



Expressing Model Relations as Basis for Structural Consistency Analysis in Models@run.time

Models@run.time Workshop 2012

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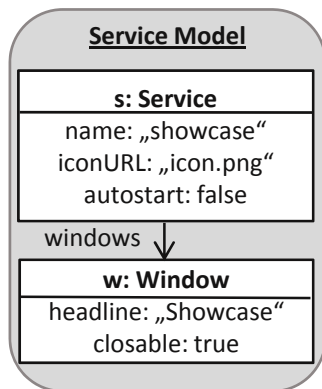
Competence Center Next Generation Services

Requirements:

- Represent arbitrary modeling languages
- Represent multiple models
- Represent model relations

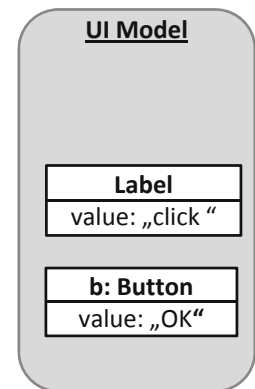
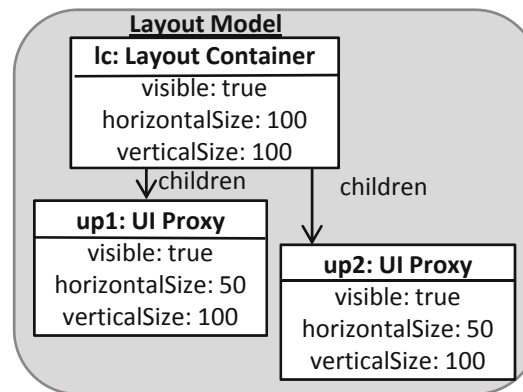
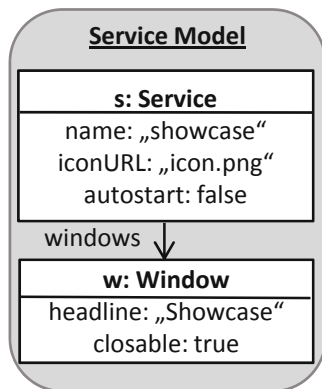
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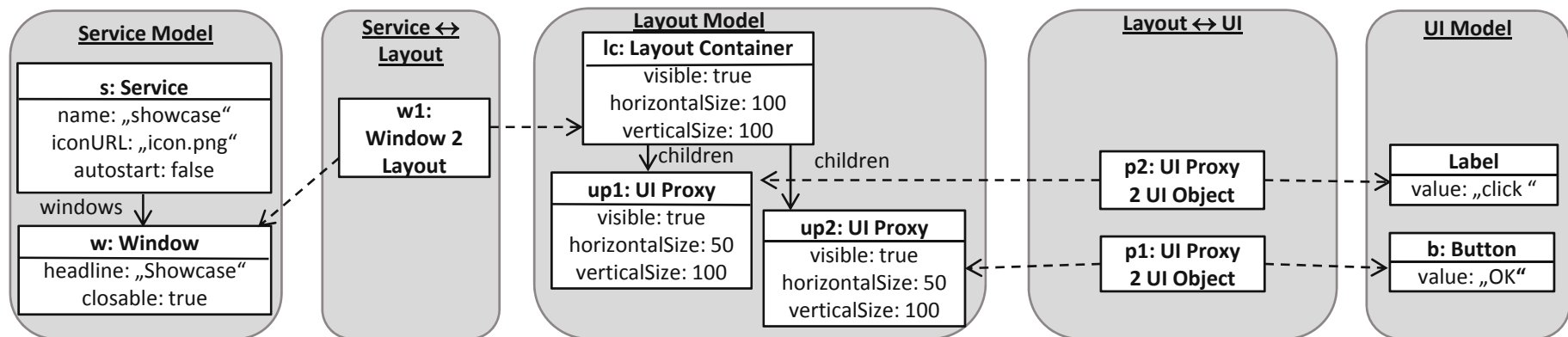
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- Represent arbitrary modeling languages
 - Attributed Typed Graphs (ATGs) [daLara2005]
- Represent multiple models
 - Multiple ATGs
- Represent model relations
 - ATGs as relation model
 - Morphisms for connection



Graph Diagrams can be used as a formal representation of multiple models of arbitrary modeling languages and their relations

Graph Diagrams can be formally defined in Category Theory

Applicable Formalisms:

- ▶ Graph Transformation [Ehrig2006]
- ▶ Nested Conditions [Habel2009]
- ▶ Formal Results in Graph Transformation Theory [Ehrig2012, Ehrig2012b]

- ▶ **[Habel2009]** Habel, A. and Pennemann, K.H.: Correctness of high-level transformation systems relative to nested conditions. *Mathematical Structures in Computer Science 19*, 245-296, National Center for Biotechnology Information
- ▶ **[Ehrig2006]** Ehrig, H., Ehrig, K., Prange, U. and Taentzer, G. 2006. Fundamentals of Algebraic Graph Transformation. Editorial Springer.
- ▶ **[deLara2005]** de Lara, J., Bardohl, R., Ehrig, H., Ehrig, K., Prange, U. and Taentzer, G. 2005. Attributed graph transformation with node type inheritance: Long version. *Technical report*, THEOR. COMPUT. SCI
- ▶ **[Ehrig2012]** Ehrig, H., Golas, U., Habel, A., Lambers, L., Orejas, F.: *M*-adhesive transformation systems with nested application conditions. Part 1: Parallelism, concurrency and amalgamation. In: *Mathematical Structures in Computer Science*, 2012. To appear.
- ▶ **[Ehrig2012b]** Ehrig, H., Golas, U., Habel, A., Lambers, L., Orejas, F.: *M*-adhesive transformation systems with nested application conditions. Part 2: Embedding, critical pairs and confluence. In: *Fundamenta Informaticae*, 2012. To appear.