

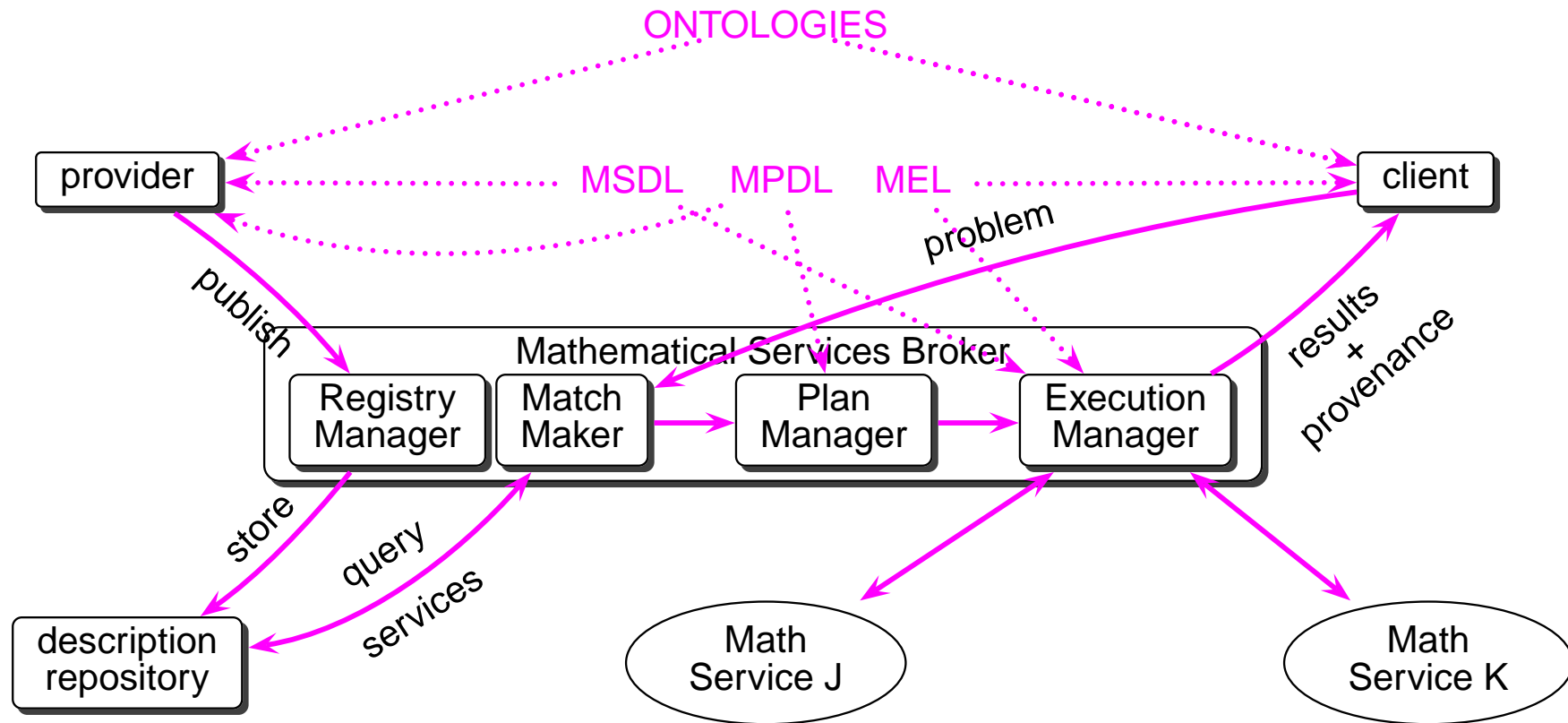
# Semantic Matching and Decomposition of Mathematical Services

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# Mathematical Service Brokers



# Mathematical service matching

- Mathematical services may be described in terms of their inputs, outputs, pre- and post-conditions.
- A big problem is the ambiguity of mathematical objects.
- We deal with this problem by normalising the objects.
- This normalisation takes a number of steps.



# Similarity measures between services

- We calculate a *similarity measure* between services.
- The similarity measure is based on the observation

$$T_{pre} \Rightarrow C_{pre} \wedge C_{post} \Rightarrow T_{post}$$

- Consider the Disjunctive Normal Form of  $T_{pre}$ ,  $T_{post}$ ,  $C_{pre}$  and  $C_{post}$  as sets of conjuncts.

We then formulate an effective computation of the similarity measure.



# Composition of services

- Task:  $T_{pre}, T_{post}$   
 Capabilities:  $C_{pre_1}, C_{post_1}$  and  $C_{pre_2}, C_{post_2}$
- Conditions for satisfiability:

- (1)  $T_{pre} \Rightarrow C_{pre_1}$
- (2)  $T_{pre} \wedge C_{post_1} \Rightarrow C_{pre_2}$
- (3)  $C_{post_1} \wedge C_{post_2} \Rightarrow T_{post}$

