About mbeddr
The majority of our interviewees were very successful with MDE but all of them either [built their own] modeling tools, made [heavy adaptations] of off-the-shelf tools, or spent a lot of time finding ways to [work around] tools. The only accounts of easy-to-use, intuitive tools came from those who had developed tools themselves for bespoke purposes. Indeed, this suggests that current tools are a barrier to success rather than an enabler.
Complexity problems are typically associated with off-the-shelf tools. Of particular note is *accidental complexity* – which can be introduced due to [..] [the] lack of flexibility to adapt the tools to a company’s own context [..]
Our interviews point to a strong need for tailoring of some sort: either tailor the tool to the process, tailor the process to the tool, or build your own tool that naturally fits your own process. Based on our data, it seems that, on balance, it is currently much easier to do the latter.
Tool Extensibility is a Problem

Reasons?

Business
Domain Knowhow
Architecture
Approach

Functionality vs. Data
Tool Extensibility is a Problem

Reasons?

Data Extensibility is missing!
A different Perspective

From Data Formats To Languages

Structure, Constraints, Semantics

Data Format + Syntax + IDE

Language
An extensible collection of integrated languages for embedded software engineering.
About mbeddr

Language Engineering Embedded Software

An IDE + Debugger for all of them
About mbeddr

Language Engineering Embedded Software

Open Source
Eclipse Public License

http://mbeddr.com
A different Perspective

From Data Formats To Languages

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Data Format + Syntax + IDE

Language

Language Workbenches
About mbeddr

Built on JetBrains MPS

A Language Workbench
About mbeddr

Built on JetBrains MPS

Open Source
Apache 2.0
http://jetbrains.com/mps
About MPS

Rich Set of Language Aspects

+ Refactorings, Find Usages, Syntax Coloring, Debugging, ...
About MPS

Projectional Editing

Parsing

Projection

Concrete Syntax

Abstract Syntax Tree

Concrete Syntax

Abstract Syntax Tree
About MPS

Notational Flexibility

Regular Code/Text

Mathematical

Tables

Graphical
About MPS

Language Composition

Separate Files

L2 \rightarrow L1

Type System
Transformation
Constraints

In One File

Type System
Transformation
Constraints
Syntax
IDE
Demo
Recap
Tool Extensibility is a Problem

Study Findings

... built their own modeling tools ...
... made heavy adaptations ... work arounds ...
... accidental complexity ...
... strong need for tailoring ...

Problem Solved!

Generic Tools, Specific Languages

Extensions are first-class!

Fundamentally different from Today's State-of-the-Art in Tools
5

Status
mbeddr Status

Used in Several Projects

itemis France: Smart Meter
BMW: Autosar Component
Modellwerkstatt: ASIC Test Generator
Fortiss: Pacemaker Case Study
Open Source: Arduino Integration
A colleague: Synthesizer

Evaluation ongoing by several big companies.
mbeddr Status

The Basis for a Commercial Product

ACCEnT

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LMS is a leading provider of test and mechatronic simulation software and engineering services in the automotive, aerospace and other advanced manufacturing industries. As a business segment within Siemens PLM Software, LMS provides a unique portfolio of products and services for manufacturing companies to manage the complexities of tomorrow’s product development by incorporating model-based mechatronic simulation and advanced testing in the product development process. LMS tunes into mission-critical engineering attributes, ranging from system dynamics, structural integrity and sound quality to durability, safety and power consumption. With multi-domain and mechatronic simulation solutions, LMS addresses the complex engineering challenges associated with intelligent system design and model-based systems engineering. Thanks to its technology and more than 1250 dedicated people, LMS has become the partner of choice of more than 5000 manufacturing companies worldwide. LMS operates in more than 30 key locations around the world.
The Bigger Picture

Same Approach In Other Domains

Current Project in Insurances.

Another Project in the Financial Domain likely to start soon.

local = \[ A1 \Rightarrow \sum_{i=1}^{NN} \left( \frac{D(X + ANUI + i - 1) - D(X + ANUI + i)}{D(X + ANUI)} \right) \times \left( 1 - \frac{TM18[i]}{TM17} \right) \]