

WP1 @ M24

Progresses and Review

Mirko Viroli
`mirko.viroli@unibo.it`

ALMA MATER STUDIORUM—Università di Bologna

Lyon, 10/9/2012



- 1 General status of Deliverables
- 2 Technical achievements
- 3 Presenting WP1 at Y2 review
- 4 Discussing T1.3 – Towards a SAPERE Methodology



Outline

- 1 General status of Deliverables
- 2 Technical achievements
- 3 Presenting WP1 at Y2 review
- 4 Discussing T1.3 – Towards a SAPERE Methodology



Our approach to the deliverables

Methodology

- Create one report per “neat contribution”
- The deliverable has one chapter (or section) summarising each
- This also gives some more week for finalising technical details
- Given the 20-pages limit, we won't repeat material from D1.2 to D1.3
 - ⇒ Given the title, should we?
 - ⇒ “D1.3 Final operational and semantic model”



D1.2 – Complete Operational Model

TOC

- ① Intro
- ② Revised Model (TR.WP1.2012.4)
 - 2.1 Abstract Model
 - 2.2 Executable Model
 - 2.3 Semantic Model
- ③ On prediction and control of SAPERE systems (TR.WP1.2012.2-3)
 - 3.1 Survey
 - 3.2 On monotonic aggregation/diffusion systems
 - 3.3 Alchemist
- ④ Conclusions

Comments

- No significant departure from what presented in Edinburgh

D1.3 – Final operational and semantic model

TOC

- ➊ Intro
- ➋ The SAPERE programming model (TR to come)
 - SAPERE as an evolution of SOA
 - Role of the eco-law set
 - Advantages/opportunities for the developer
- ➌ On monotonic aggregation/diffusion systems, revisited (TR to come)
 - Also including dynamic topologies, contextualisation, field combinations
 - A more rigorous proof methodology based on “confluence”
- ➍ The SAPERE Semantic model (based on ASENSIS paper)
 - Role of semantics in SAPERE
 - Translation to semantic Web technologies
 - A case study on self-organising semantic resource discovery
 - Published resources (ontologies)
- ➎ Conclusions

D1.4 – Early Report on Methodology

TOC

- ① Intro
- ② Survey of methodologies
- ③ Requirements for SAPERE methodology
- ④ Methodology
 - Life-cycle
 - Meta-model
 - Phases
- ⑤ *ALCHEMIST* as an Analysis Suite
 - Specifying SAPERE systems with *ALCHEMIST*
 - Simulation and A-SMC
- ⑥ Conclusions

Comments

- We decided to have the formal stuff in D1.3

Outline

- 1 General status of Deliverables
- 2 Technical achievements**
- 3 Presenting WP1 at Y2 review
- 4 Discussing T1.3 – Towards a SAPERE Methodology



Recent developments in WP1

Contributions

- Simplification of the programming model
- New results on the formal proofs side
- Approximate Stochastic Model-Checking with *ALCHEMIST*
- Applications of self-organising semantic mechanisms (*ASENSIS* paper)
- Early Methodology (will be presented later)



On the proofs about stabilisation

Initial system considered: two eco-laws, LSA-set upward-closed

$$\bullet \quad x + y \rightarrow \min(x, y) \quad x \rightarrow x + \sigma(x)^* \quad (\sigma(x) \geq x)$$

Progression of results

- ① Overall system is confluent (i.e. with don't care non-determinism)
- ② It stabilises—final values depend only on minimal paths to source LSA
- ③ Stabilisation time goes linearly with the network diameter
- ④ With multiple sources, the resulting field is obtained by “min” field
- ⑤ Combining different fields does not affect stabilisation
- ⑥ There is self-stabilisation to node/link addition
- ⑦ Stabilisation to node/link removal needs also $x \rightarrow \sigma(x)^*$ and fairness
- ⑧ Contextualisation turned into σ -specialisation

1-page status on *ALCHEMIST*

Motivation

- Filling the gap between chemical simulators and MABS (e.g. Repast)

Features

- Now: Speed, parallel, dynamic and mobile environments, A-SMC
- Later: GUI, on-the-fly interactions, loading maps, distribution, AI

Usage

- Language: Java and high-level SAPERE-oriented language
- Editor with code highlighting + auto-completion
- Available at: <http://alchemist.apice.unibo.it>
- Used in all cases of Y2 papers, new demos to be developed

Outline

- 1 General status of Deliverables
- 2 Technical achievements
- 3 Presenting WP1 at Y2 review**
- 4 Discussing T1.3 – Towards a SAPERE Methodology



Presenting WP1 at Y2 review

Several advances: few minutes each

- ① New Model: simpler formalisation, better “Semantic Web” use
- ② Progr. Model: the SOA view and eco-laws set (showing code here?)
- ③ ALCHEMIST: showing a Demo, giving a taste of its programming
- ④ Formal proofs: Brief on technicalities, deeper on implications
- ⑤ Methodology: Summarising goal/approach, giving few details

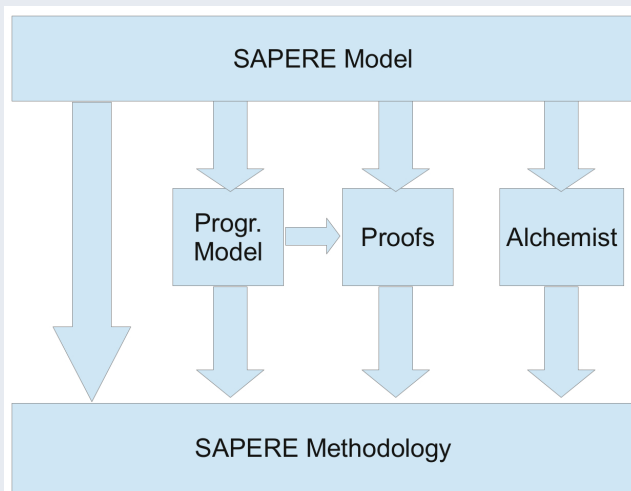
Reviewers comments strictly influenced our work throughout

- Impact on Programming model
 - ⇒ Simplification of the model
 - ⇒ Choice of a simple set of eco-laws
- Effort on analysis of properties
 - ⇒ Built ALCHEMIST
 - ⇒ Proved new theoretical results

.. methodology as a key “platform” for new results in Y3

Presenting WP1 at Y2 review

Contributions and relationships



Outline

- 1 General status of Deliverables
- 2 Technical achievements
- 3 Presenting WP1 at Y2 review
- 4 Discussing T1.3 – Towards a SAPERE Methodology



Towards a SAPERE Methodology

Brief presentation – few facts

- Devising a SAPERE methodology is the ground of T1.3 (WP1 in Y3)
- It couples methodological guidelines with an analysis suite
 - ⇒ ALCHEMIST, to be extended in Y3
 - ⇒ Existing and new results on stabilisation
- Should build on agent-based and self-org. methodologies (as of Dow)
- Only about 8 PM so far (mostly Andrea + Ambra)
- Should probably set up a WP workshop just after the review meeting
- Andrea will explain details..

