

Toward a Model Architecture for Model Composition Techniques

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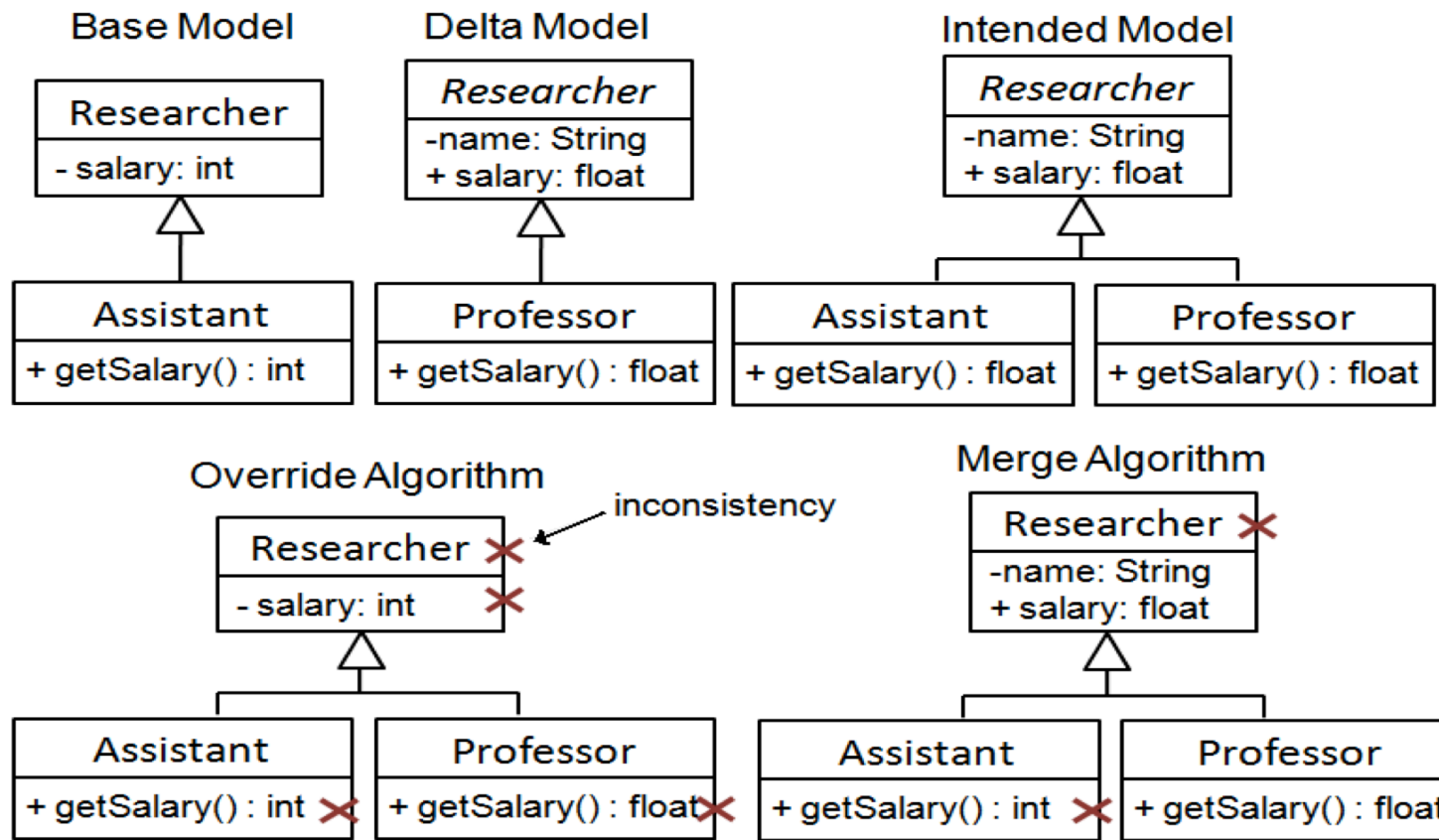
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Introduction

- *Model composition*: MA and MB, in order to produce an output-intended model, MAB.
- It is an important task in MDE (Model Driven Engineering)
 - Evolving design models
 - reconciling multi-view models (*parallel development*).
- Actually, Merging is a “*time-consuming, complicated, and error-prone process*” [Ton Mens];
- Current composition tools are limited and closed to a set of particular composition cases;
- To overcome these shortcomings: We proposed an model architecture.

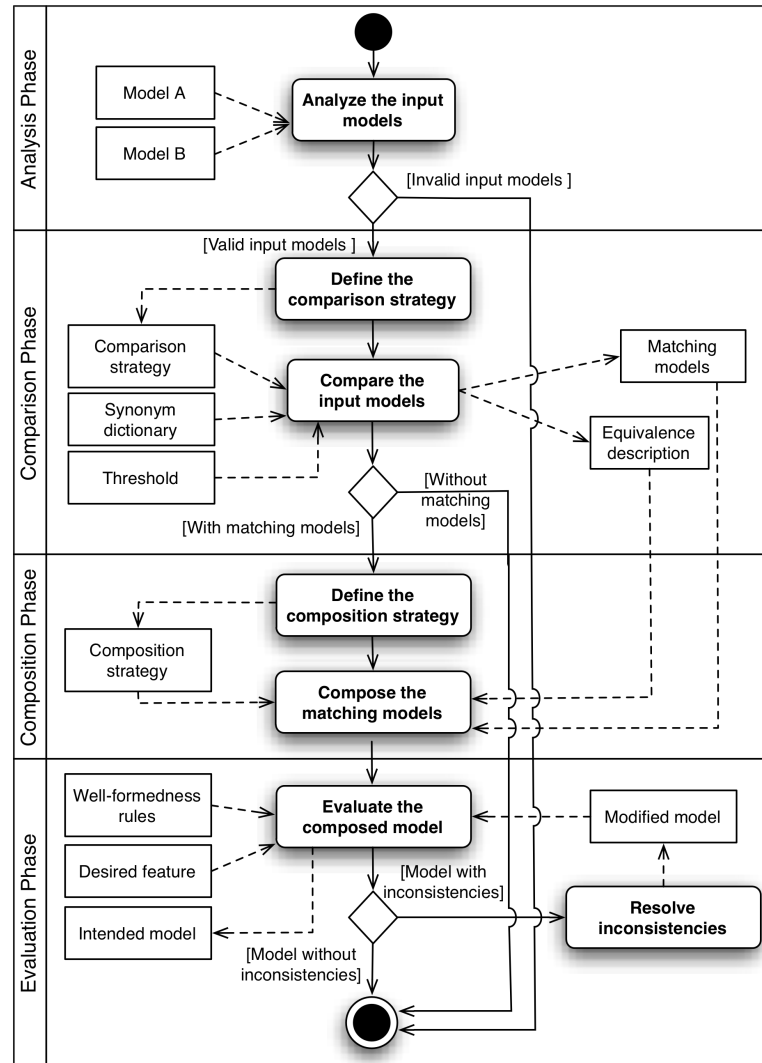
Background



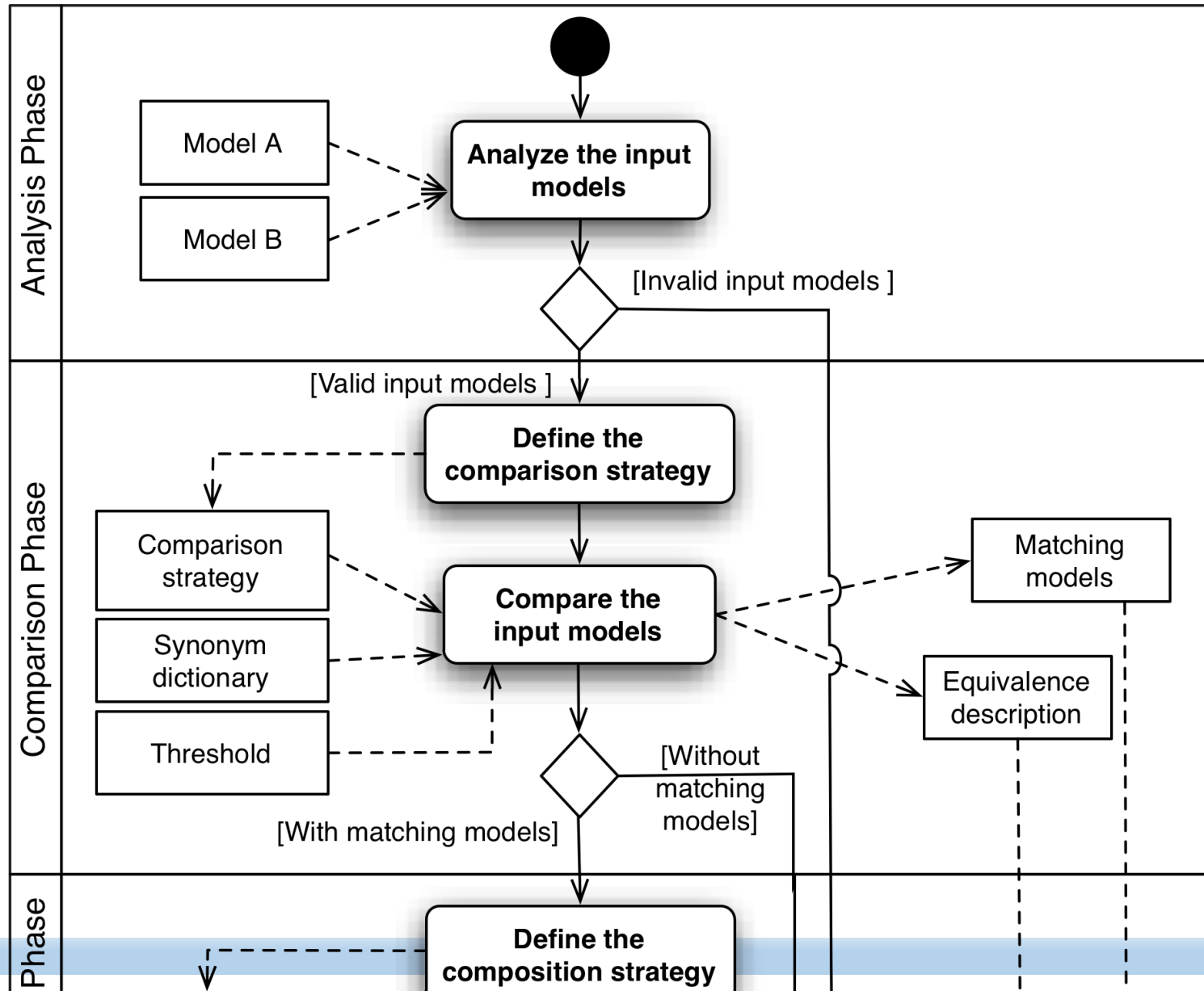
Background

- Model Matching Strategies
 - Default: Find the model correspondence between component names;
 - Partial: Matches the elements according its syntactic properties;
 - Complete: Comparison using syntactic and semantic model properties;

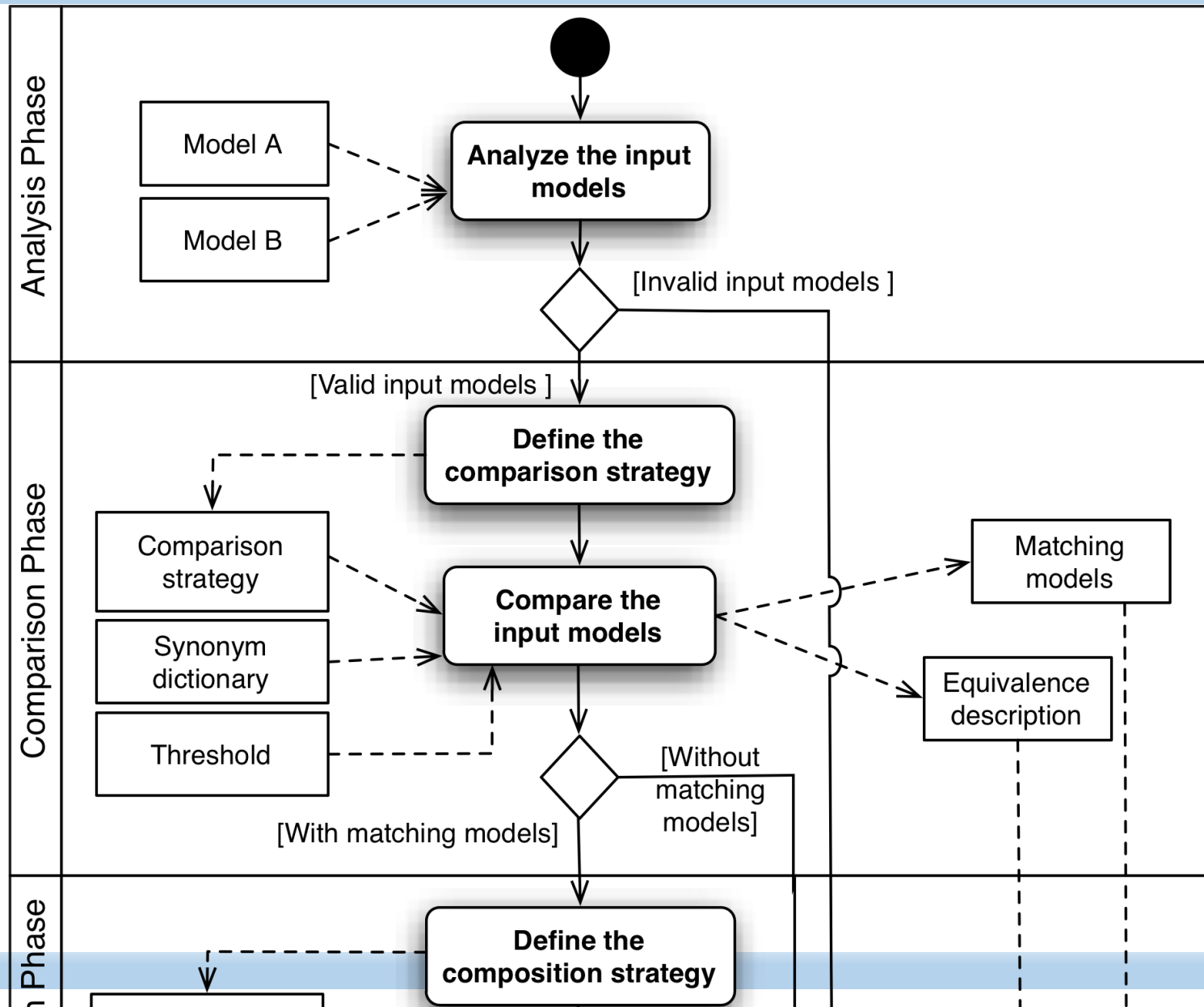
MoCoTo Composition Process



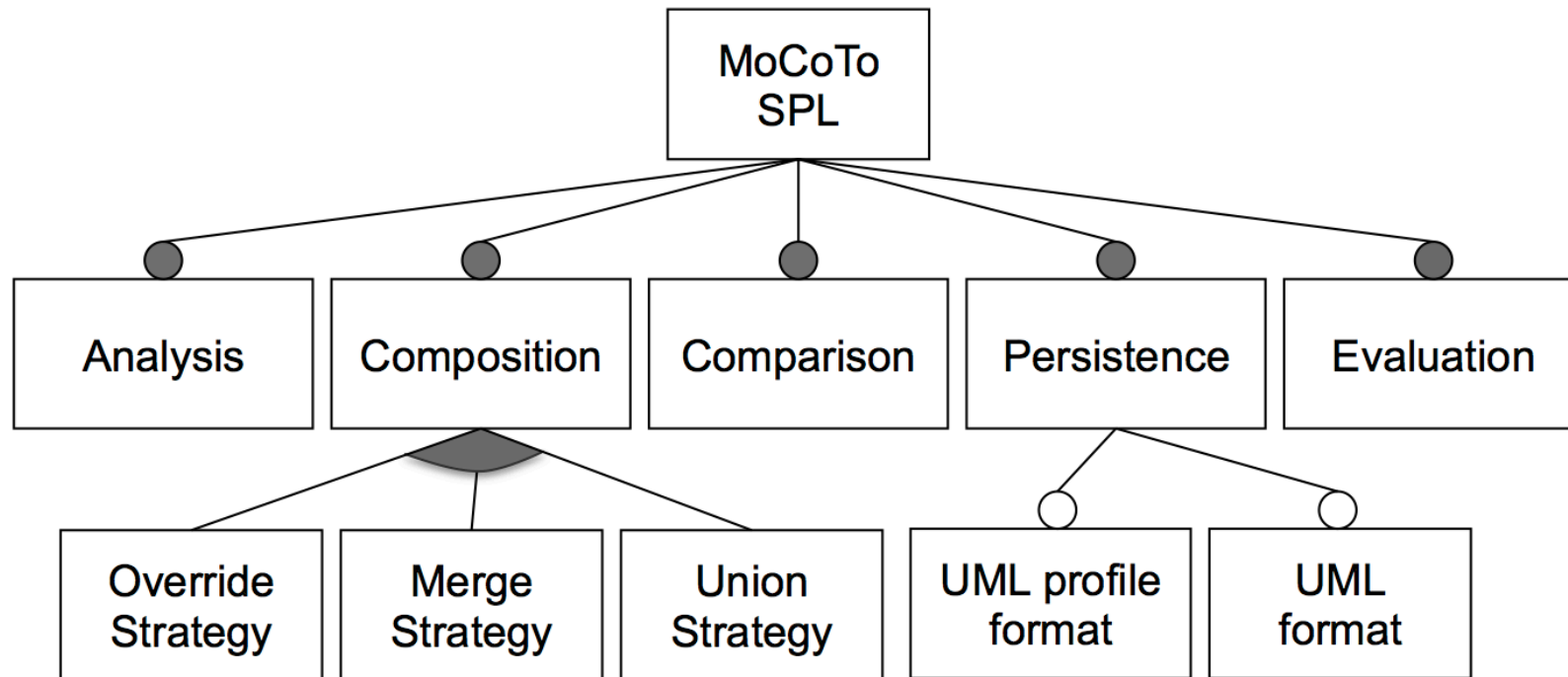
MoCoTo Composition Process



MoCoTo Composition Process



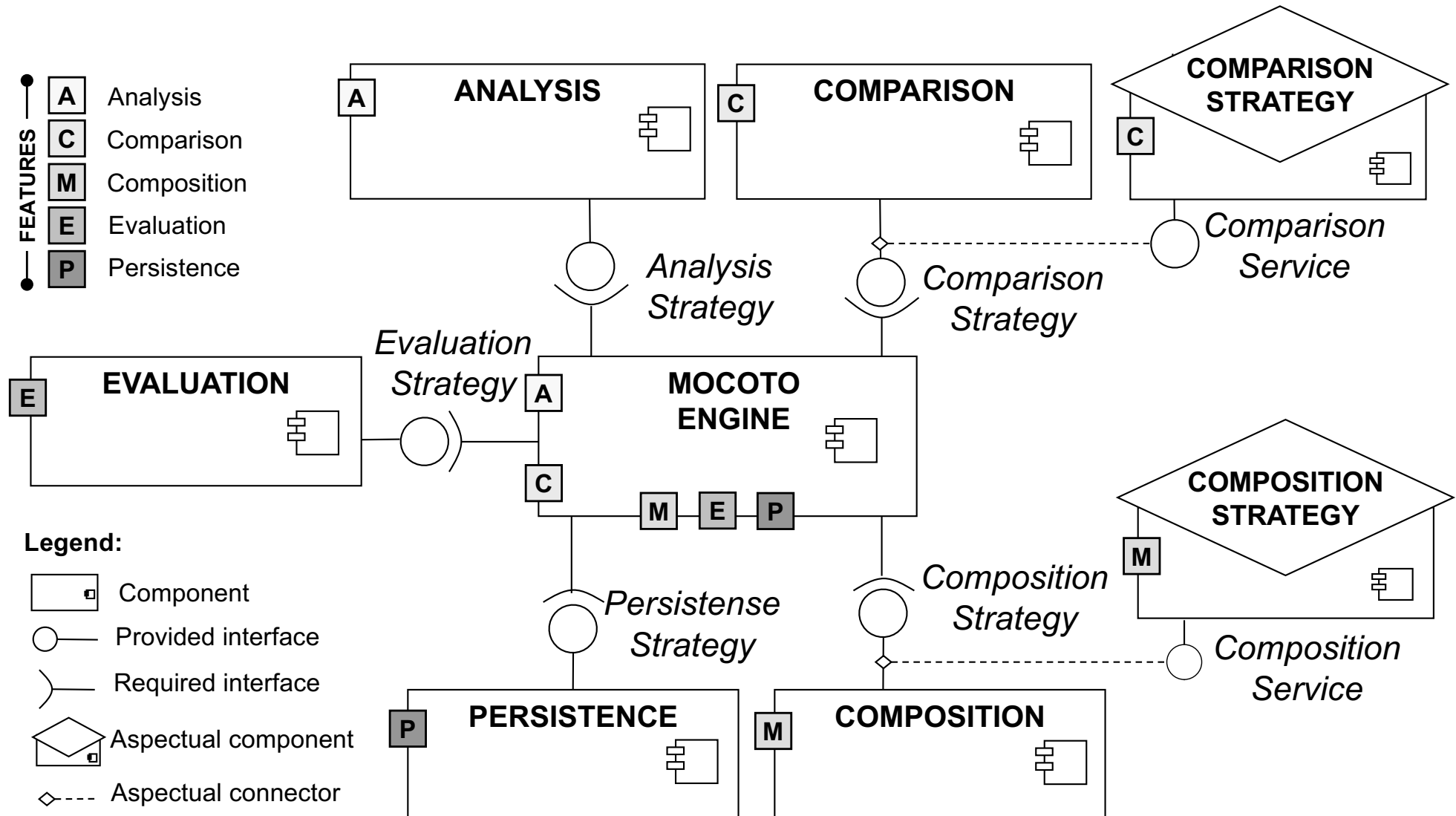
MoCoTo architecture feature model



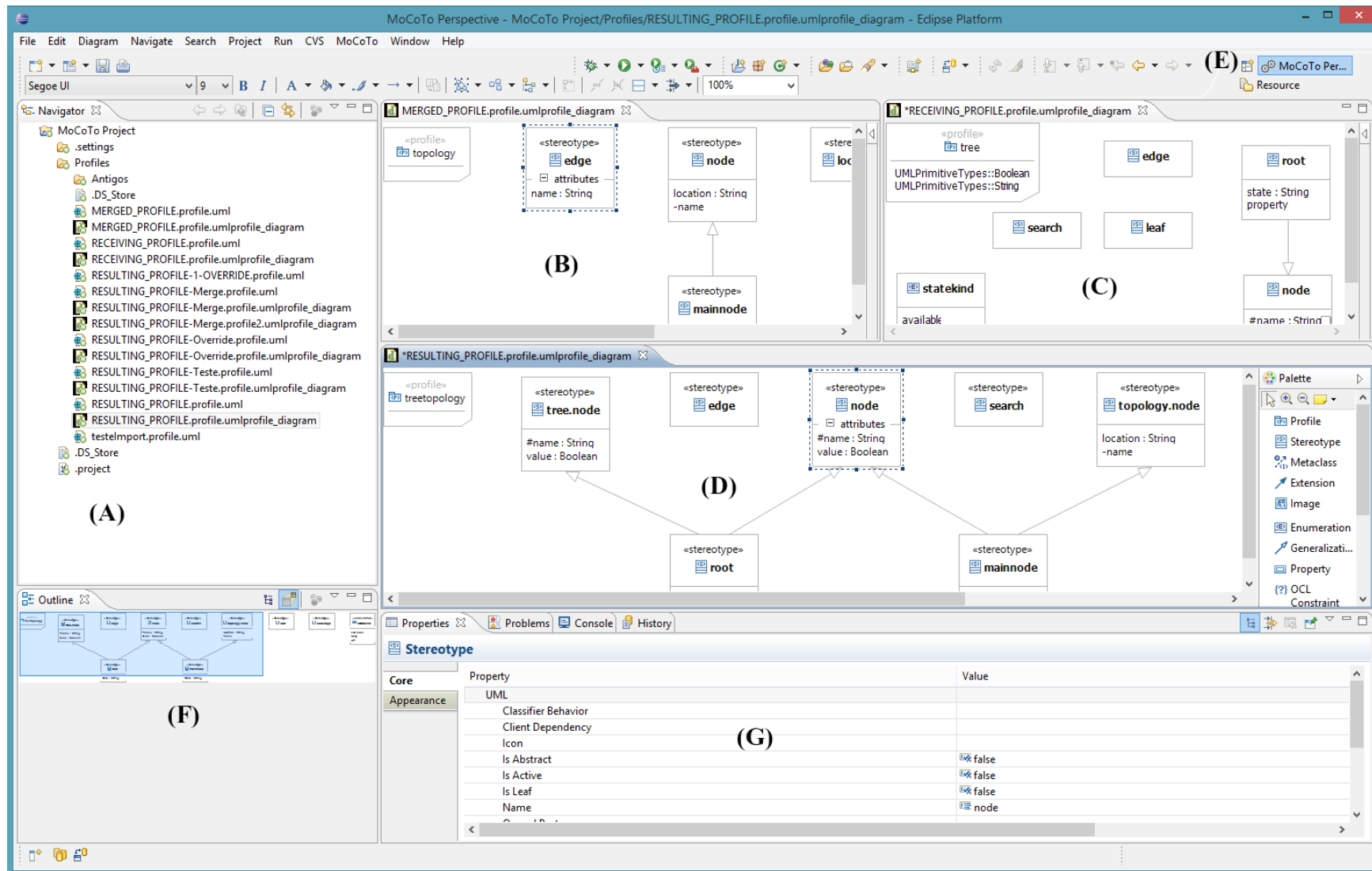
Legend:

—●— Mandatory —○— Optional △ Alternative ▲ Or

MoCoTo architectural components



MoCoto Eclipse Plugin



Conclusion and future work

- This paper introduced a flexible, component-based architecture for supporting the development of model composition techniques;
- The preliminary results have indicated that the proposed architecture is able to support the development of composition tools for UML models.
- The future investigations:
 - Do developers invest significantly more effort to develop a new composition technique than derive one from MoCoTo-Arch?
 - How effective is MoCoTo to combine realistic, semantically richer design models?

References

- [1] T. Mens, “A state-of-the-art survey on software merging,” *IEEE Trans. Softw. Eng.* 28(5), 449–562, 2002.
- [2] J. Whittle, P. Jayaraman, “Synthesizing hierarchical state machines from expressive scenario descriptions,” *ACM TOSEM*, 19(3), 1–45, 2010.
- [3] K. Farias *et al*, “A flexible strategy-based model comparison approach: bridging the syntactic and semantic gap,” *Journal of Universal Computer Science*, 15(11):2225-2253, 2009.
- [4] S. She, U. Ryssel, N. Andersen, A. Wasowski, K. Czarnecki. “Efficient synthesis of feature models”, *Information & Software Technology*, 56(9): 1122-1143, 2014.
- [5] K.Farias, A. Garcia, & C. Lucena “Effects of stability on model composition effort: an exploratory study”. *Software & Systems Modeling*, vol. 13, number 4, pp. 1473-1494, 2014.
- [6] K. Farias. *Empirical Evaluation of Effort on Composing Design Models* (Doctoral dissertation, PUC-Rio). 2012.
- [7] K. Farias. Empirical evaluation of effort on composing design models. In *2010 ACM/IEEE 32nd International Conference on Software Engineering*, vol. 2, pp. 405-408, IEEE, 2010.