What do Practitioners Expect from the Language Workbenches?: A Su

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What do Practitioners Expect from the Language Workbenches?: A Survey

In this survey, the goal is to understand the expectations of practitioners in different industries from the meta-modeling tools (aka language workbenches) for the (domain-specific) language development. The survey also aims to learn the top-used meta-modeling tools in industry and the challenges that practitioners face with. In this survey study, the meta-modeling tools are considered in terms of the following categories: language definition (syntax and semantics), editor services, model transformation, validation, testing, and composability.

The survey is expected to take 3-13 minutes at most and the results of the survey will be analysed to determine practitioners' expectations and new research directions on meta-modeling tools. Also, a paper will be prepared on the survey results, which will be submitted to a well-regarded journal/conference.

No identifying information will be collected and all participants shall remain anonymous. Collected data are planned to be published as a research article.

By clicking through the consent statement and submitting the completed survey, individuals are indicating their willingness to participate.
We really appreciate your time and input.

If you have any questions about the survey, please contact Dr. Mert Ozkaya

Accept and continue *

○ Yes

○ No

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Description (optional)

Which country do you work in?

○ Australia

○ Azerbaijan

○ Belgium

○ Brasil

○ Canada

○ China

○ Crotia

○ Czech Republic

○ Denmark

○ Finland

○ France

○ Germany

○ Greece

○ Hungary

○ India

○ Iran

○ Italy

○ Japan

○ Mexico

○ Norway

○ Poland

○ Portugal

○ Russia

○ Serbia

○ Spain

○ Sweden

○ Taiwan

○ The Netherlands

○ Turkey

○ UK

○ USA

○ Other...

What is (are) your current job position(s)?

□ Analyst

□ Consultant

□ Design Team Lead

□ High-level Manager (CEO, CIO, CFO, etc.)

□ Language Engineer

□ Researcher (or Research Scientist)

□ Software Architect

□ Systems Engineer

□ Software Developer/Programmer

□ Software Tester

□ Quality Assurance Engineer/Lead

□ Other...

Which industrial sector(s) do you work in?

☑ Checkboxes ▾

□ Automotive and Transportation ✕

□ Consumer Electronics ✕

□ Defense/Military & Aviation ✕

□ Finance and Accounting ✕

□ Government ✕

□ Healthcare and Biomedical ✕

□ IT and Telecommunications ✕

□ Research ✕

□ Software Outsourcing ✕

□ Other... ✕

□ Add option

Required

Please indicate below the domain(s) in which you develop or use domain-specific modeling languages.

□ Automotive

□ Control and Automation Systems

□ Data Analytics

□ Document Engineering

□ Embedded

□ Enterprise Solutions

□ Financial Services

□ Industrial

□ Internet of Things (IoT) Device Development

□ Medical Device Development

□ Mobile

□ Railway Systems

□ Real-time Operating Systems

□ Telecommunications

□ Testing

□ User Interface Design

□ Web Applications

□ Other...

How many years of experience do you have in meta-modeling (i.e., developing languages)?

○ None

○ Less than 2 years

○ 2-5 years

○ 6-10 years

○ 10+ years

After section 2 Continue to next section

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The meta-modeling tool (i.e., language workbench) usage

Description (optional)

Please choose the meta-modeling tool(s) that you use for developing (domain-specific) languages and their toolset.

□ ADOXX

□ AtomPM

□ ConceptBase

□ Diagen

□ Fujaba

□ GEMS (Generic Eclipse Modeling System)

□ GME (Generic Modeling Environment)

□ JastEMF

□ Melange

□ MetaDepth

□ MetaEdit+

□ MetaModelAgent

□ Microsoft DSL Tools

□ MPS (MetaProgrammingSystem)

□ Sirius

□ Spoofax

□ Xtext

□ VMTS (Visual Modeling and Transformation System)

□ WebGME

□ Other...

After section 3 Continue to next section ▾

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Language definition (syntax & semantics)

Description (optional)

Please indicate the type(s) of notation set that you consider in developing languages via the meta-modeling tools.

□ Hybrid/Blended

□ Map

□ Matrix

□ Textual

□ Tabular

□ Tree

□ Other...

If you define the language semantics via the meta-modeling tools, please indicate below what type(s) of semantics you prefer.

□ Interpretative semantics (i.e., directly executing a model without any translation)

□ Translational semantics via model-to-text translation (i.e., concatenating strings)

□ Translational semantics via model-to-model translation (translation into models in another language)

What other meta-modeling tool features for the language definition is(are) important for you?

□ Collaborative real-time editing

□ Importing/exporting

□ Library re-use

□ Versioning

□ Other...

Do you face with any challenges while defining the language syntax and semantics with the

Long answer text

After section 4 Continue to next section

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Editor services

Description (optional)

What type(s) of editing mode do you prefer to use?

□ Free-form (i.e., the user freely edits the model to be parsed (e.g., source-code))

□ Projectional (i.e., the user edits a projection of the model)

Which of the following syntactic editor features is(are) important for you?

□ Auto formatting, restructuring, aligning, or layouting of a model's presentation

□ Comparison of models via a diff-like tool

□ Customizable visual highlighting in models

□ Folding to hide part of a model

□ Navigation support via an outline view

□ Reusing models

□ Syntactic completion templates that provide incomplete models/code/graph to the users

□ Other...

□ Advanced search (i.e., capability to find semantic elements with advanced search criteria (type, prop…

□ An error marker for highlighting the model element and the corresponding error message

□ Automatic update of the models when meta-model changes

□ Co-evolution of metamodels together with models

□ Live translation between the model and generated code (i.e., displaying the model and code side-by-…

□ Navigation to representations (i.e., capability to see on which representations a given semantic elem…

□ Refactoring of models without changing semantics (e.g., renaming and language-specific restructuri…

□ Semantic completions (i.e., suggestions made to the user for completing the model semantically)

□ Tracing between the source and target models after model transformation

□ Quick fixes for automatically fixing any model errors detected

□ UML support (e.g., reusing and extending the UML language syntax and semantics)

□ Other…

What other features of modeling editors are important for you ?

□ Adapting intellectual property management techniques (e.g., watermarking, fingerprinting, or obfusc…

□ Document generation (e.g., RTF, Word, and HTML)

□ Enabling multiple concurrent modelers (i.e., collaborative modeling)

□ Importing/exporting models (e.g., XML, binary format)

□ IDE integration

□ Impact analysis (i.e., capability to easily navigate through the model from a starting object to in-goin…

□ Modeling in the cloud (aka. modeling as a service)

□ Security (e.g., confidentiality and integrity) for collaborative modeling (or meta-modeling)

□ Smart modeling (or meta-modeling) based on AI techniques (e.g., deep learning)

□ Support for modeling with chatbots

□ Traceability between model elements

□ Usability (e.g., minimum number of clicks for modeling)

□ Various modeling operations (copy/paste, reuse, replace, group, layout, grids, zooms, model hierarch...

□ Version control system integration (e.g., SVN and GIT)

□ Web access (i.e., capability to give access to the tool without any desktop deployment)

□ Other...

Do you face with any challenges while developing and using the modeling editors? If so, please indicate the challenge(s) and tool(s).

Long answer text

After section 5 Continue to next section ▾

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Model transformation/Code generation definition

Description (optional)

Which of the following features of model transformation/code generation definition technologies are important for you?

Bidirectionality in model transformations (i.e., the source and target models remain consistent when…

□ Code folding

□ Code templates, patterns, etc.

□ Content assist

□ Error detection

□ Generator debugging

□ Integration with programming languages (e.g., Java)

□ Model-to-model transformation

□ Reading and processing external files

□ Refactoring

□ Smart, AI-based model transformation

□ Scalability (i.e., transforming large and heterogenous models)

□ Syntax highlighting

□ Queries to extract information from models

□ Quick outline

□ Other…

Do you face with any challenges while using the generator definition technologies of the meta-modeling tools? If so, please indicate the challenge(s) and tool(s).

Long answer text

After section 6 Continue to next section ▾

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Language Validation

Description (optional)

If you consider defining the validation rules for a language, please indicate below what types of validation you prefer.

- ☐ Semantic validation (e.g., name and type analysis)
- ☐ Structural validation (e.g., containment and multiplicities)

Which of the following meta-modeling tools features for language validation are important for

- ☐ Animating models
- ☐ Automated validation of models based on the meta-model
- ☐ Integration with external tools (e.g., simulators, model checkers, provers, etc.)
- ☐ Defining the user-defined type systems and rules and their automated validation
- ☐ Support for developing and integrating model debuggers
- ☐ Other...

Do you face with any challenges while defining/using the language validations with the meta-modeling tools? If so, please indicate the challenge(s) and tool(s).

Long answer text

After section 7 Continue to next section

Testing

Description (optional)

If you consider testing the languages, please indicate which of the following aspect(s) of the language development you address for the language testing.

☐ Editor

☐ Model transformation/Code generation definition

☐ Semantics

☐ Syntax

☐ Validation

Do you face with any challenges while testing languages via the meta-modeling tools? If so, please indicate the challenge(s) and tool(s).

Long answer text

After section 8 Continue to next section

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Composability

Description (optional)

If you consider composing languages (e.g., extending a language or unifying multiple languages), please indicate below which of the following aspect(s) of the language

□ Editor

□ Model transformation/Code generation definition

□ Semantics

□ Syntax

□ Validation

Do you face with any challenges while composing languages via the meta-modeling tools? If so, please indicate the challenge(s) and tool(s).

Long answer text

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Further remarks

Description (optional)

If you have any other expectations from the meta-modeling tools or any challenges that are not related to the survey sections above, please state your expectations/challenges here.

Long answer text