



Model Driven Solutions
Where Business Meets Technology

Int'l Workshop on Executable Modeling at MODELS 2018, Copenhagen

Precise Semantics Standards at OMG: Executing on the Vision

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Precise Semantics Standards: The Executable UML Vision



- Standardize the precise semantics for a subset of UML useful for executable modeling.
- Specify “precise semantics” by defining an executable UML model of an interpreter for executable UML models.
- Ground this meta-circular definition by using formal logic to give a base semantics to a minimal executable UML subset.
- In order to support the development of standards-based executable modeling tools.



Foundational UML (fUML)

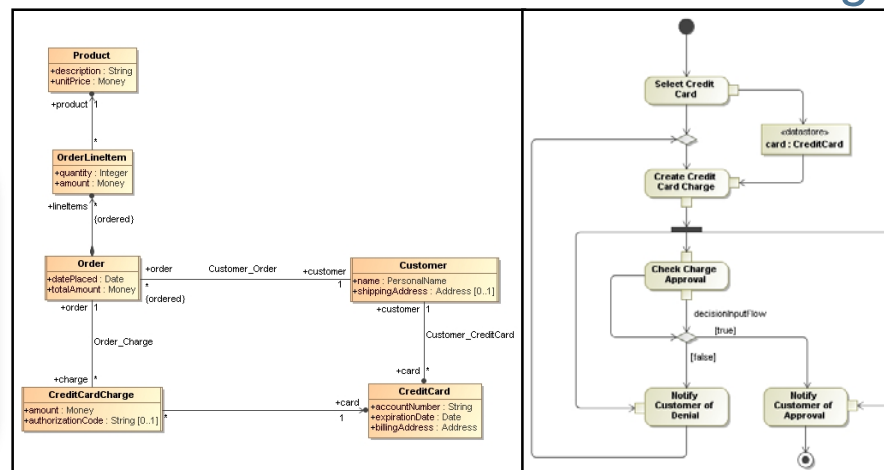
Structural and behavioral modeling

An executable subset of standard UML that can be used to define, in an operational style, the structural and behavioral semantics of systems

Adopted: v1.0 (2011)

Current: v1.4 (2018)

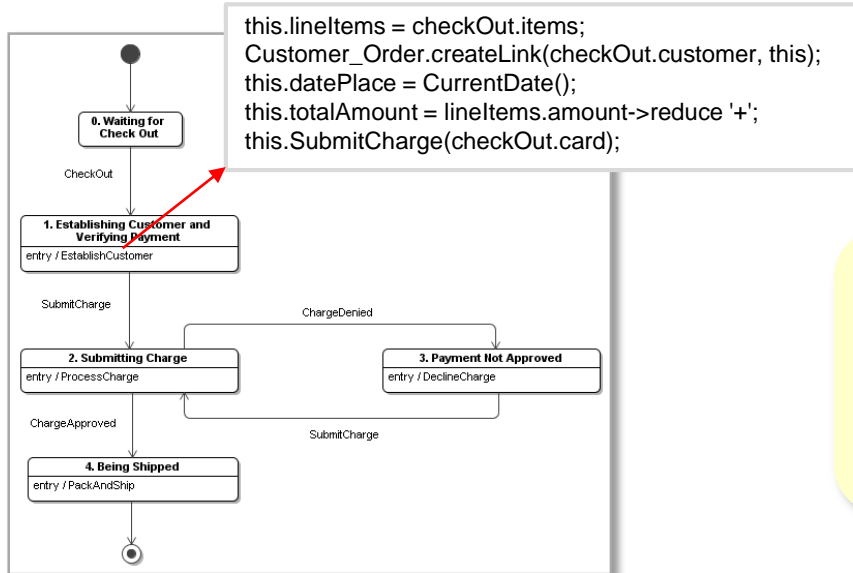
Planned: v1.5 (2019)



Foundational UML (fUML)



Action Language for fUML (Alf)



At the extended conformance level, Alf can also be used to represent structural class models.

A textual surface representation for fUML models, particularly executable behaviors

Adopted: v1.0.1 (2013)
Current: v1.1 (2017)
Planned: v1.2 (2019)

Action Language for fUML (Alf)

Foundational UML (fUML)



Precise Semantics of Composite Structure (PSCS)

*An extension of fUML for the execution
of composite structure models*

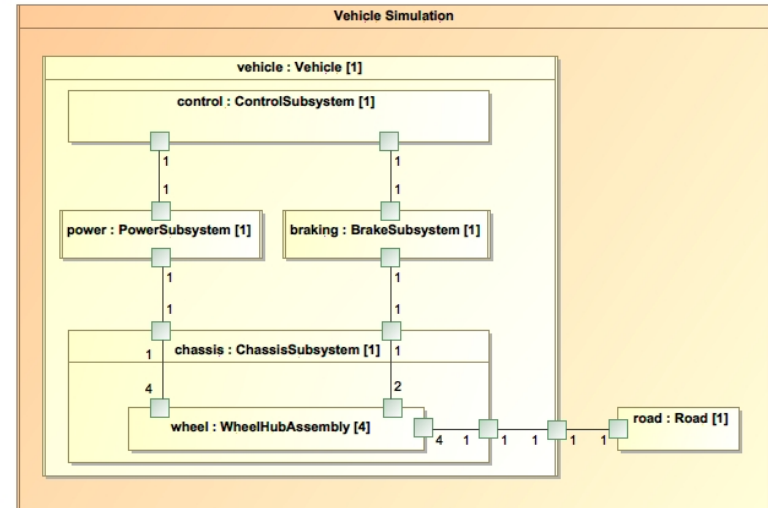
Adopted: v1.0 (2015)

Current: v1.2 (2018)

Planned: None

Precise
Semantics of
Composite
Structure
(PSCS)

Composite structure modeling



Action Language for fUML (Alf)

Foundational UML (fUML)



Precise Semantics of State Machines (PSSM)

An extension of fUML for the execution of state machine models

Beta: (2016)
Planned: v1.0 (2018)

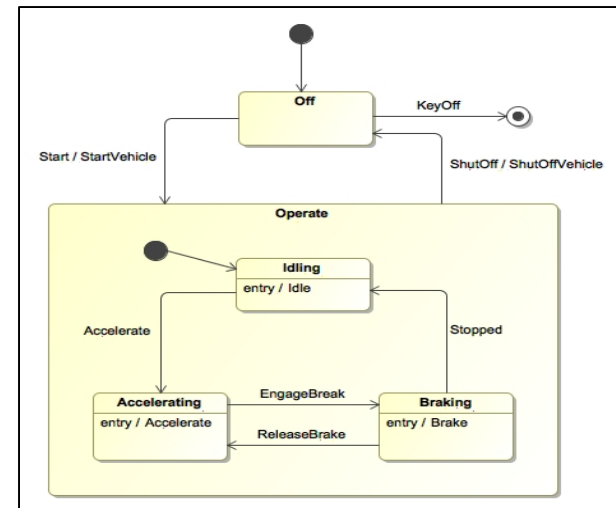
Precise Semantics of Composite Structure (PSCS)

Precise Semantics of State Machines (PSSM)

Action Language for fUML (Alf)

Foundational UML (fUML)

State machine modeling





Next Steps for Executable UML

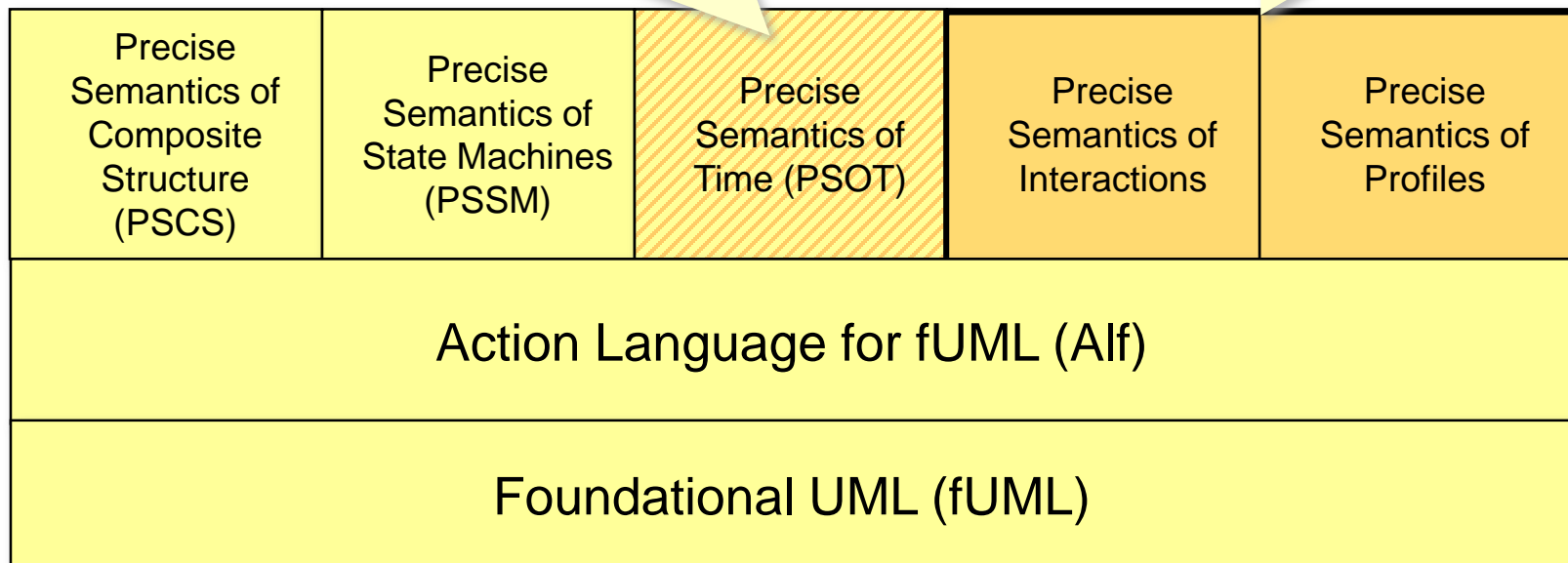
An extension to fUML to more precisely define the semantics of time in executable UML models.

RFP: Dec 2017

Initial submissions: August 2019

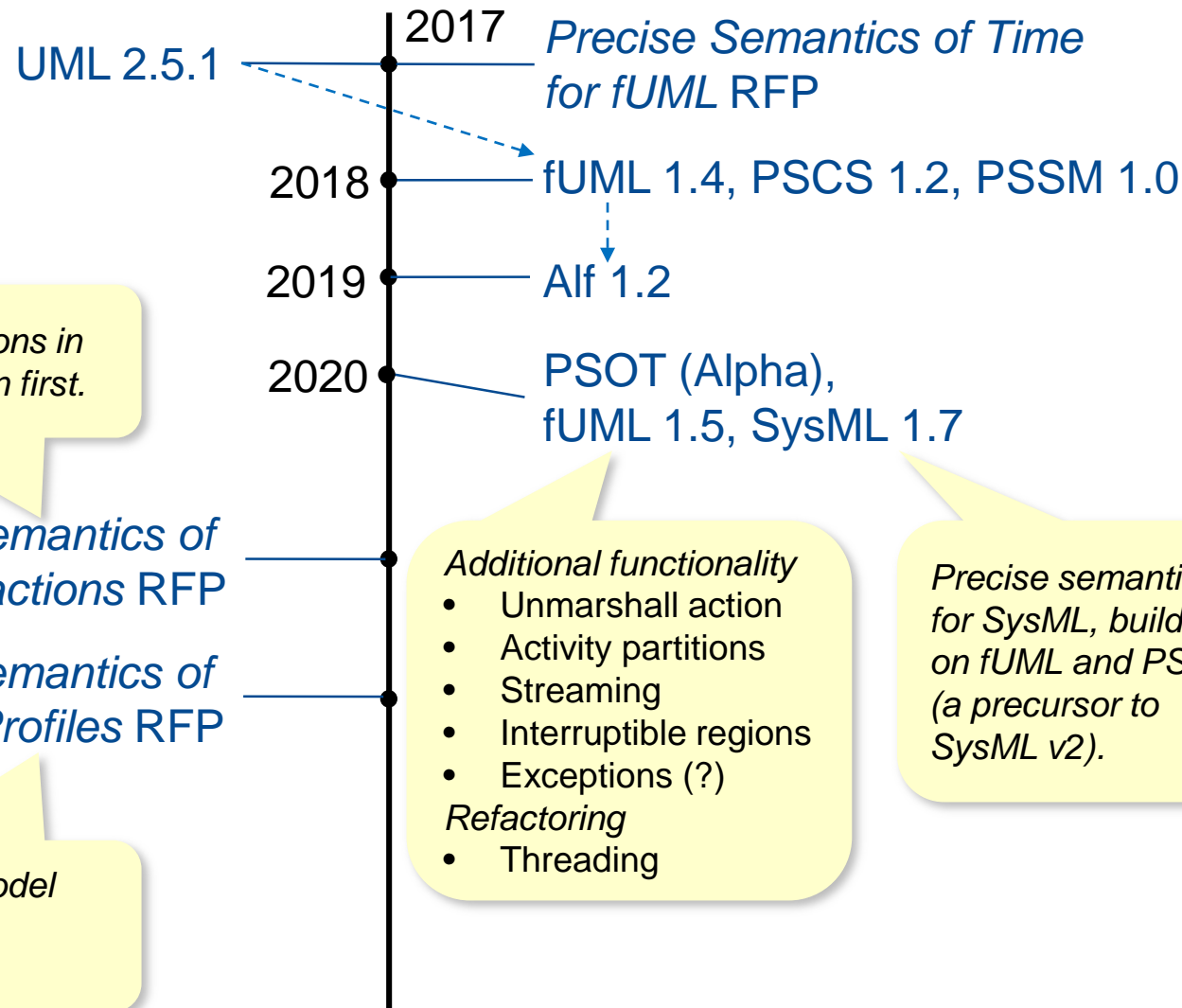
Final submissions: May 2020

Possible future standards





Roadmap for Executable UML





Precise Semantics Beyond Executable UML

- Precise Semantics for Uncertainty Modeling (PSUM)
 - RFP issued for a metamodel that enables:
 - Capturing uncertainty and its related concepts
 - Measurement of uncertainty and its related concepts
 - Proposals are required to include “an ontology of uncertainty”.
- Systems Modeling Language v2
 - RFPs issued for both the language and for APIs/services
 - Proposals are required to include “a metamodel that includes abstract syntax, concrete syntax, semantics, and the relationships between them”.
 - Proposals may include non-mandatory features such as a semantic model library, declarative semantic grounding and a reasoning capability
 - The submission team is currently committed to including all these features.



Resources

- Specification documents and machine-readable artifacts
 - <http://www.omg.org/spec/FUML>
 - <http://www.omg.org/spec/PSCS>
 - <http://www.omg.org/spec/PSSM>
 - <http://www.omg.org/spec/ALF>
- fUML Open Source (Reference) Implementation (Lockheed Martin/Model Driven Solutions)
 - <http://fuml.modeldriven.org>
- Alf Open Source (Reference) Implementation (Model Driven Solutions)
 - <http://alf.modeldriven.org>
- OMG Groups (requires OMG membership)
 - Executable UML Working Group: executable-uml@omg.org
 - SysML Revision Task Force: sysml-rtf@omg.org



Requests for Proposals

- Precise Semantics of Time for fUML
 - RFP: <https://www.omg.org/cgi-bin/doc?ad/17-12-07>
 - Submission Team Contact
 - Ed Seidewitz, ed-s@modeldriven.com
- Precise Semantics of Uncertainty
 - RFP: <https://www.omg.org/cgi-bin/doc?ad/17-12-01>
 - Submission Team Contact
 - Tao Yue, tao@simula.no
- SysML v2 RFPs
 - Language RFP: <https://www.omg.org/cgi-bin/doc?ad/17-12-02>
 - API/Service RFP: <https://www.omg.org/cgi-bin/doc?ad/18-06-03>
 - Submission Team Contacts:
 - Ed Seidewitz, ed-s@modeldriven.com
 - Sandy Friedenthal, sanford.friedenthal@gmail.com