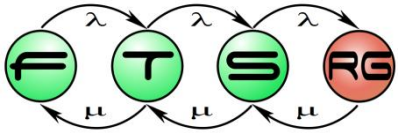
# Verification of business processes

Ábel Hegedüs

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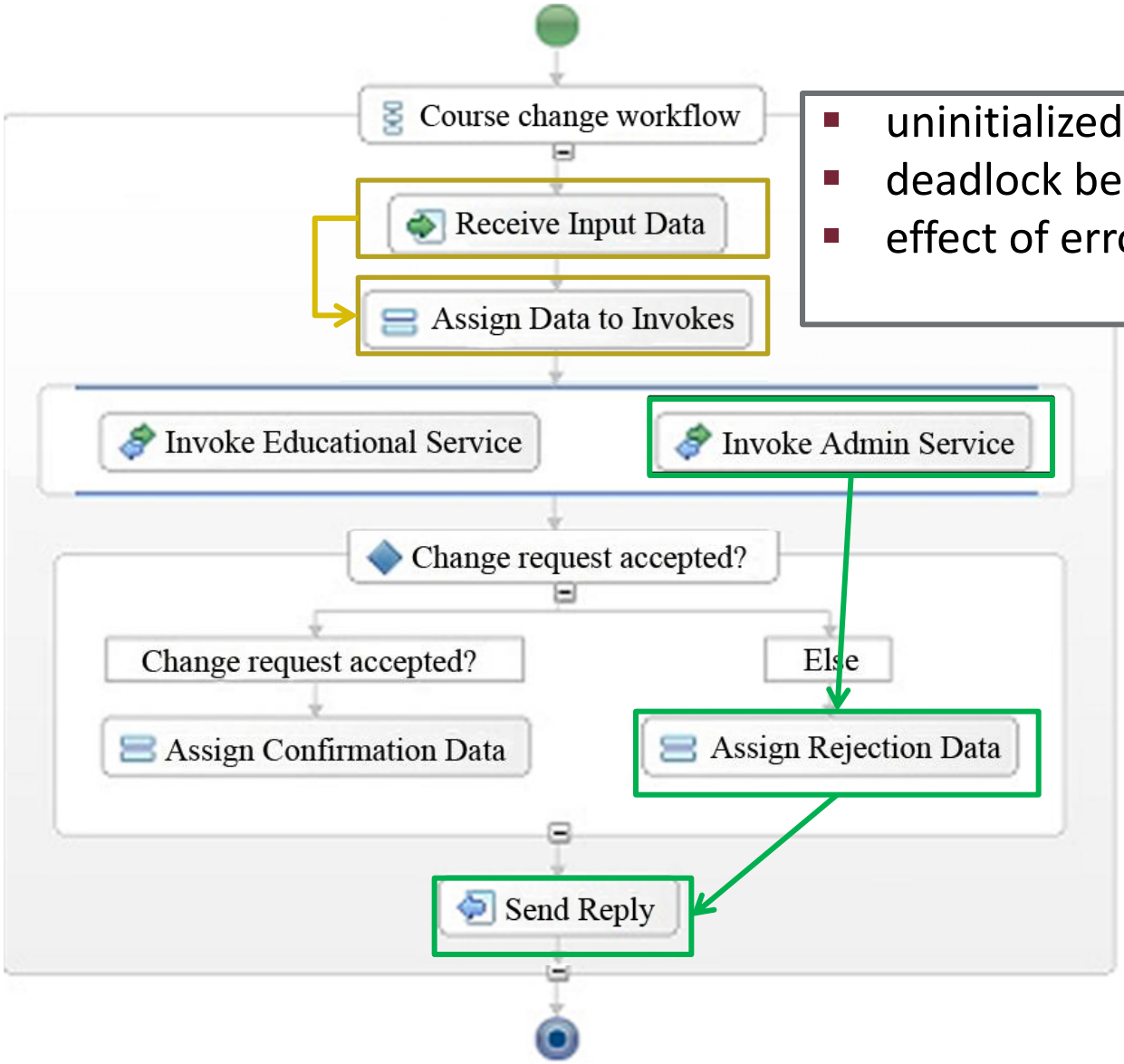
# Verification of business processes

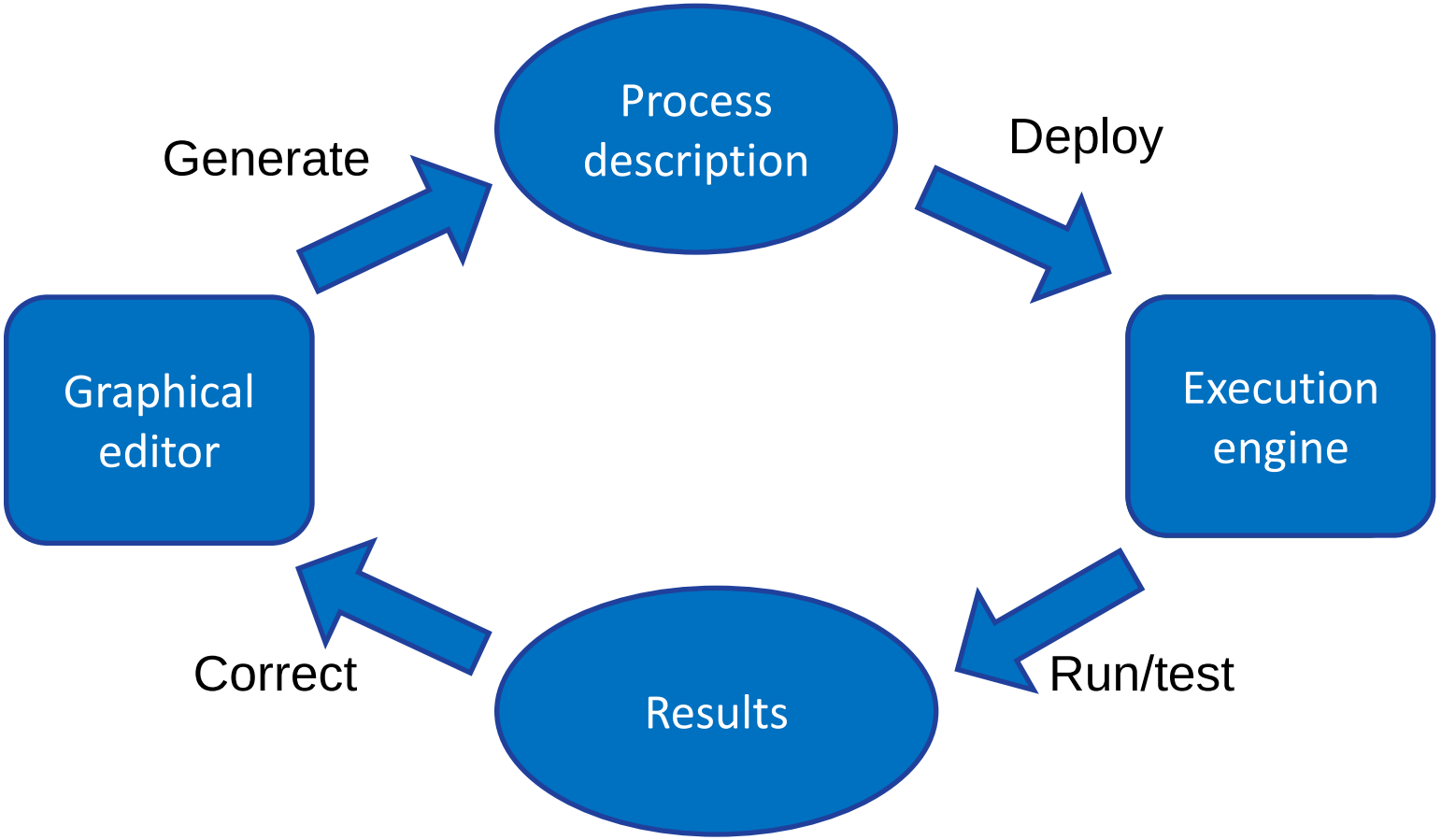
- Design tools only provide syntax checking
- BPEL 2.0 standard defines static analysis
  - Restrictions on the process (attributes, structure)
- Service-critical usage areas
  - E.g. Banking, stock market, medical
- How to ensure correct behavior?

# Errors in BPEL processes

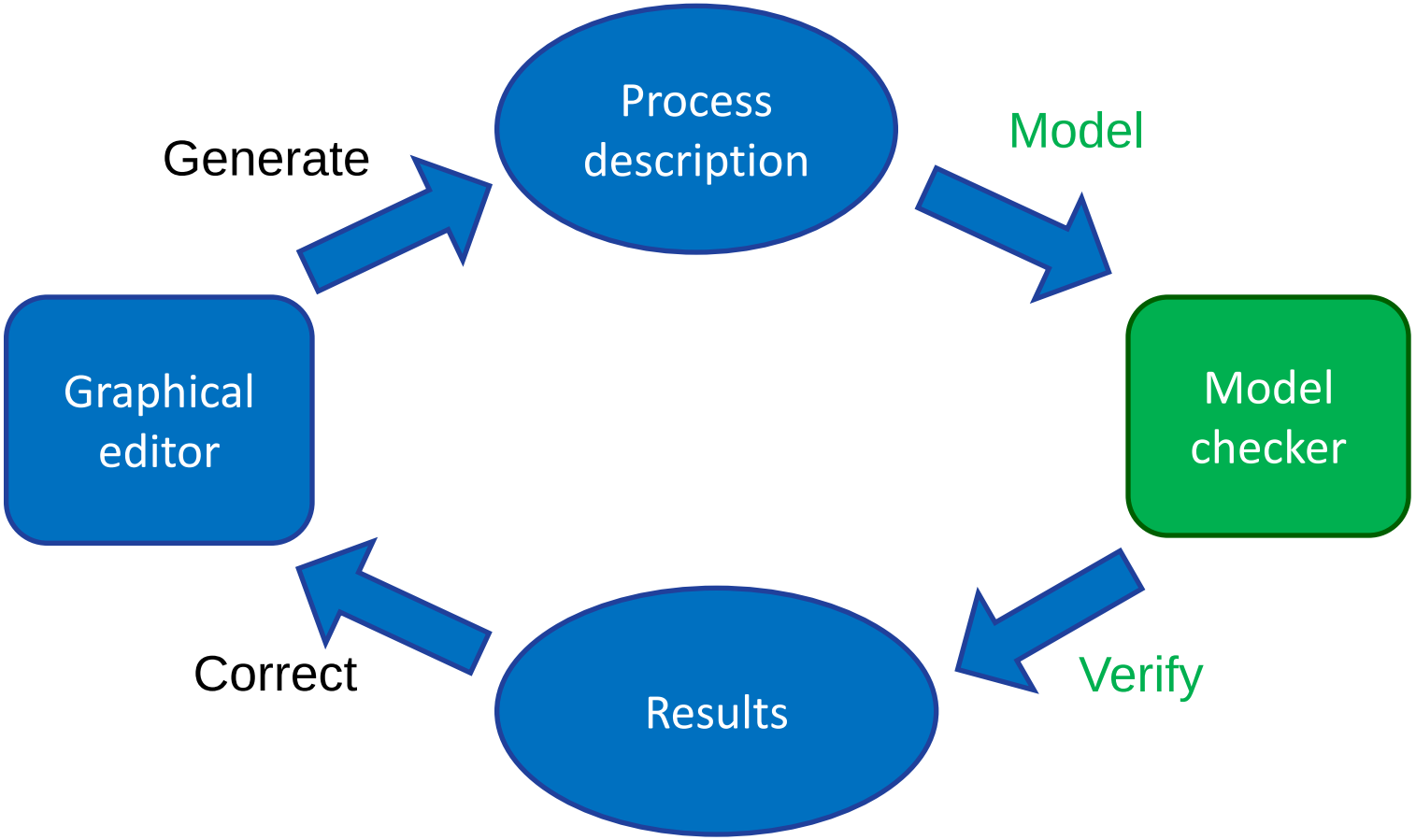



- uninitialized data
- deadlock because of lost messages
- effect of errors on execution

# Analysis of workflows



# Analysis of workflows



# Modeling BPEL

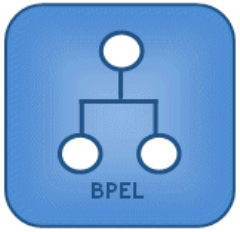
- Formal mathematical model
- Non-interpreted modeling
  - States instead of variable values and activities
- Using model transformation
- Result:
  - Verifiable model

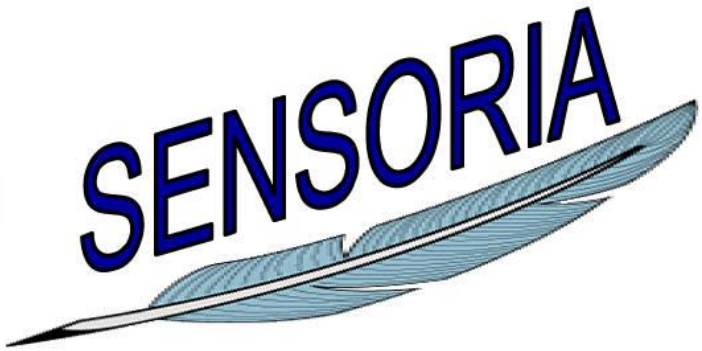
# Executing verification

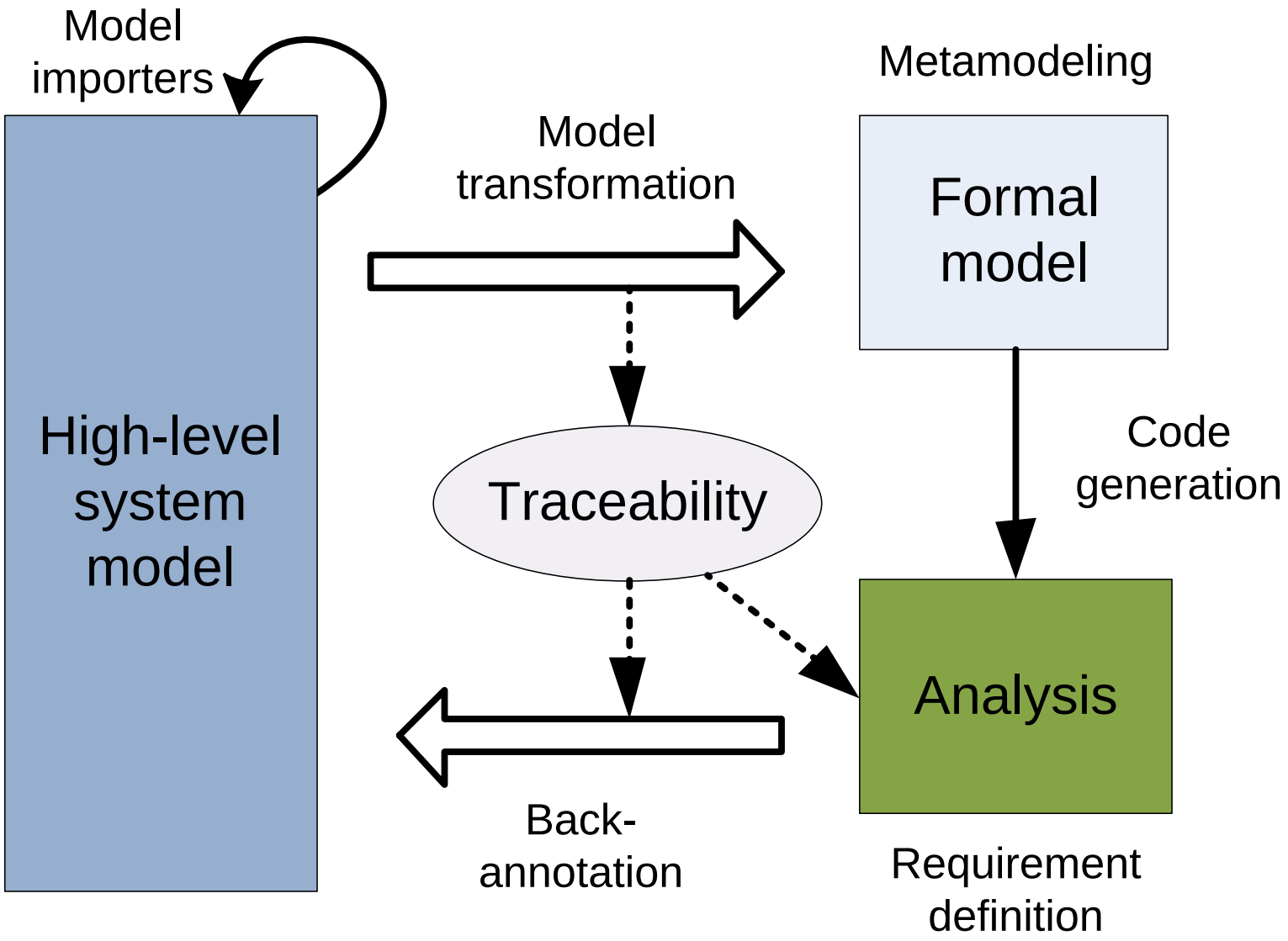
- Initially:
  - Manual requirement definition
  - Command-line tool
  - Manual processing of results
  - Really slow and difficult
- Instead:
  - Integration into process modeling environment
  - Intuitive user interface
  - Support requirement definition
  - Back-annotation of results

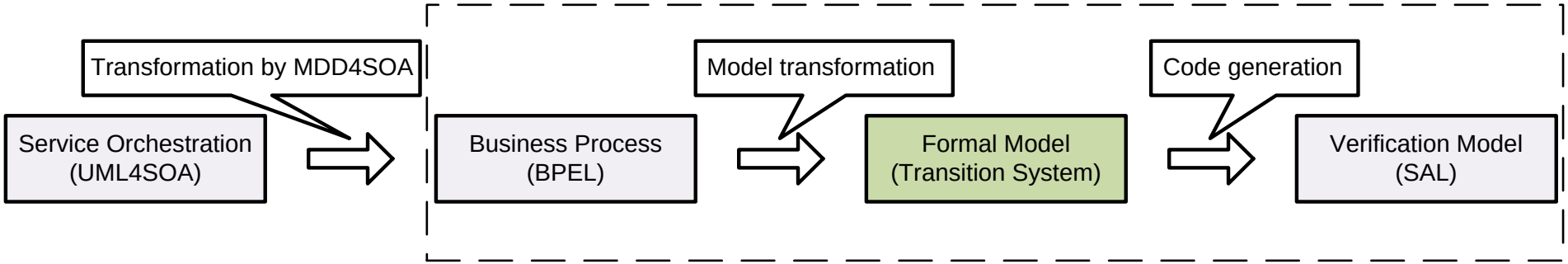
# Demo

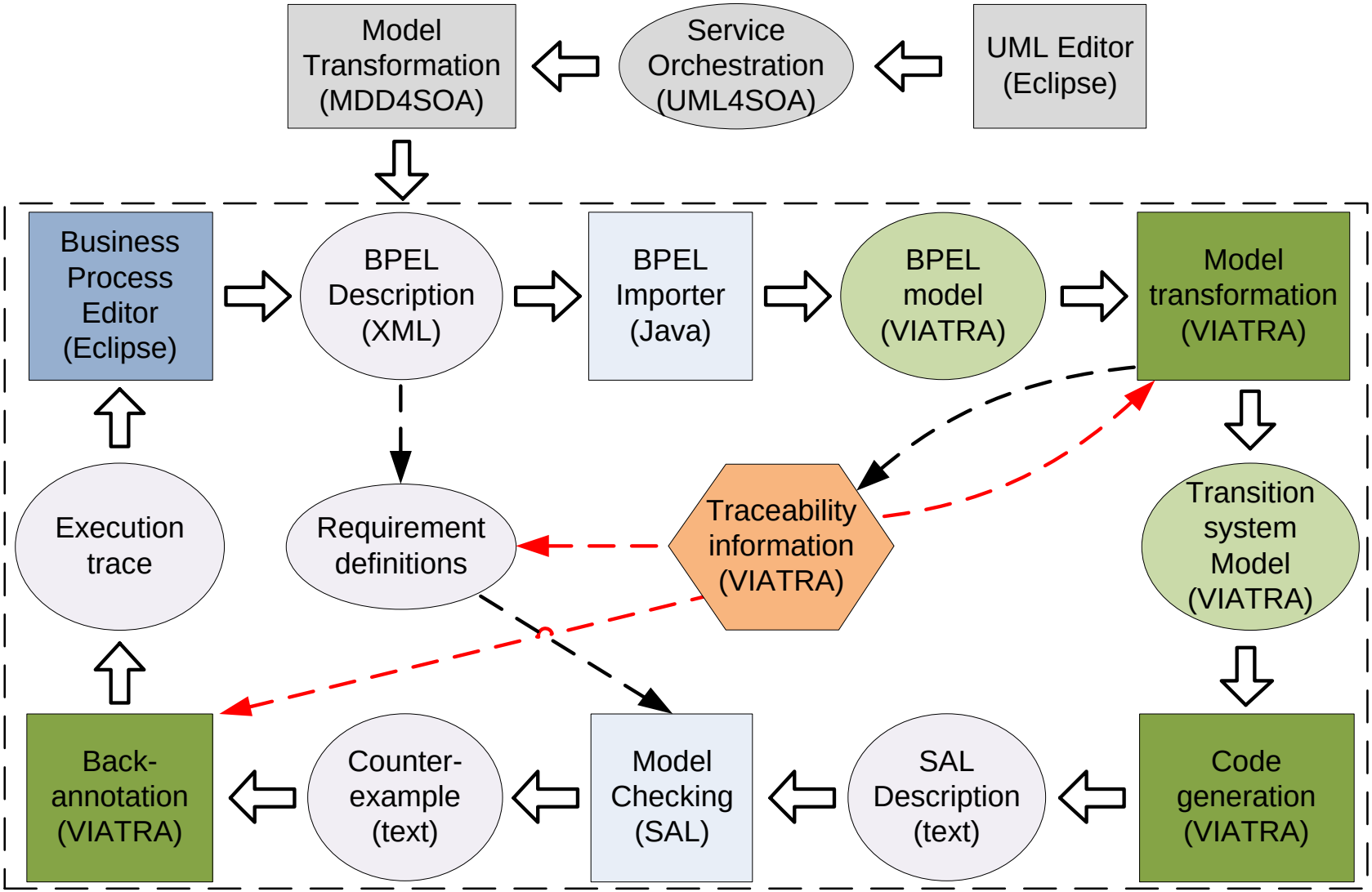
- Eclipse BPEL Designer
- BPEL Verification Tool
- BPEL Animation Controller
- VIATRA Traceability

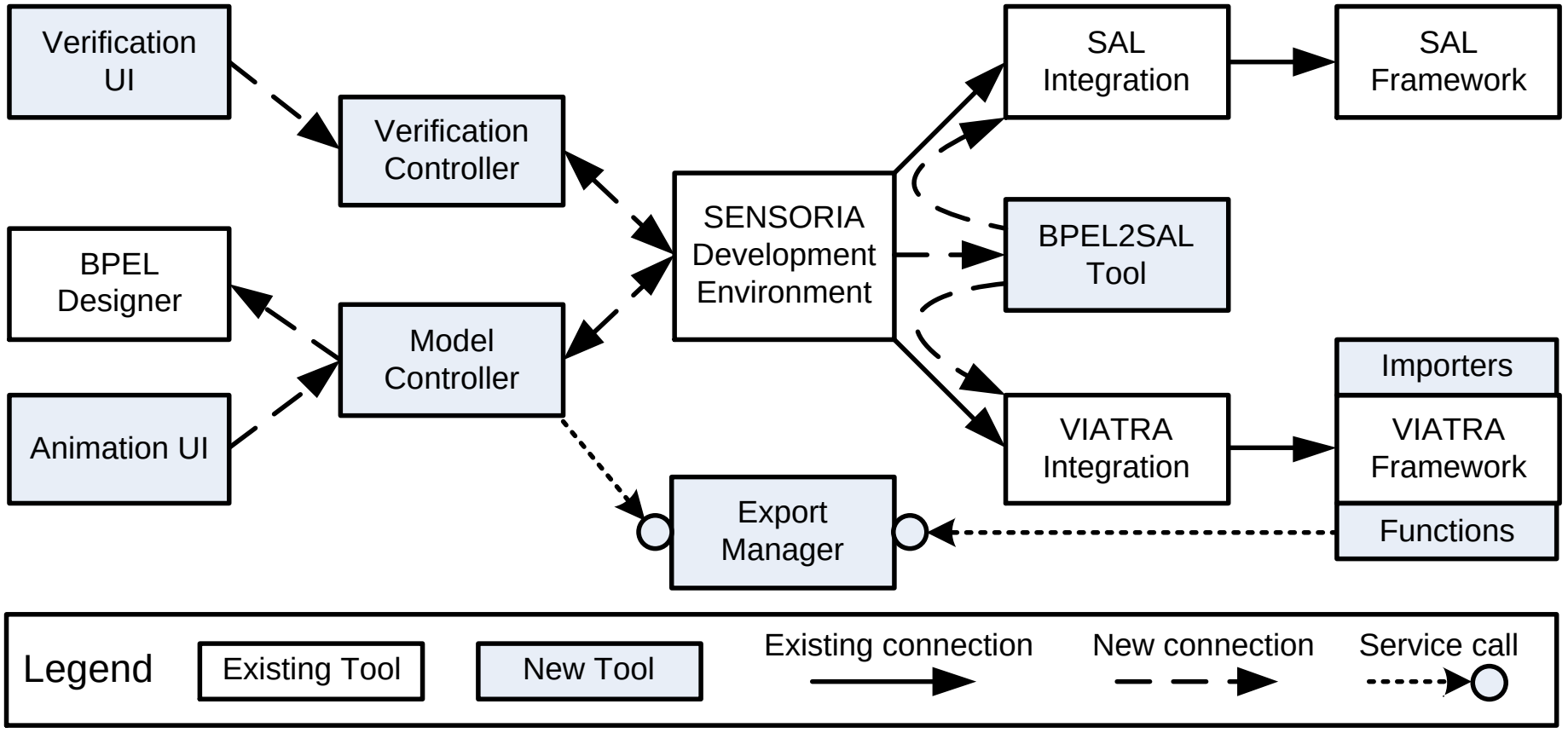





Model importers
High-level system model
Model transformation
Traceability
Back-annotation
Metamodeling
Formal model
Code generation
Analysis
Requirement definition


Transformation by MDD4SOA
Model transformation
Code generation
Service Orchestration (UML4SOA)
Business Process (BPEL)
Formal Model (Transition System)
Verification Model (SAL)


Model Transformation (MDD4SOA)
Service Orchestration (UML4SOA)
UML Editor (Eclipse)
Business Process Editor (Eclipse)
BPEL Description (XML)
BPEL Importer (Java)
BPEL model (VIATRA)
Model transformation (VIATRA)
Execution trace
Requirement definitions
Traceability information (VIATRA)
Transition system Model (VIATRA)
Back-annotation (VIATRA)
Counter-example (text)
Model Checking (SAL)
SAL Description (text)
Code generation (VIATRA)


Verification UI
Verification Controller
BPEL Designer
Model Controller
Animation UI
SENSORIA Development Environment
SAL Integration
SAL Framework
BPEL2SAL Tool
VIATRA Integration
Importers
VIATRA Framework
Functions
Export Manager
Legend
Existing Tool
New Tool
Existing connection
New connection
Service call