

# LionWeb: Status + Delta Protocol

LangDev 2025

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# Status





# Mission

**To create an ecosystem of interoperable components for building language-oriented modeling tools on the web.**

**Adopt language engineering**

**Reduce vendor lock-in**

**Mix and match components**

**Foster innovation and incremental improvements**

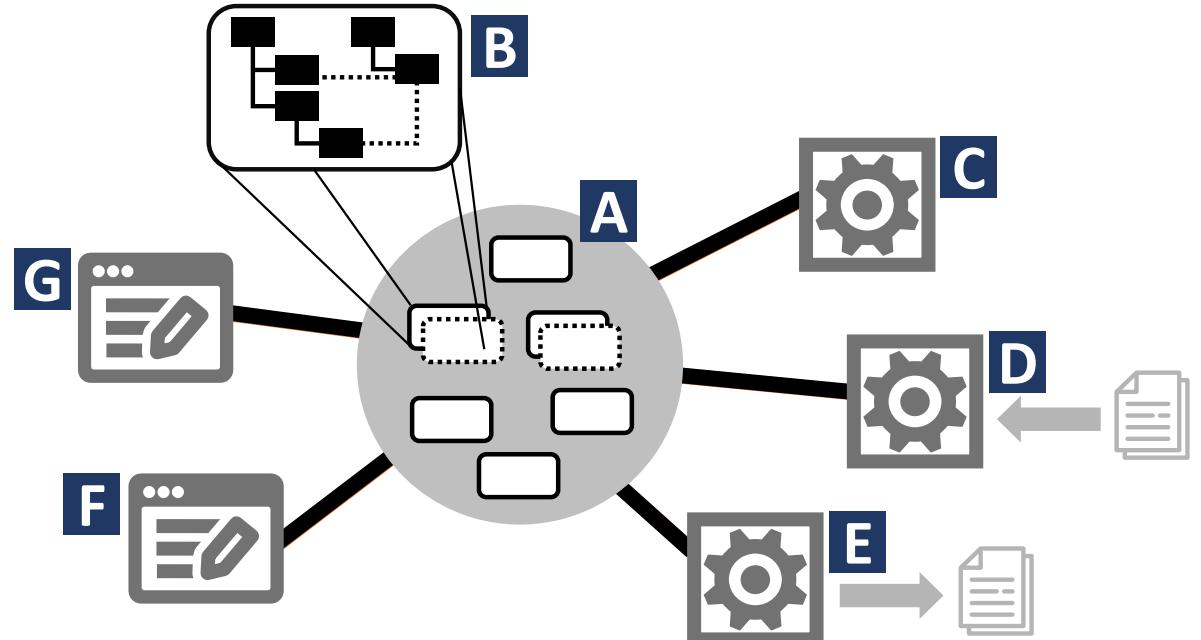
# Reference Architecture

## Repository

### Models

**A** Original ✓

**B** Derived ✓



## Clients

### Editors

**F** Visual ✓

**G** Projectional ✓

### Processors

**C** Model checker ✓

**D** Importer ✓

**E** Generator ✓

Protocols (bulk ✓ / delta ✓)  
 Contents (JSON ✓ / Protobuf ✓)



# Talks

- LangDev 2023 ([slides](#), [video](#))
- LangDev 2024 ([slides](#), [video](#))
- SEN Symposium 2024 ([conference](#), [slides](#))
- MODELS 2024 ([conference](#))
- MBSE 2025 ([conference](#))

## Working documents

- [Roadmap](#)
- [Reference architecture](#)
- [Use cases](#)

# Other talks about LionWeb @ LangDev 25

Title	Speaker	Affiliation
<a href="#"><b>Protostar: an AST solution for ANTLR4 and LionWeb</b></a> Thursday 9:30	Alessio Stalla	Strumenta
<a href="#"><b>LionWeb's delta protocol: incremental model changes</b></a> Thursday 15:00	Meinte Boersma, Niko Stotz	DSL Consultancy, FIRE
<a href="#"><b>Making DSLs conversable</b></a> Thursday 15:30	Krishna Narasimhan	FIRE
<a href="#"><b>Freon-Powered: Crafting Web-Native DSL Editors That Wow</b></a> Thursday 17:00	Jos Warmer	OpenModeling
<a href="#"><b>SysML v2 language in LionWeb</b></a> Friday 10:10	Ulyana Tikhonova	FIRE

# Better documentation

lionweb.io

The screenshot shows a web browser displaying the [About LionWeb](#) page of the [LionWeb](#) documentation. The page has a clean, modern design with a white background and black text. At the top, there is a navigation bar with links for [LionWeb](#), [Java references](#), [LionWeb on GitHub](#), and a sun icon. The main content area has a breadcrumb navigation with links for [Home](#) and [About LionWeb](#). The title "LionWeb" is prominently displayed in a large, bold font. Below the title, a subtitle reads "LionWeb stands for Language Interfaces on the Web." A section titled "Mission" contains a bold statement: "To create an ecosystem of interoperable components for building language-oriented modeling tools on the web." A detailed paragraph explains the belief that a lively ecosystem will facilitate the adoption of language engineering and modeling solutions by reducing vendor lock-in. The sidebar on the right lists several categories: Mission, Reference, Architecture, Working documents, Versions of the LionWeb Specifications, and Legal. The sidebar also features a sun icon.

LionWeb

About LionWeb

Resources about LionWeb

About this project

Introduction

LionWeb Java

LionWeb Kotlin

LionWeb Python

LionWeb Typescript

LionWeb C#

LionWeb Repository

Home > About LionWeb

# LionWeb

LionWeb stands for Language Interfaces on the Web.

## Mission

To create an ecosystem of interoperable components for building language-oriented modeling tools on the web.

We believe that a lively ecosystem will facilitate the adoption of language engineering and modeling solutions by reducing vendor lock-in. Development of advanced solutions will be accelerated by mixing and matching components, potentially sourced from different vendors or open source initiatives. It will also foster innovation, as incremental improvements can be defined on top of the existing libraries and components.

Mission

Reference

Architecture

Working documents

Versions of the LionWeb Specifications

Legal

# Better outreach

## New core members

- Pedro Molina / Metadev
- Ulyana Tikhonova, Erkan Diken / FIRE

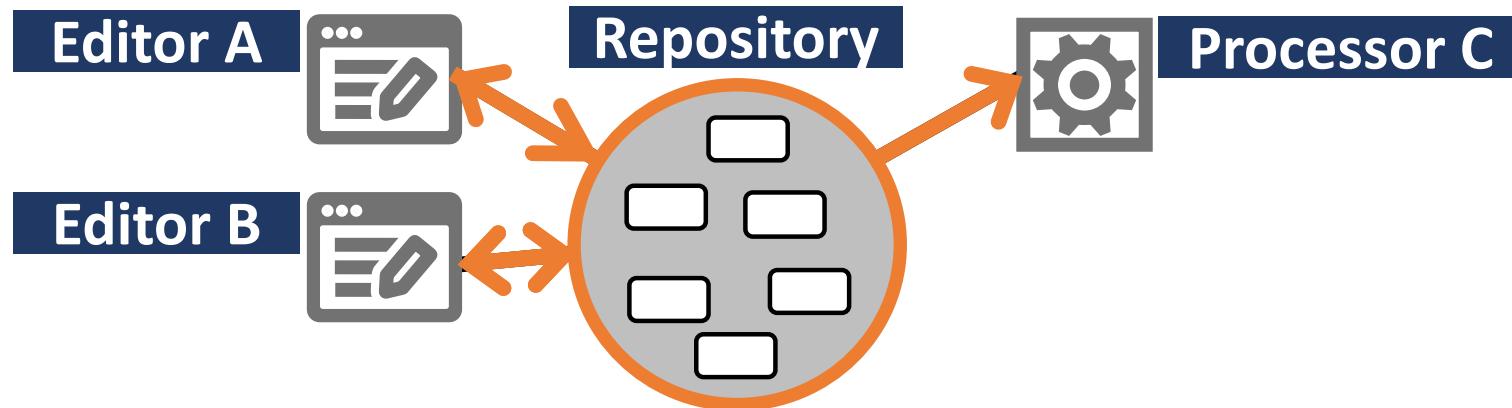
## Office hours

- Once a month (every second Friday)

# Delta protocol



# Basic idea



Assumption: Every client starts from same model state

1. Editor A sends command `ChangeProperty` to Repository
2. Repository checks and integrates command
3. Repository sends event `PropertyChanged` to all clients
4. Editor B sends query `SignOn` to Repository
5. Editor B sends query `SubscribeToPartitionContents` to Repository, receives partition contents

# Message kinds

Command	Client $\Rightarrow$ Repository	Async	“I want to change this”
Event	Client $\Leftrightarrow$ Repository	Async	“This changed”
Query	Client $\Leftrightarrow$ Repository	Synchronous	“Tell me about this”

# All commands

Action	Child	Annotation	Reference	Property	Partition / Classifier
Add	Add child	Add annotation	Add reference Add reference ResolveInfo Add reference target	Add property	Add partition
Delete	Delete child	Delete annotation	Delete reference Delete reference ResolveInfo Delete reference target	Delete property	Delete partition
Change	Replace child	Replace annotation	Change reference Change reference ResolveInfo Change reference target	Change property	Change classifier
Move	from other node	Move child from other containment	Move annotation from other parent	Move entry from other reference	
	from other feature in same node	Move child from other containment in same parent		Move entry from other reference in same parent	
	in same feature in same node	Move child in same containment	Move annotation in same parent	Move entry in same reference	
Move and replace existing	from other node	Move child from other containment and replace existing child	Move annotation from other parent and replace existing annotation	Move entry from other reference and replace existing entry	
	from other feature in same node	Move child from other containment in same parent and replace existing child		Move entry from other reference in same parent and replace existing entry	
	in same feature in same node	Move child in same containment and replace existing child	Move annotation in same parent and replace existing annotation	Move entry in same reference and replace existing entry	
Composite	Composite				

# All queries

## Subscription

- Subscribe to partition changes
- Subscribe to partition contents
- Unsubscribe from partition contents

## Participation

- Sign On
- Sign Off
- Reconnect

## Miscellaneous

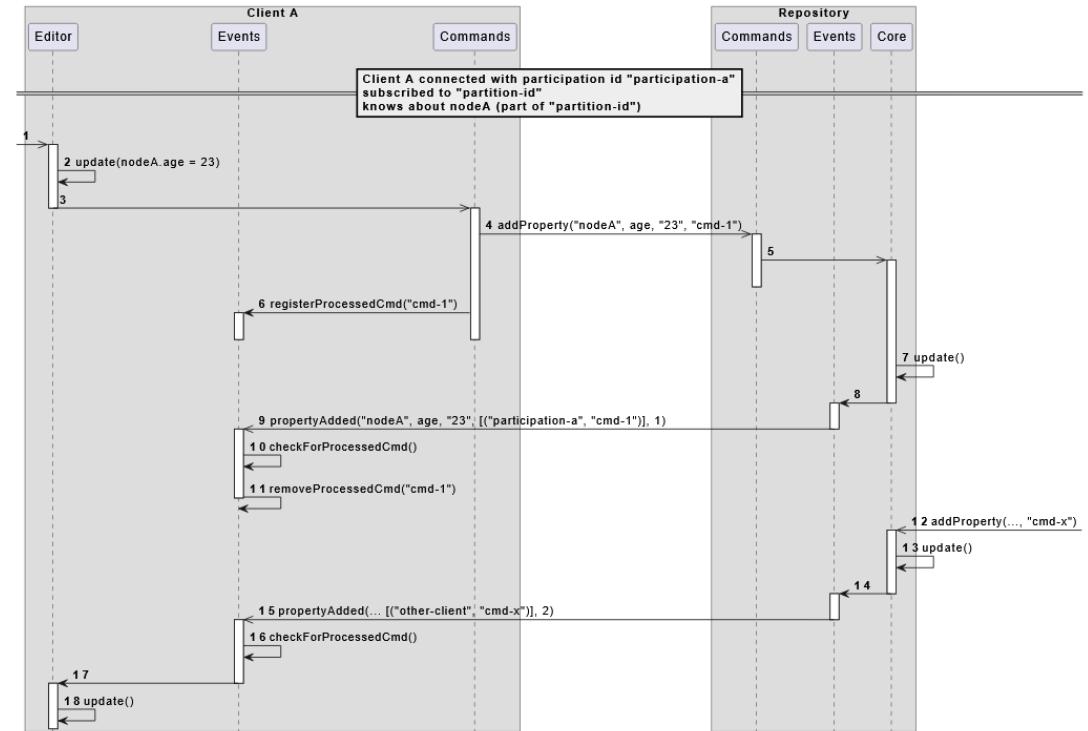
- Get available ids
- List partitions

# Well documented

## 6.4.4. Children

Command / Event / Description	Before	After
<u>Add child</u> <u>Child added</u> Add new node <code>newChild</code> to parent in containment at index.		
<u>Delete child</u> <u>Child deleted</u> Delete existing node <code>deletedChild</code> from parent's containment at index.		
<u>Replace child</u> <u>Child replaced</u> Replace existing node <code>replacedChild</code> inside parent's containment at index with new node <code>newChild</code> . Delete <code>replacedChild</code> .		
<u>Move child from other containment</u> <u>Child moved from other containment</u> Move existing node <code>movedChild</code> (currently inside <code>oldParent</code> 's <code>oldContainment</code> at <code>oldIndex</code> ) inside <code>newParent</code> 's <code>newContainment</code> at <code> newIndex</code> .		

## 5.4. Client changes known node with local update

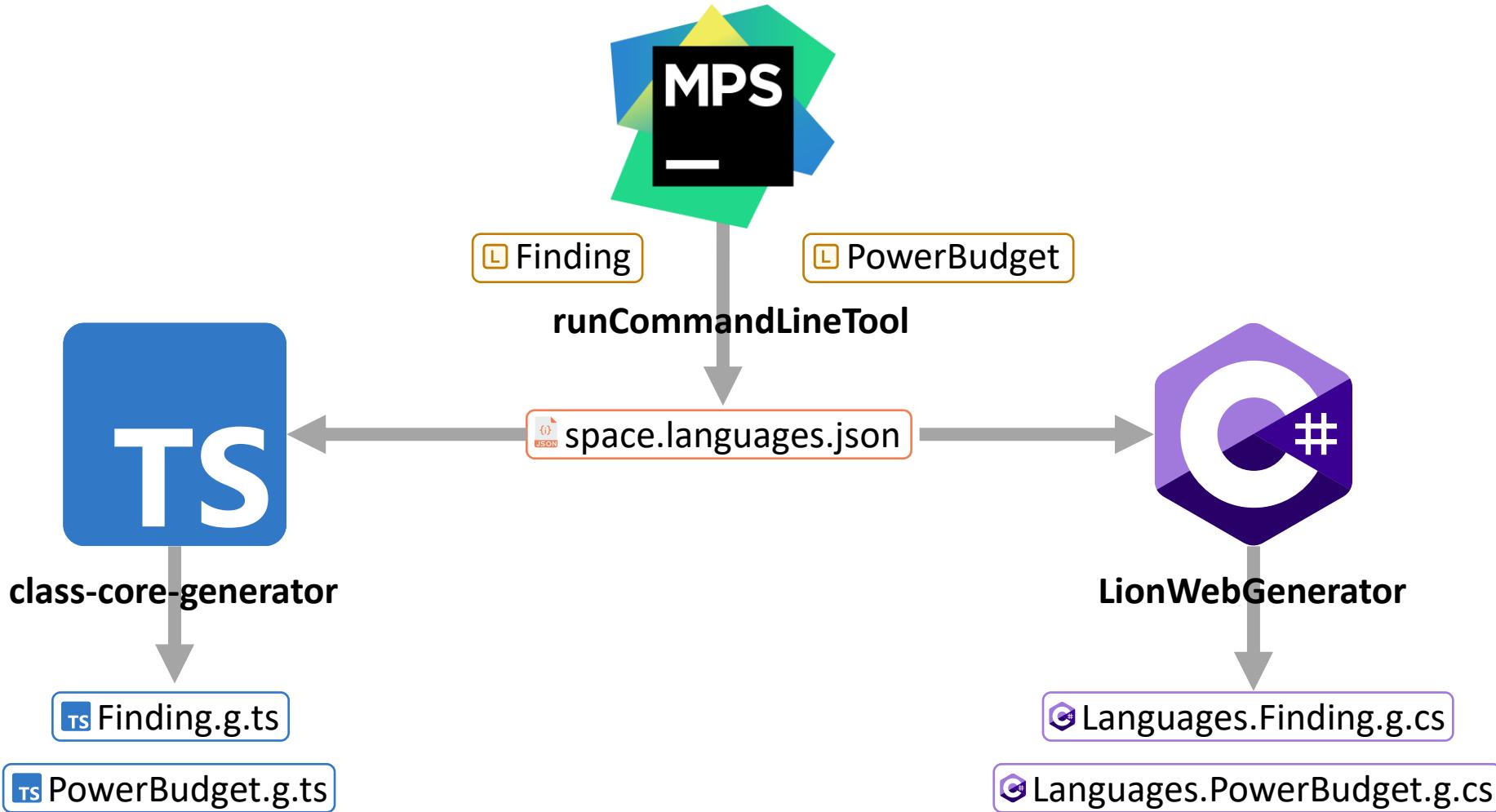


# Demo

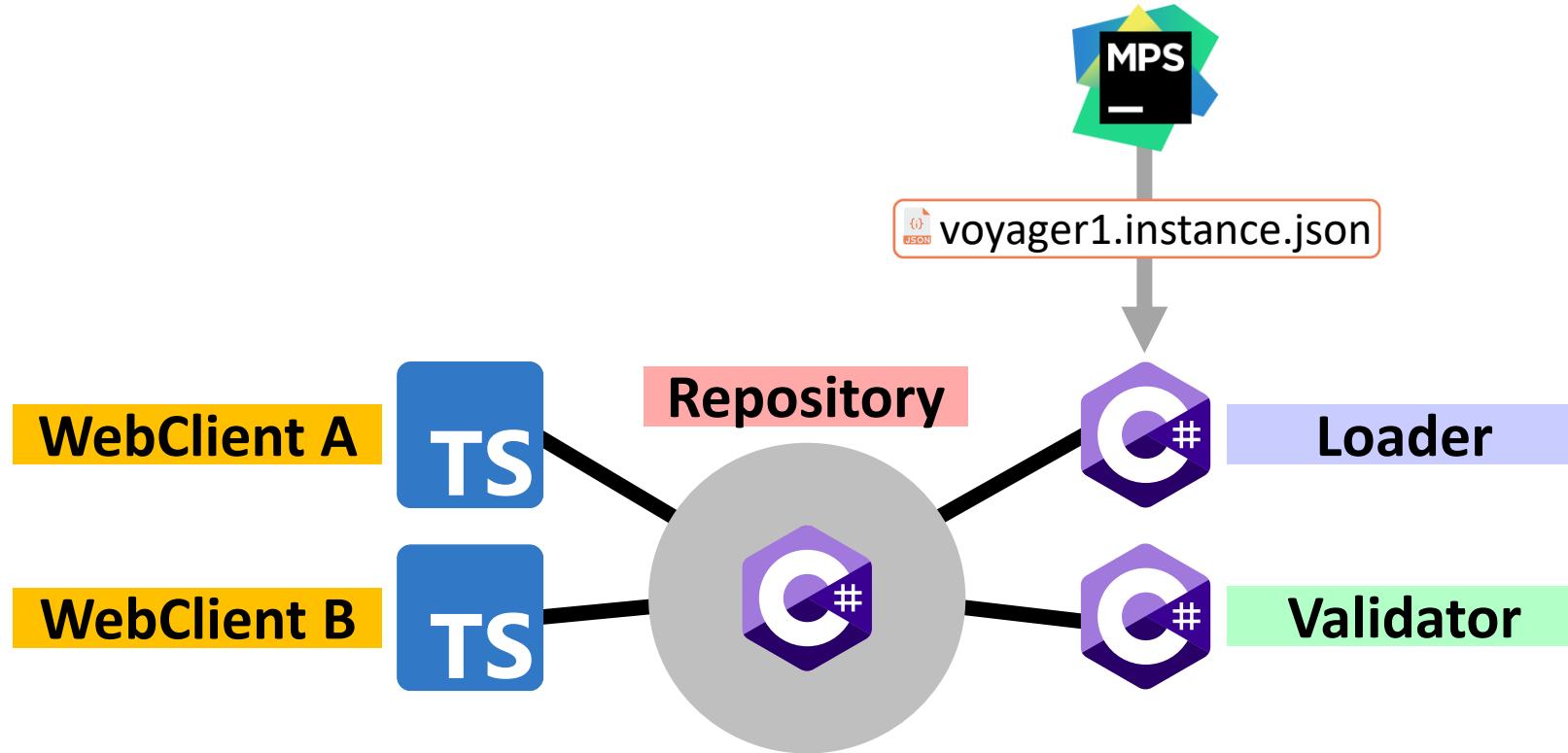


<https://github.com/LionWeb-io/space-demo>

# Languages (M2)



# Instances (MI)





# Team and Contact

## Team

<b>Meinte Boersma</b>	DSL Consultancy
<b>Erkan Diken</b>	FIRE
<b>Norman Koester</b>	itemis (Modelix)
<b>Sergej Koscejev</b>	Freelancer
<b>Sascha Lisson</b>	itemis (Modelix)
<b>Pedro Molina</b>	Metadev
<b>Eugen Schindler</b>	Canon Production Printing

<b>Alex Shatalin</b>	JetBrains (MPS)
<b>Niko Stotz</b>	FIRE
<b>Federico Tomassetti</b>	Strumenta
<b>Markus Voelter</b>	Freelancer
<b>Ulyana Tikhonova</b>	FIRE
<b>Jos Warmer</b>	Freelancer (Freon)

## Contact

**Want to work with us:**  
[info@lionweb.io](mailto:info@lionweb.io)

**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](https://join.slack.com/t/lionweb/shared_invite/zt-2k1k5bsv7-EvC2IABlgSxWrqJNVOZ0HQ)

