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Linked Services Initiatives

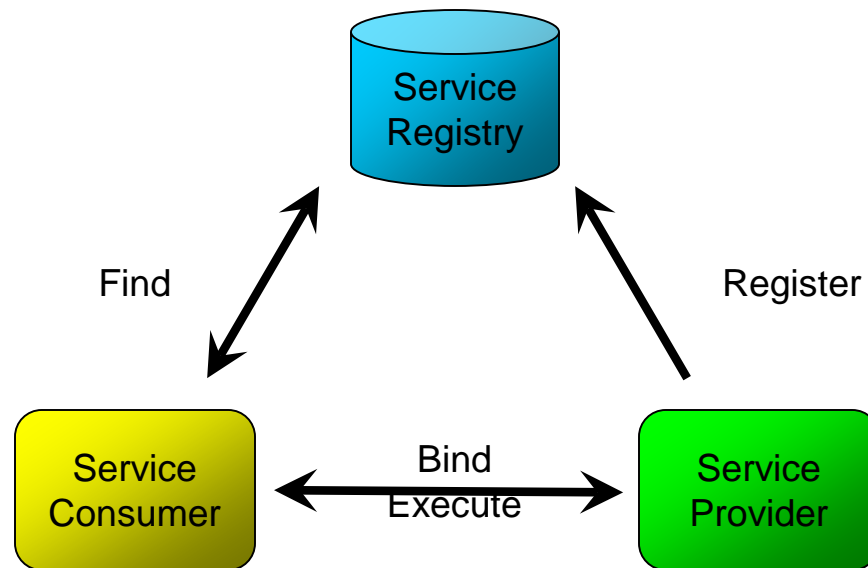
Lightweight semantics for services on the Web of Data

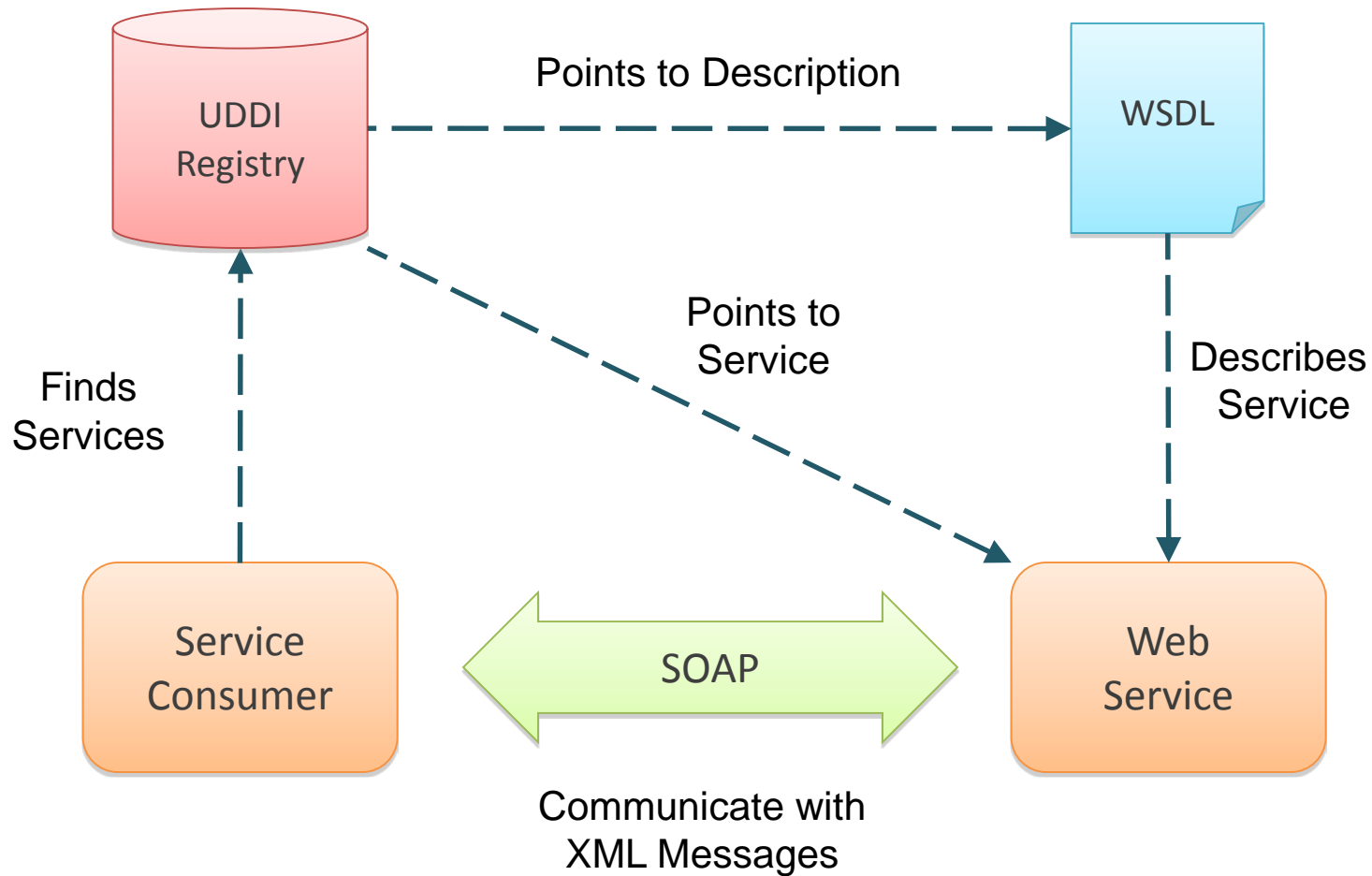
José M. García

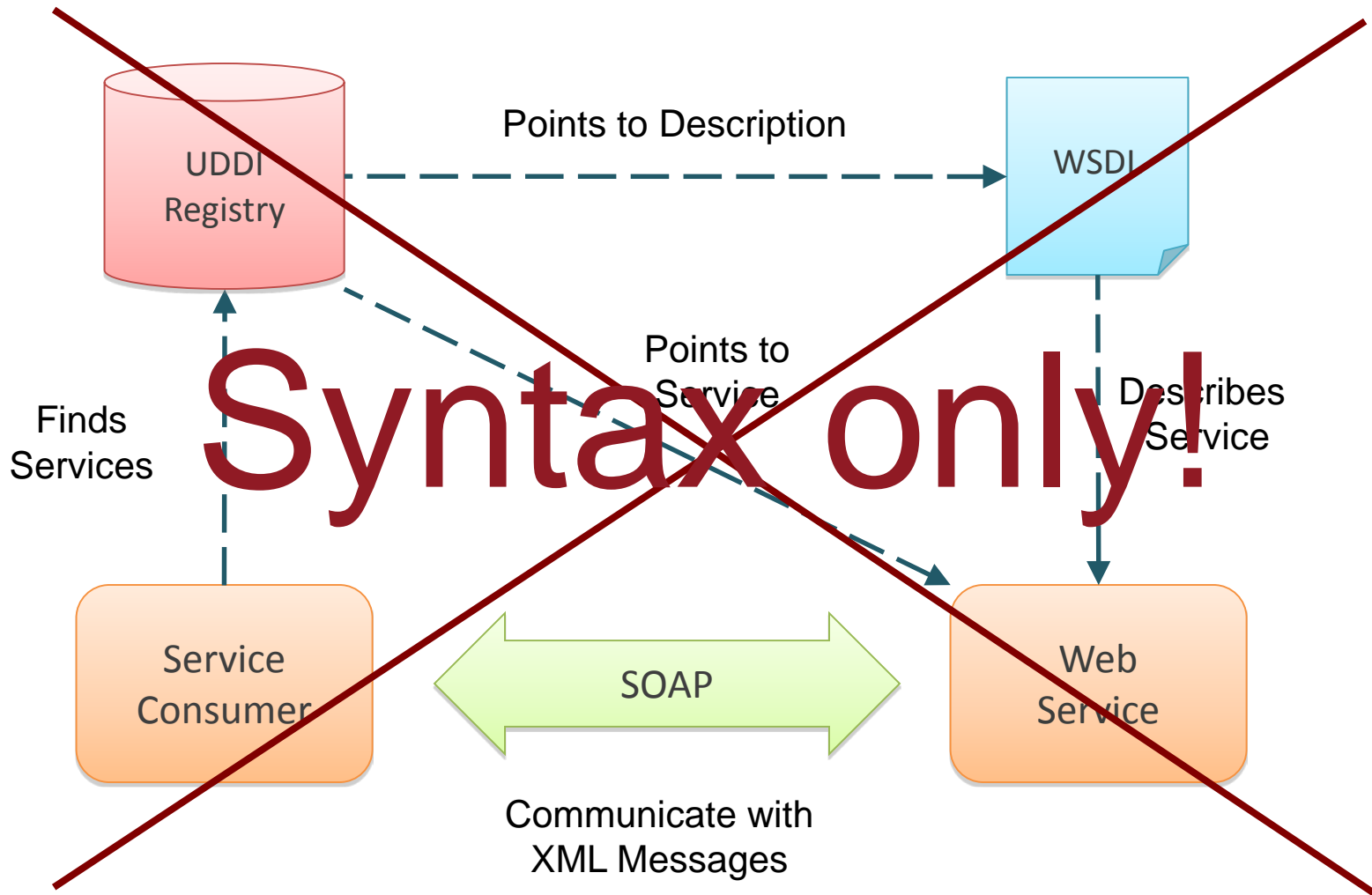
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- Semantic Web Services: the story so far
- Services on the Web of Data
- Current initiatives in Linked Services
- Conclusions







- current technologies allow usage of Web Services
- but:
 - only syntactical information descriptions
 - syntactic support for discovery, composition and execution
 - => *Web Service usability, usage, and integration needs to be inspected manually***
 - no semantically marked up content / services
 - no support for the Semantic Web

=> Initial Web Service Technology Stack failed to realize the promise of Web Services

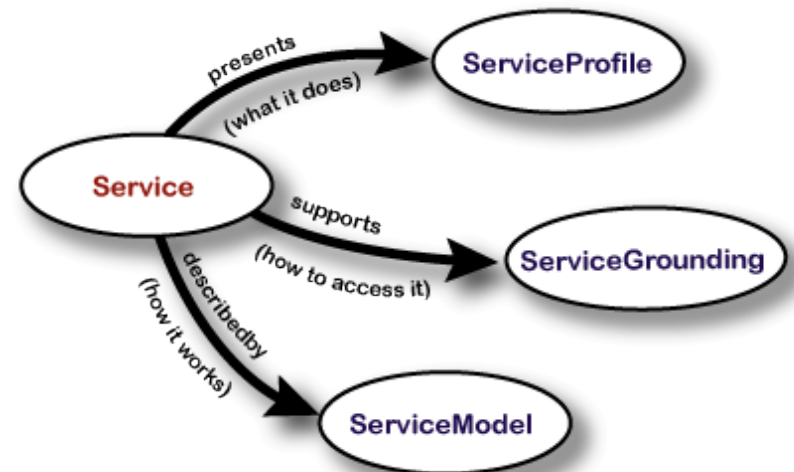
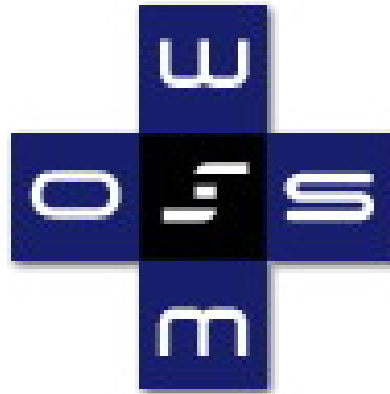
Problem: Lack of technologies to cope with the scale envisioned for WS

Solution: Techniques for automated support for service related tasks

- **Mechanized support** is needed for
 - Annotating/designing services and the data they use
 - Finding and comparing service providers
 - Negotiating and contracting services
 - Composing, enacting, and monitoring services
 - Dealing with numerous and heterogeneous data formats, protocols and processes, i.e. mediation

=> Conceptual Models, Formal Languages, Execution Environments

- WSMO
- OWL-S
- METEOR-S
- SWSF



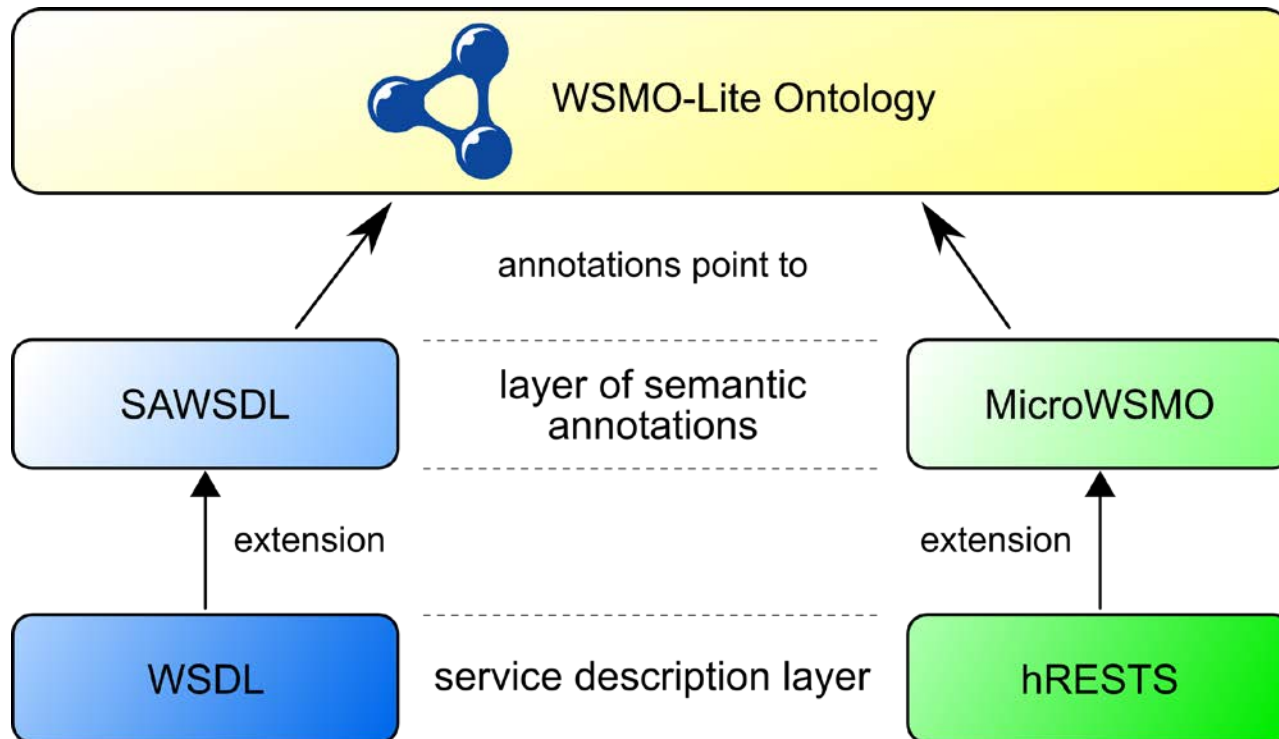
- The vision of Semantic Web Services (SWS)
 - Automating typical Web Service usage tasks.
 - Resolving heterogeneities issues.
 - Fostering scalability.
 - Existing SWS approaches
 - WSMO, OWL-S, SWSF
 - Addressing the aforementioned problems.
- , but they are considered as
- Heavyweight solutions.
 - Introducing new languages founded on a expressive formalisms.
 - Promoting the top-down modeling approach (semantics-first).
 - Grounded usually in WSDL-based services

- Semantic Web uptake
 - Heavyweight ontologies and reasoning did not get enough traction
 - Complex definitions
 - Computation needs
- WSDL-based services uptake
 - Mostly in intranets, for specific purposes
 - Not really WEB services

- Need for lightweight service ontologies.
- Directly built on top of the newest W3C standards
 - RDF(S), OWL, SAWSDL
- Promoting the bottom-up modeling approach
 - Augmentation of existing service specifications with semantic descriptions.
- Covering the other grounding approaches (i.e., REST)
 - WSDL-based services
 - 23757 services and 8094 providers according to Service Finder¹
 - Many of them are used for the intra enterprise integration
 - RESTful-based services
 - 68% RESTful services vs. 19% SOAP services² ?!
 - Currently the dominant approach to offer services over the Web

¹ Statistics retrieved from the Service Finder demo on Dec 17th, 2009 @ <http://demo.service-finder.eu/statistics>

² Statistics retrieved from the Programmable Web on Dec 17th, 2009 @ <http://www.programmableweb.com/apis>



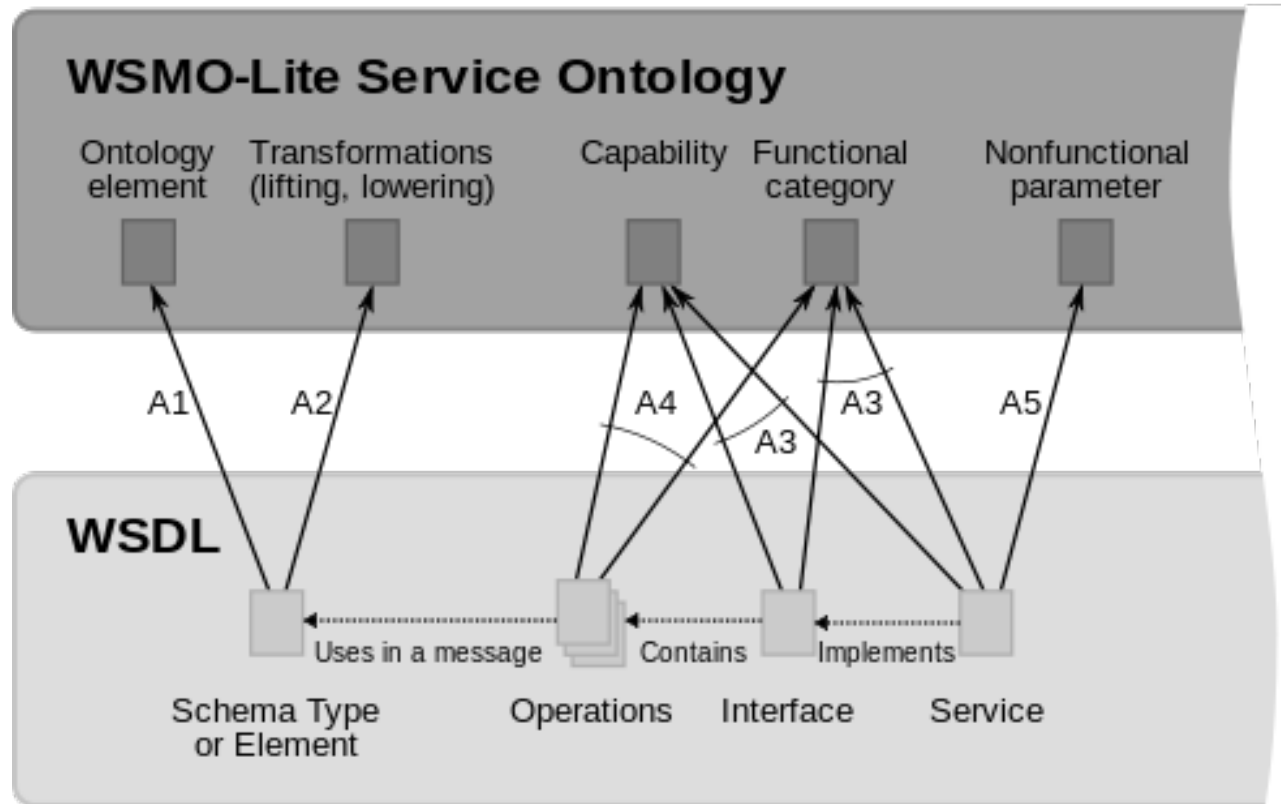


Figure from <http://www.w3.org/Submission/2010/SUBM-WSMO-Lite-20100823/>

- Lightweight semantics
- Annotations made easy
- Interlinking related services
- Fostering real uptake

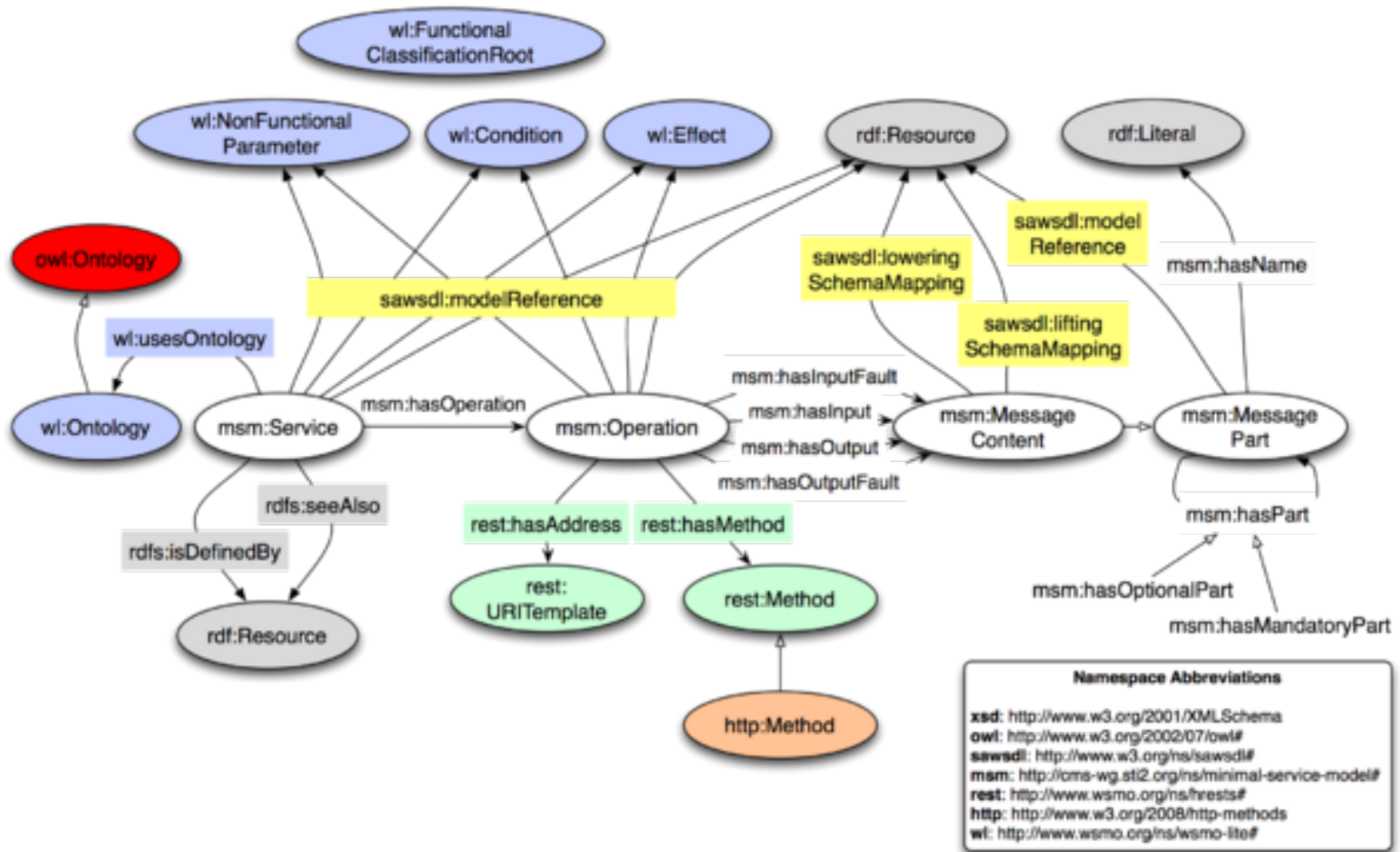


Figure from http://iserve.kmi.open.ac.uk/wiki/IServe_vocabulary/ (Carlos Pedrinaci et al.)

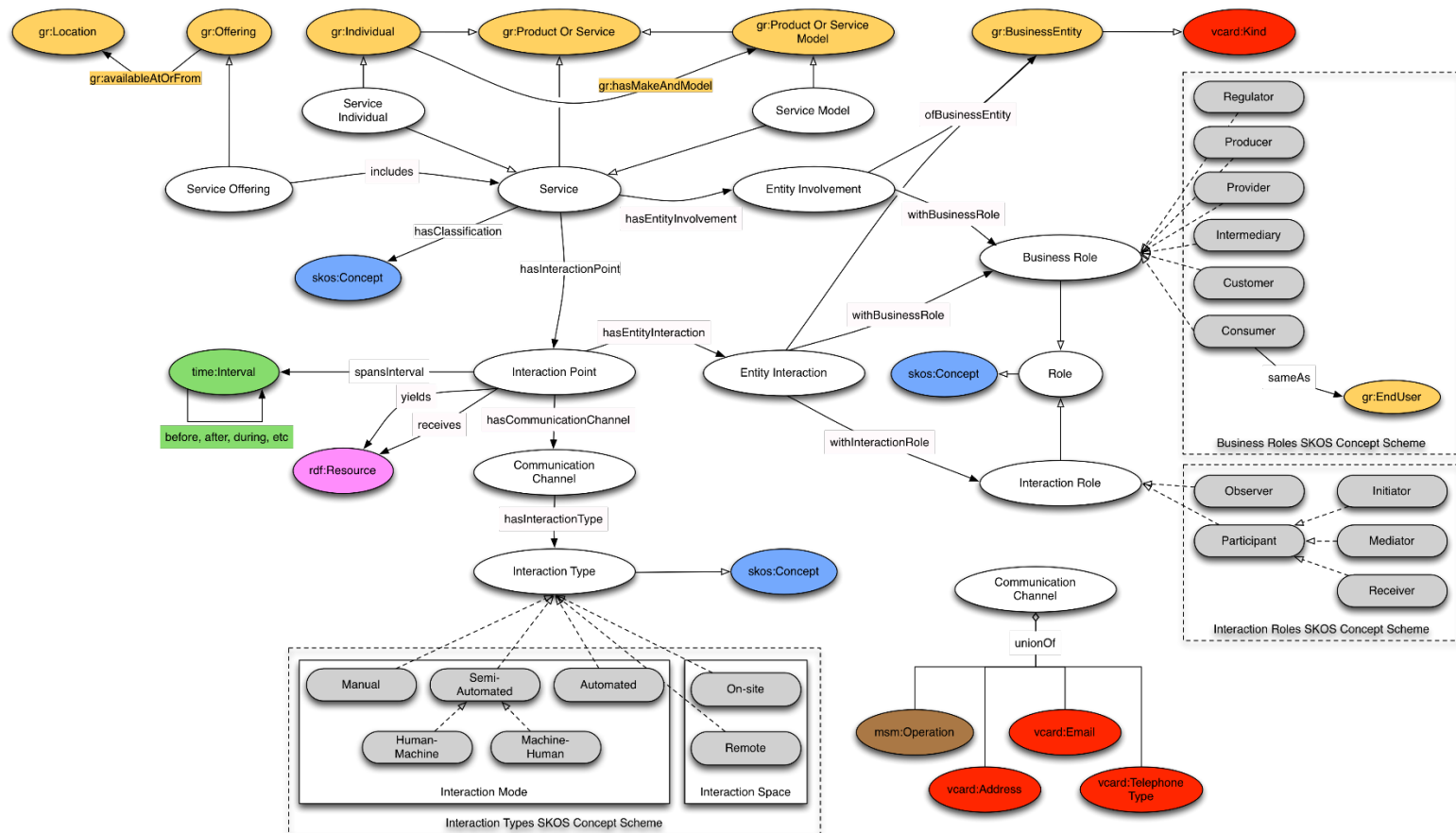
Are we going to fail again?

- Probably not this time...
- Linked Data is gaining momentum
- RESTful services are the real WEB services
- What about non-Web services?

- USDL
 - Universal Service Description Language
 - Developed mainly by SAP
- Linked-USDL
 - Aims at promoting the use of USDL on the Web
 - Remodelling USDL using Linked Data principles
 - Using existing vocabularies: GoodRelations, MSM, FOAF...
 - Several proposed vocabularies: core, price, sla...
 - Linked-USDL core vocabulary v1 released last January 2014
- Driven by
 - KMi (Open University)
 - SAP Research



- More at <https://github.com/linked-usdl>



- Creation of extension vocabularies
 - Pricing
 - Agreements
- Linked-USDL Agreements
 - Collaboration between USE, OU, KIT, and STI
 - Connection with Linked-USDL core and other vocabularies
 - Tool support by transforming it to WS-Agreement
 - First draft model, examples available at <https://github.com/linked-usdl/usdl-agreement>

- (Semantic) Web Services are dead, long live Linked Services!
- Linked Data is gaining momentum
- Service descriptions should be kept simple and close to service definition
- Ongoing efforts (Linked-USDL)



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Thanks for your attention

Questions?

