

Modeling support for research projects in Eclipse platform

<http://d3s.mff.cuni.cz>



Michal Malohlava

michal.malohlava@d3s.mff.cuni.cz



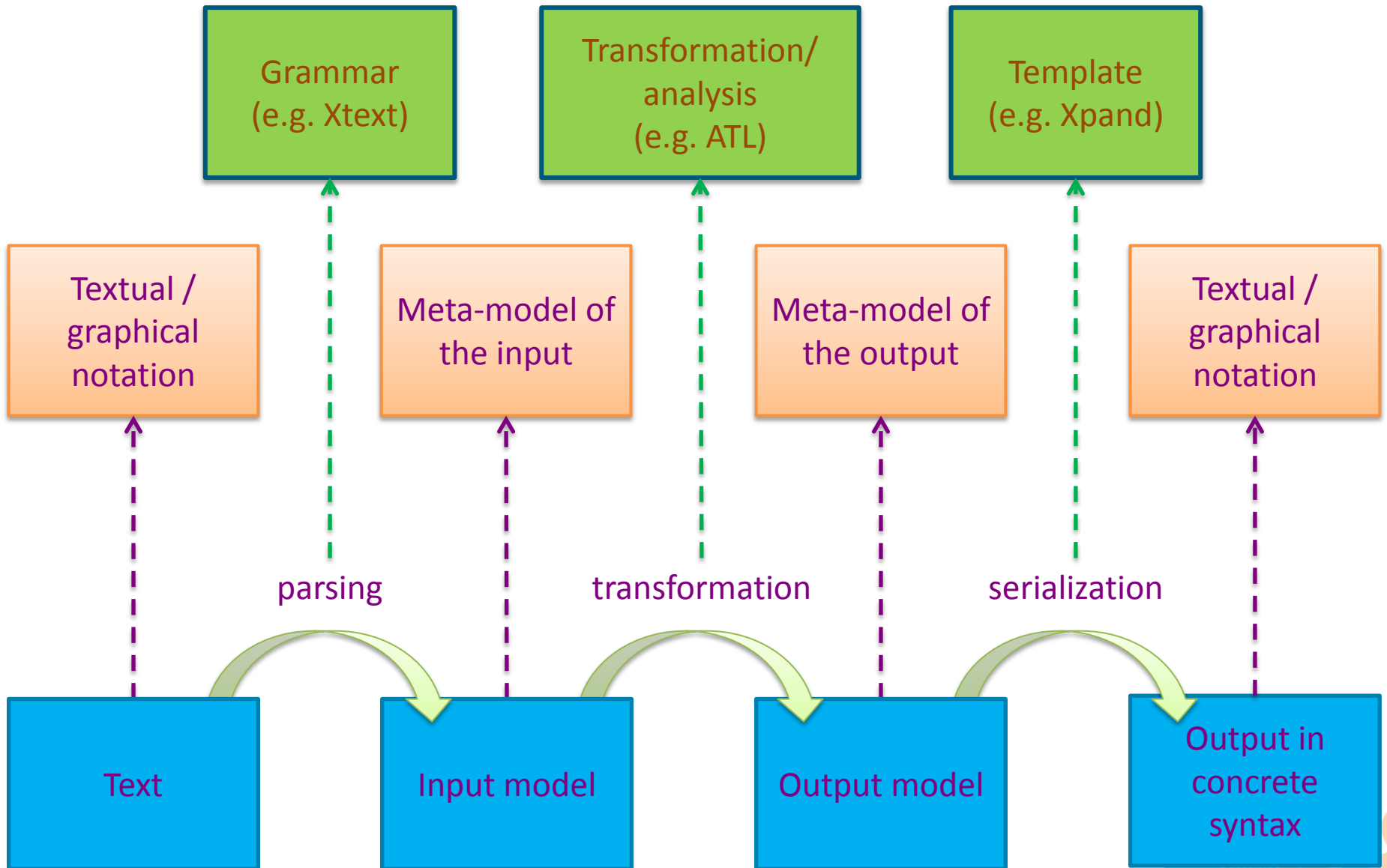
CHARLES UNIVERSITY IN PRAGUE

faculty of mathematics and physics

Models & Eclipse

- Model - describes a problem
 - E.g., static structure, behavior, code, atmosphere, engines, ...
- Why models?
 - Problem abstraction
 - Input for
 - Code/documentation generation
 - Analysis
 - Documentation value
- Why Eclipse?
 - Open-source mature platform
 - “Easily” extensible (OSGi based)
 - Easy way of providing mature research tools

An example of modeling workflow



Eclipse support for modeling

- Meta-model definition
- Model visualization
- Model transformation
- Model serialization and persistence

Meta-models definition

- EMF
 - Eclipse Modeling Framework
 - Variant of MOF (meta-object facility)
- EMF helps to define meta-models
 - Rules which have to be satisfied by a model
- OCL (object-constraint language)
 - Model constraints

Model visualization

- How models are presented to users.
- Textual
 - Xtext project
 - Easy way of prototyping textual models
 - Domain specific languages
 - Easy to extend
- Graphical
 - GMF
 - Automatically generated from EMF meta-model
 - Powerful, however needs coding experience
 - Quite hard to extend

Model transformation

- Transformation between models
- Two mains tools
 - QVT (OMG standard)
 - Operational
 - Declarative
 - ATL
 - Similar QVT operational

Model serialization & persistence

- XML representation
 - Native EMF support
- Textual representation
 - Model-to-text transformation
 - Acceleo, Xpand
- Database
 - Teneo
 - Based on Hibernate, saves models into a database
 - Suitable for large models

Other not-only Eclipse tools

- Spoofax
 - Tree rewriting based on Stratego language
- JetBrains MPS
 - Open-source
 - Rapid prototyping of text-based internal DSL
 - Extension of Java
- MetaEdit+
 - Rapid prototyping of graphical DSLs
 - Code generation

Summary

- Eclipse provides a huge set of various modeling tools
- Easy prototyping
- However, it is hard to finalize tools to be used in productive environment
 - Still needs lot of effort

Models

- Textual
- Graphical

DSL taxonomy

