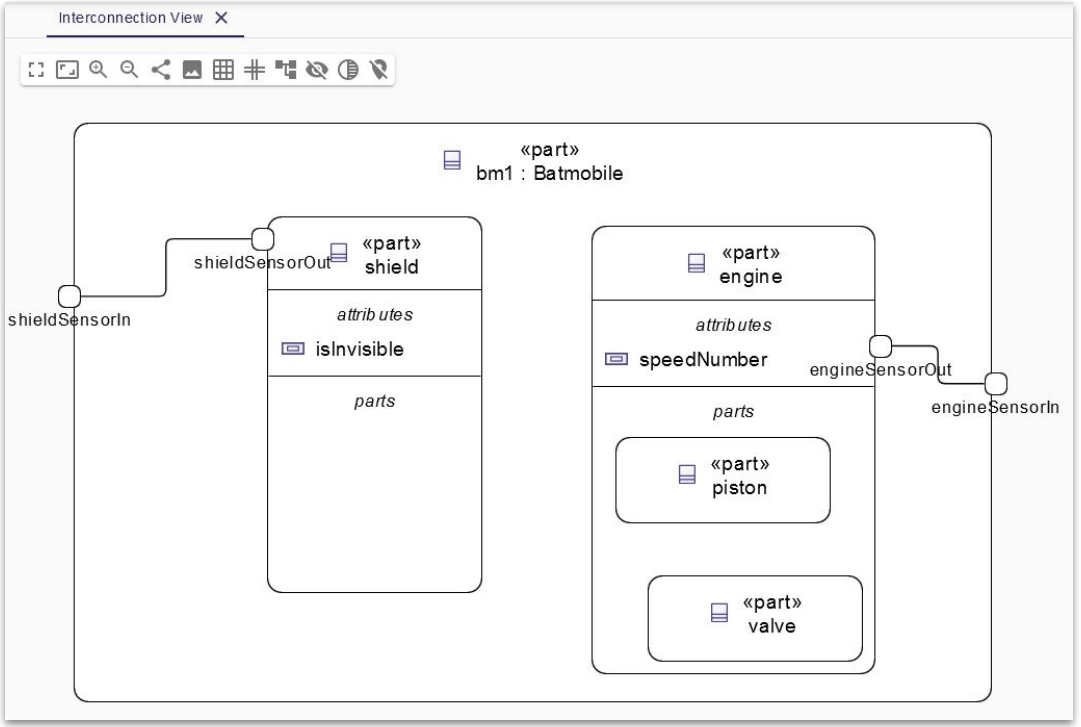
SysMLv2 a. k. a. SysON | The power of Modeling + Flexibility

System Engineering

Ecore based Metamodel
Memberships and Typing management
General View
Interconnection View
Action View





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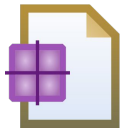
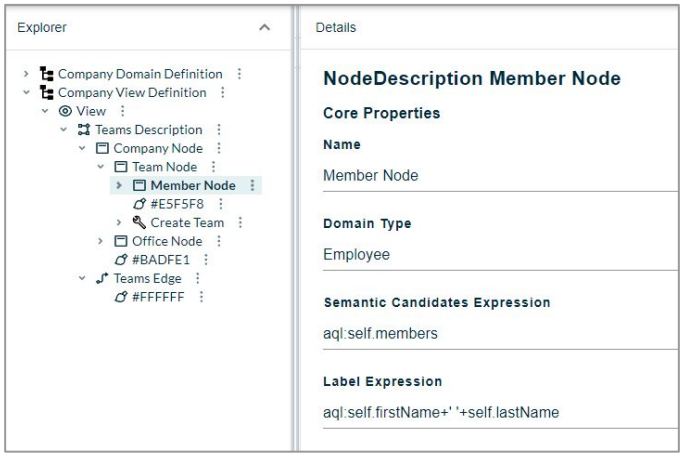
Models in Different Shapes | The power of Modeling + Flexibility



Editors specification (View Model)




```
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();
```

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Eased Adoption and User Experience

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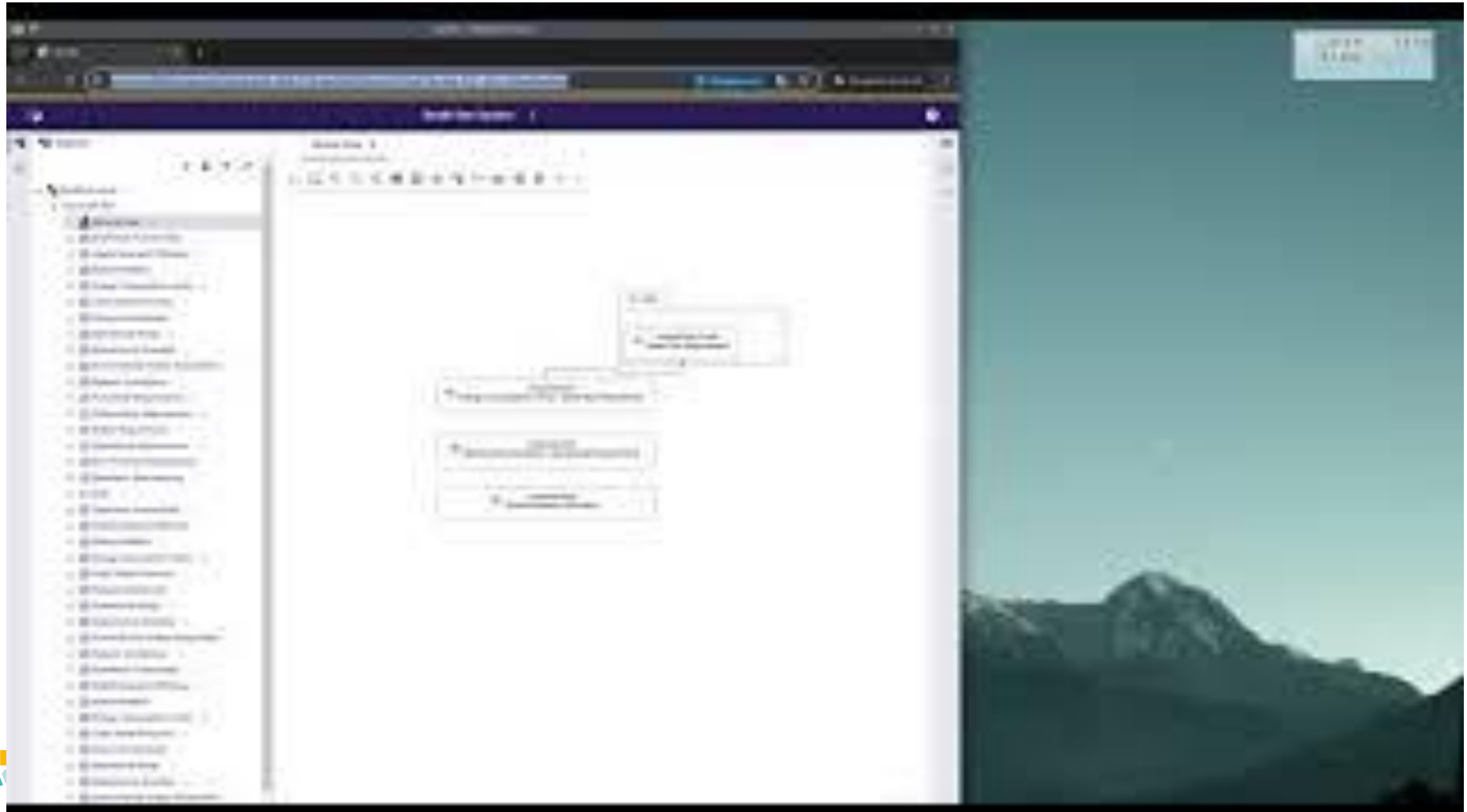
One click Onboarding | Eased Adoption and User Experience



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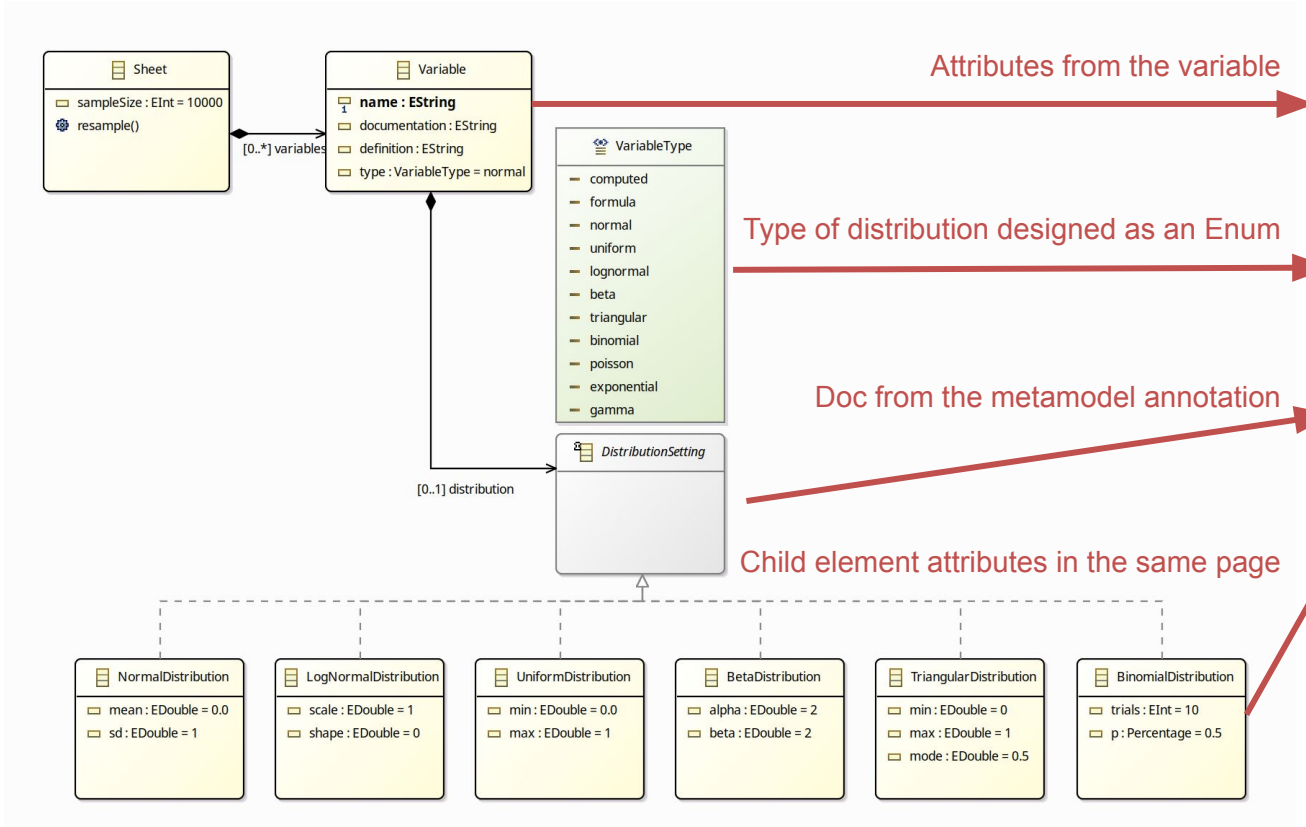
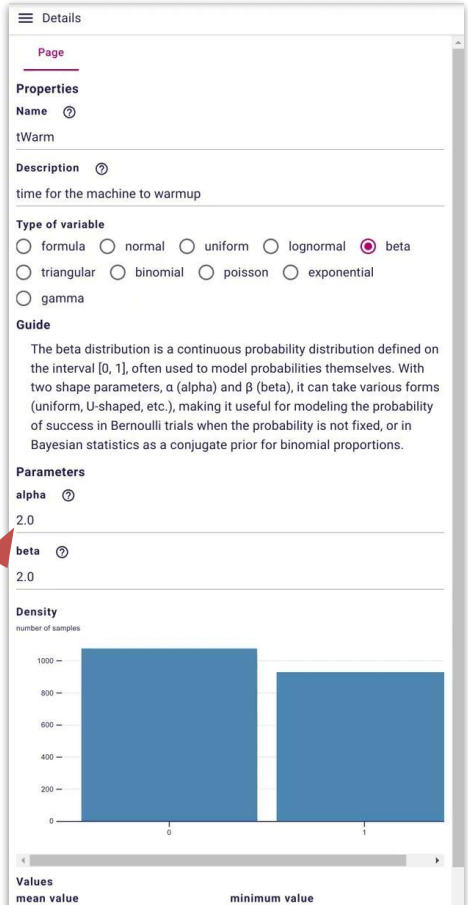
Property Views | Eased Adoption and User Experience

Great by default and 100% customizable through the view model





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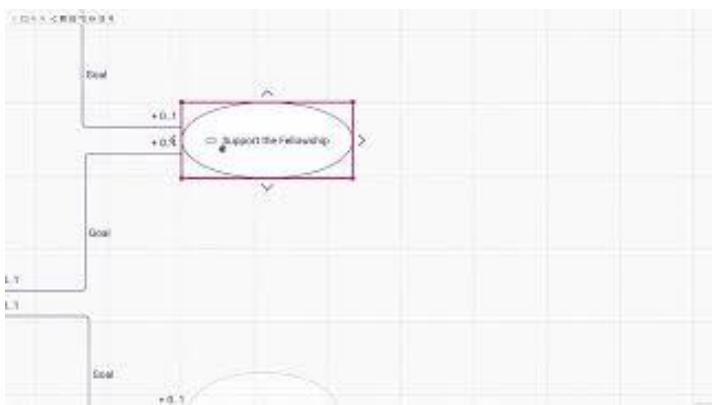
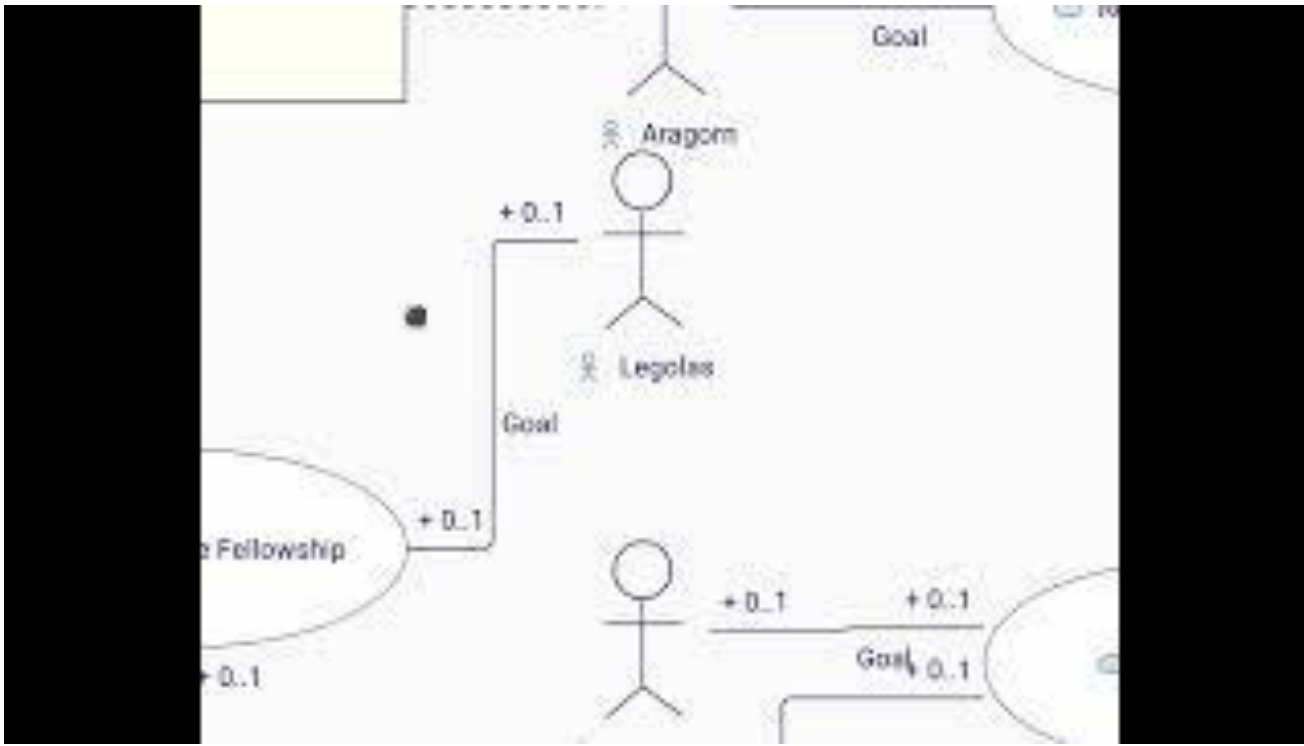
Rendering Quality | Eased Adoption and User Experience





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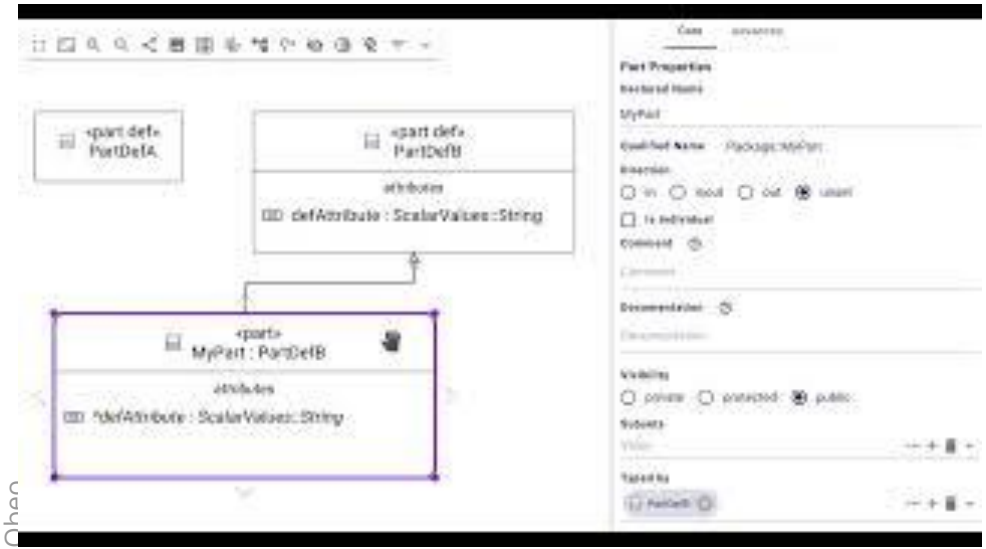
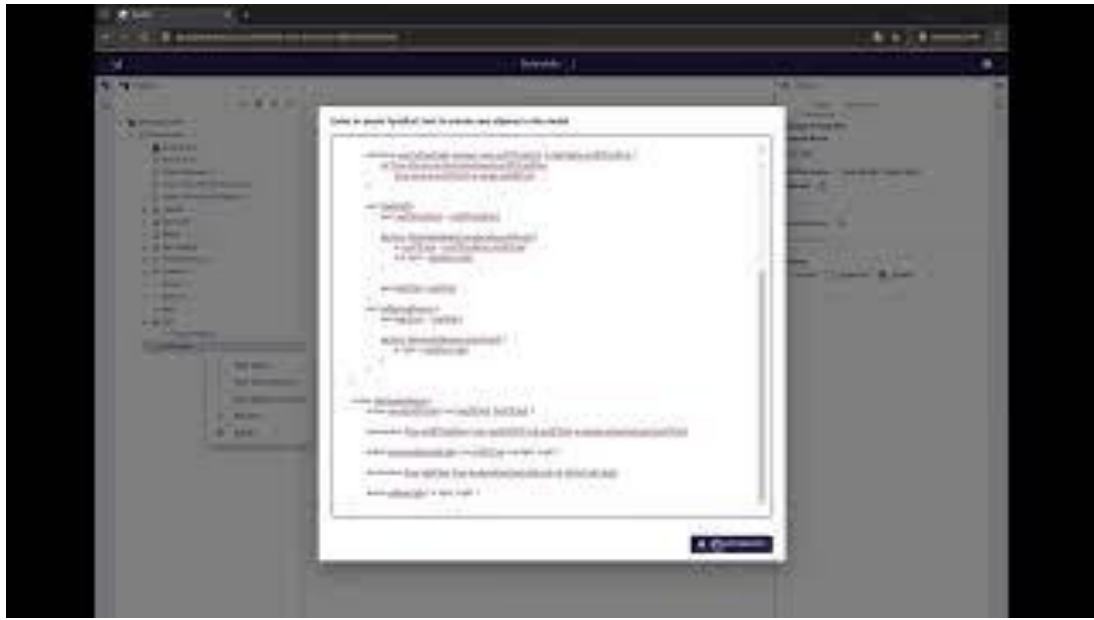
Tailored Text editing | Eased Adoption and User Experience

“Smart” label edit



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



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Powered By SysIDE

Extensibility

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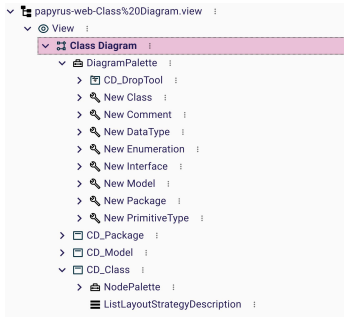
Extensibility | Fundamentals



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)

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Backend Implementations | Extensibility

```java
/**
 * 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

```java
@Component
public class MyService {

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

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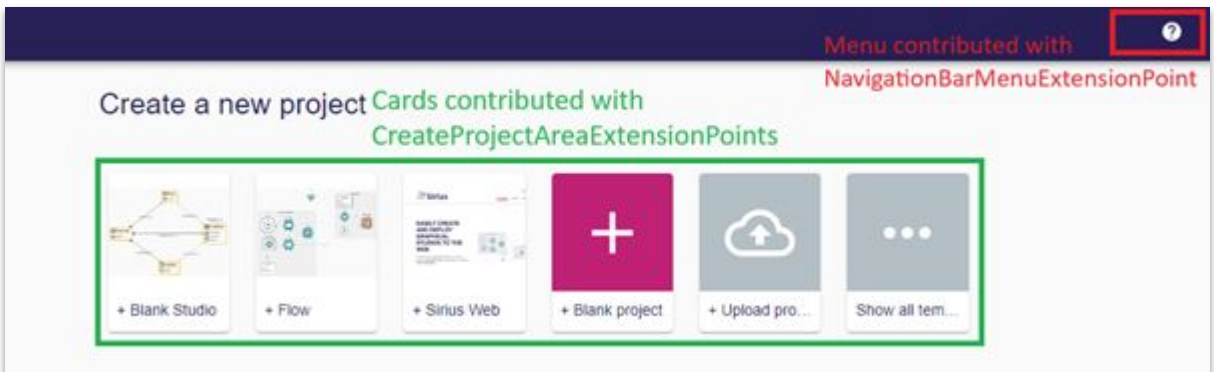
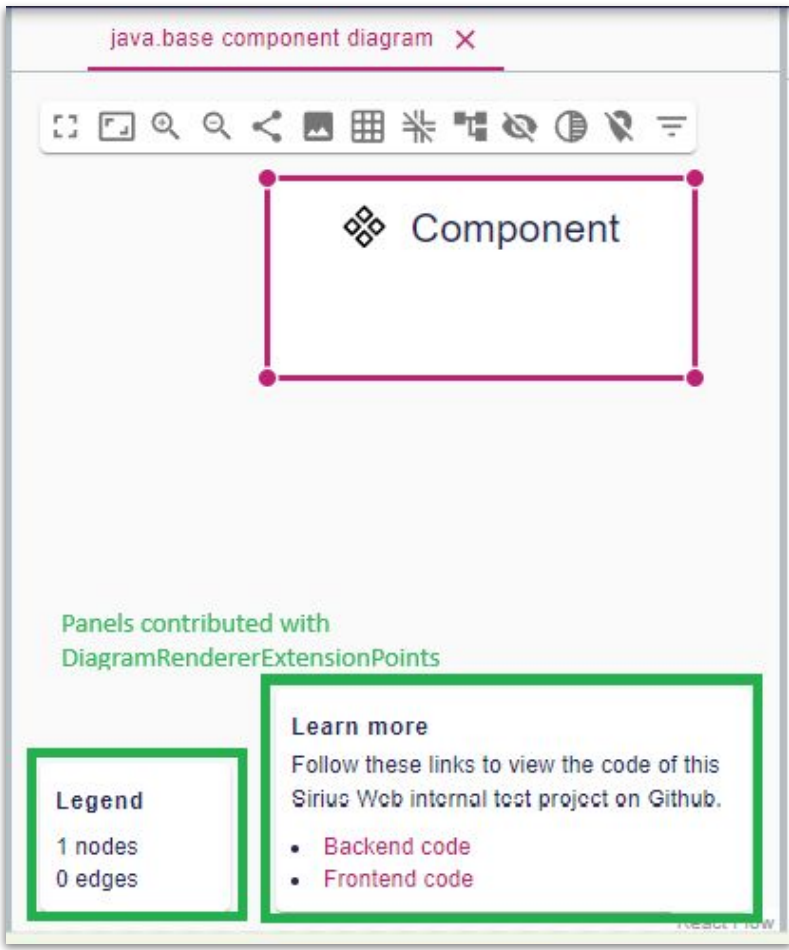
User Interface Contributions | Extensibility

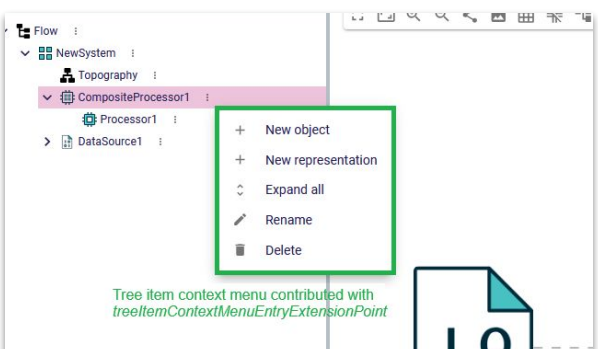
Leverage the huge React eco-system for the frontend





More details here :

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



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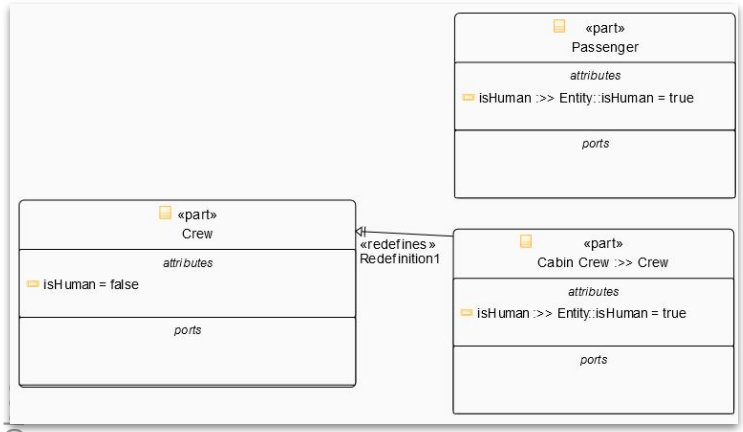
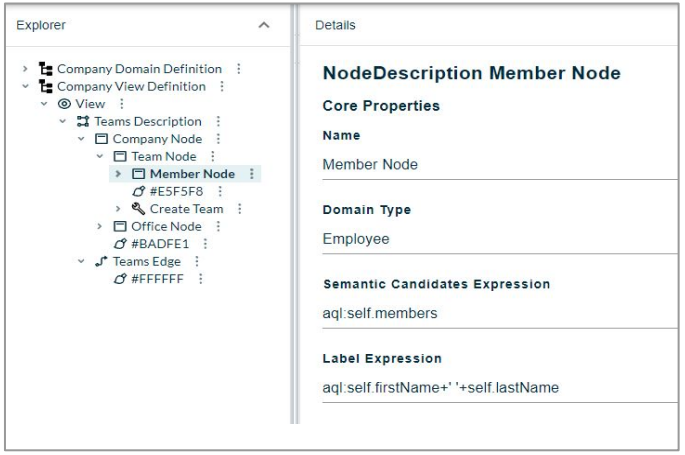
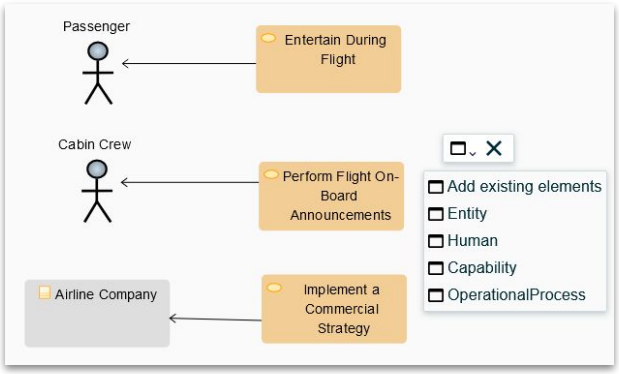
Model Based | Extensibility

SysML v2 library + Editors specification (View Model) = Tailored Editor







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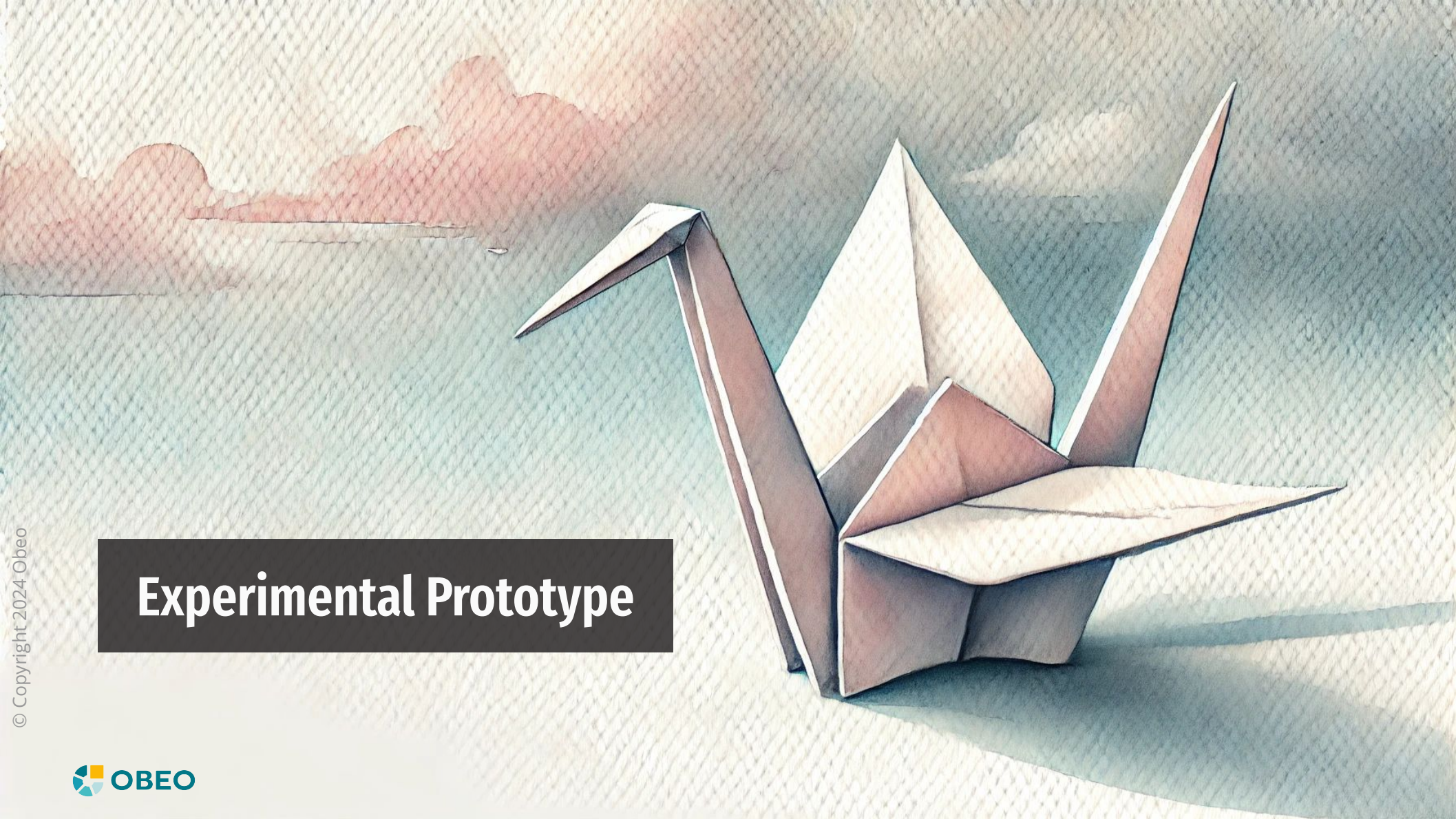

Experimental Prototype

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LLM + Your Modeling Tool | Integration

Mattermost Chat Server

Channels
Posts

REST API

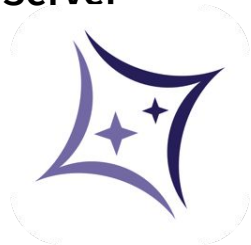
Websockets

Available commands

REST API used through EMF

Sirius Web Server

Models
Editors
Validation



LLM API

Pick and launch the commands

REST API

LLM Bot : Kevin

About 500 lines of Java code exposing tools to manipulate the model

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

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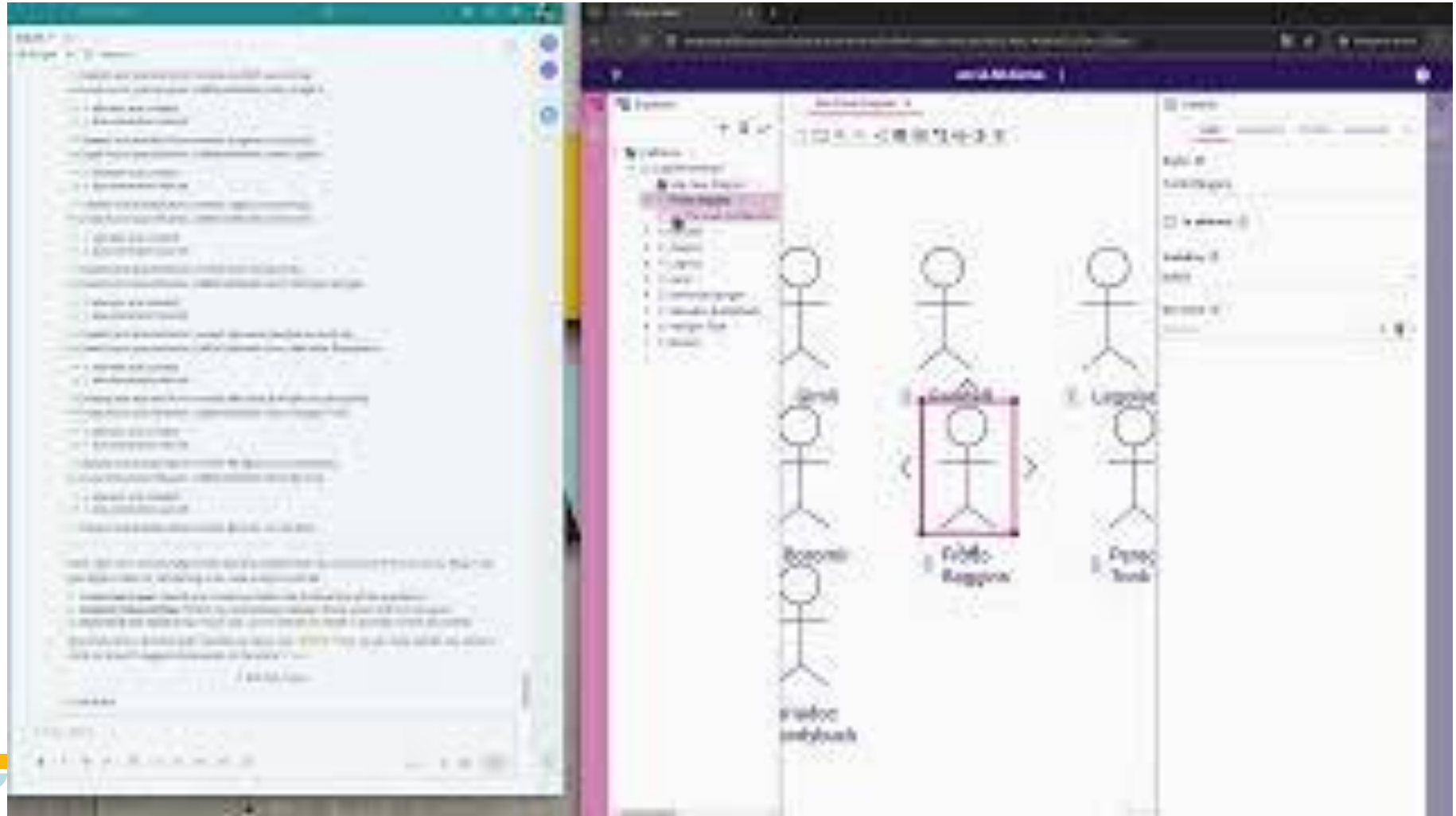
LLM + Your Modeling Tool | Integration



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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 ...

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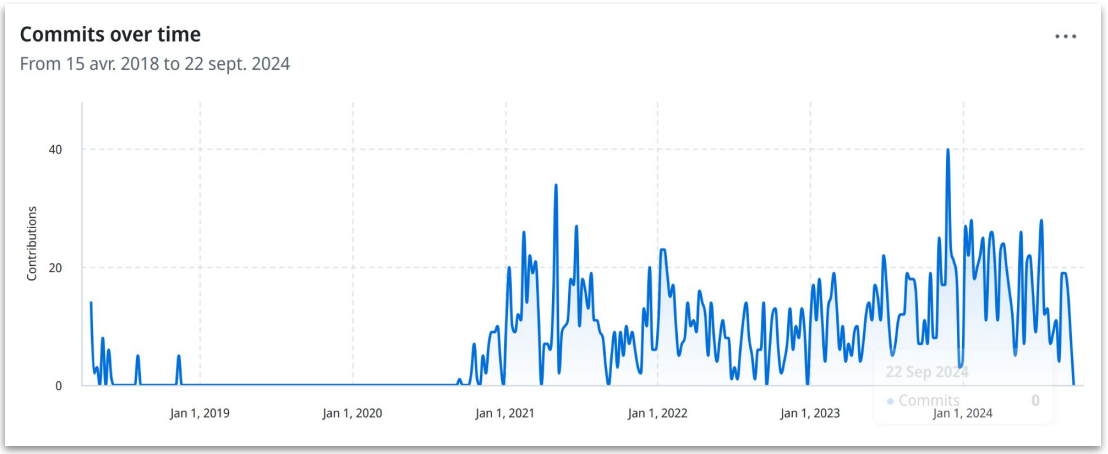
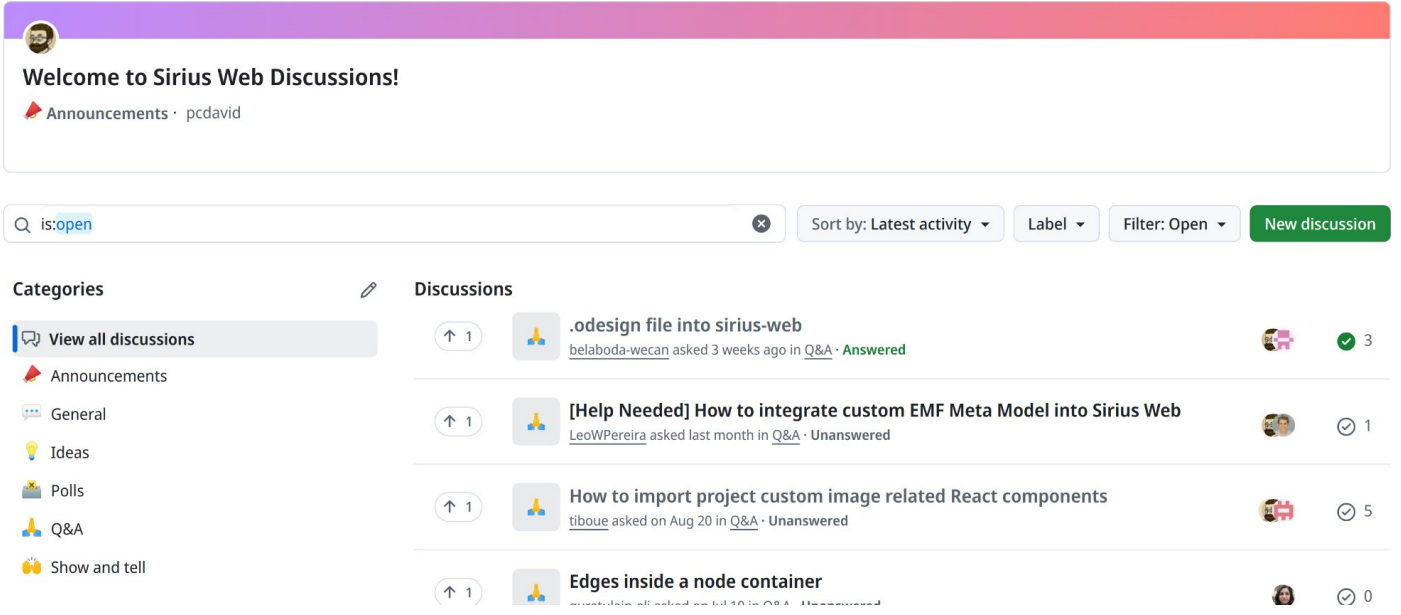


Release every 8 weeks

Tell the community you are using it!

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



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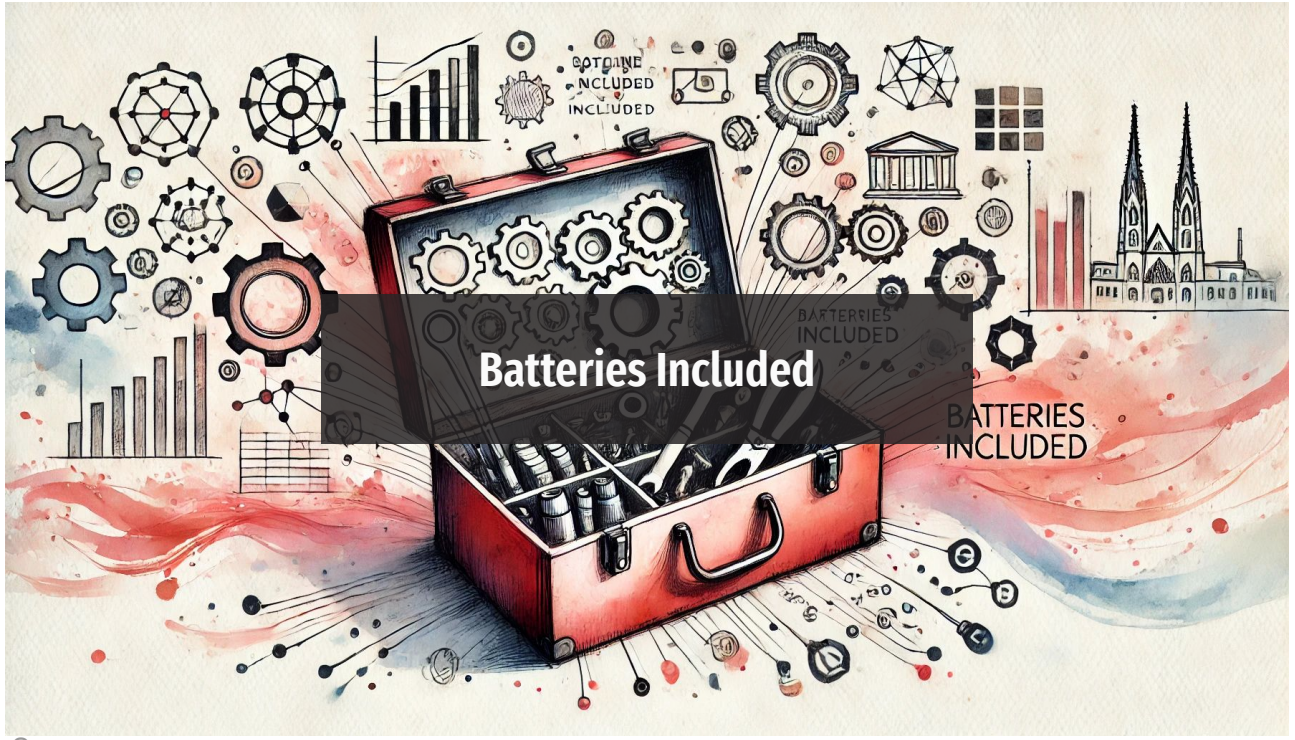

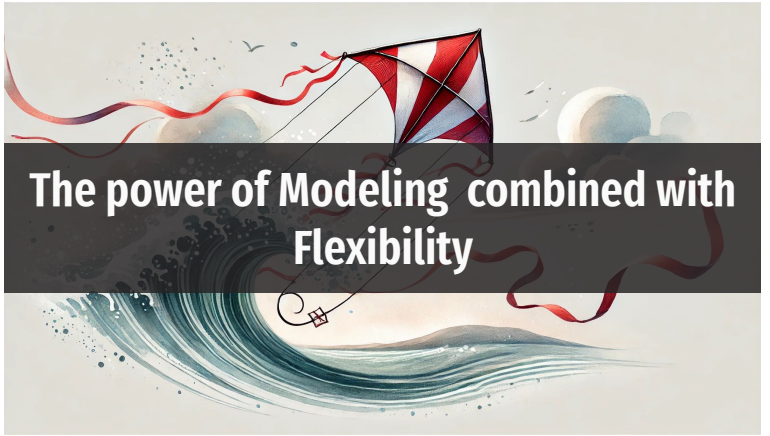

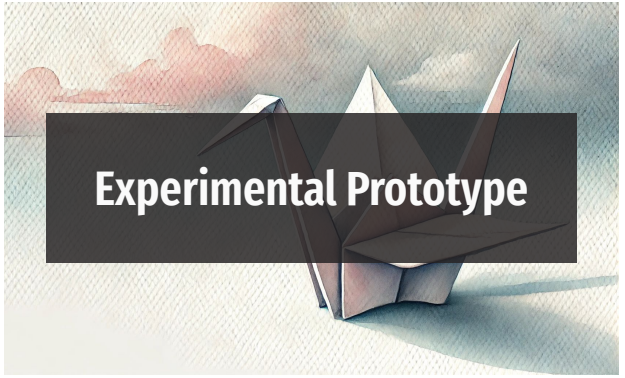

https://eclipse.dev/sirius/sirius-web.html

https://mbse-syson.org