

Ontology mapping based on multi-dimensional services

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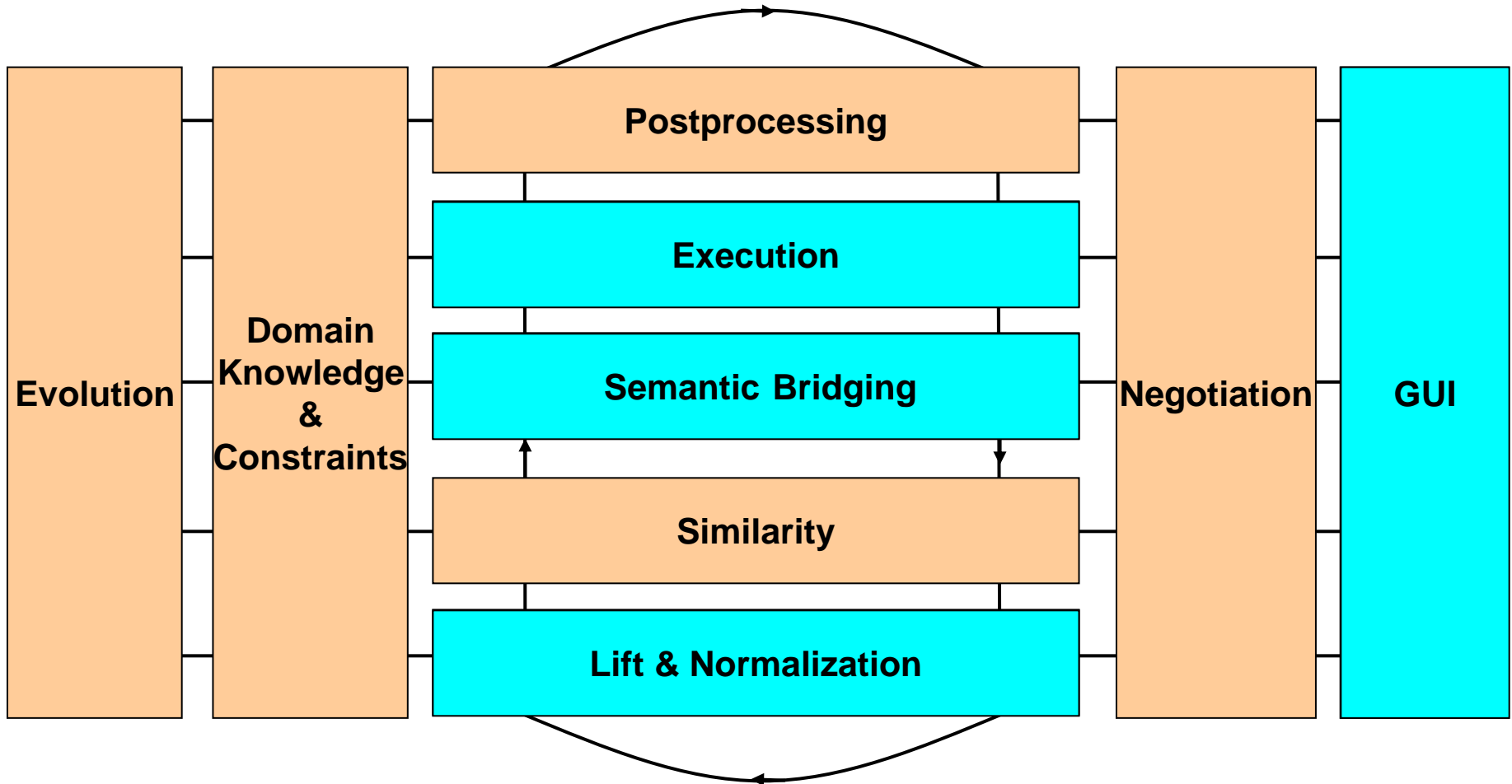
Agenda

- **Introduction**
- **SBO (fundamental notions)**
- **Service-based architecture**
- **Service-based automatic bridging**
- **Conclusion & Future Work**

Context

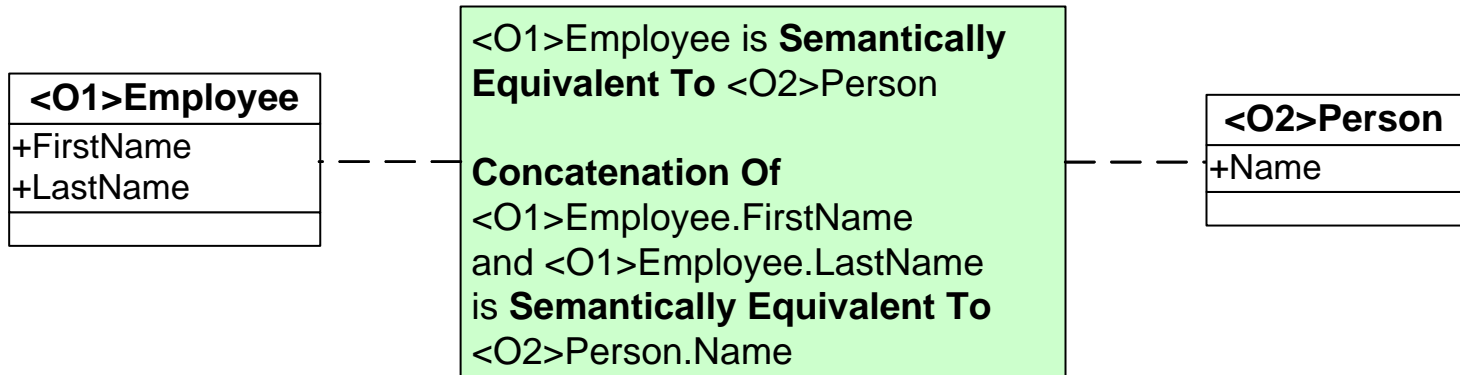
- **Ontology is a key technology in many applications:**
 - Knowledge Management
 - E-Commerce (e.g. B2B Integration)
 - Semantic Web
- **Ontology is not a *panacea* for knowledge sharing:**
 - Same concepts specified differently, different concepts specified equally
 - Need to exchange data from Different, (Partially) Incompatible, Ever-evolving ontologies

What is ontology mapping?

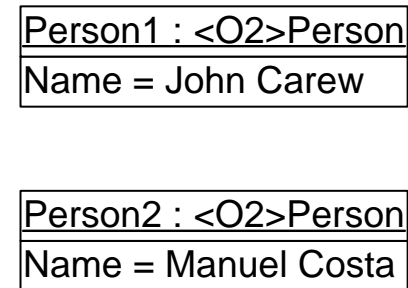
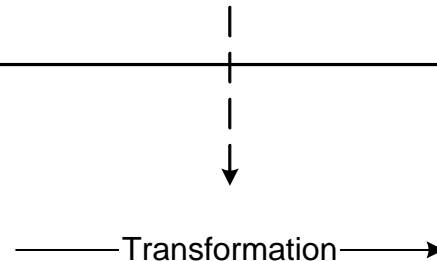
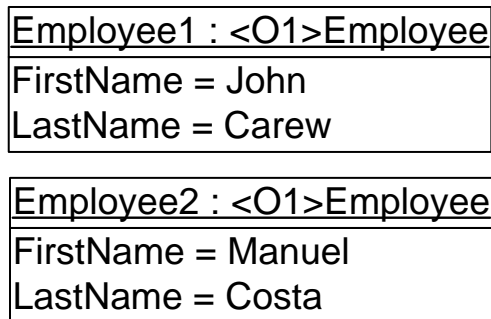


Simple Example

Conceptual Level



Data Level

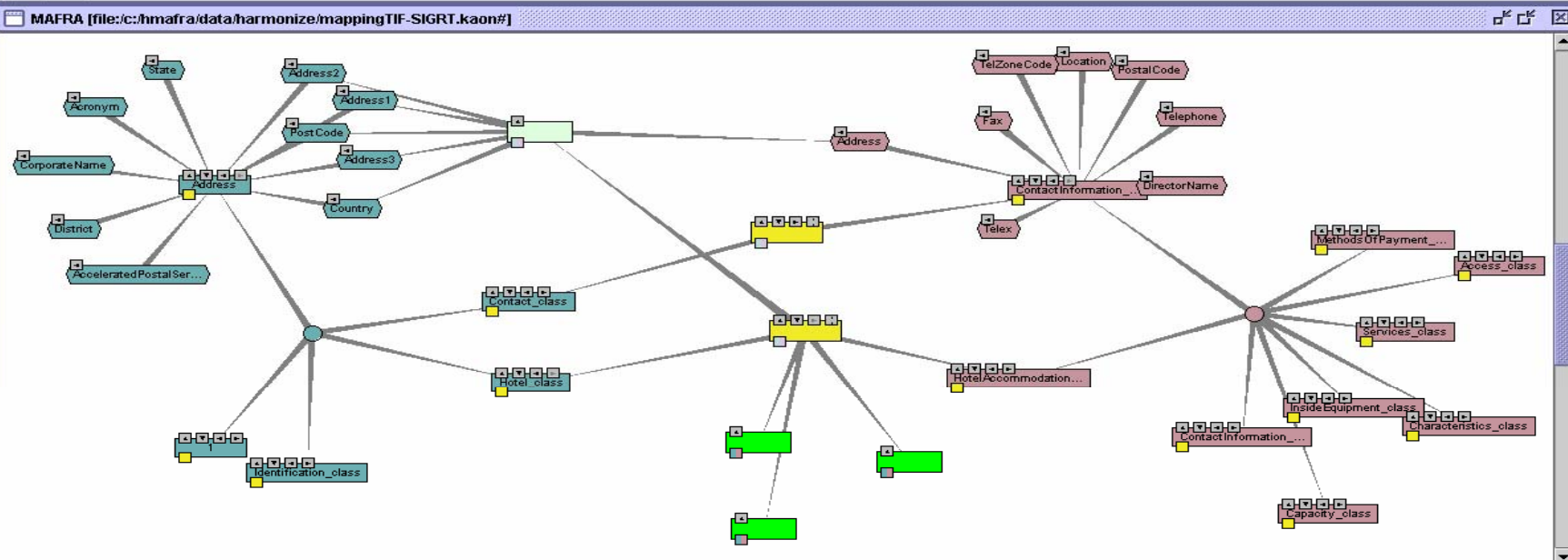


MAFRA Toolkit

MAFRA - Mapping Framework

File NormTool Matching Mapping View HARMONISE DEMO

MAFRA [file:c:/hmfra/data/harmonize/mappingTIF-SIGRT.kaon#]



The diagram illustrates a mapping framework with several central nodes and their associated attributes:

- Address** (green box) is connected to: State, Acronym, Corporate Name, District, Accelerated Postal Ser..., Address2, Address1, Post Code, Address3, and Country.
- Contact_class** (blue box) is connected to: Address, Contact Information_... (with attributes: TelZone Code, Location, Postal Code, Fax, Telephone, Telex, DirectorName), and Identification_class.
- Hotel_class** (blue box) is connected to: Contact_class and Hotel Accommodation... (with attributes: Methods Of Payment..., Access_class, Services_class, Inside Equipment_class, Characteristics_class, Capacity_class).
- Identification_class** (blue box) is connected to: Address, Contact_class, and Hotel_class.

Service Identification

Concat concatenate many string separated by a specific literal

Argument	Type	Mandatory
Array Of Attribute Paths	ArrayOfAttributePaths	true
Array Of Literals	ArrayOfLiterals	false
Attribute Path	AttributePath	true

Update

Ready

Goals

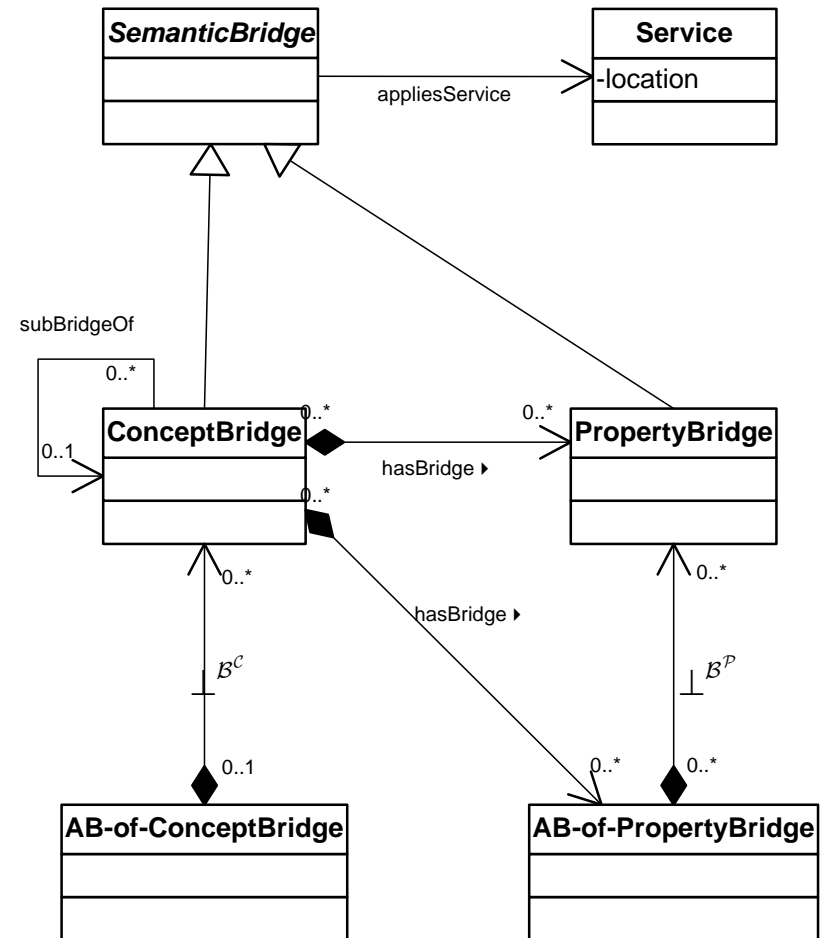
- **Develop a semi-automatic ontology mapping system, such**
- **Combines existent matching algorithms to propose semantic relations**
- **Applies automatic negotiation between ontology owners agents**
- **Ultimately validated by the user/domain expert**

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SBO - Semantic Bridge Ontology

- **Taxonomy of bridges:**
 - Concept Bridge
 - Property Bridge
 - Alternative Bridge
- **Relation between bridges**
 - subBridgeOf
 - hasBridge
- **An ontology mapping specification is an instantiation of the SBO**



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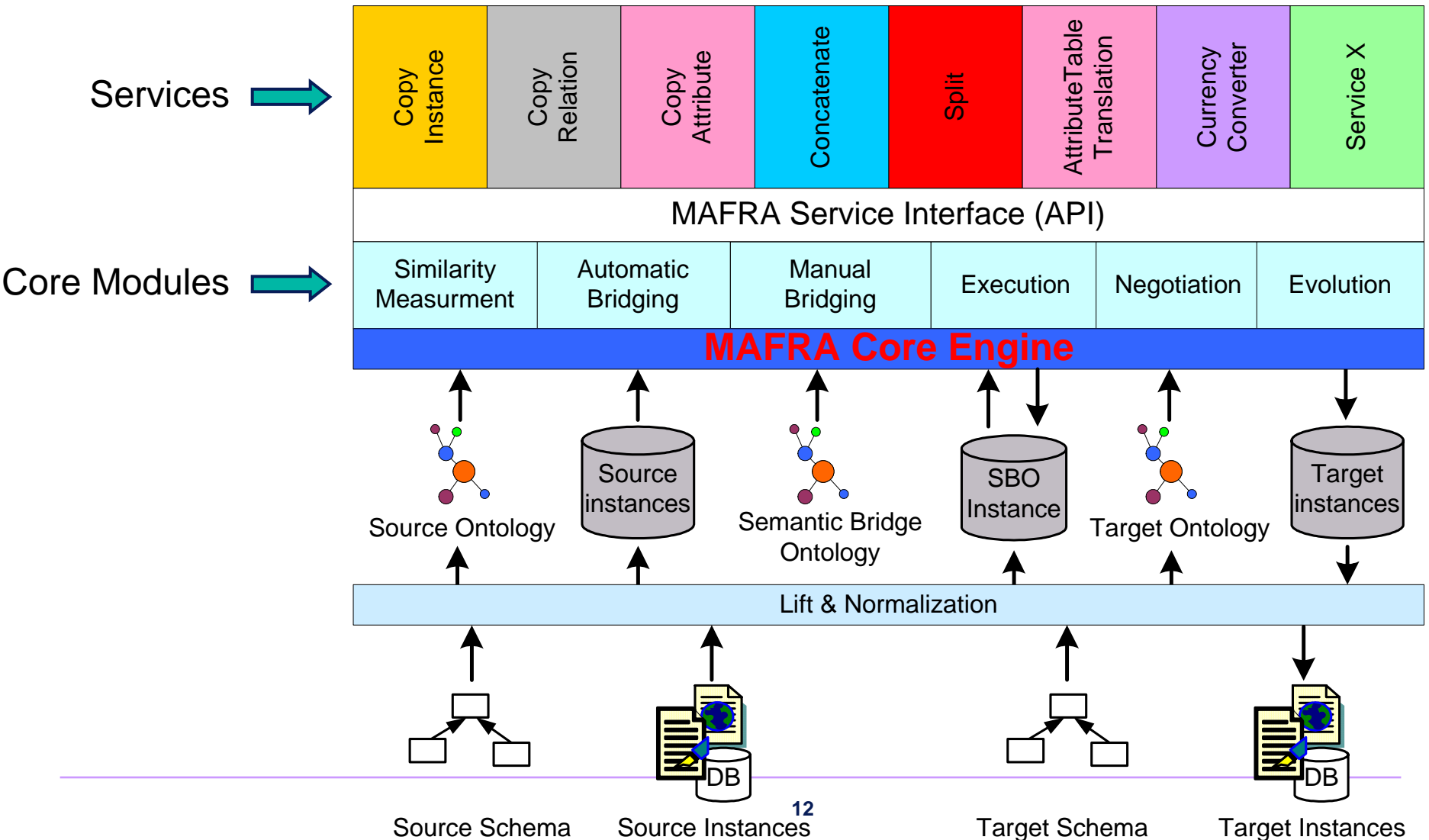
Transformations

- **Creation of concept instances is universal.**
- **Creation of relations instances is universal.**
- **Attribute Transformation is not universal!**
 - **Need to choose the correct transformation**
 - **Many different requirements**
 - **It's necessary to provide mechanisms to allow any service to be applied**



Dynamic + Pluggable Transformation Services

Architecture

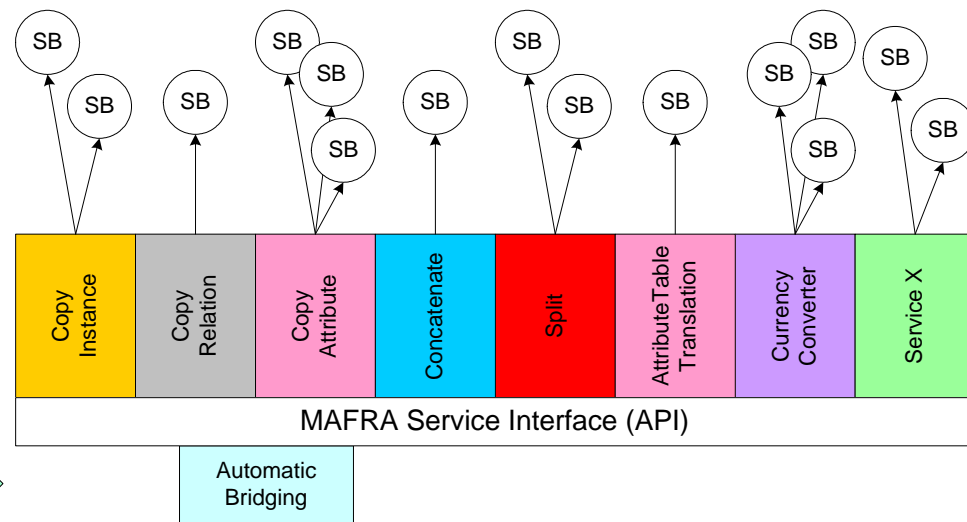
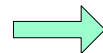


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Methaphore

id	Source Entity	Target Entity	Matcher	Value	Justif.
m11	Individual	Woman	MOMIS-like	0,78	-
m10	Individual	Man	MOMIS-like	0,78	-
m9	Individual	Individual	MOMIS-like	0,78	-
m8	name	surname	Hyponymic	1	-
m7	name	given_name	Hyponymic	1	-
m6	spouseIn	noMarriages	Resnik-like	0,66	-
m5	name	surname	Resnik-like	0,82	-
m4	name	given_name	Resnik-like	0,82	-
m3	Individual	Woman	Resnik-like	0,86	-
m2	Individual	Man	Resnik-like	0,86	-
m1	Individual	Individual	Resnik-like	0,95	-



Parameterization

matchers

MOMIS like
Resnik like
Type matcher
Hyponymic
Matcher Y

Service	Considered matches types	Threshold	Extra requirements
CopyInstance	Resnik-like	0,7	
	MOMIS-like	0,7	
Split	Resnik-like	0,5	
	MOMIS-like	1	
CopyAttribute	Resnik-like	0,8	
	MOMIS-like	0,8	
CopyRelation	Resnik-like	0,75	
	Type matcher	1	
Currency Converter	Resnik-like	$0,3 < Y < 0,5$	Source and target attributes should be of type “currency”
	Type matcher	1	

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Conclusions

- **Bridging + Execution:**
 - Declarative specification
 - Pluggable, Procedural Transformations Services
 - Generic Library of services
- **Automatic bridging**
 - Similarity Discovery based on generic matchers
 - Expanded services competencies, that
 - Combine values and constraints from matchers
 - Propose and revise semantic bridges, and
 - Propose and update services parameterization

Future Work

- **Continuously:**
 - Support case tests specific requirements
 - Improve and Generalize library of Services
- **Short-Term**
 - “Virtual Concept” implementation
 - Evolution
- **“not so short”-Term**
 - Library of Mappings
 - Inter-mappings: when a mapping serves as ontology

Thanks!
Any questions?



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