neo4jsbml: import Systems Biology Markup Language data into the graph database Neo4j

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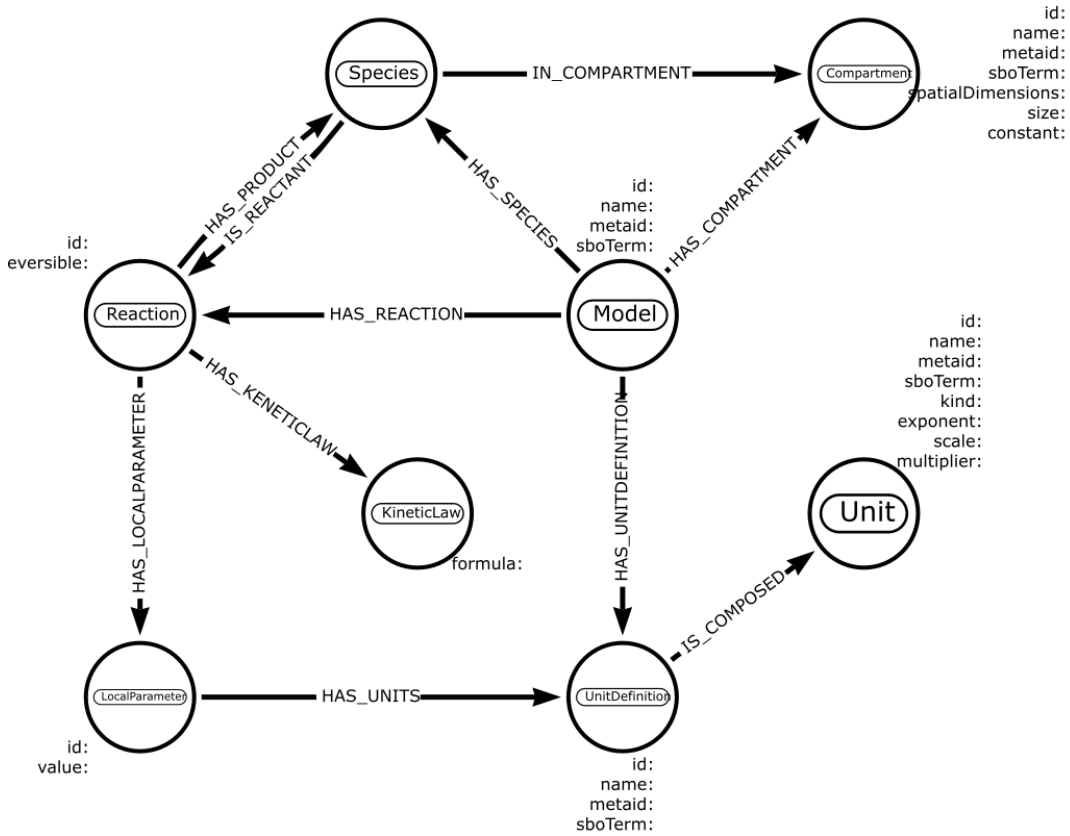
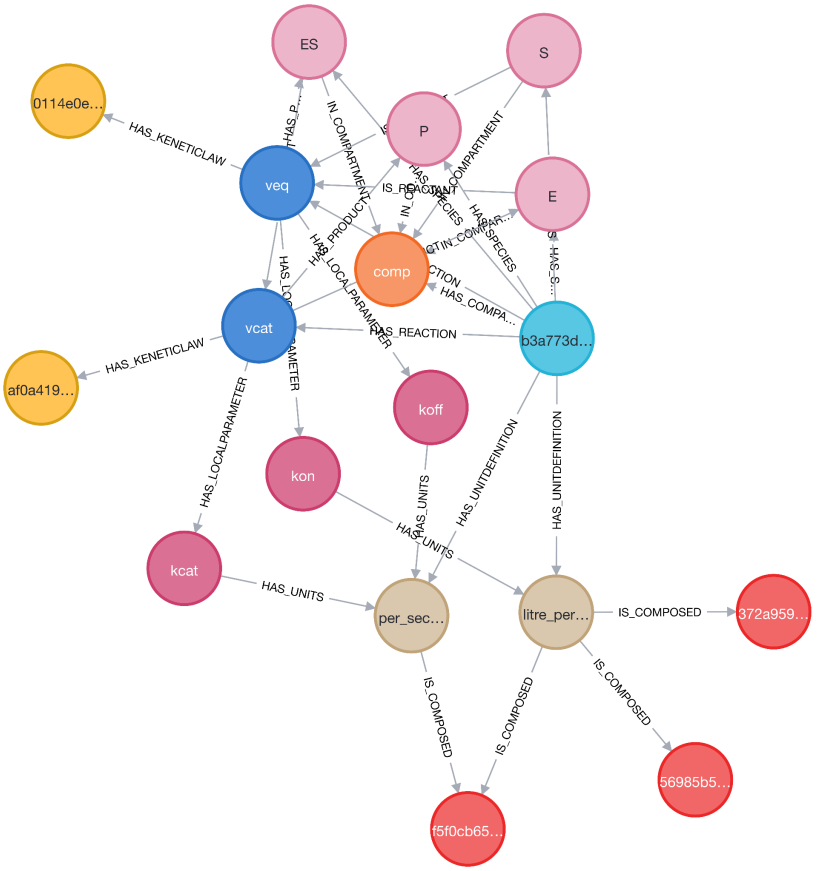
Supplementary Figure S1

SBML models were extracted from Chapter 7 of the SBML specifications, Level 3 Version 2 [1], then they were loaded into Neo4j. The Arrows schema used and all nodes and relationships extracted from Neo4j were shown for each example. **A**. A simple example application of SBML. **B**. A simple example using the conversionFactor attribute. **C**. An alternative formulation of the conversionFactor example. **D**. Example of a discrete version of a simple dimerization reaction. **E**. Example involving assignment rules. **F**. Example involving algebraic rules. **G**. Example with combinations of boundaryCondition and constant values on Species with RateRule objects. **H**. Example of translation from a multi-compartmental model to ODEs (Ordinary Differential Equations). **I**. Example involving function definitions. **J**. Example involving delay functions. **K**. Example involving events **L**. Example involving two-dimensional compartments. **M**. Example of a reaction located at a membrane. **N**. Example using an event with a non-persistent trigger and a delay

A

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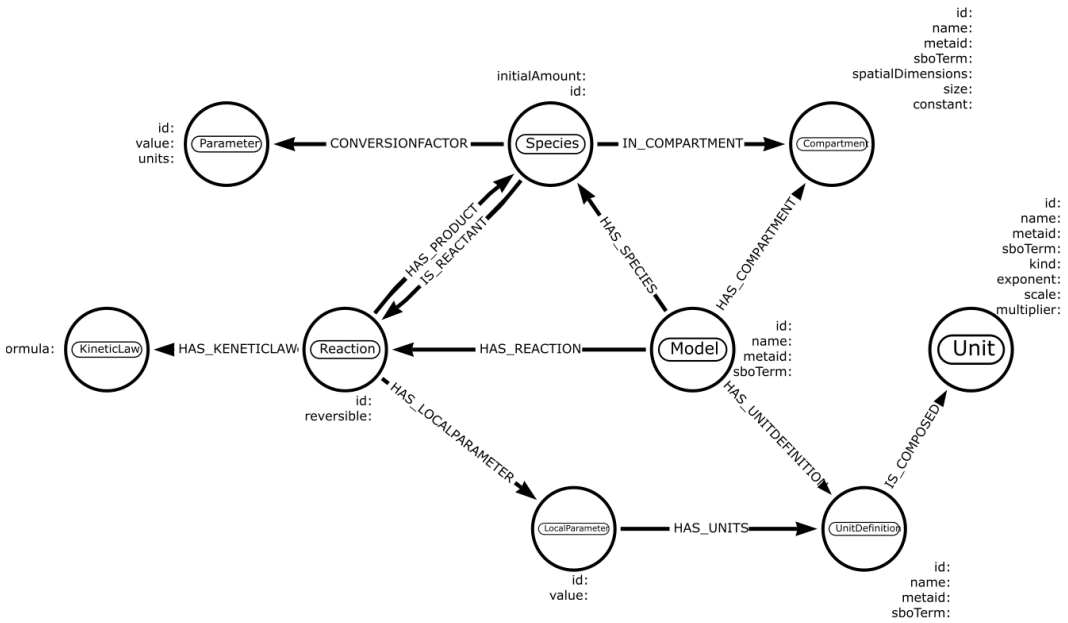
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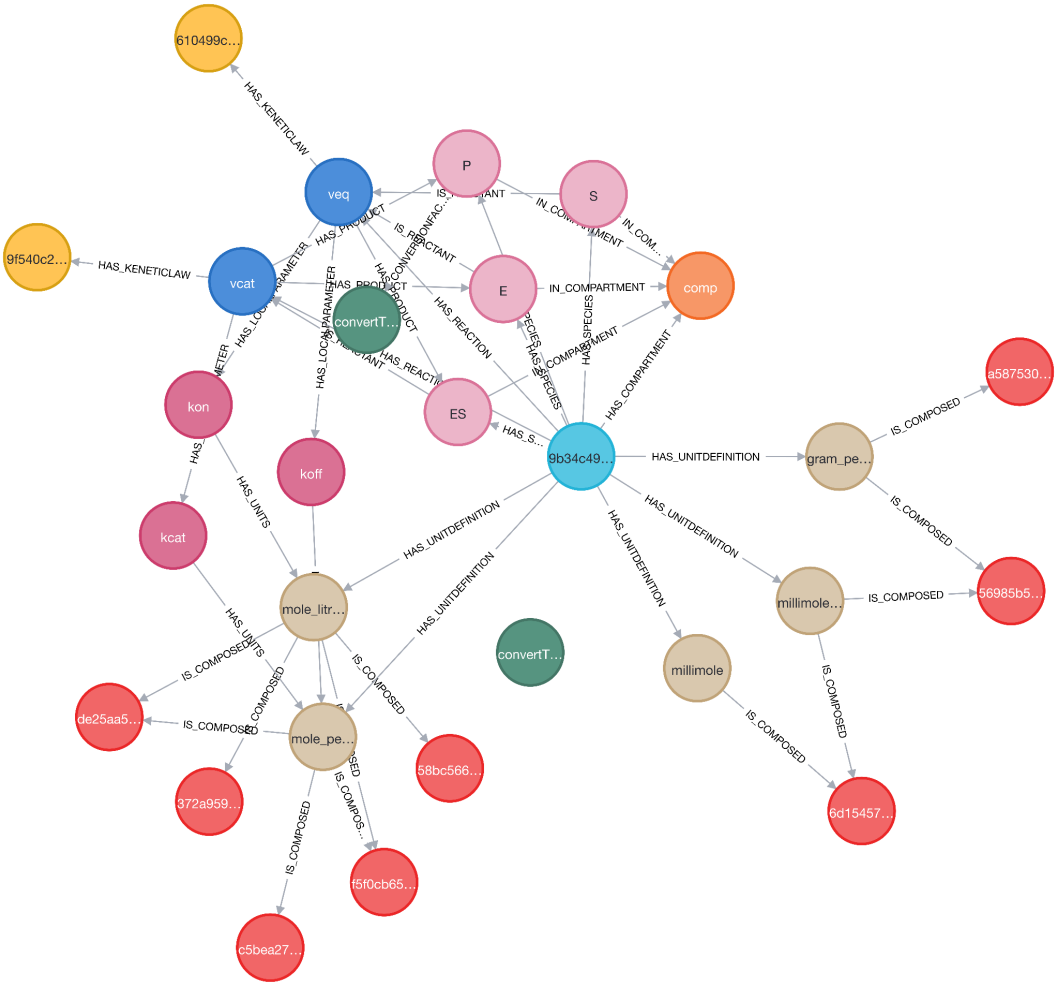
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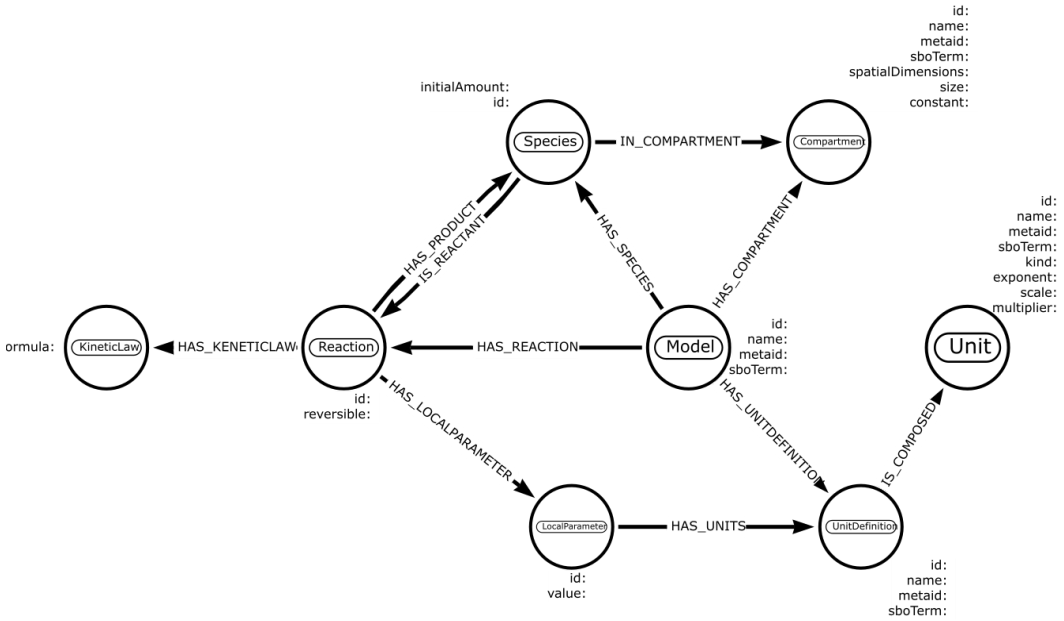
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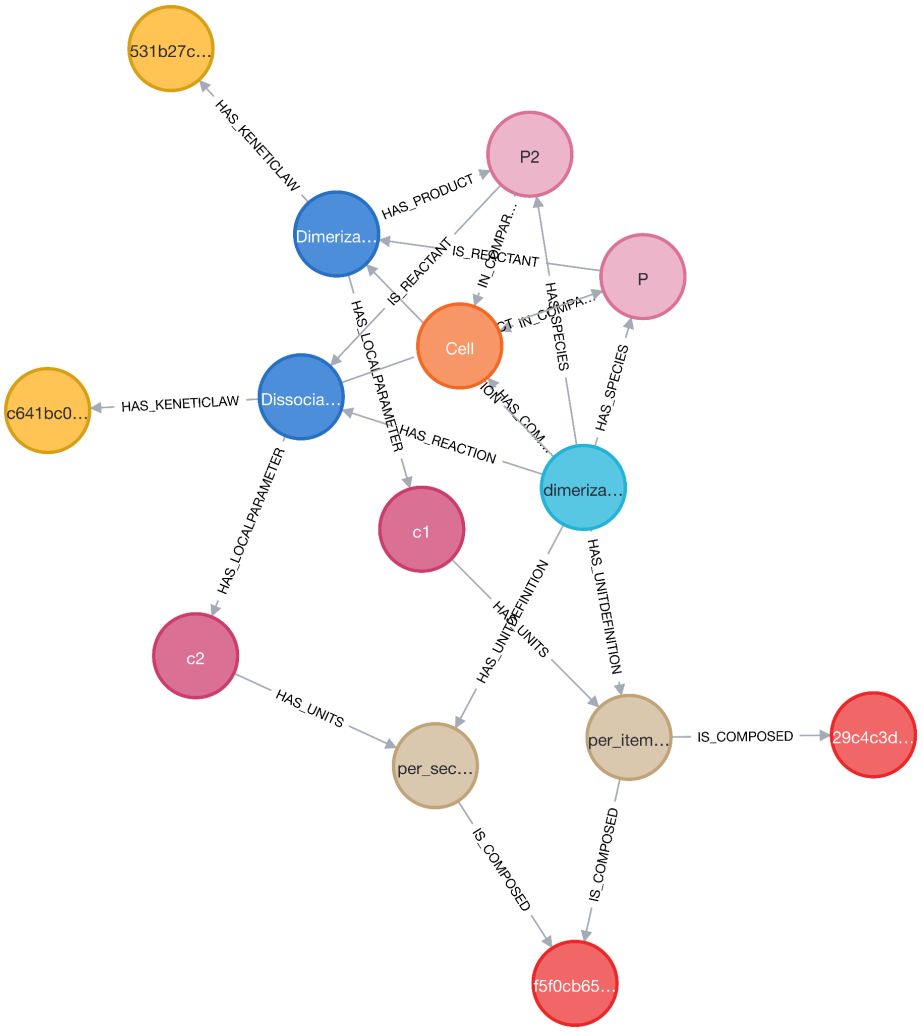
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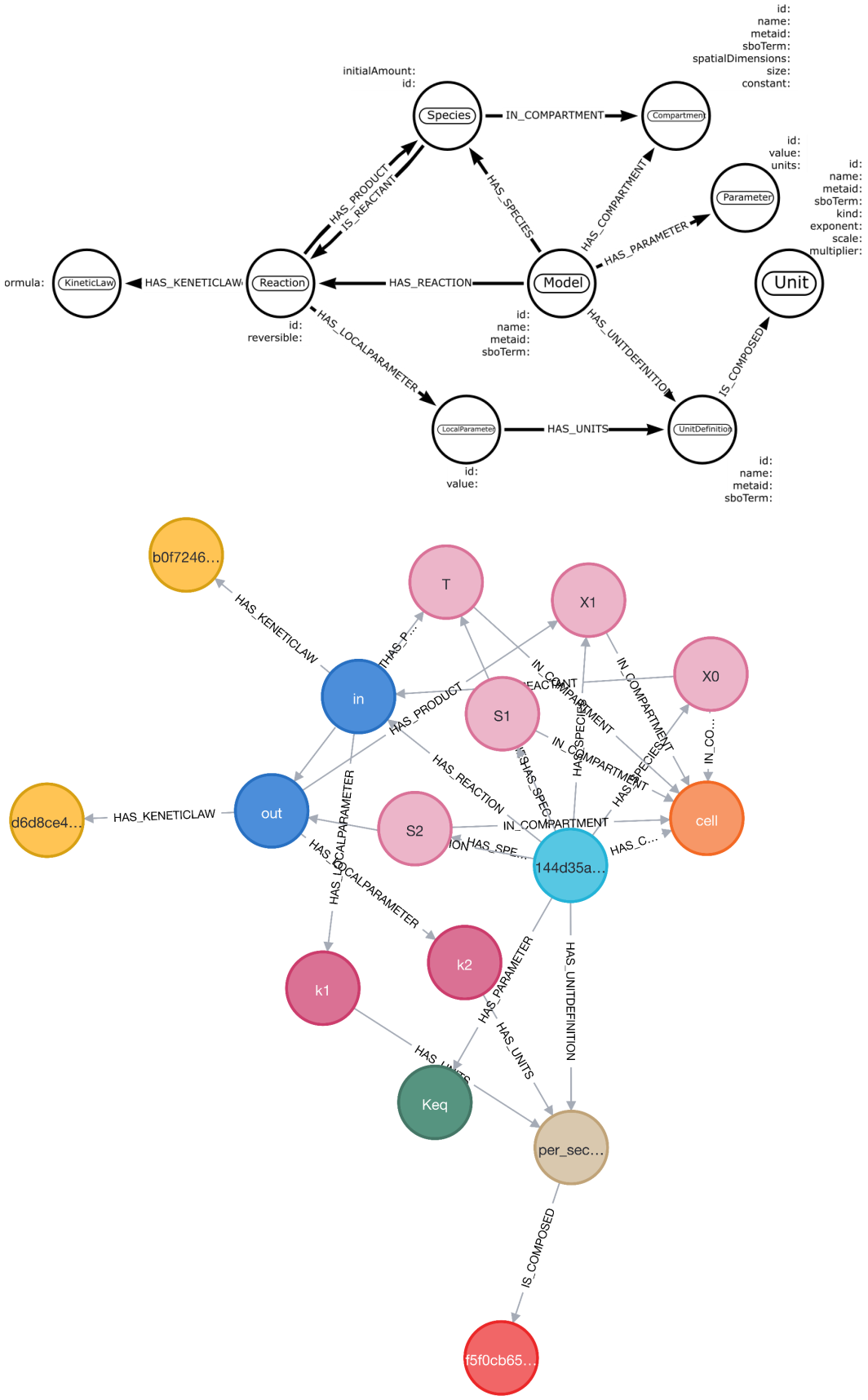
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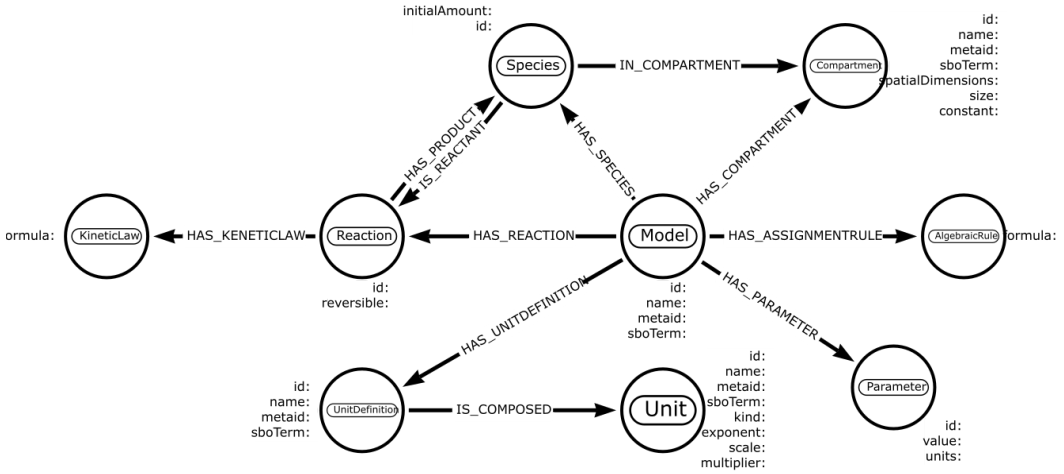
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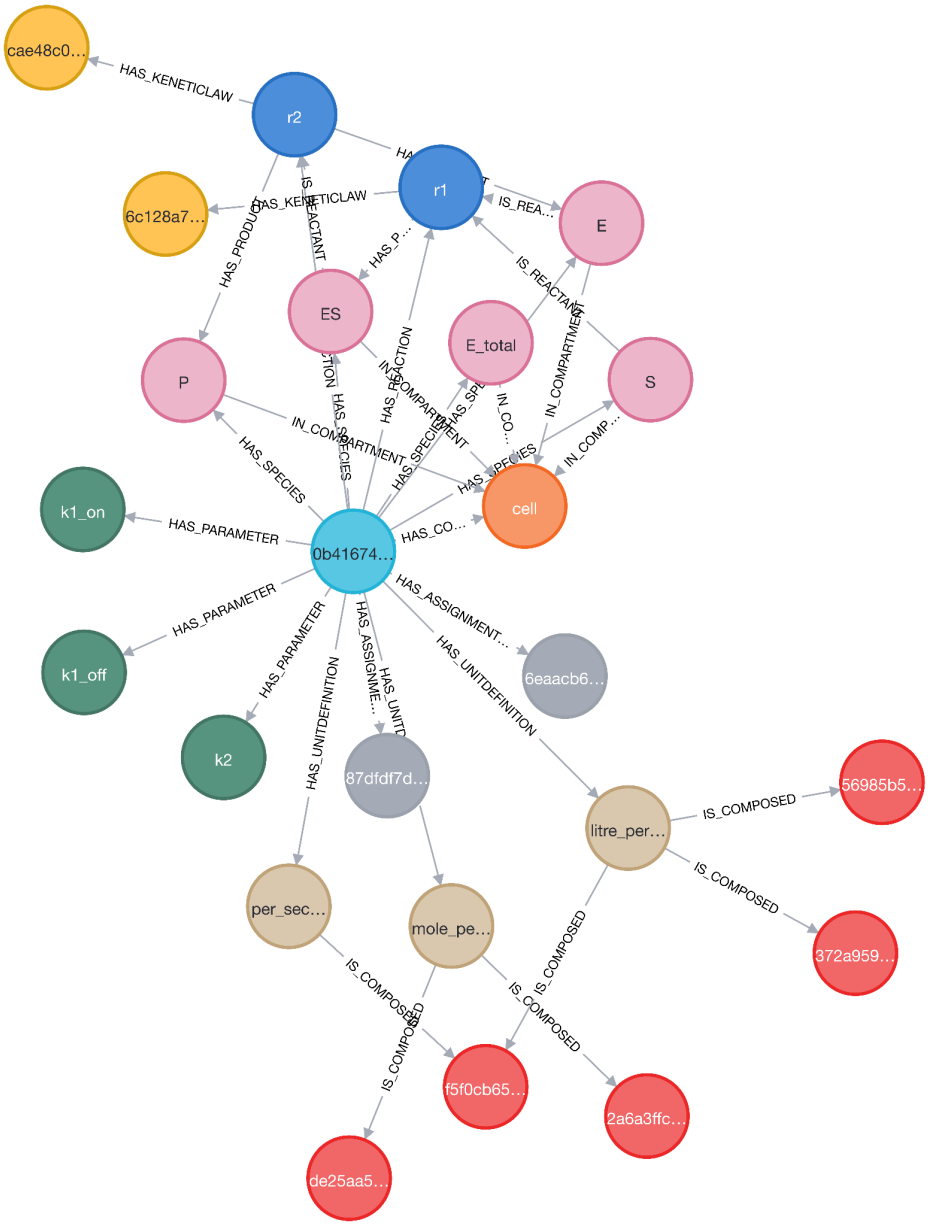
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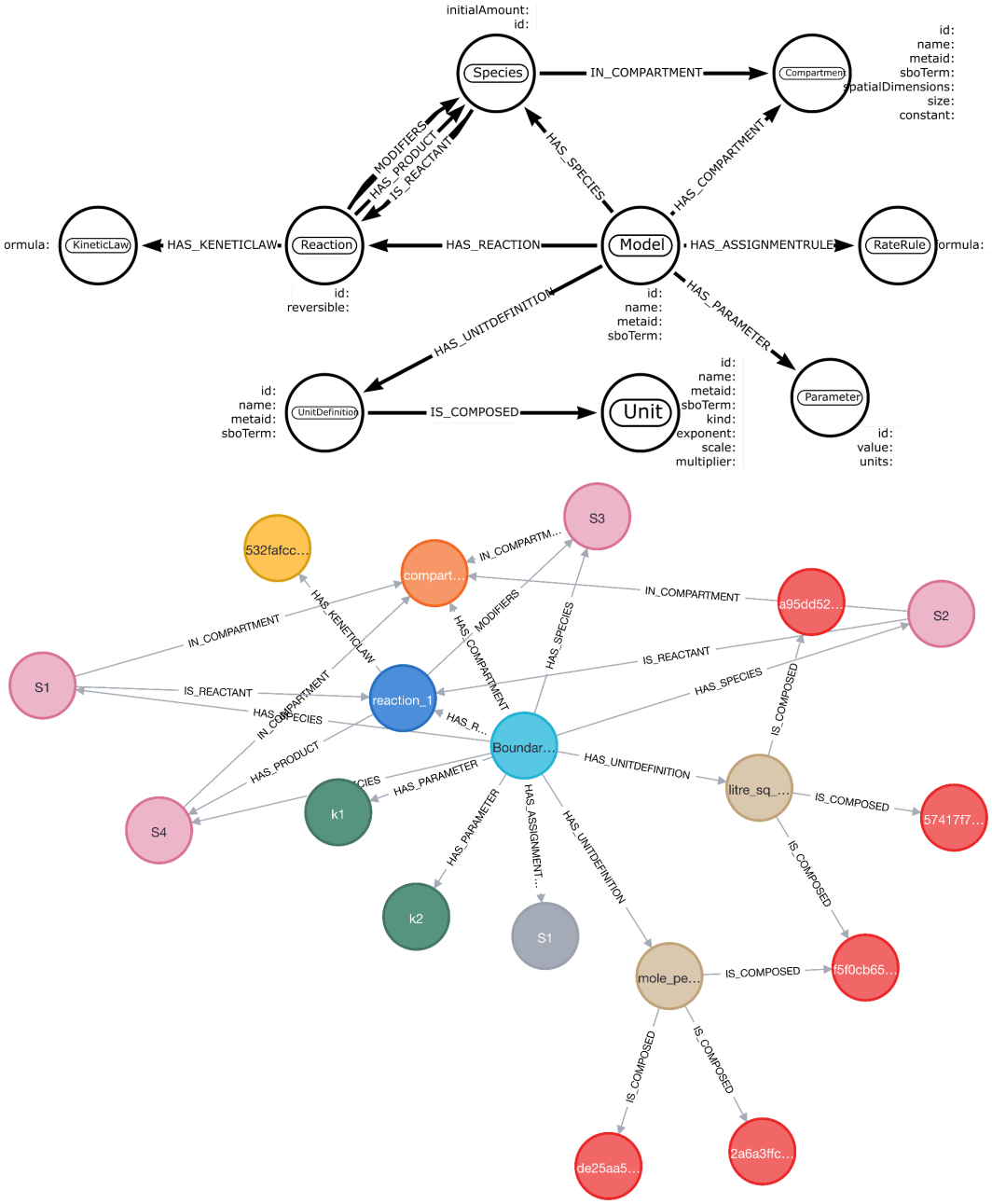
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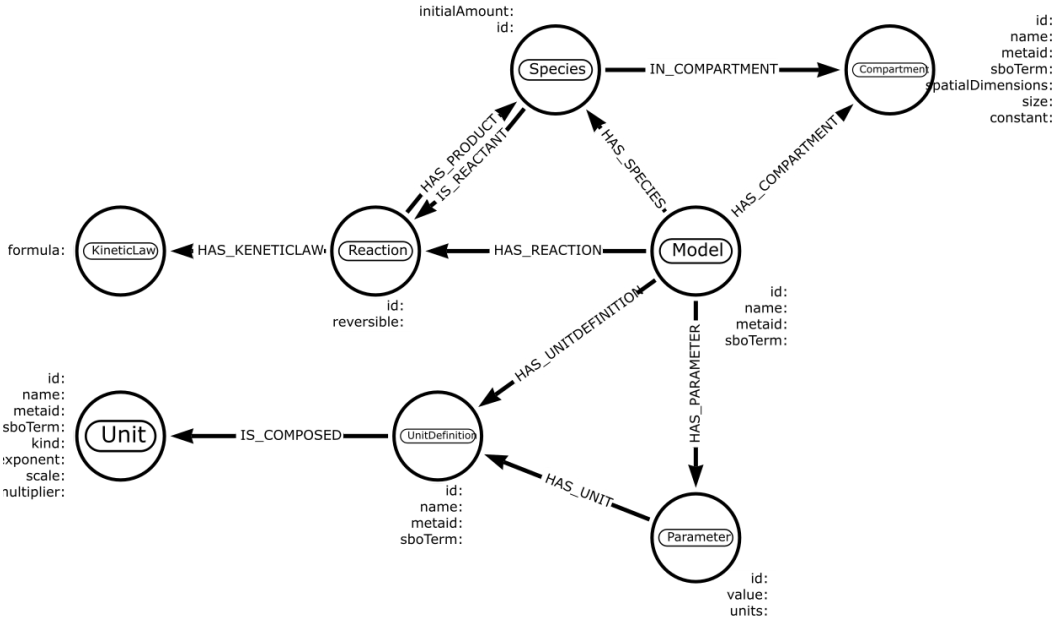
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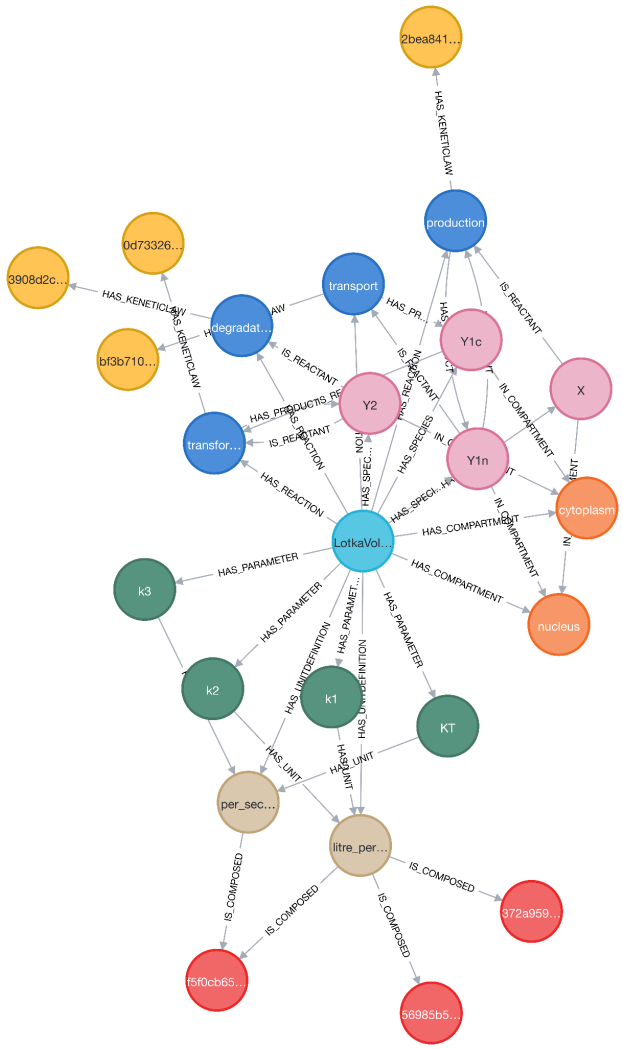
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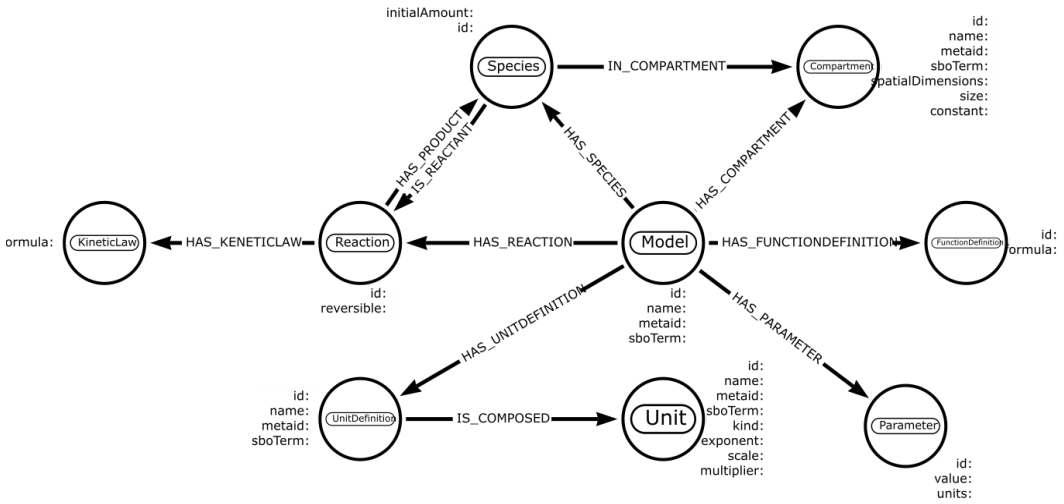
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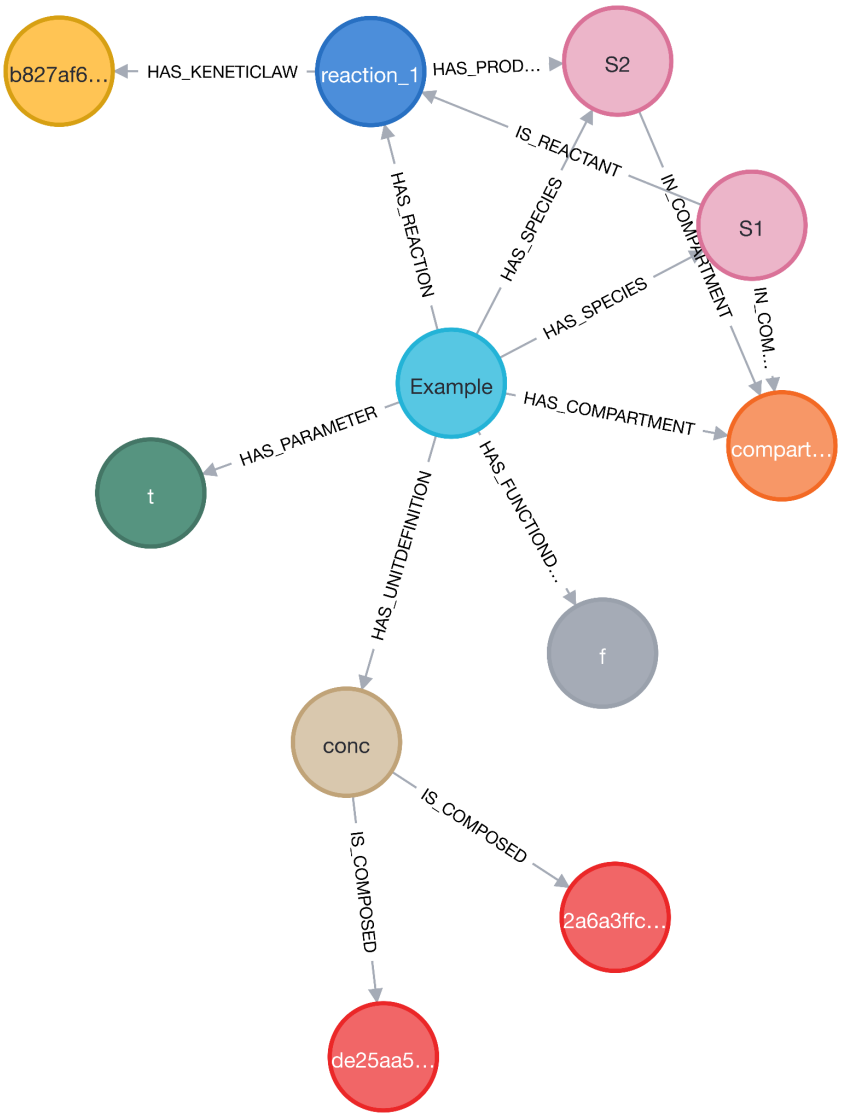
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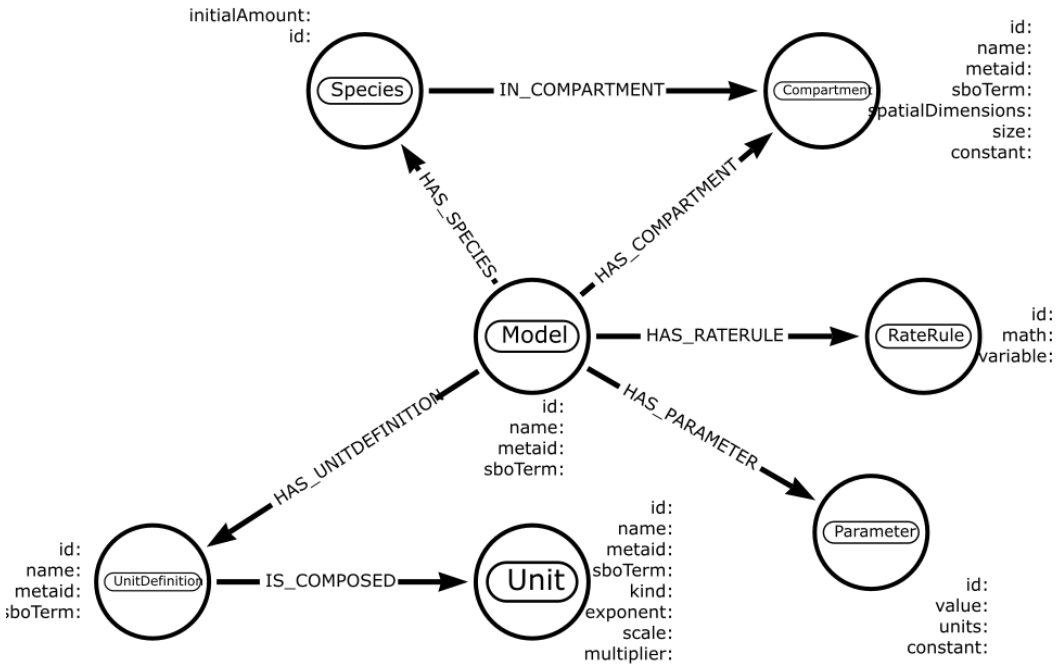
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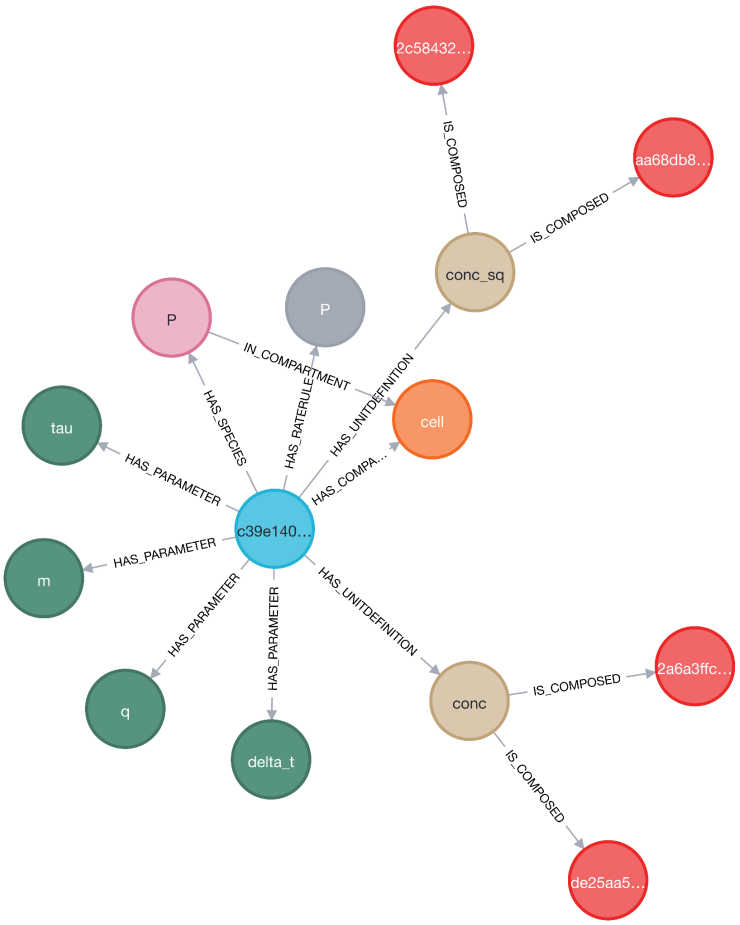
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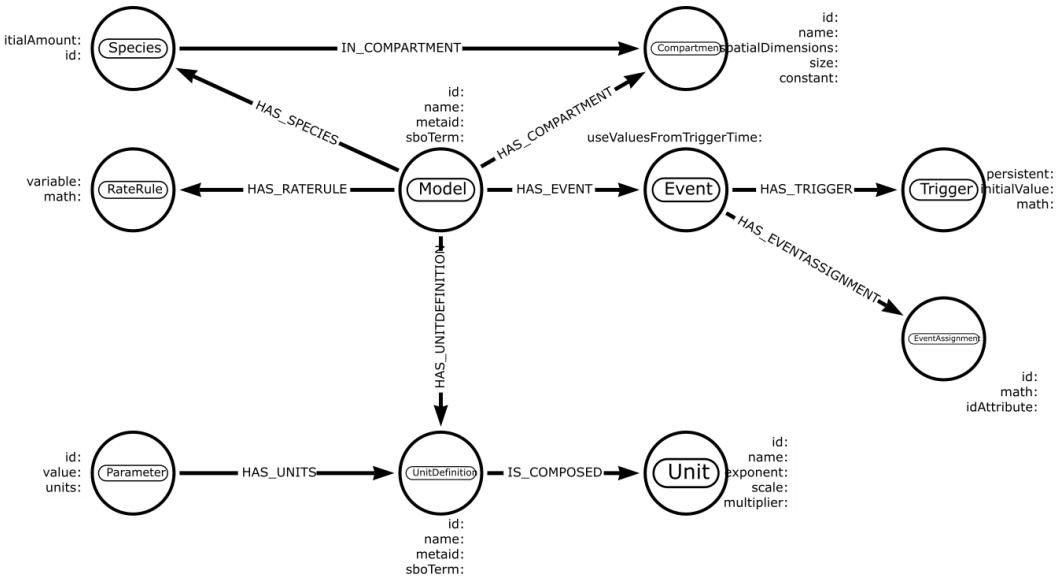
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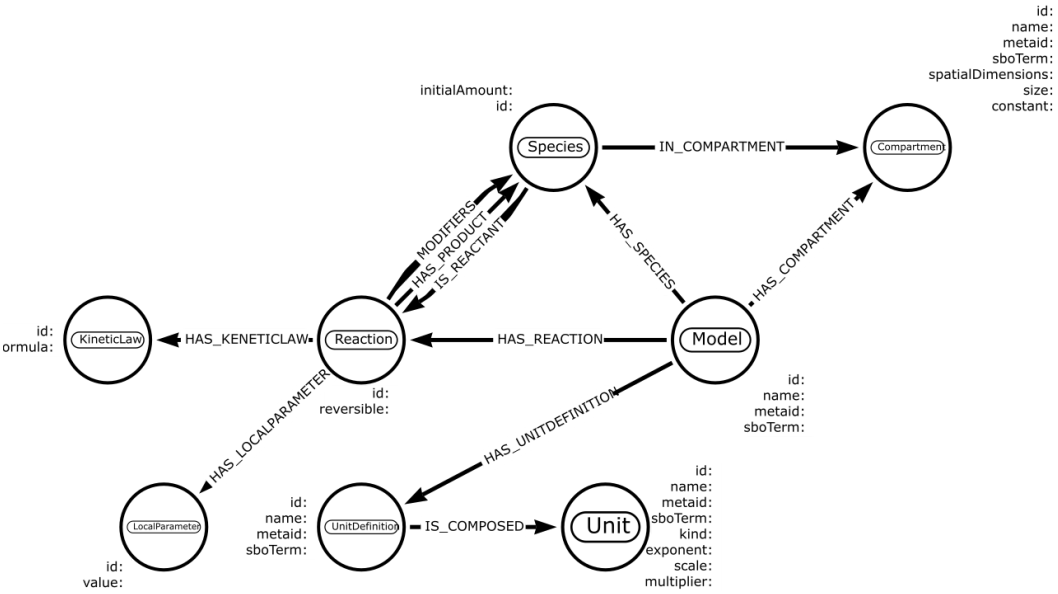
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HAS_SPECIES
HAS_COMPARTMENT
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ormula:
KineticLaw
HAS_KENETICLAW
Reaction
HAS_REACTION
Model
HAS_LOCALPARAMETER
id:
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id:
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sboTerm:
HAS_UNITDEFINITION
id:
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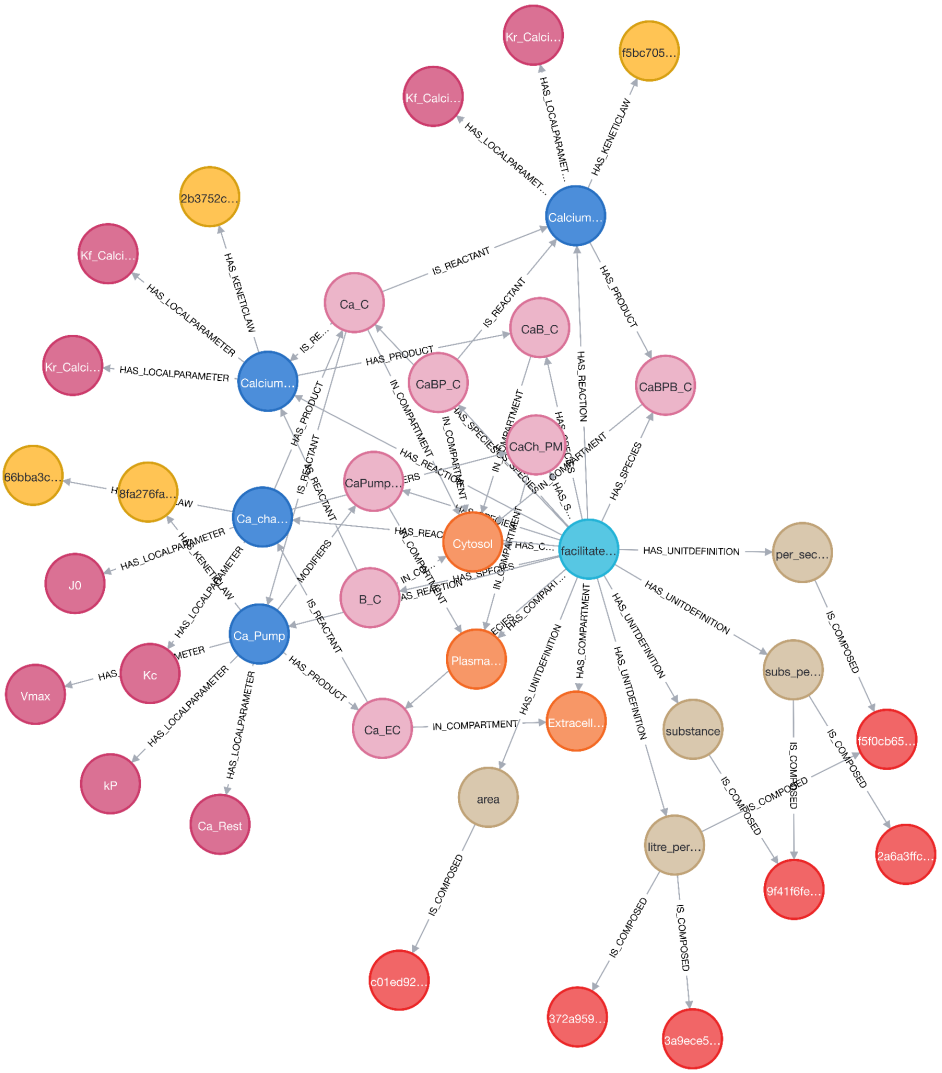
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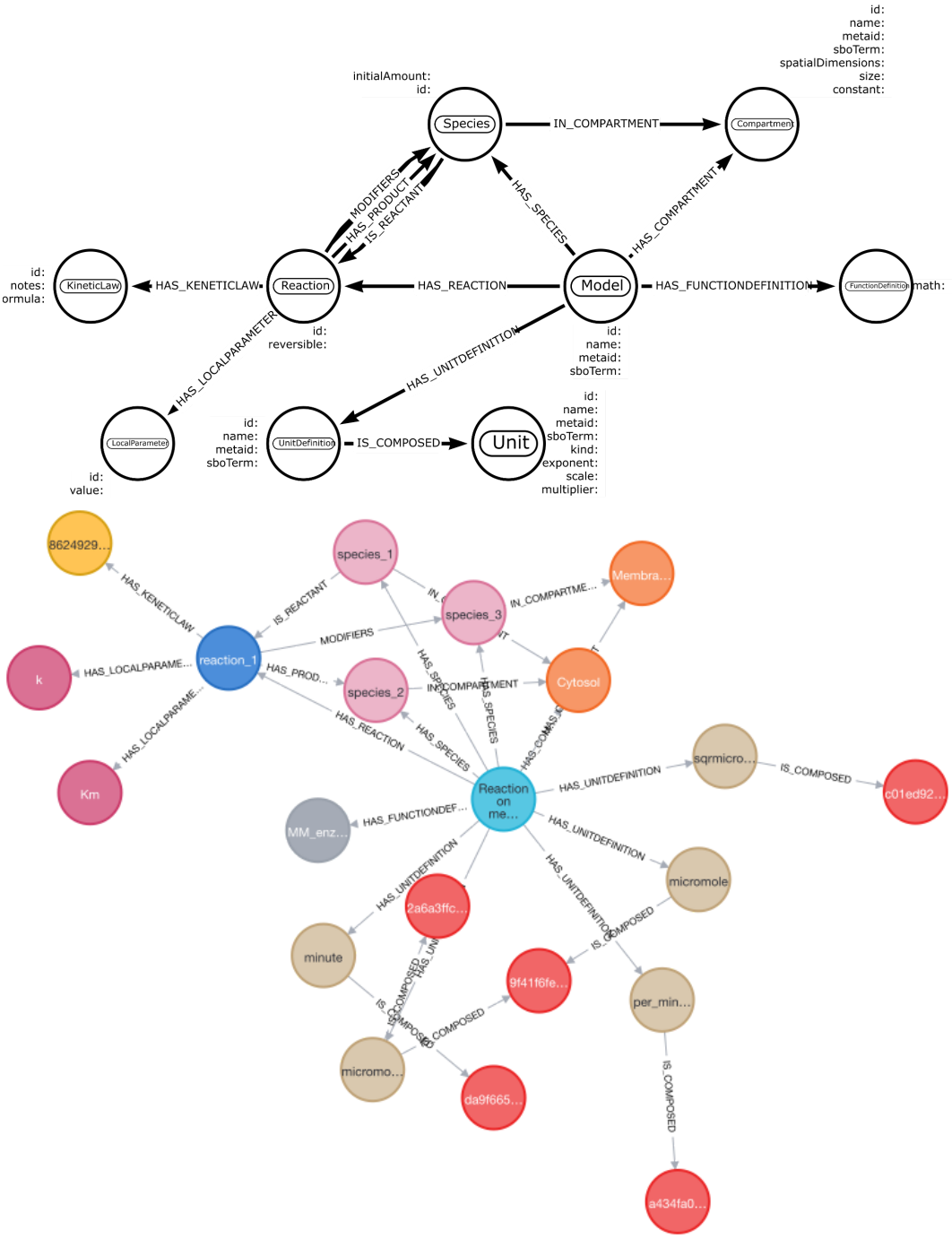
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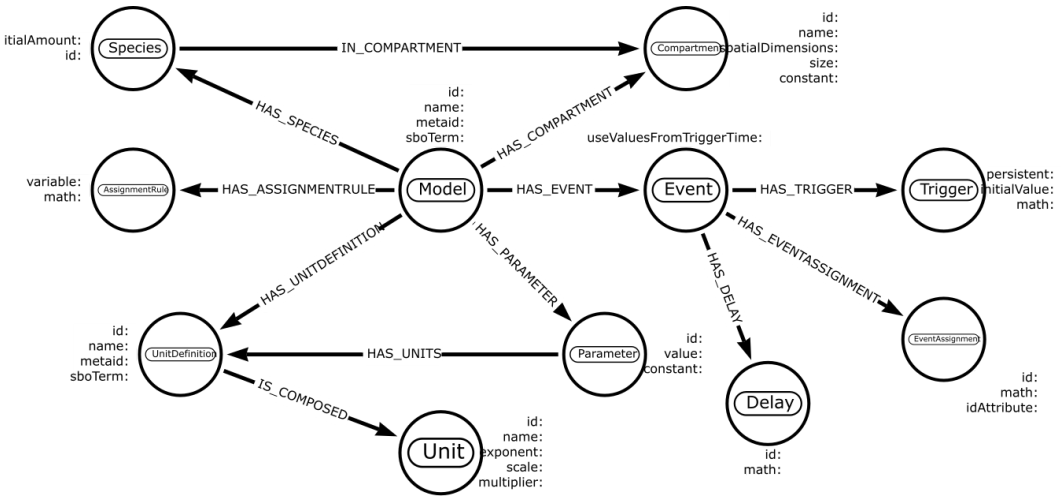
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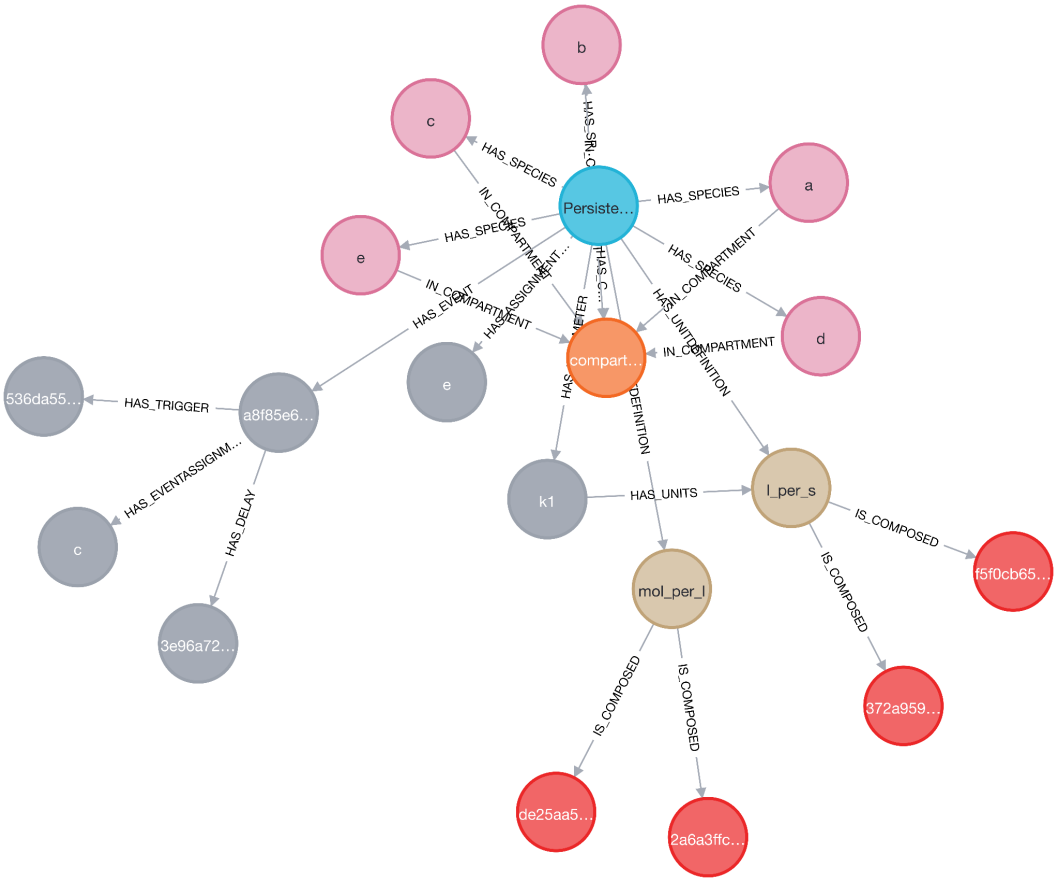
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(1) Hucka, M.; Bergmann, F. T.; Chaouiya, C.; Dräger, A.; Hoops, S.; Keating, S. M.; König, M.; Novère, N. L.; Myers, C. J.; Olivier, B. G.; Sahle, S.; Schaff, J. C.; Sheriff, R.; Smith, L. P.; Waltemath, D.; Wilkinson, D. J.; Zhang, F. The Systems Biology Markup Language (SBML): Language Specification for Level 3 Version 2 Core Release 2. *J. Integr. Bioinforma.* **2019**, *16* (2). https://doi.org/10.1515/jib-2019-0021.