



Why settle for one MBSE tool when you can have an ecosystem?

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WE NEED INTEROPERABILITY



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captiontool.com

Challenges of interoperability

Universal vs. specific

Open vs. closed format

Semantic mapping

Possibility for customizations

Standard vs. tools

Identity of the transferred elements

Traceability

Merge conflicts

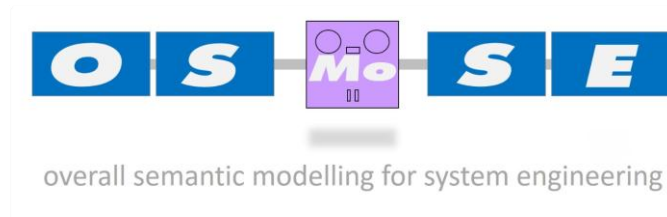
Model Driven Engineering & Domain Specific Languages

- **Capture business knowledge**
- **Use it as the single source of truth**
- **Use jargon, conventions, and notations of the domain**
- **Accessible for subject matter experts**
- **Actionable/executable with interpreters and generators**

Banking Insurance
Taxes Automotive Space Railway
Healthcare Cyber-physical systems Game development

MBSE vs MDE & DSLs

Languages to capture the domain of System Engineering



Domain-Specific Extensions on top of them

MBSE tools to create, edit, and share models



MBSE built with MDE tools

 **Capella**
Open Source MBSE Solution

 **emf**
ECLIPSE MODELING FRAMEWORK



 **SysON**

 **Sirius**



Xtext



 **SysIDE**

 **Langium**



 **APRICOT**

 **DAGA**

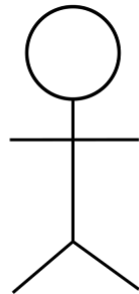
We want to choose a tool
that fits our project
without having to restart
from scratch

The real-world case

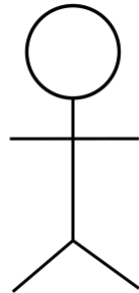
Customers use different software to work with their specific tools.



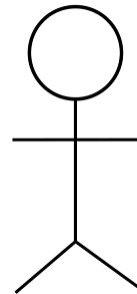
Language engineer



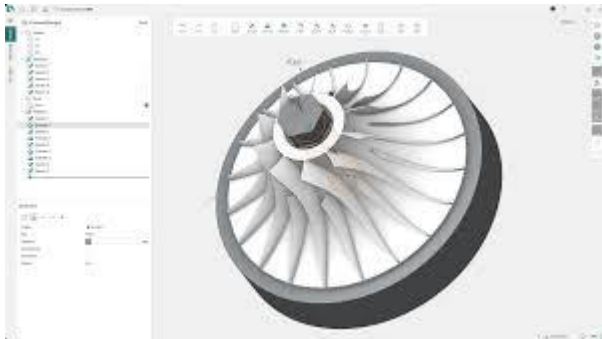
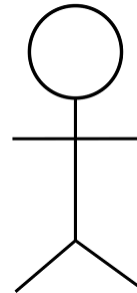
Designer



Software engineer

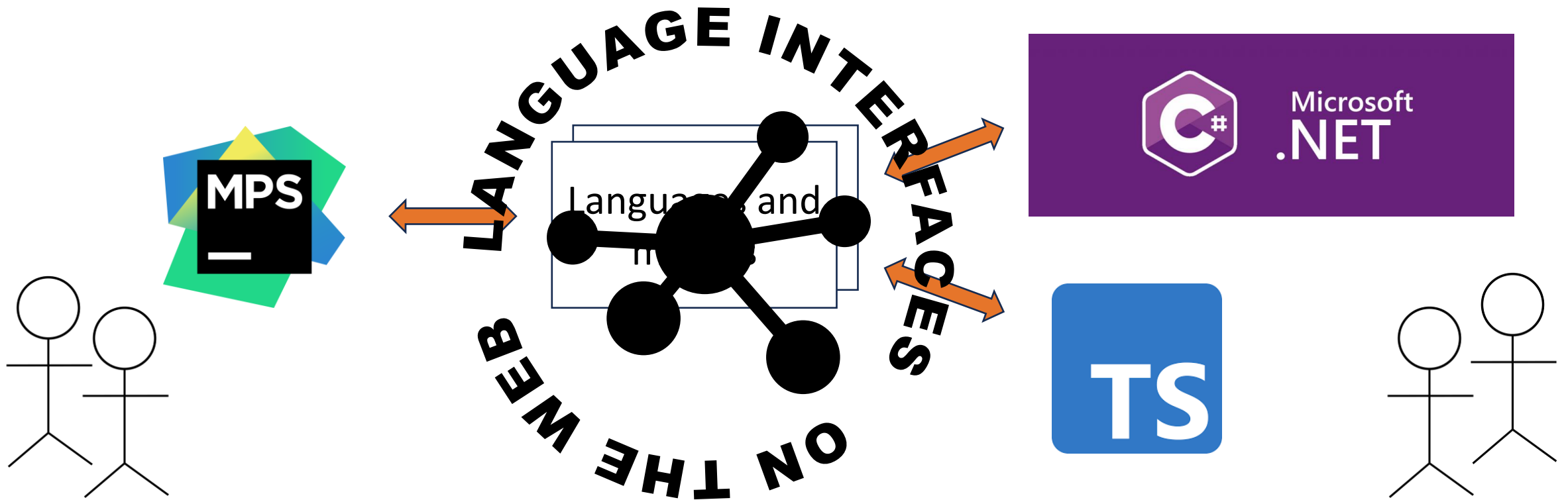


Operator



The real-world case

Customers use different software to work with their tools.
The next generation of software uses LionWeb to assure data consistency, reducing friction.

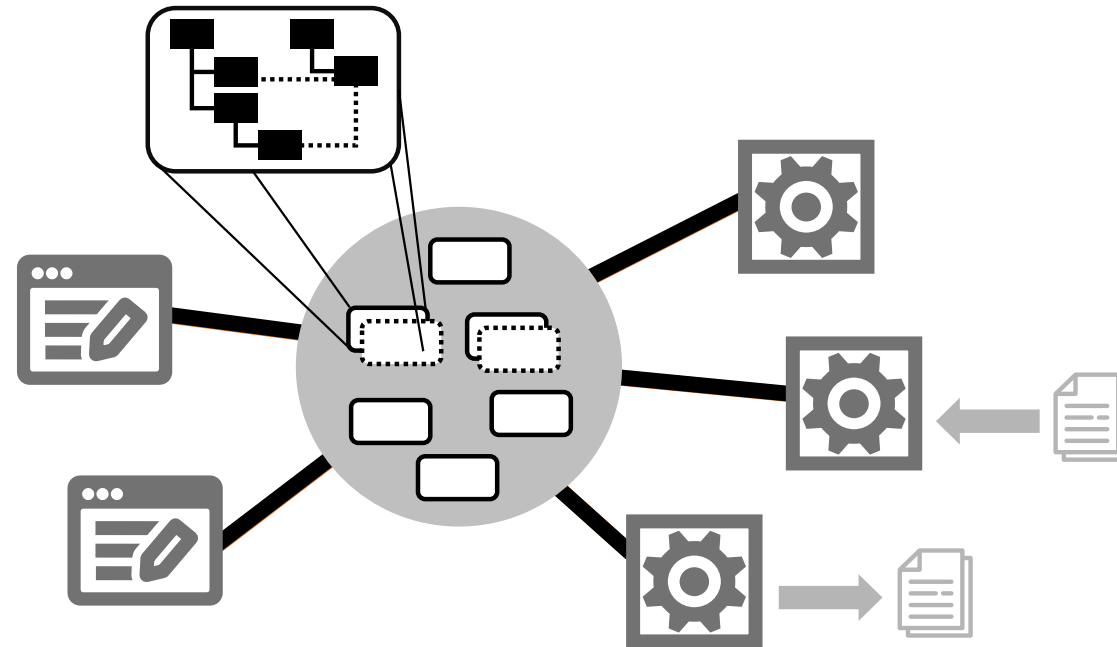




LionWeb:

a protocol for exchanging
languages and models

LionWeb architecture



Repository

Models

- Original
- Derived

Clients

Editors

- Textual
- Visual
- Projectional

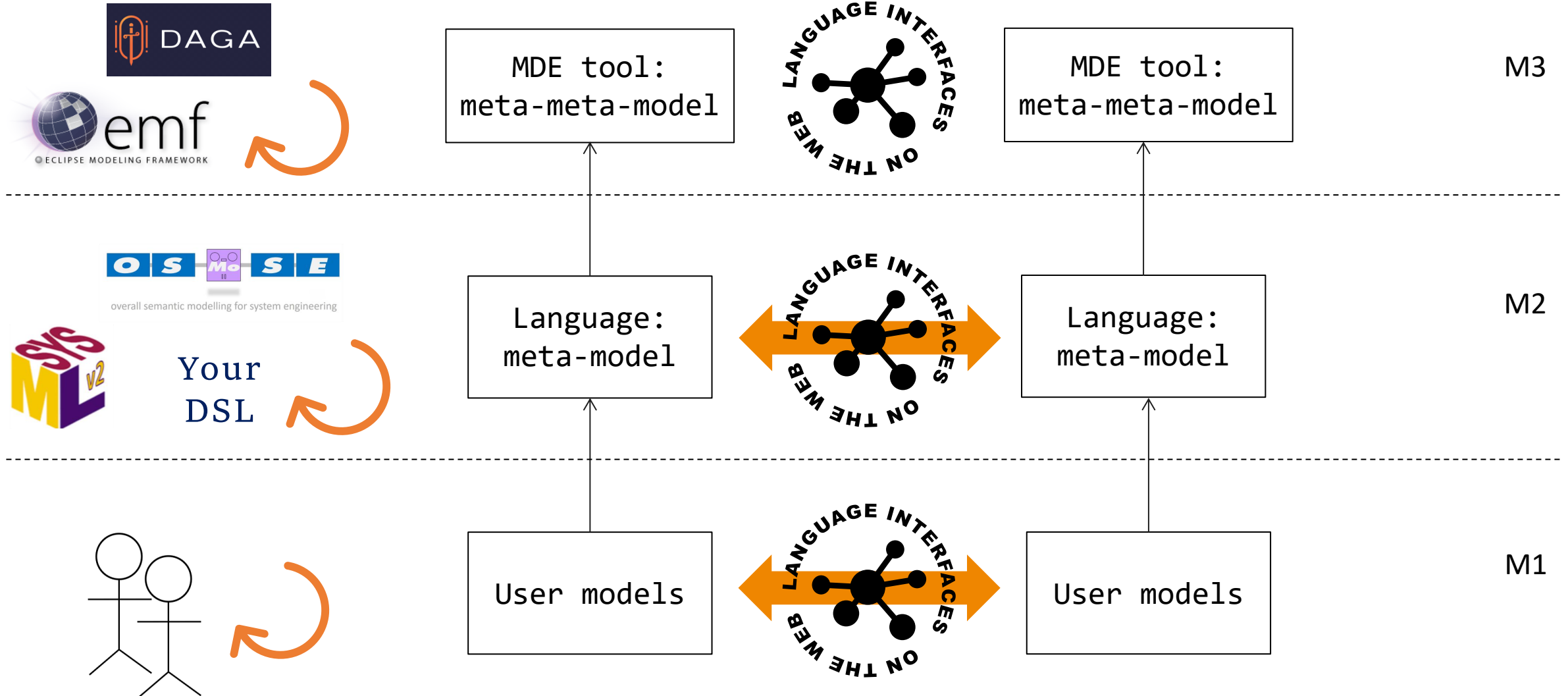
Processors

- Model checker
- Importer
- Generator



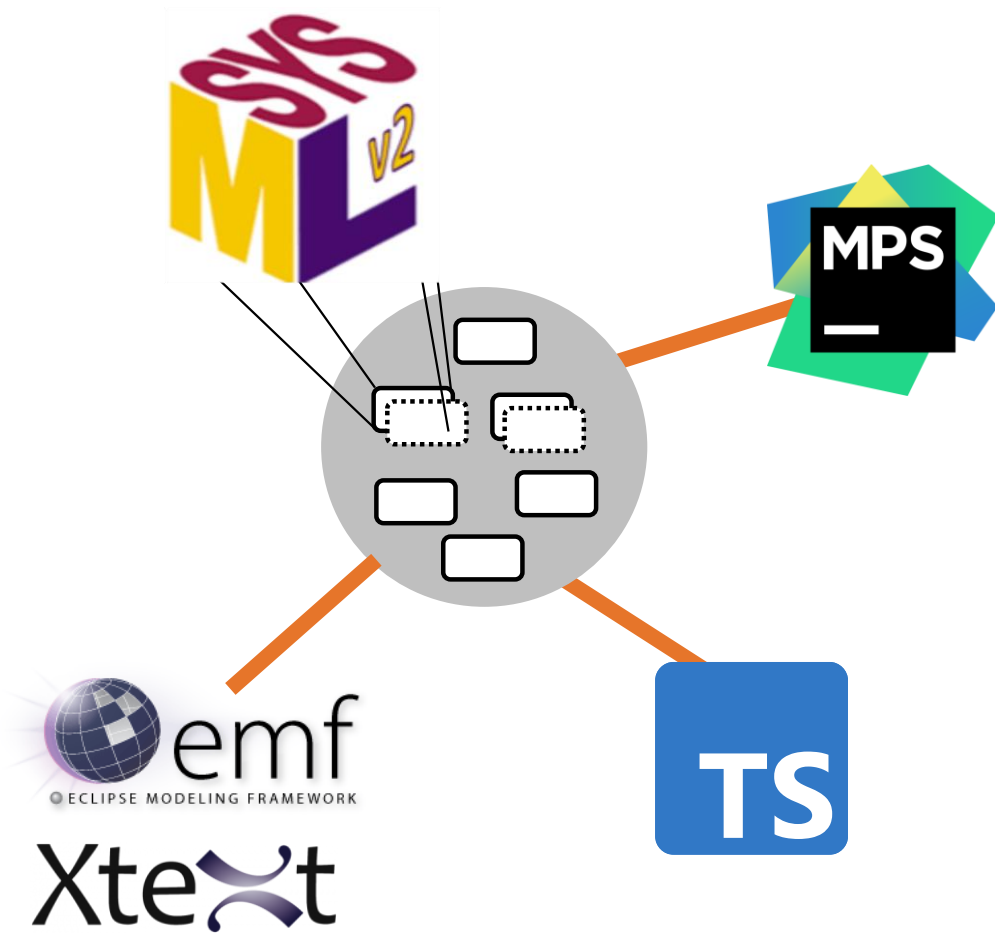
Protocols (bulk / delta)
Contents (JSON)

Interoperability levels

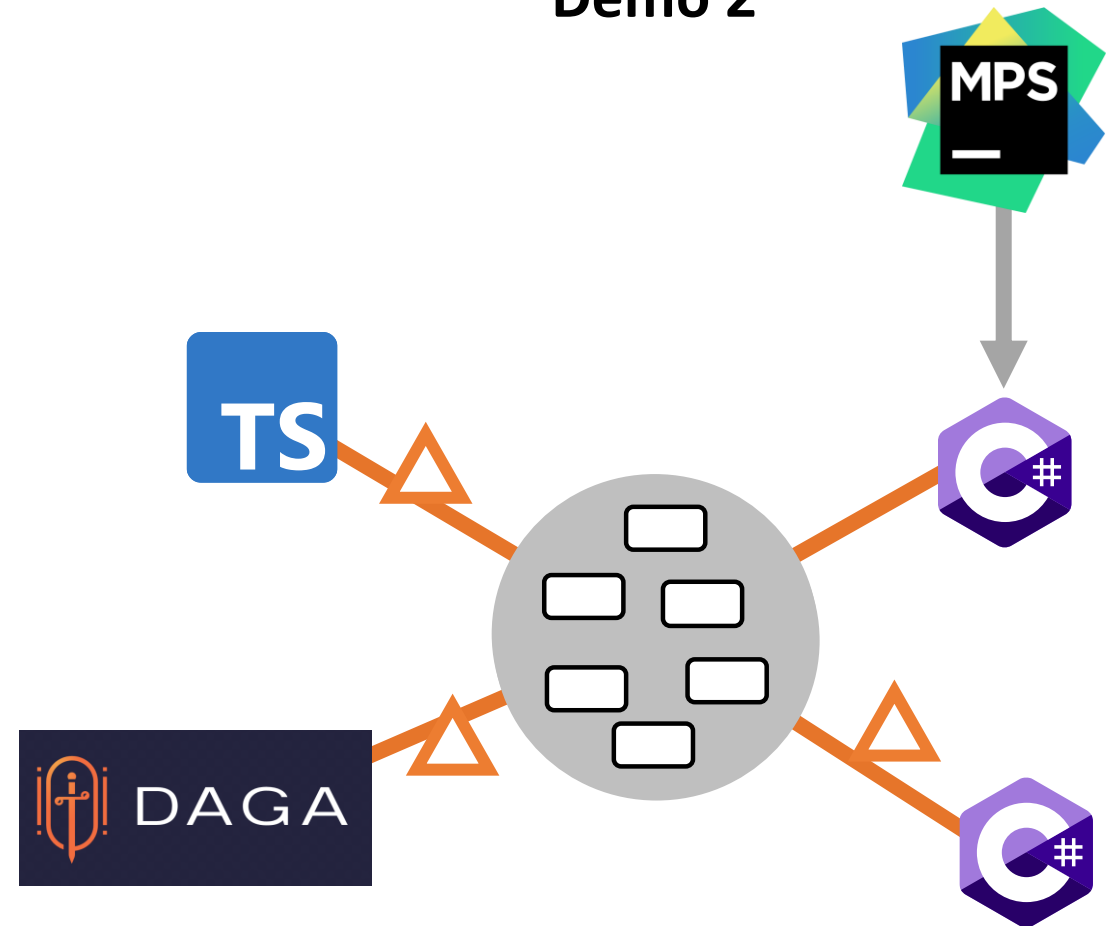


Demo

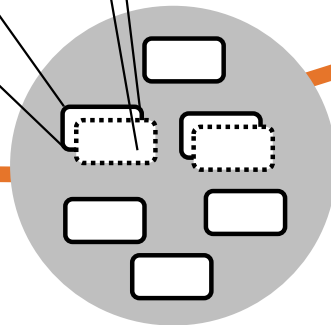
Demo 1



Demo 2



Demo I



```
fun sumOf1ToN(n: number) = 
$$\sum_{i: \text{int} = 1}^n i$$

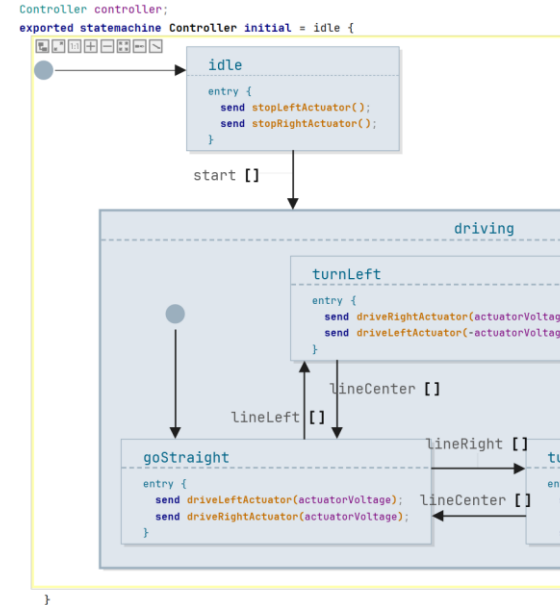
```

```
fun sumOf1ToNInduction(n: number) = 
$$\frac{n * (n + 1)}{2}$$

```

```
fun sumRealFn(a: int, b: real) = 
$$\sum_{\text{idx: int} = 1}^a \text{idx} * b$$

```



Jet-Mobile

Event: Internet on button: 1 Greeting: Did you know that our internet is fast

On button: 1 -->	Discont
On button: 2 -->	Data limit
On button: * -->	Return to main menu

Event: Discont on button: 1 Greeting: Welcome in section of discounts!

On button: 1 -->	Summer discount
On button: 2 -->	Hidden discounts
On button: * -->	Step back

Event: Summer discount on button: 1 Greeting: Hello!

other

Event: Hidden discounts on button: 2

get info

Event: Step back on button: *

BACK (Action in jetbrains.mps.samples.VoiceMenu)

GENERAL (Action in jetbrains.mps.samples.VoiceMenu)

GET_INFO (Action in jetbrains.mps.samples.VoiceMenu)

MENU (Command in jetbrains.mps.samples.VoiceMenu)

OTHER (Action in jetbrains.mps.samples.VoiceMenu)

Event: Payment on button: 2 Greeting: Since now we offer you easiest way of

On button: 1 -->	Billing
On button: 2 -->	Recharging
On button: 3 -->	Payments
On button: * -->	Step back

Context Actions

- BILLING_RETENTION
- CABLE_BILLING_DEPT
- CABLE_T/S_BILLING_DEPT
- INTERNET_BILLING_DEPT
- INTERNET_T/S_DEPT
- PAY_BILL
- PHONE_BILLING_DEPT
- PHONE_T/S_BILLING_DEPT

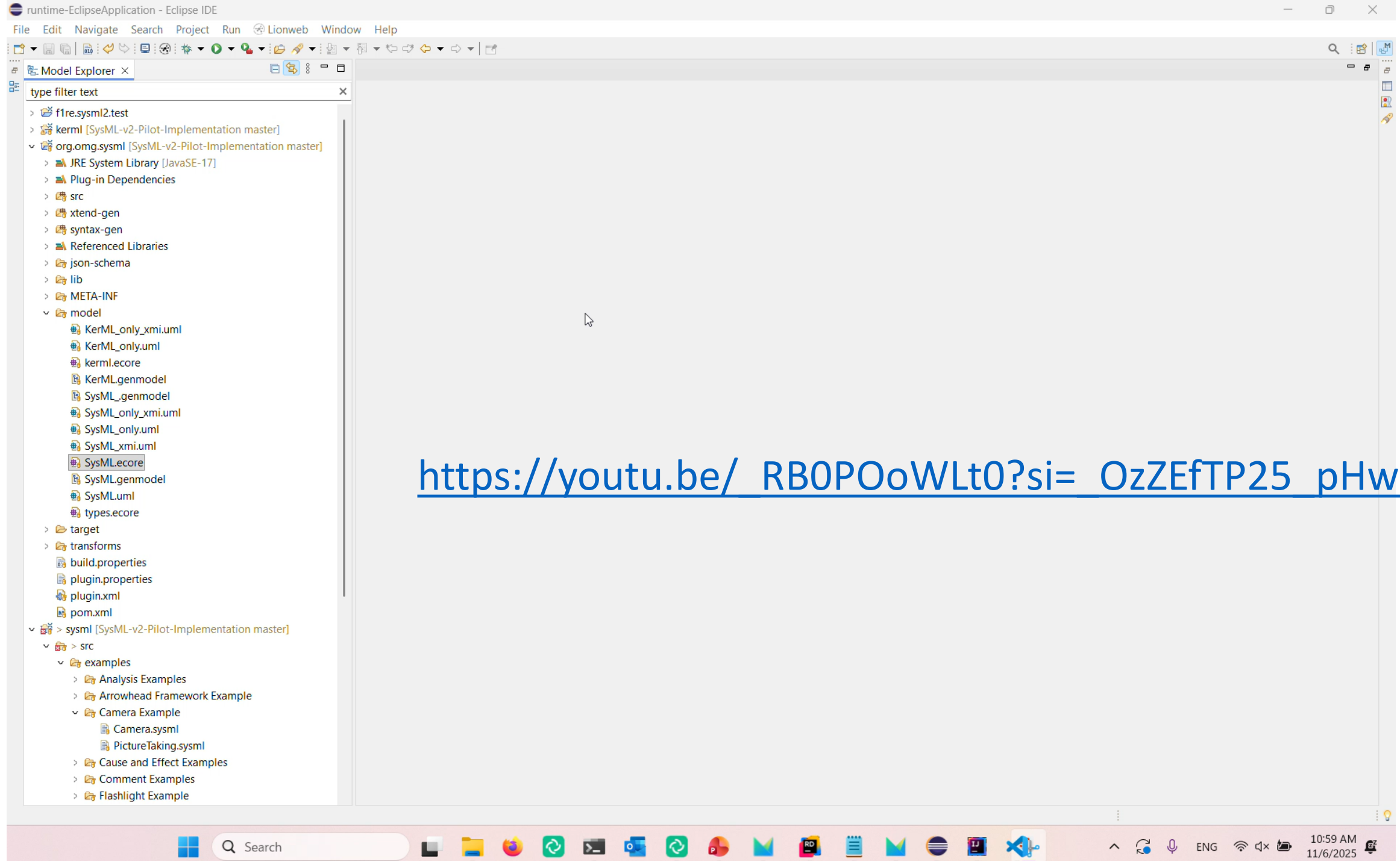
Actions/Sales

- SALES_CZECH
- SALES_ENGLISH
- SALES_GERMAN

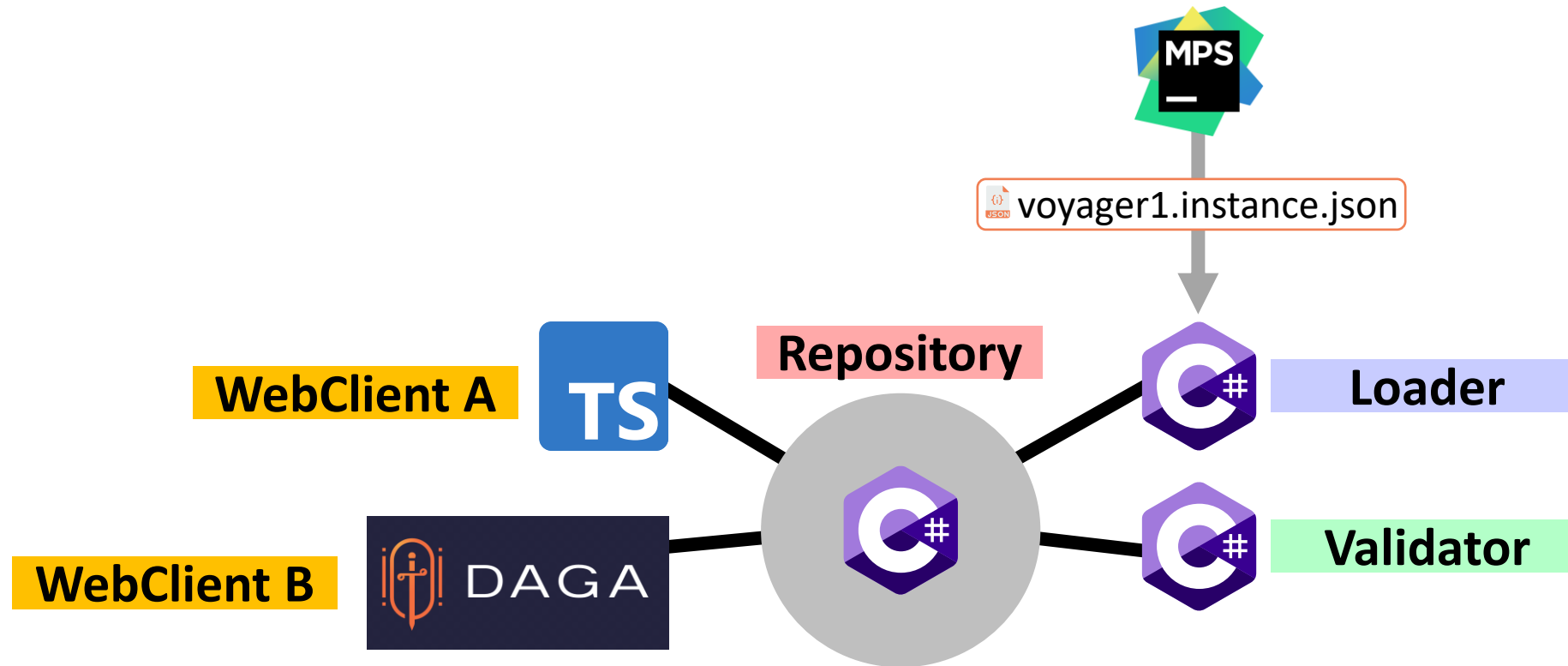
VCS Addons: This project uses Git. For better integration with MPS, it is recom... (3 minutes ago)

Git: master

199 of 1981M



Demo 2



https://youtu.be/inN9l8gKxSc?si=XF6_wbB4cvAHq2HN

Our work on LionWeb



Apps

- [Repository](#)
- [Repository admin UI](#)

Integrations

- [MPS](#)
- [Rascal](#)
- [Freon](#)
- [Modelix](#)
- [EMF](#)

Libraries

- [C#](#)
- [Java](#)
- [Kotlin](#)
- [Python](#)
- [TypeScript](#)

Specification documents (public)

- Specification documents hosted on GitHub:
github.com/LionWeb-io/specification

How – Principles



International consortium of developers

- With a long history in language engineering and modeling tools

LionWeb as boring, reliable base

- Innovate on top

Rough consensus & Running code

- No paperware

Everything is a model

- Markus Voelter's [Whitepaper](#) “A Platform for Systems and Business Modeling”

Business-friendly Open Source License

- Apache 2.0

Interested in Integration



Jetbrains WebMPS

Metadev Daga

ModelingValueGroup Dclare

TU Delft Spoofax

TypeFox Langium

- <https://www.typefox.io/blog/lionweb-langium/>

TypeFox Typir

What LionWeb solves



Technical interoperability

➔ **LionWeb format and protocols**

Identity

➔ **established by clients (tools)**

Semantic mapping

➔ **fine-grained and use-case specific**

Your feedback for us

Team and Contact



Team

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Sergej Koscejev	Freelancer
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Contact

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GitHub:
<https://github.com/LionWeb-io>

Web:
<https://lionweb.io/>

Slack to follow us, use, or implement LionWeb:
https://join.slack.com/t/lionweb/shared_invite/zt-2k1k5bsv7-EvC2IABlgSxWrqJNVOZ0HQ

