Meeting of
The GEMOC Initiative

http://www.gemoc.org/meeting-ec2013

Research-Project Symposium
ECOOP, ECMFA and ECSA 2013
July 1st, 2013
Context

• Open forum for sharing experiences, problems and solutions on the conjoint use of multiple software languages

• Bring together programming and modeling communities

• Informal and working meeting => Your meeting!

• Organized by the GEMOC initiative (see http://gemoc.org)
Objectives

• Exchange of concrete artifacts, ideas and opinion

• Provide constructive feedback

• Leverage on experiences to start a classification of the possible relations between modeling/programming languages

• Encourage collaborations (and start building a community) on solving the problems arising from the globalization of modeling languages
Program – Morning  (public)

• 09:30 - 10:00: Welcome, and GEMOC initiative (B. Combemale)
• 10:30 - 11:00: Language workbenches for model and language heterogeneity #1 (GEMOC Studio, J. DeAntoni)
• 10:30 - 11:00: coffee break
• 11:00-11:30: Language workbenches for model and language heterogeneity #2 (ModHel’X, F. Boulanger)
• 11:30-12:00: Language workbenches for model and language heterogeneity #3 (Neverlang, W. Cazzola)
• 12:00-12:15: Conclusion, and agenda of the afternoon session
• 12:15 - 14:00: lunch
Program – Afternoon  (for the GEMOC members)

• 02:00-02:15: Round table and news about the GEMOC initiative

• 02:15-03:30: BoF session "model and language composability" (relations, differences)

• 03:30-04:00: coffee break

• 04:00-05:00: BoF session "scope and roadmap of the GEMOC initiative"

• 05:00-05:15: Conclusion (actions, collaborations…)}
The GEMOC Initiative

On the Globalization of Modeling Languages

http://www.gemoc.org

Contact: Benoit Combemale
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Version: June, 2013
Complex Software-Intensive Systems

- deal with multiple concerns
  ⇒ require *global analysis and execution*

- integrate heterogeneous parts
  ⇒ require *global service*

- manage evolution of concerns and the emergence of new concerns
  ⇒ require evolution and creation of tools and methods for software development
Heterogeneous Modeling Languages
Heterogeneous Modeling in Global Software Engineering
Model Driven Engineering…

Distribution

Fault tolerance

Security

Functional behavior

Use case model

Change one Aspect and Automatically Re-Weave: From AORE, SPL to DAS

Design Model

Code Model
Software Language Engineering

• The separation of concerns…

  Modularization [Parnas72] to allow the structure of the product to resemble the structure of the organization that designed it [Conway68]

• … at the language level

  Domain-Specific (Modeling) Language (DSML) should serve to implement a solution in terms of a problem (socio-technical coordination [Herbsleb07]).

• requires to manage the relations between languages

  to avoid social isolation and non sharing information (as observed for example in the use of APIs [Souza04])
Challenges

• *Model Driven* Engineering
  ➤ *Software Language* Engineering

• Language relationships should be capitalized
  ➤ from transformation to composition

• Global model coordination and analysis
  ➤ from design to runtime
On the Globalization of Modeling Languages!
An Initiative…

Focuses on SLE tools and methods for interoperable, collaborative, and composable modeling languages.
... Constantly Growing
The GEMOC Initiative is born!

An open initiative to

- coordinate (between members)
- disseminate (on behalf the members)

worldwide R&D efforts on the globalization of modeling languages

http://gemoc.org

- Advisory Board: Benoit Combemale (Fr.), Robert B. France (USA), Jeff Gray (USA), Jean-Marc Jézéquel (Fr.)

- Funded by complementary and successive projects
- IP left to PCA of each projects
Current Projects

completed, ongoing

**CNRS GDR GPL**

**Specific Action 2011**
- Survey of the techniques and tools to compose DSMLs and their respective MoCs
- *Partners: IRISA (Triskell), I3S (Aoste)*
- *Cf. [http://gemoc.org/as2011](http://gemoc.org/as2011)*

**ANR INS GEMOC**

**2012-2016**
- A Language Workbench for Heterogeneous Modeling and Analysis of Complex Software-Intensive Systems
- *Partners: Inria (Triskell), I3S (Aoste), IRIT, ENSTA-Bretagne, Thales, Obeo*
- *Cf. [http://gemoc.org/ins](http://gemoc.org/ins)*

**CNRS PICS MBSAR**

**2013-2015**
- Travel funds for permanent staff and PhD students
- *Partners: IRISA (Triskell), CSU*
- *Cf. [http://gemoc.org/mbsar](http://gemoc.org/mbsar)*
ANR INS GEMOC (2012-2016)

"A Language Workbench for Heterogeneous Modeling and Analysis of Complex Software-Intensive Systems »

Tools and methods for the definition and coordination of heterogeneous executable modeling languages over heterogeneous models of computation

http://gemoc.org/ins
Executable Metamodeling

• Effective environments for the design and implementation of executable domain specific languages (e.g., Kermeta at Inria)

• BUT these environments do not allow the integration of heterogeneous models of computation (concurrency, communication…)}
Models of Computation

• Effective environments to deal with the execution and analysis of models based on heterogeneous models of computation (e.g., Ptolemy at UC Berkeley, ModHel’X at Supélec)

• BUT these environments do not allow adaptation to specific business/application domains
Heterogeneity and SE

Models of Computation

Metamodeling

Global Software Engineering

[Schmidt'06] [Lee and Sangiovanni'98] [Karsai'03] [Schmidt'06] [Atkinson'06] [Winskel'87] [Jantsch'04] [Eker et al.'03] [Conway'68] [Boehm'84] [Herbsleb'01] [Souza'04] [Clarke'02] [Lédeczi'01] [Straw'04]
ANR INS GEMOC: Issues

• **Scientific Issues:**
  - Formal foundations for composable software language design and implementation
  - Formal foundations for semantic coordination of software languages
  - Associated tool-supported methodology leveraging on executable metamodeling and models of computation

• **Technical Issues:** an Eclipse-based GEMOC studio integrating
  - A language workbench
  - A language coordination and execution engine
  - A workbench for viewpoint definition and animation over heterogeneous models
ANR INS GEMOC: Expected Studio

- **GeMoC Studio (from WP4)**
  - eXecutable Modeling Tools (reflexive editors, VM and compilers: EMF, Kermeta, and OBEO Designer)
  - Reflexive Model Animators (OBEO Designer)

- **Execution Engine for Heterogeneous Models (from WP4)**

- **Language Definition Tools**
  - DSML (from WP1), MoCC (from WP2), Graphical Animation (from WP4), and their Composition (from WP3 and WP4)

- **Domain Designers (from WP5)**

- **Domain Experts (from WP5)**

- **Eclipse Modeling**

- **Eclipse**
Cross Road Traffic Light

http://youtu.be/gT1QUUmFkLM
ANR INS GEMOC: Identification

• Project Coordinator: Benoit Combemale (benoit@gemoc.org)
• Consortium: Inria, CNRS I3S, INPT IRIT, ENSTA Bretagne, Thales, Obeo
• External Partner: Supélec
• Date: 01.12.12 – 30.03.16 (40 months)
• Budget: 2 700 000 €

• Supported by the French Agency for Research (ANR)
  ‣ Program Ingénierie Numérique et Sécurité (INS 2012)
  ‣ Grant n°ANR-12-INSE-0011
  ‣ ANR Funding: 982 720€

• Competitiveness clusters: Image & Réseaux, Aerospace Valley, Systematic

Visit http://gemoc.org/ins
GEMOC MEETING

July 1st, 2013, Montpellier, France
co-located with ECMFA, ECOOP and ECSA 2013
Research-Project Symposium

• Official launch of the GEMOC Initiative
• Working group on the classification of the relations between modeling languages
• Coordination EU-US, and intra EU

http://gemoc.org/meeting-ec2013/
GlobalDSL 2013

International Workshop on
*The Globalization of Domain Specific Languages*
July 2\(^{\text{nd}}\), 2013, Montpellier, France
co-located with ECMFA, ECOOP and ECSA 2013

- Topics of interest include *composability, interoperability, modularity, reuse*, and *variability* of programming/modeling languages
- Keynote by Prof. Dr. Bernhard Rumpe on "*Compositional Model-Based Software Development*"

http://gemoc.org/globaldsl2013
GEMOC 2013

International Workshop on
The Globalization of Modeling Languages
September 29th, 2013, Miami, Florida, USA
co-located with MODELS 2013

• Topics of interest include composability and interoperability of heterogeneous modeling languages, model and metamodel composition, multi-paradigm modeling and simulation

• An open forum for sharing experiences, problems and solutions on the conjoint use of multiple modeling languages.

http://gemoc.org/gemoc2013