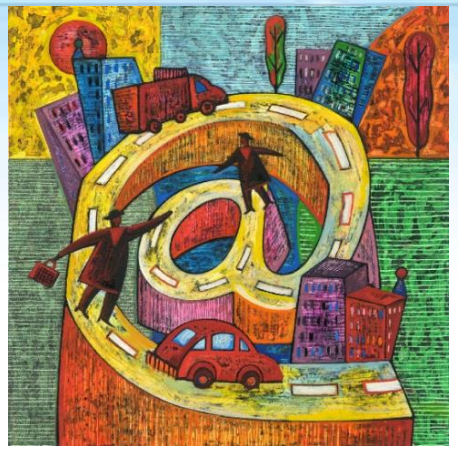
Atenea
Modeling Software Systems



GISUM

Globalizing Modeling Languages: Issues and Challenges

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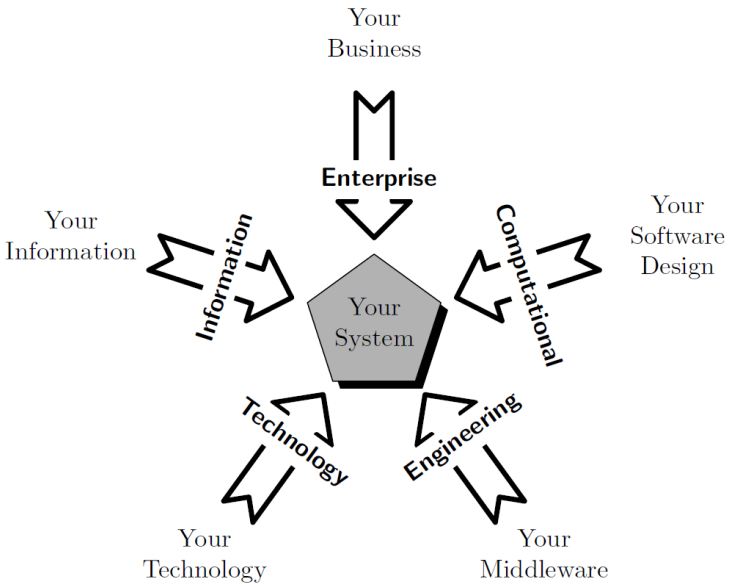
Dagstuhl, October 2014

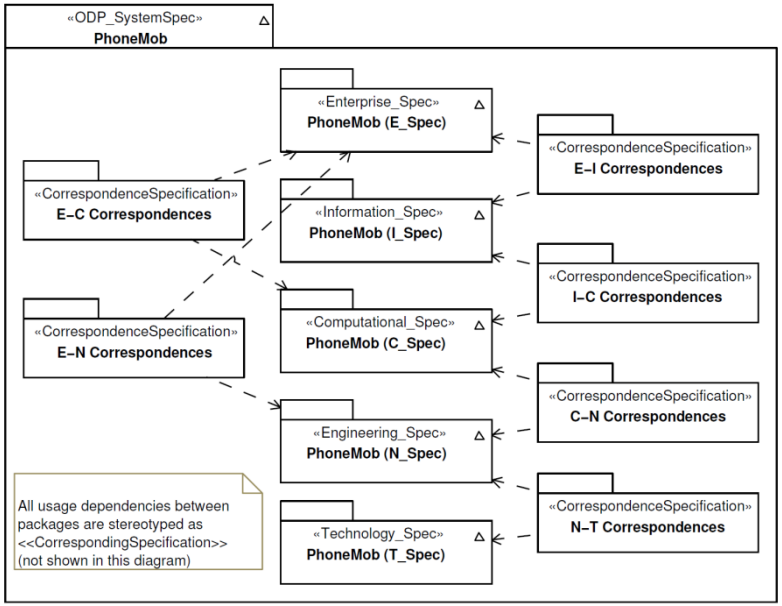
Q1: What is your definition of "Globalization of Modeling Languages"

- The definition given in the original GEMOC paper [1]:
  "The *use* of multiple languages to support coordinated *development* of diverse systems aspects"
- However, I see it is more adequate to define what **Multi-Viewpoint Modeling** is/should be about:
  "The *combination* of multiple languages to support coordinated *specification, analysis and development* of diverse systems aspects"
- Thus, in my view, "Globalizing a Modeling Language" means
  "Making a Modeling Language amenable for integration into a (standard) Multi-Viewpoint Modeling environment"
- Notes:
  - Globalized MLs need to be *combinable* and *integrable*
  - Interfaces at different levels should be defined
  - Standardization should play a key role here

Q2: What are we doing in this area?

- RM-ODP
  - A mature framework for the specification of systems, using viewpoints (ISO & ITU-T standard!)
  - Five viewpoints and their Viewpoint Languages (VPL)
  - Explicit correspondences between the VPL





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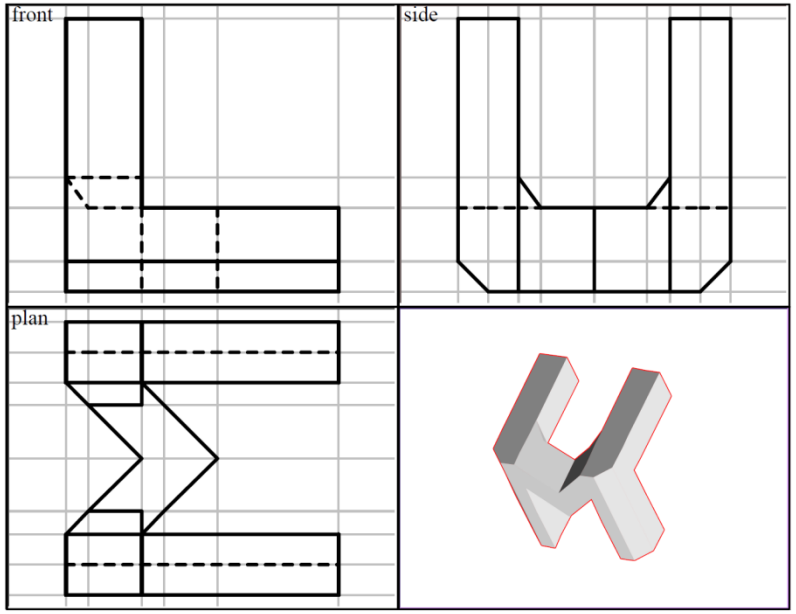
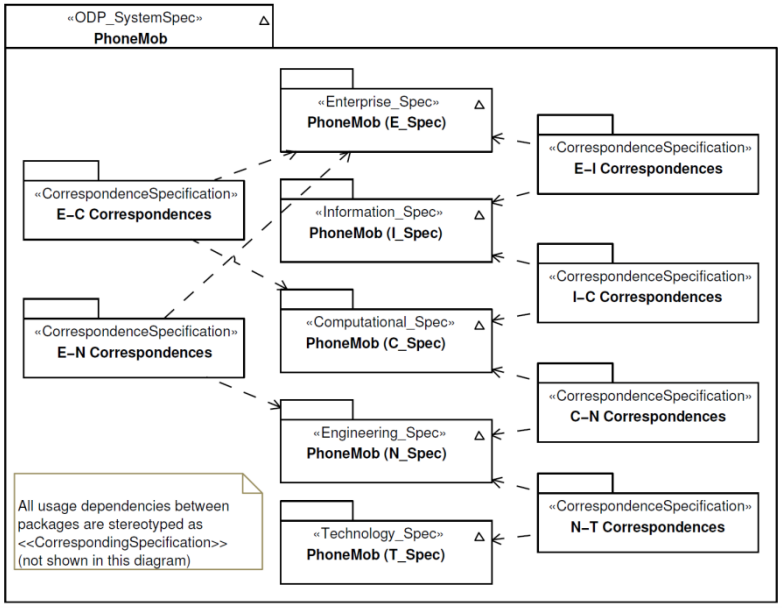
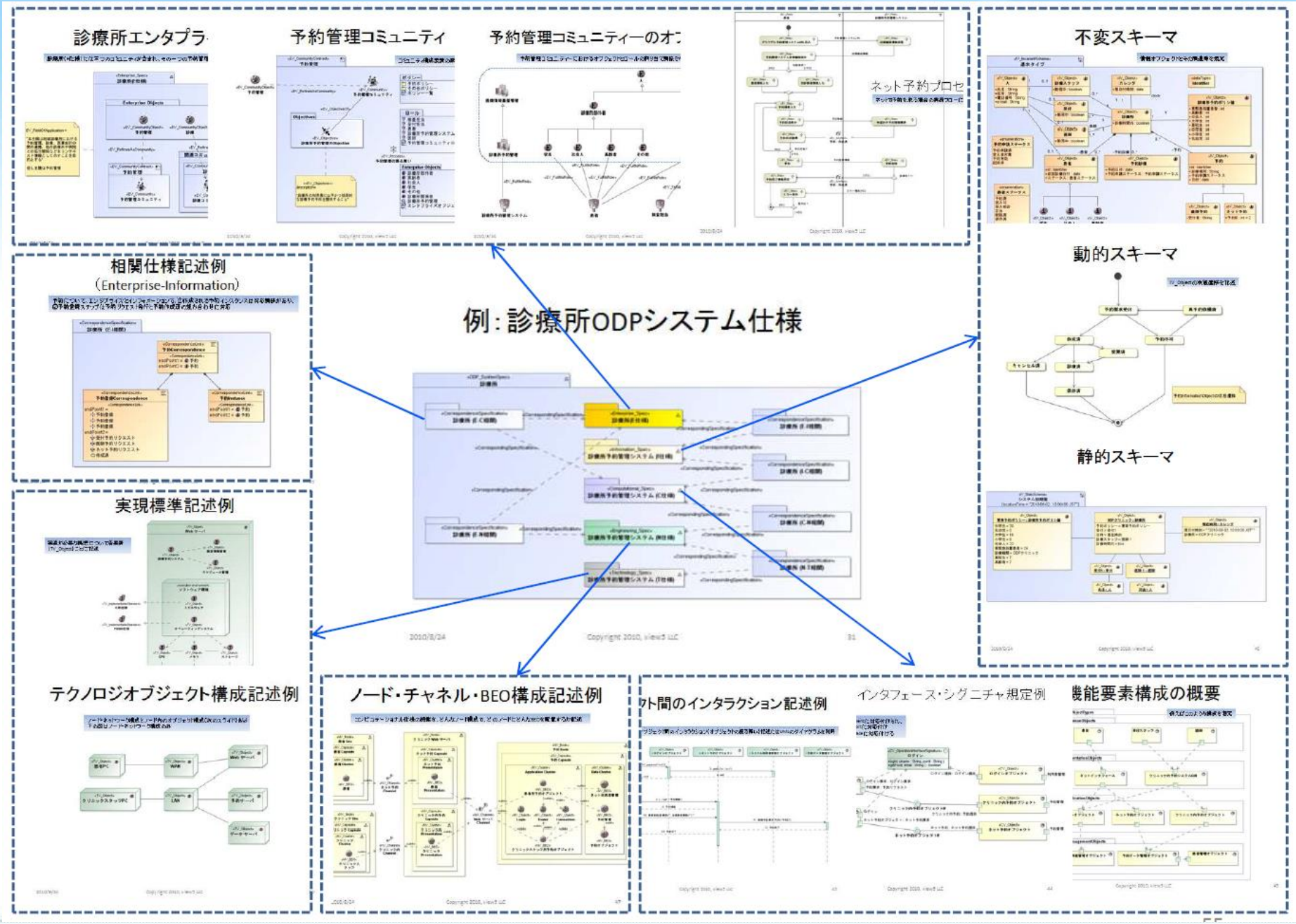





診療所エンタプラ
予約管理コミュニティ
予約管理コミュニティーのオ
ネット予約プロセ
不変スキーマ
相関仕様記述例
(Enterprise-Information)
例：診療所ODPシステム仕様
動的スキーマ
静的スキーマ
実現標準記述例
テクノロジオブジェクト構成記述例
ノード・チャネル・BEO構成記述例
ト間のインタラクション記述例
インタフェース・シグニチャ規定例
機能要素構成の概要

Correspondence Metamodel (UML4ODP)

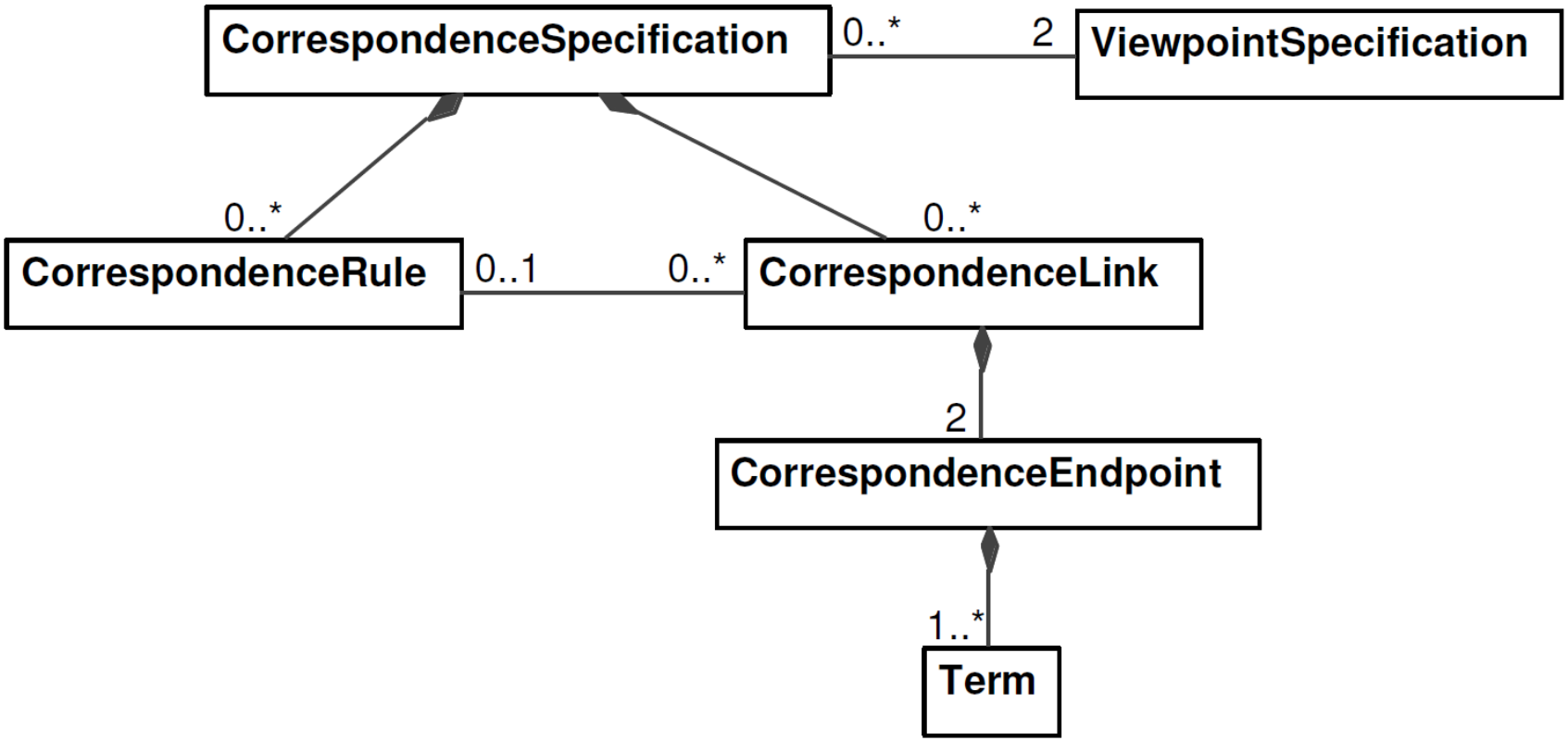
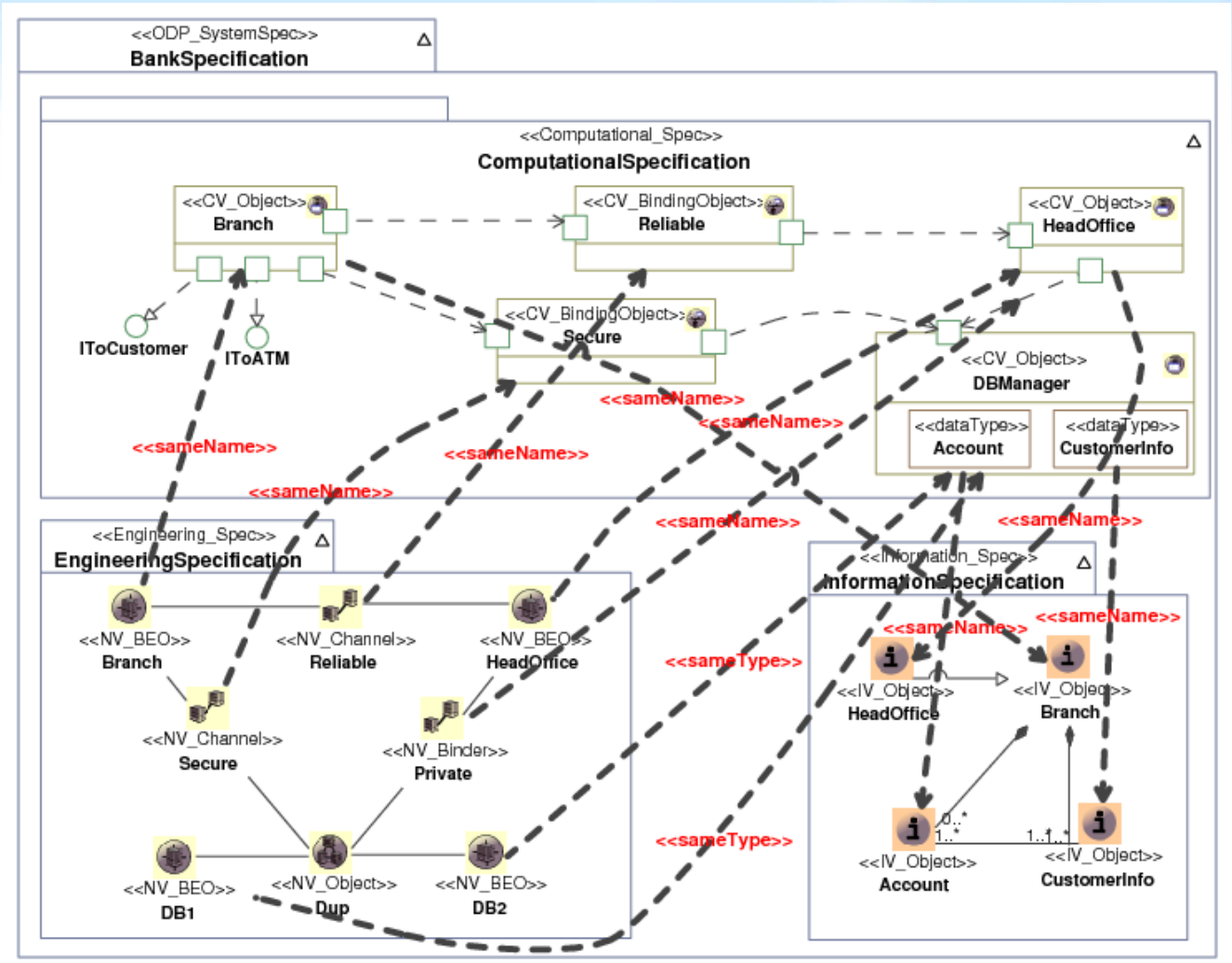


FIGURE 7.2: The elements of a correspondence specification.

Establishing correspondences



Q2: What are we doing in this area?

- Working on RM-ODP
  - Editor of the new version of the standards (2010-13)
  - Editor of ISO 19793 "Use of UML for ODP systems specification" (2009, 2013)
  - Book on ODP [2]
  - Research on the specification of correspondences [3]
  - A tool for ODP systems specifications using UML4ODP (the official MagicDraw plugin for ODP) [4]
    - Editors for the 5 viewpoints and for the correspondences
    - Model validators
    - Simulations supported for the Computational Viewpoint
- Working on the combination of DSMLs
  - How to combine DSMLs, issues and challenges [5]

References

[1] B. Combemale et al. "**Globalizing Modeling Languages**". Computer, 2014.

[2] P. Linington, Z. Milosevic, A. Tanaka, A. Vallecillo. "**Building Enterprise Systems with ODP — An Introduction to Open Distributed Processing**", Chapman & Hall/CRC Press, Sep 2011. http://theodpbook.lcc.uma.es/

[3] J.R. Romero, Juan I. Jaen, A. Vallecillo. "**Realizing Correspondences in Multi-Viewpoint Specifications**". Proc. of EDOC'09, pp. 163-172, Sept 2009, IEEE CS.

[4] J.R. Romero, J.I. Jaén, A. Vallecillo. "**A Tool for the Model-Based Specification of Open Distributed Systems**". The Computer Journal, 56(7):793-818, 2013.

[5] A. Vallecillo. "**On the Combination of Domain Specific Modeling Languages**". In Proc. ECMFA'10, LNCS 6138, pp. 301-316, June 2010.

Q3: Top 3 research challenges

- Combination/Integration/Unification of languages
  - Has to be at the same level of abstraction!
  - Needs establishing correspondences between them (at all levels: Abstract Syntax, Concrete Syntax and Semantics)
  - Needs to deal with heteronegeous (and not always combinable, see [5]) semantics
  - Correspondences between metamodels, and between models
- Specification/Visualization of correspondences
  - In an efficient, correct, usable and maintainable manner
  - Both implicit and explicit (see [3] and [4])
- Reasoning about the information expressed across the different models
  - Emergent properties!

ALL MUST BE TOOL-SUPPORTED (otherwise useless!)