



软件工程
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Discussion about MFI-7: Metamodel for Service Registration

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2009.11.18

Motivation of MFI-7

- Services
 - Large scale
 - Multiple protocols
- How to effectively discover appropriate services is an important issue. It is necessary to
 - semantically describe service information including functional and non-functional information
 - provide corresponding registration mechanism for services

Definition of Service - from wikipedia

- Service (systems architecture): the provision of a discrete function within a systems environment
 - In the context of Enterprise architecture, Service-orientation, and Service-oriented architecture, the term service refers to **a set of related software functionality, together with the policies that should control their usage.**
- Web service: a software system to support interaction over a network
 - OASIS : **a mechanism to enable access to one or more capabilities,** where the access is provided using a prescribed interface and is exercised consistent with constraints and policies as specified by the service description.”
 - Web services are frequently just **Internet Application Programming Interfaces (API)** that can be accessed over a network, such as the Internet, and executed on a remote system hosting the requested services

Definition of Service in MFI-7

- Service is defined as
 - a modular functionality entity with provision of value that can be invoked by accessing its interface

- Key points

- Provision of value
- Transparency
- Interaction/negotiation

Capability

Interface

Interaction

Web Services: SOAP, RESTful, Atom,...

■ SOAP Web Service

- Operation-centric
- SOAP+WSDL

■ RESTful (Representational State Transfer) Web Service

- Resource-centric

- For example, to query the detail information of a book with the ISBN 0321357890,
- SOAP: a cryptic URI will be

<http://www.bookstore.com/action/query?t=b&id=11117645532&qp=0321357890>

- REST: *<http://www.bookstore.com/books/0321357890/>*
- Light-weight Web service
- HTTP-based
 - Accessed by a fixed URI using Put, Post, Get, Delete

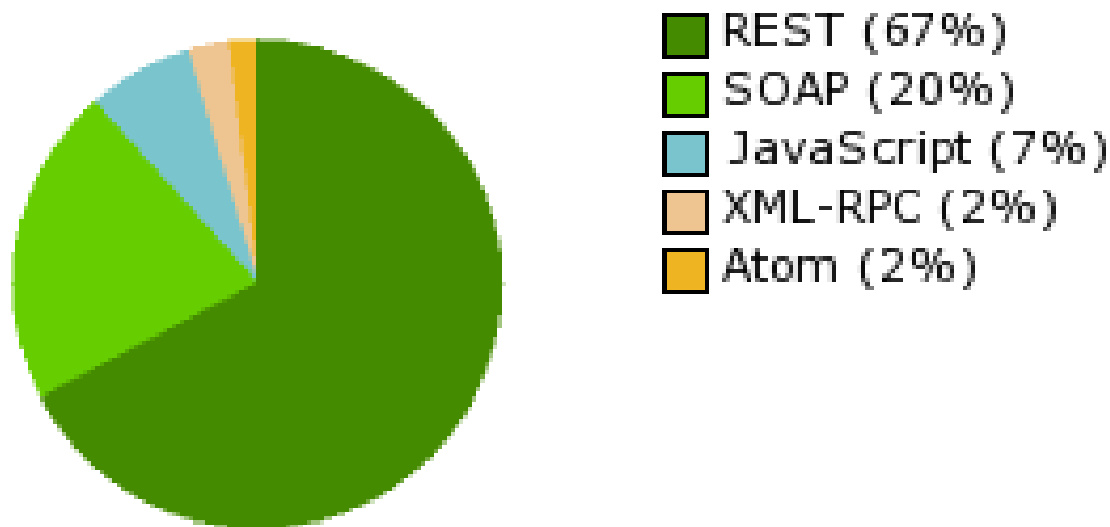
■ Atom Data Service

- Encapsulation of database or other data sources

Current Usage Status of Web Service API

- From Programmableweb
(www.programmableweb.com)

Protocol Usage by APIs



ProgrammableWeb.com 08/17/09

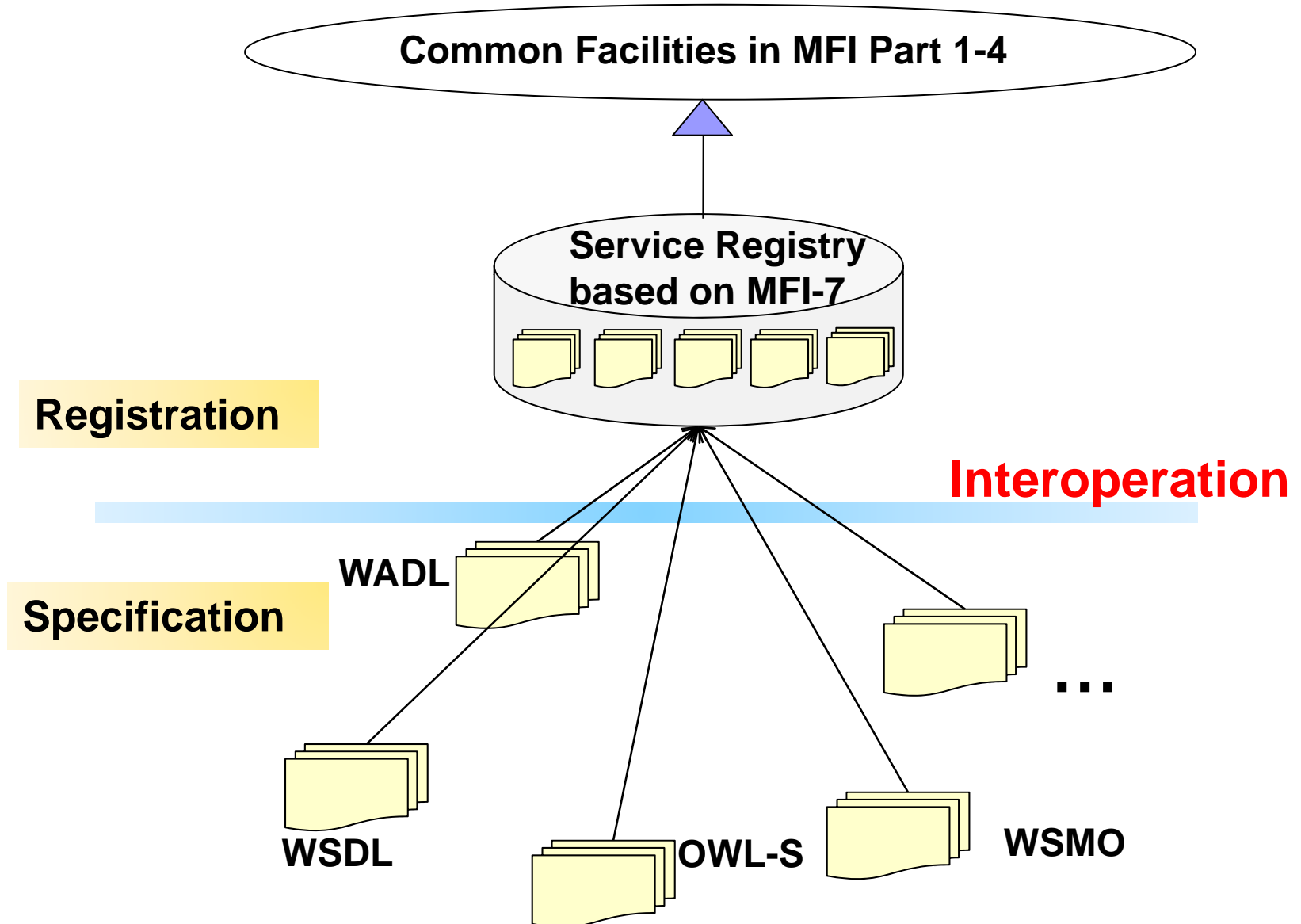
Scope of MFI-7(1/2)

- Specify a metamodel for registering services that can enable users to discover appropriate services.
- Define the functional and nonfunctional description of services.
- Promote semantic interoperation between various services.

Important Decisions from ROR/ODMS/SMMP Study Period Meeting,
Wuhan, 2008.9.6

- It does not specify
 - language specific details
 - the composition of services

Scope of MFI-7(2/2)



Elements of Metamodel for Service Registration

■ Capability

- Precondition, Postcondition
- Quality_Property

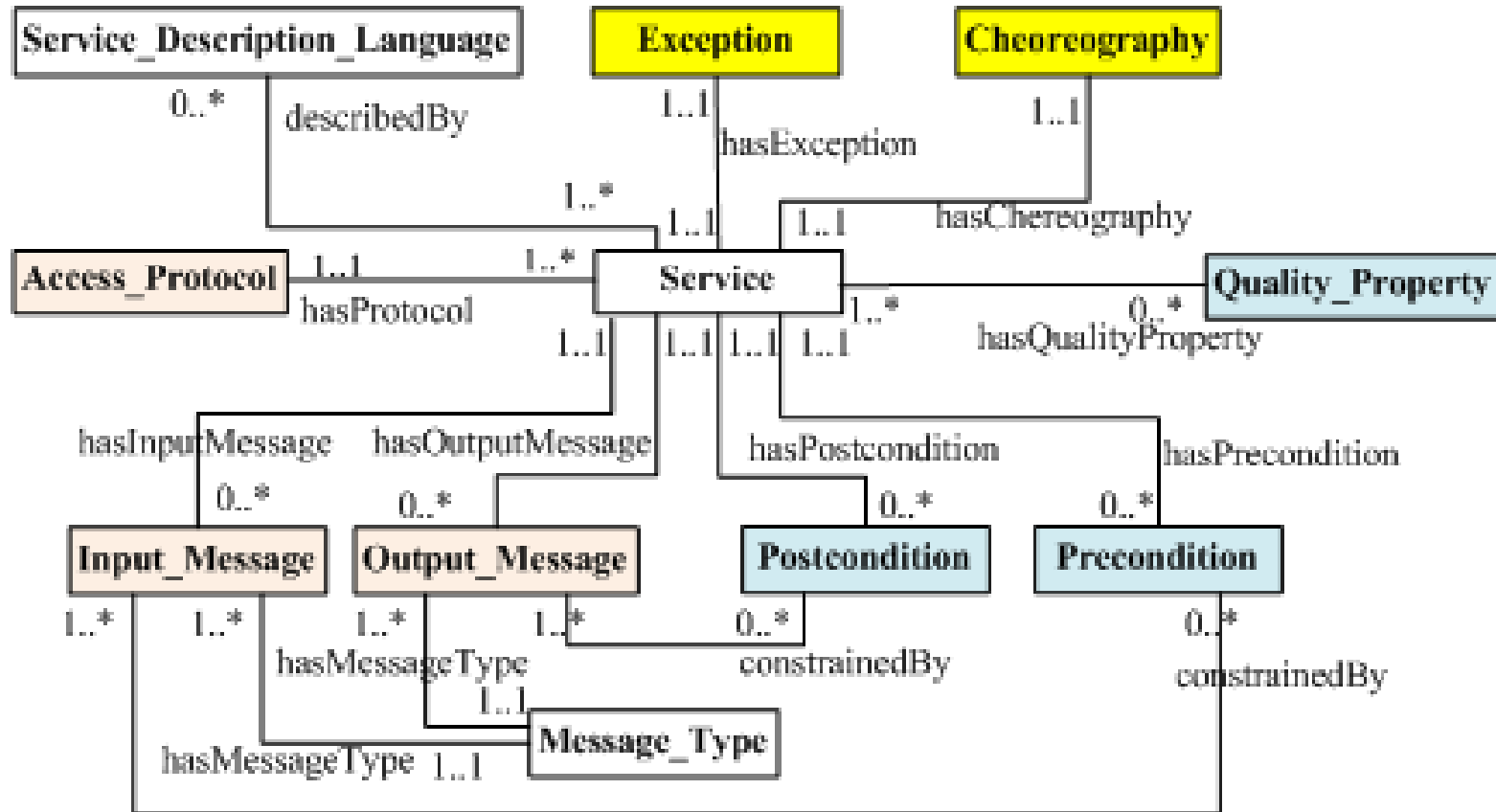
■ Interface

- Access_Protocol
- Input_Message, Output_Message

■ Interaction

- Choreography
 - ▣ Value exchange: Provider, Requester
- Exception

Metamodel of MFI Service Registration



Capability_Related
 Interface_Related
 Interaction_Related

Capability-related Metaclasses

■ Quality_Property

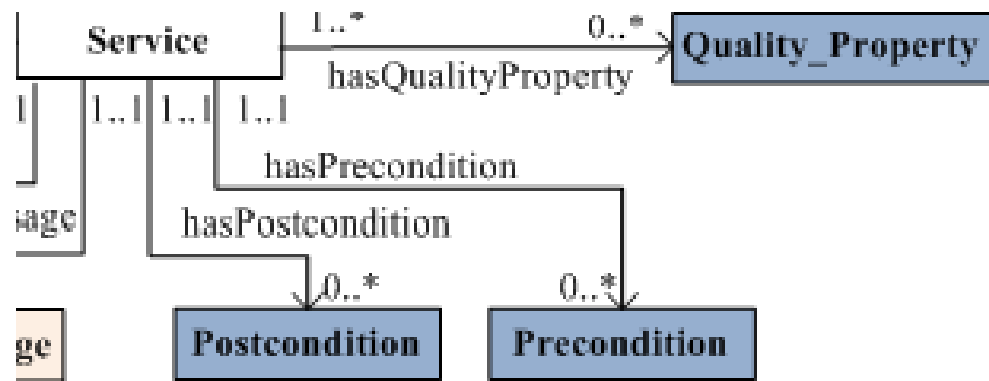
- depicts the nonfunctional description, which can be used to represent the quantitative or qualitative value of service in certain aspect such as response time, cost, reliability, and so on

■ Precondition

- specifies the state that should be satisfied before a service is invoked

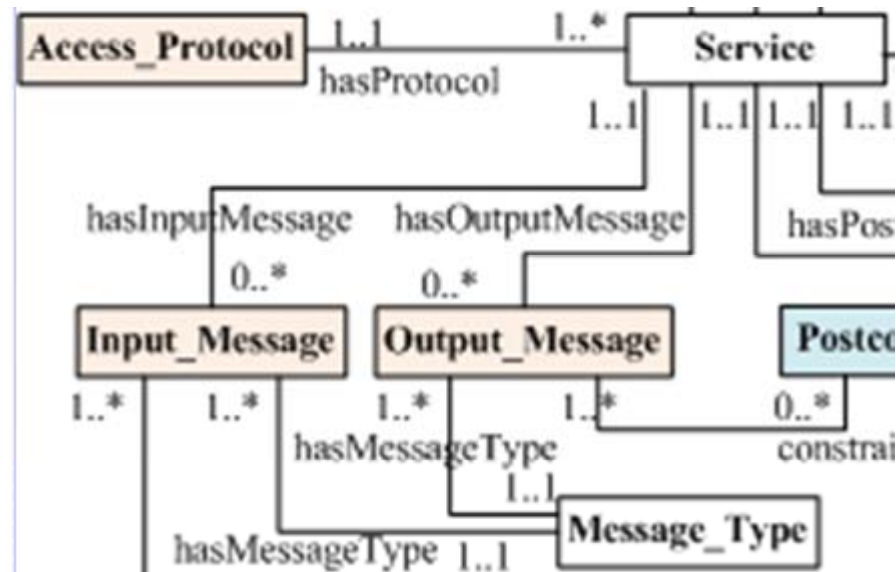
■ Postcondition

- specifies the state that should be satisfied after a service is invoked successfully



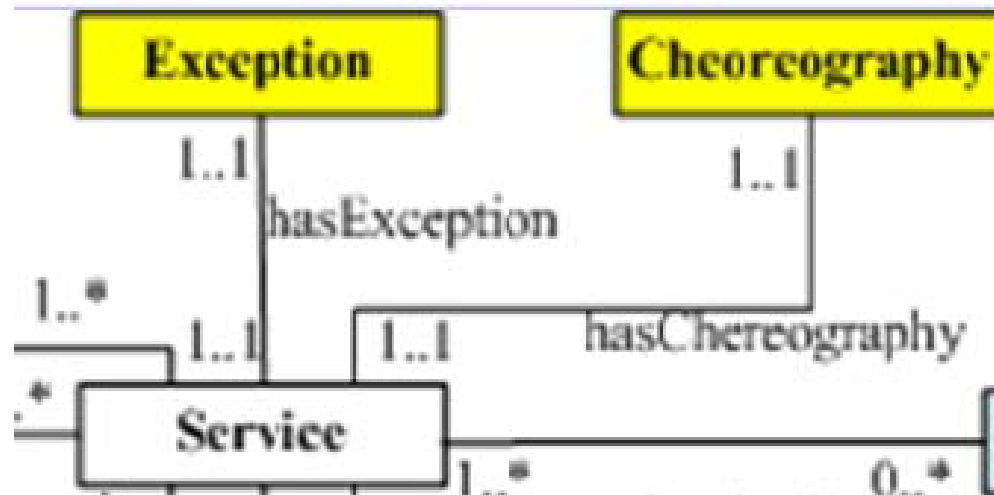
Interface-related Metaclasses

- Access_protocol
 - a requester can access the service by obeying the protocol
- Input_message, output_message
 - the link between service and outer space



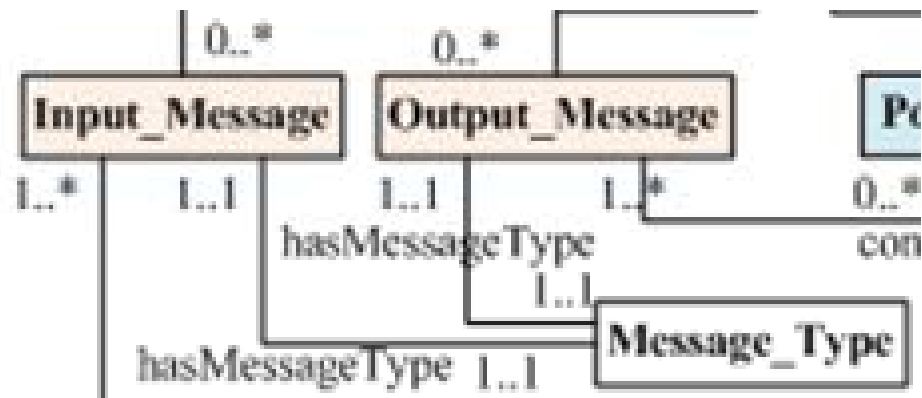
Interaction-related Metaclasses

- Choreography
 - provide the necessary information to enable communication with the service from the client point of view
- Exception
 - define the cases that the service are not correctly invoked

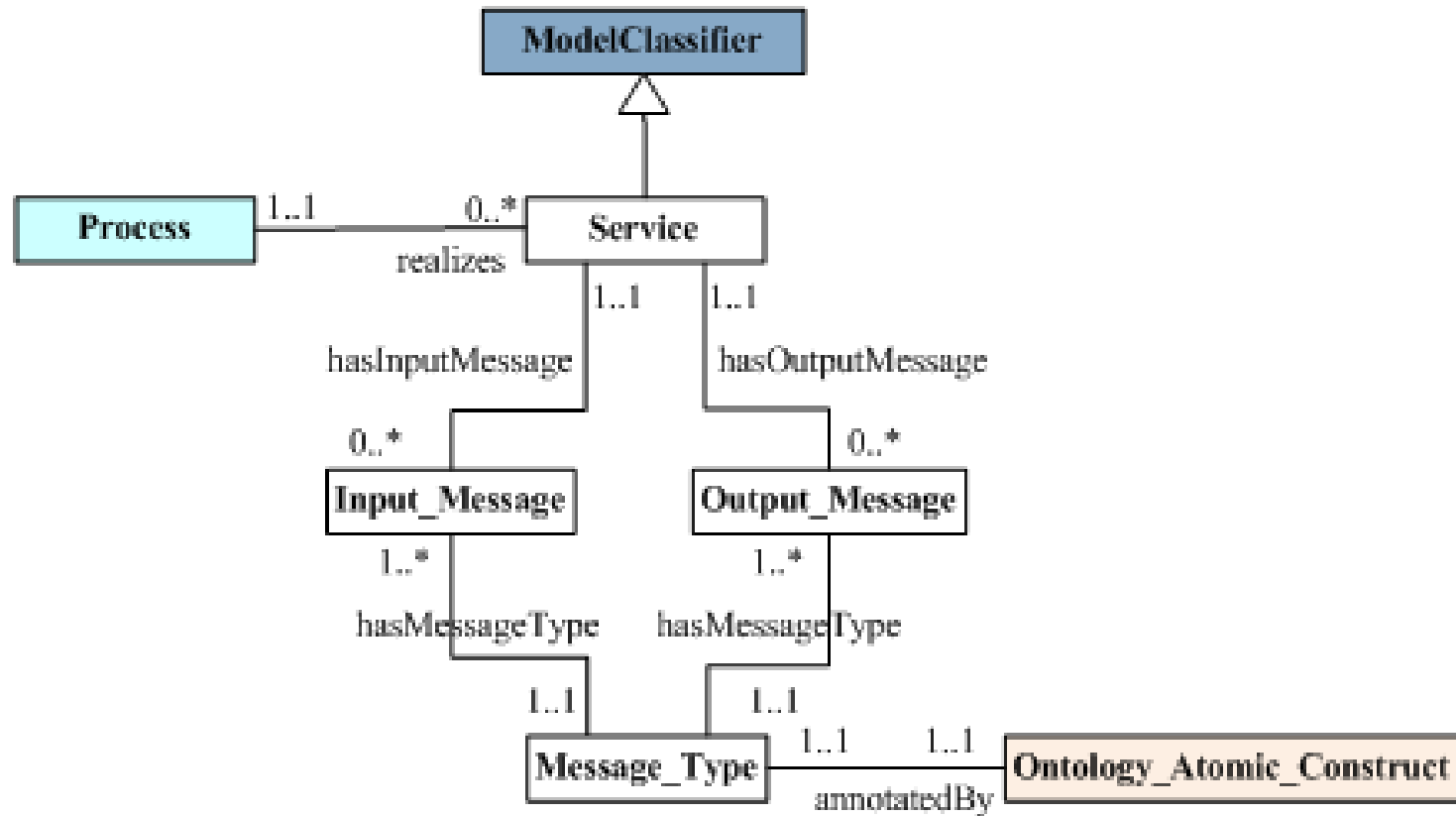


Semantic Annotation

- Input_Message, Output_Message
 - Message_Type: domain concepts in Ontology



Relationship with Other Parts in MFI



- Metaclass from MFI-2
- Metaclass from MFI-5
- Metaclass from MFI-3

MFI-7 vs. UDDI

■ UDDI

- service semantics is not explicitly provided
- mainly considers SOAP Web services

■ MFI-7

- Provides a mechanism to register service semantics based on MFI-3 and 5
- also considers other kinds of services
 - ▣ different protocols

Service vs. Process in MFI

- Services can be used to realize process
 - A process can be realized by zero or more services
 - A service can realize exactly one (atomic or composite) process
- Services emphasize on the encapsulation of certain functionality
 - only exposes certain interface to outer space, while hide its internal execution order
- Processes focus on achieving certain functionality by composing certain activities

Future Work

■ Summary

- MFI-7 provides a means to register functional and nonfunctional information and semantics of services
- The services supported in MFI-7 are more than SOAP Web services

■ Prepare a new version for CD ballot in Feb 2010

Thank You!
תודה רבה!