VERTEILTE SYSTEME

An Ontology for Quality-Aware Service Discovery

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VERTEILTE SYSTEME
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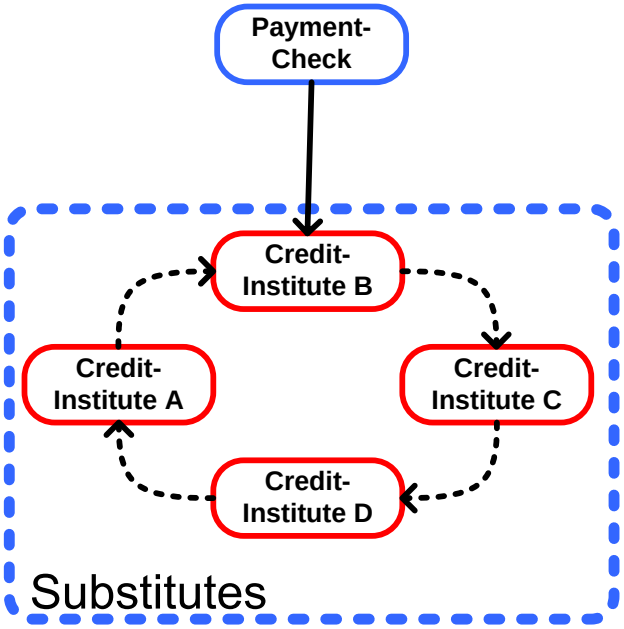
Quality aware Service Discovery

- Quality aware discovering of substitute services for compositions.
- Enhancing compositions by choosing substitutes with better service levels.



Service level criteria:

- Minor expenses.
- Longer availability.
- Better work load.
- Faster response time.

Service Level Brokering

Current quality aware service discovery:

1. Vendor modelling quality of service document.

2. Composer choosing service with appropriate quality of service.

3. Composer negotiating with service vendor.

=> Cumbersome service integration

Proposed service level brokering:

1. Modelling service level packages and prices using our Ontology

2. Choosing by modelling requesting service level packages

=> Automatic service level brokering by matchig requests and offers

Service Level Packages

- Service Level Packages as conjunction between obligated guarantees
- Disjunction between alternative Service Level Packages

Credit-Institute A

Service Offer
Credit-Checking-Service

Quality-Dimensions	Gold-Guarantees	Silver-Guarantees
Responsetime	< 200ms	< 400ms
Transactions	10000	5000
Contract time	1 month	1 month
Price	50 €	20 €

Modelling Obligations

- Modelling obligated guarantees as rules using SWRL
- Matching obligated guarantees regarding their strictness

Expression:

Responsetime < 200

Description Logic (SWRL):

hasEffect(ObligatedGuarantee,SWRL_Rule_Lessthan_200) AND onDimension(ObligatedGuarantee,Responsetime) => hasValue(Responsetime, ?z) AND swrl:lessThan(?z, 200)

Improving Brokering Flexibility

- Supplementary Service Level Packages are bought additionally
- Supplementary Service Level Packages effect obligated guarantees

Supplementary Packages:

Transactions = Transactions + 10000
Price = Price + 50

Description Logic (SWRL):

boughtSupplementary(moreTransactions) AND
hasValue(ObligatedTransactions, ?z)
=>
PackagePriceAdd(GoldPackage,50) AND
swrl:add(?z, 10000))

Service Level Brokering Example

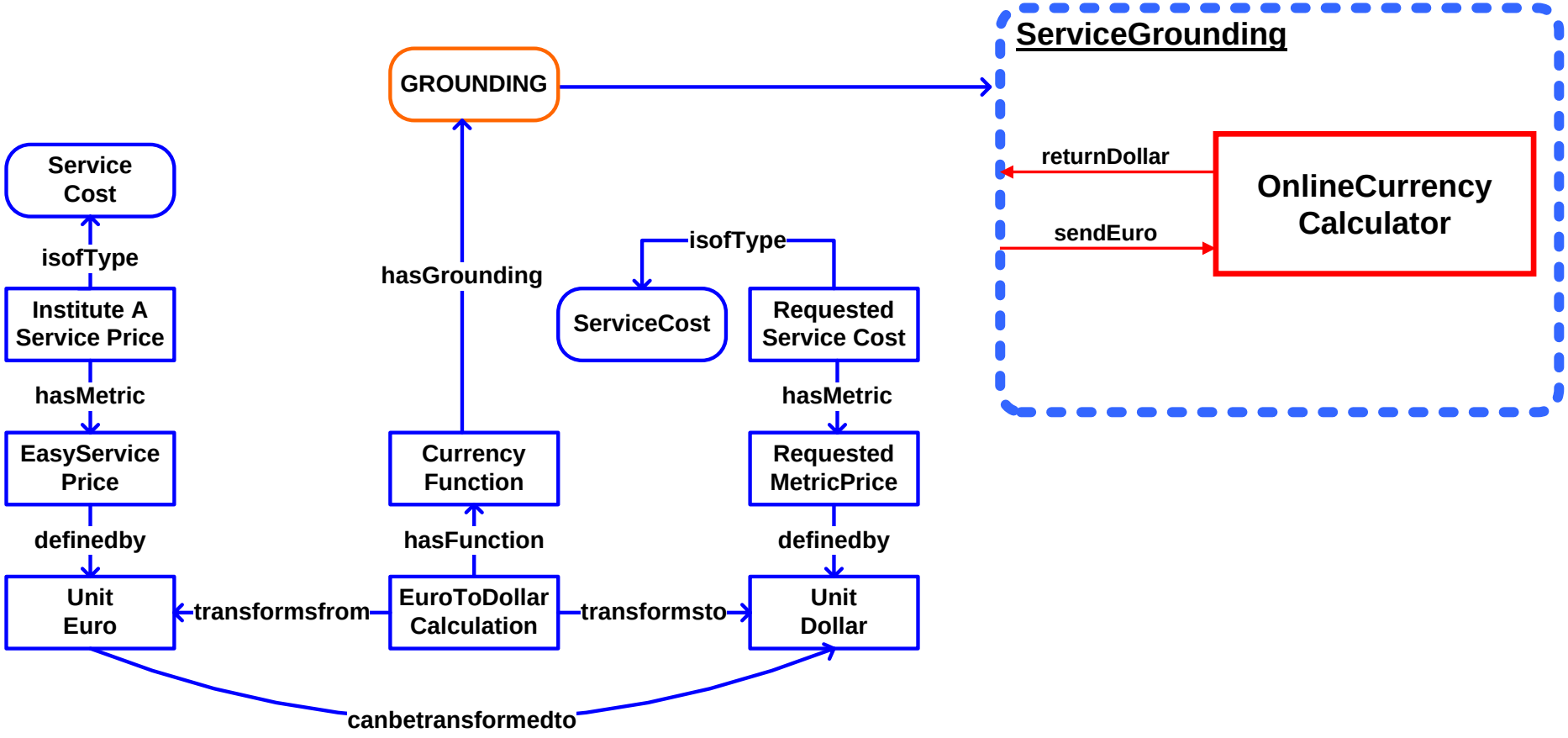
Service Offer ´Credit-Checking-Service				Service Request Credit-Checking-Service	
Quality-Dimensions	Gold-Guarantees	Silver-Guarantees	Supplementary-Package	Quality-Dimensions	Requested-Guarantees
Responsetime	< 200ms	< 400ms		Responsetime	< 400 ms
Transactions	10000	5000		Transactions	> 4000
Contract time	1 month	1 month	+1 month	Contract time	1 year
Price	50 €	20 €	5 €		

Service Level Brokering:

Appropiate Service Level: Silver-Guarantees + 11 * (Supplementary-Package)

Matchmaking of Units

Two service level prices but different currencies



Conclusion

Service Level Brokering:

- Specifying Service Level Base Packages
- Specifying Service Level Supplementary Packages
- Matching by combining Base Packages with Supplementary Packages

Matchmaking Dimensions and Units

- Modelling semantic relations between quality dimension
- Modelling transformations between units.

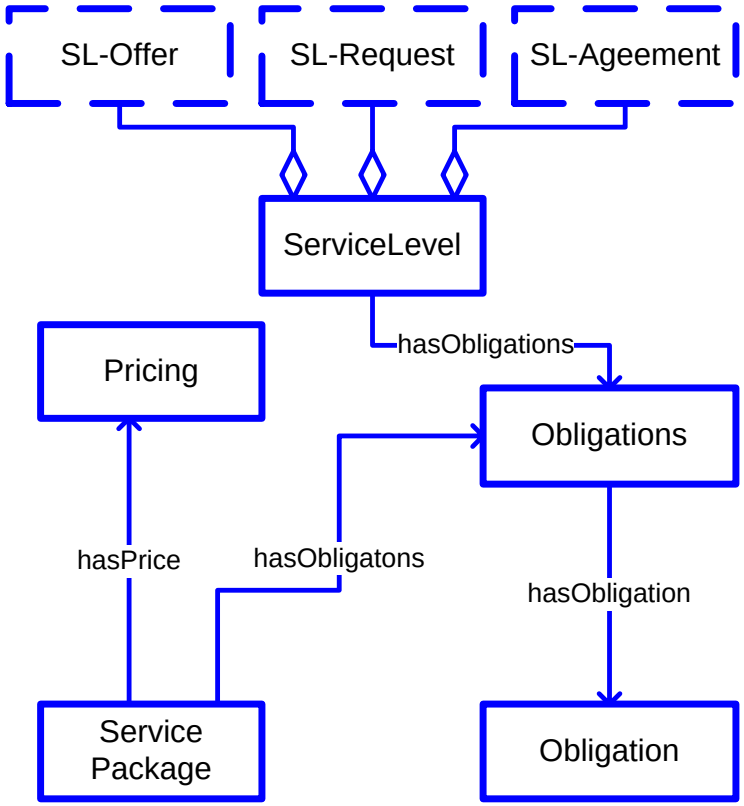
=> Automatic quality aware service discovery and service level brokering.

The End

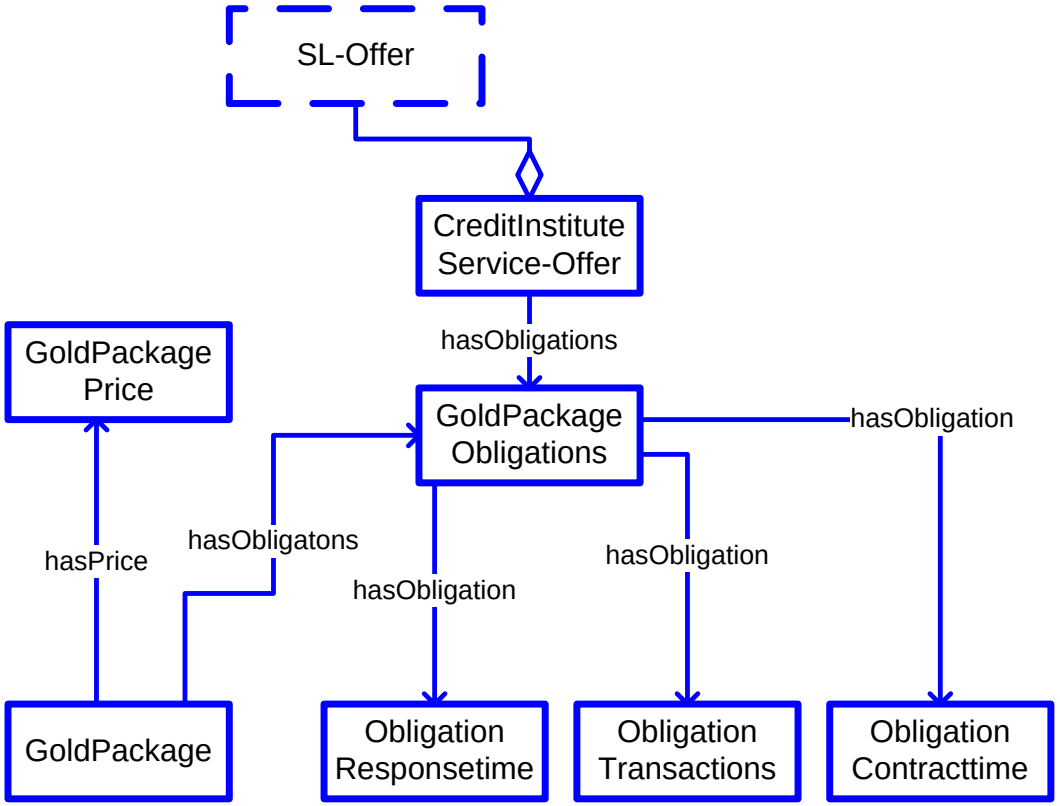
Questions ?

Modelling Service Level Packages Example

Service Level Package Schema:



Service Level Offer Package Instance:



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  author      = {Steffen Bleul and Thomas Weise},
  title       = {An Ontology for Quality-Aware Service Discovery},
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                 Contact Thomas Weise at tweise@gmx.de or http://www.it-weise.de/.},
  abstract    = {The fast emergence and acceptance of service oriented architectures
                 leads to fast development of extensional technologies like service
                 delivery, discovery and composition. As main effort is being spent on
                 automatic discovery and composition, current solutions do not reflect
                 real world scenarios sufficiently. Services are offered by different
                 vendors with different quality levels and prices. Large service oriented
                 architectures with dynamic service compositions are not able to adapt
                 without manual inspection of service quality and negotiation of service
                 contracts. We propose an ontology for modelling Quality of Services
                 (QoS) and Service- Level-Agreements (SLA). A semantic approach should
                 bridge the gap of different terminology, languages and metrics making
                 Service-Level offers and requests agent understandable and automatic
                 quality-aware discovery possible.},
  contents    = {* Introduction\\
                 * Quality-Aware Service Discovery\\
                 * Service Level Ontology\\
                 * Quality-Aware Matchmaking\\
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  keywords    = {Web Service Discovery, Quality-Aware, QoS},
  language    = {en},
  url         = {http://www.it-weise.de/documents/index.html\#BW2005QASD}
}
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