SOA-RM

Overview and relation with SEE

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  - Visibility
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- About services
  - Service descriptions
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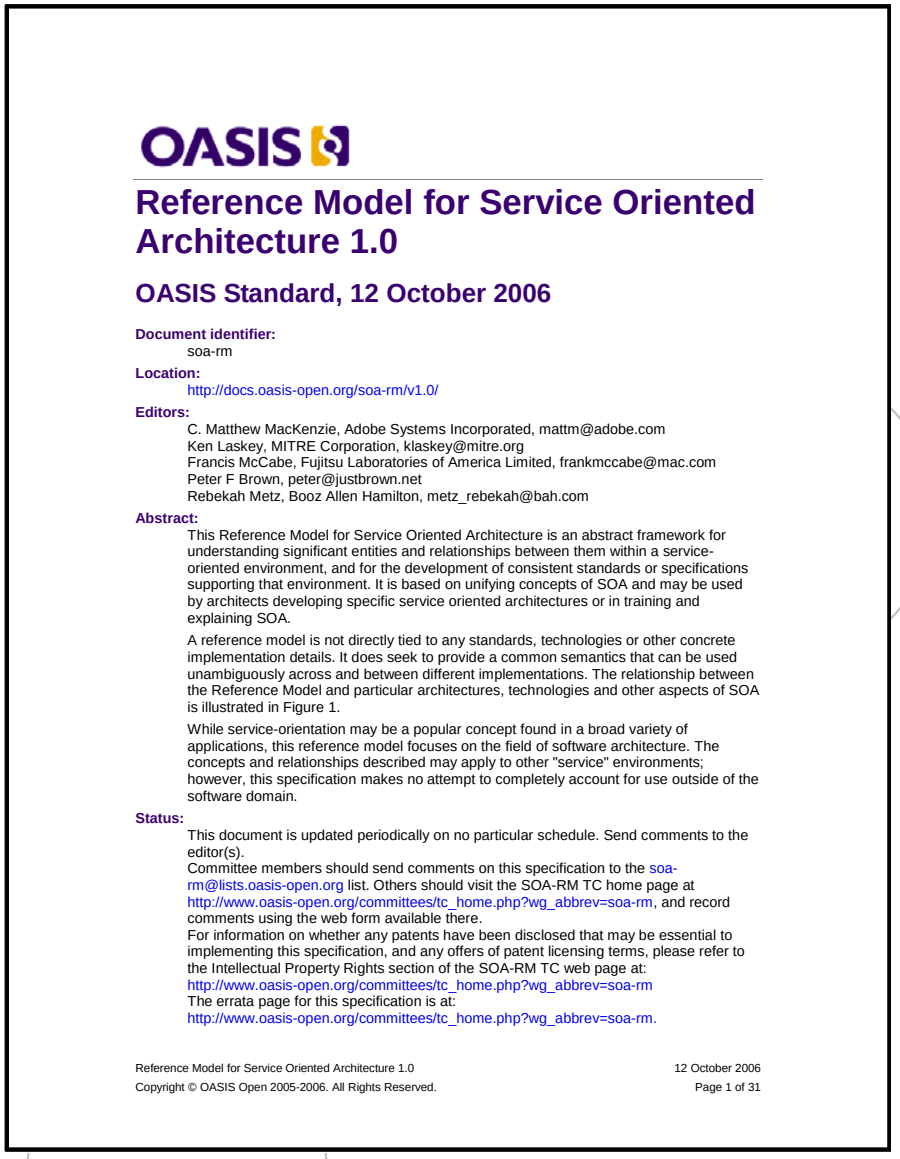
  - Execution context
- SEE vs SOA-RM



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Reference Model for Service Oriented Architecture 1.0

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Abstract:
This Reference Model for Service Oriented Architecture is an abstract framework for understanding significant entities and relationships between them within a service-oriented environment, and for the development of consistent standards or specifications supporting that environment. It is based on unifying concepts of SOA and may be used by architects developing specific service oriented architectures or in training and explaining SOA.

A reference model is not directly tied to any standards, technologies or other concrete implementation details. It does seek to provide a common semantics that can be used unambiguously across and between different implementations. The relationship between the Reference Model and particular architectures, technologies and other aspects of SOA is illustrated in Figure 1.

While service-orientation may be a popular concept found in a broad variety of applications, this reference model focuses on the field of software architecture. The concepts and relationships described may apply to other "service" environments; however, this specification makes no attempt to completely account for use outside of the software domain.

Status:
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Reference Model

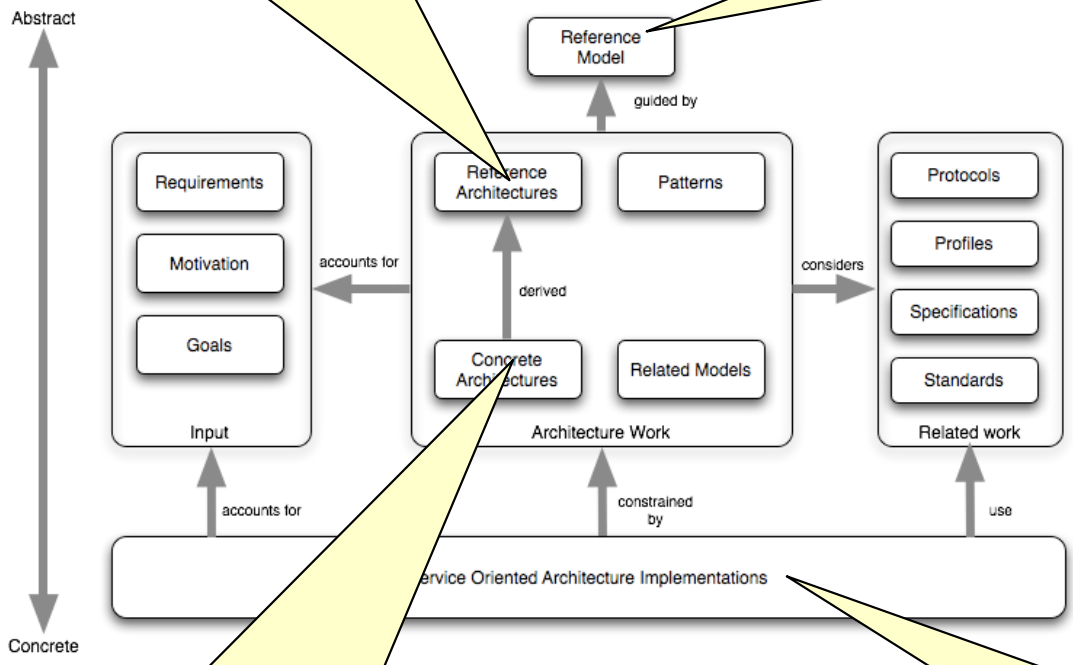
"… abstract framework for understanding significant relationships among the entities of some environment"

"… consists of a minimal set of unifying concepts, axioms and relationships within a particular problem domain, and is independent of specific standards, technologies, implementations, or other concrete details."

Reference Model
Example

Patterns for housing: bedrooms, kitchen, hallways, etc.

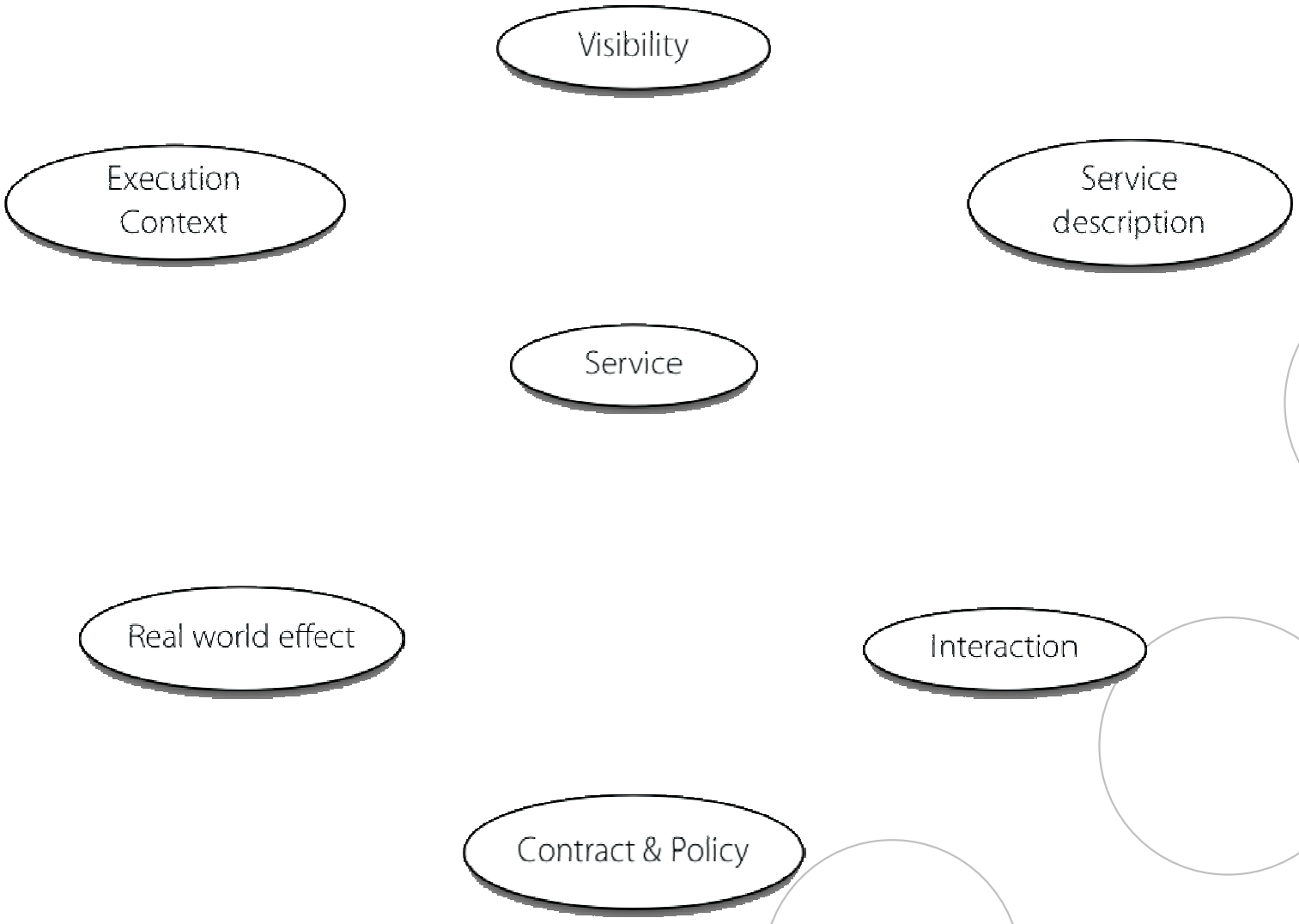
Eating areas, hygiene areas, sleeping areas, etc.



Architectural styles, windows arrangements, construction materials, etc.

A concrete house

The Reference Model
Elements



Overview

- Reference Model
- Service
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- Enable access to one or more capabilities
- Access through a prescribed interface
  - How to access the underlying capabilities
- Opaque to the service consumer except from:
  - The information and behavior models in the interface
  - Information required to asses if a service suits its needs
- Consequences of invoking a service:
  - Information returned in response to a request
  - A change to the shared state defined entities

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The Reference Model
Dynamics of Services

Visibility

- How service participants can see each other
  - *Awareness*
  - *Willingness*
  - *Reachability*

Service

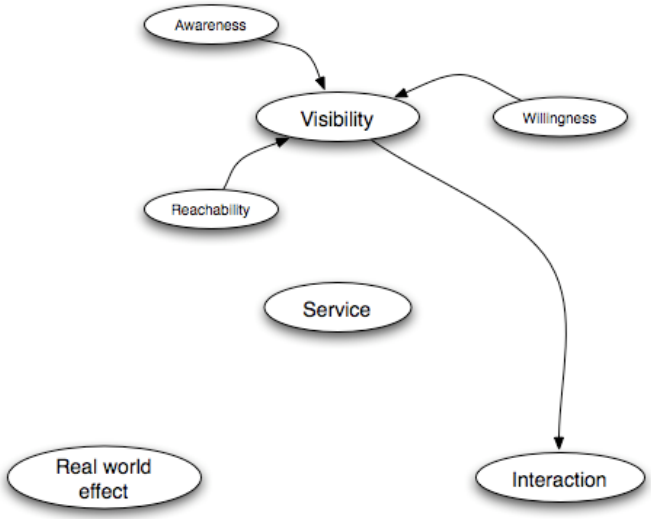
- Response to a request for information
- The changed in the state of some shared entities

Real world effect

Interaction

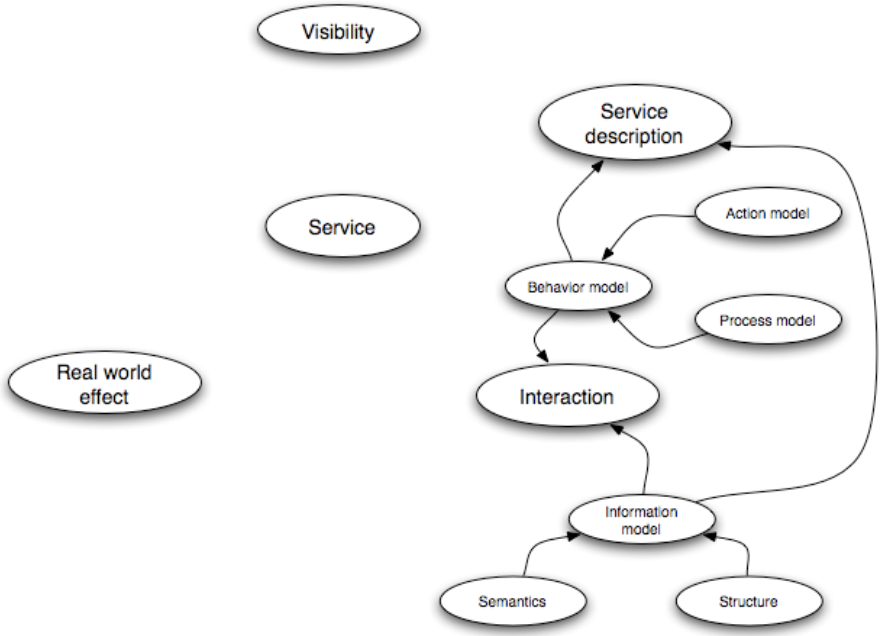
- Characterization of the information exchanged with the service
  - *Information Model*
  - *Behavior Model*

Dynamics of services
Visibility



- Awareness
  - Discovery
    - Provider Discovery
    - Requester Discovery
  - Service awareness
    - Service description
    - Policy
- Willingness
  - Intentional act to initiate and to participate in a service interaction
  - Subject of policies
    - Documented in the service descriptions
- Reachability
  - Participants must be able to communicate
  - No communication path -> no visibility

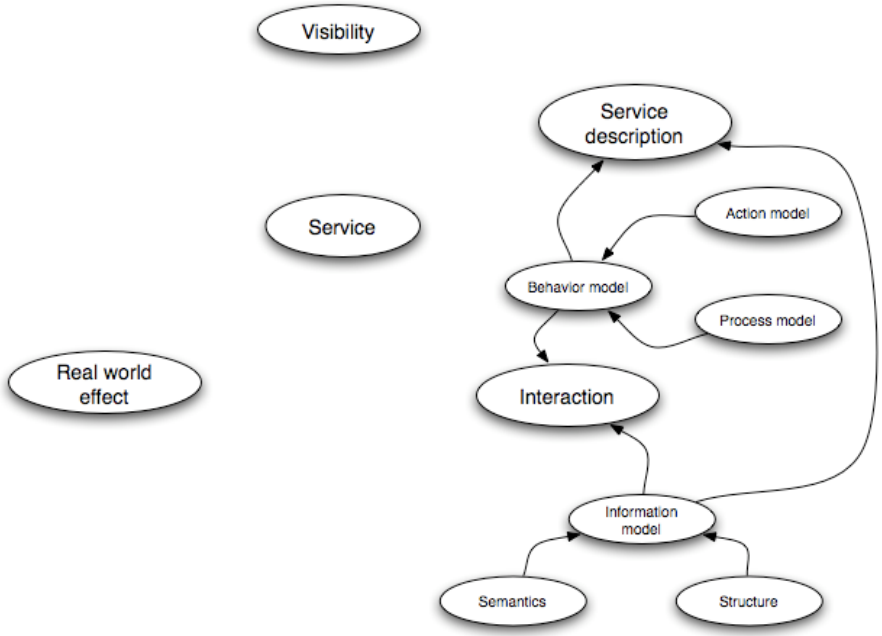
Dynamics of services
Interacting with services (I)



Information Model

- Information exchanged with the service
- **Structure** of data
  - Representation (encoding)
  - Structure and format
  - *Not sufficient to completely describe the appropriate interpretation of data*
- **Semantics**
  - Interpretation of data
    - Consistent between the participants
  - Formal descriptions of terms and of relationships
    - E.g. Ontologies
- *Service interface enable providers and consumers to identify unambiguously those definitions*

Dynamics of services
Interacting with services (II)



Behavior Model

- **Action Model**
  - Knowledge of the actions invoked against the service
    - Effect on the shared state
    - The involved dependencies
    - Data changes can vary from different contexts
- **Process Model**
  - Process (or temporal) aspects of interacting with the service
  - Choreography and orchestration can be part of this model
  - High order attributes of service:
    - Idempotent
    - Long-running
    - Transactional

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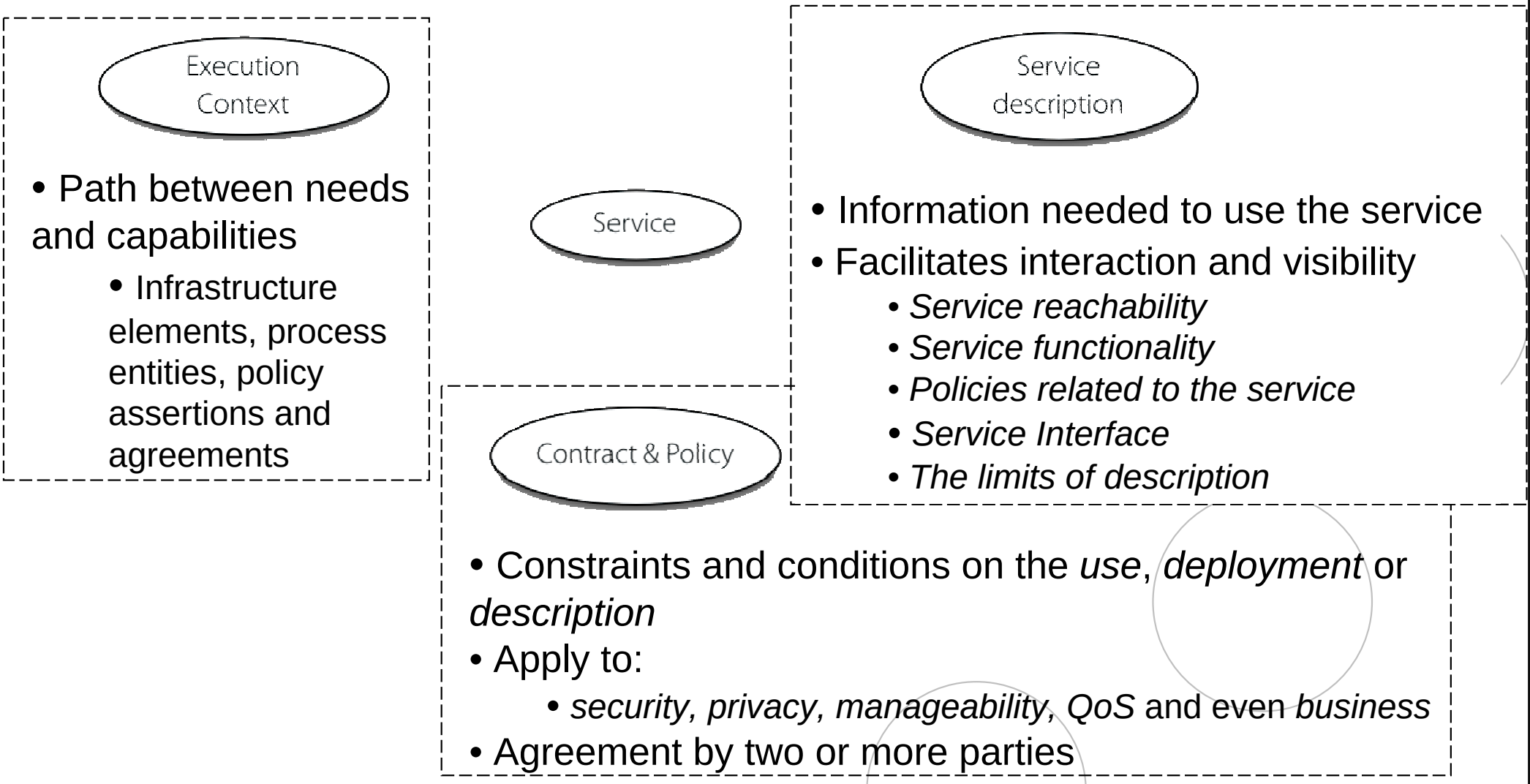
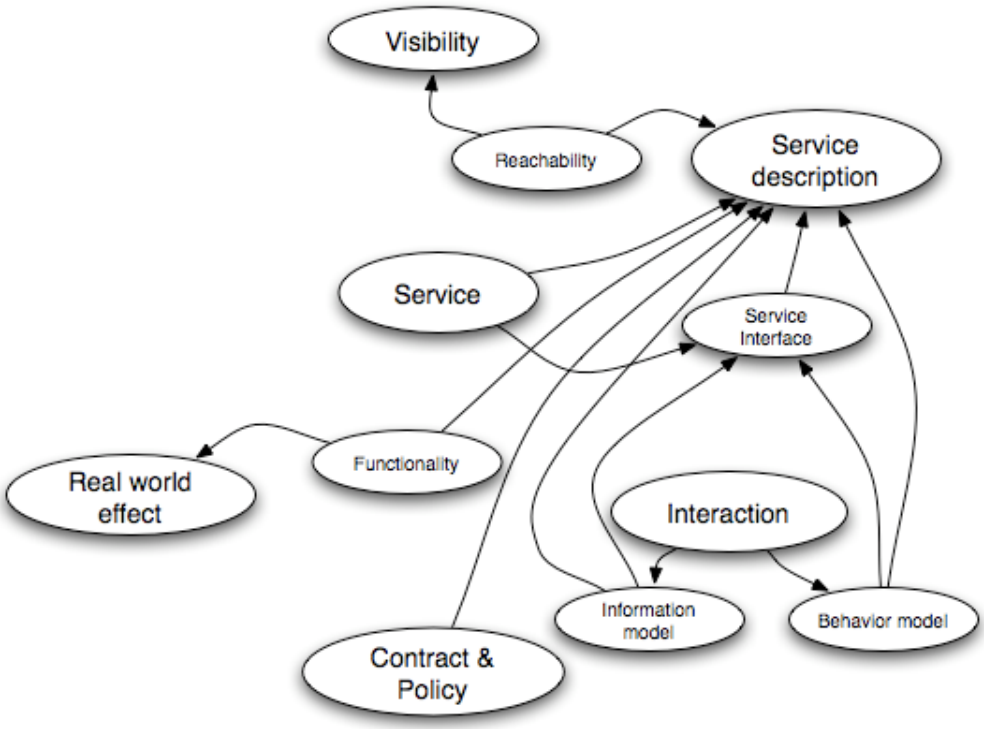
The Reference Model
About Services

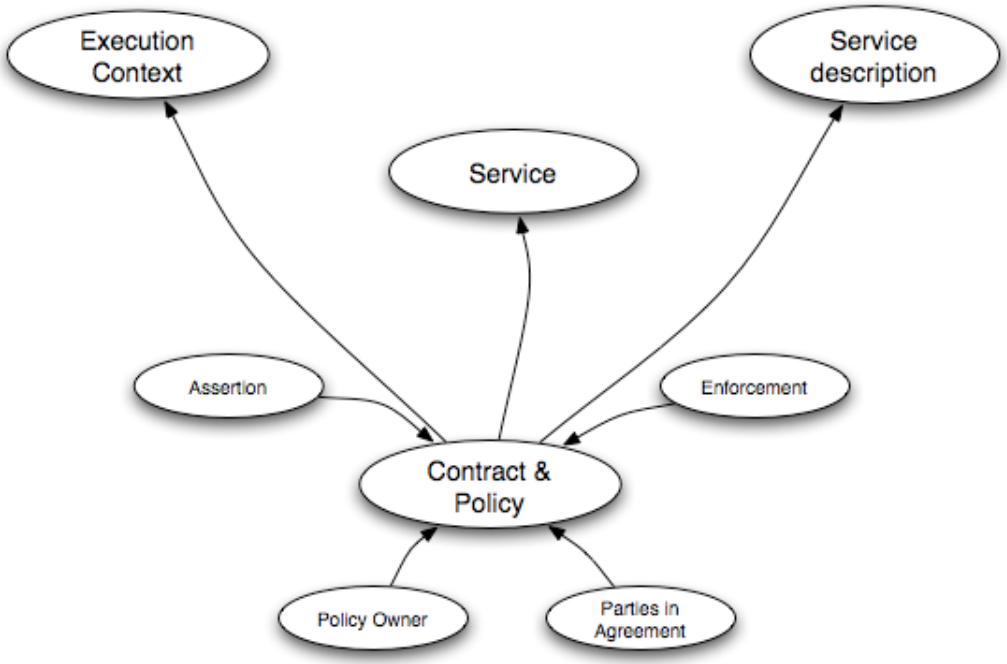


About Services
Service description



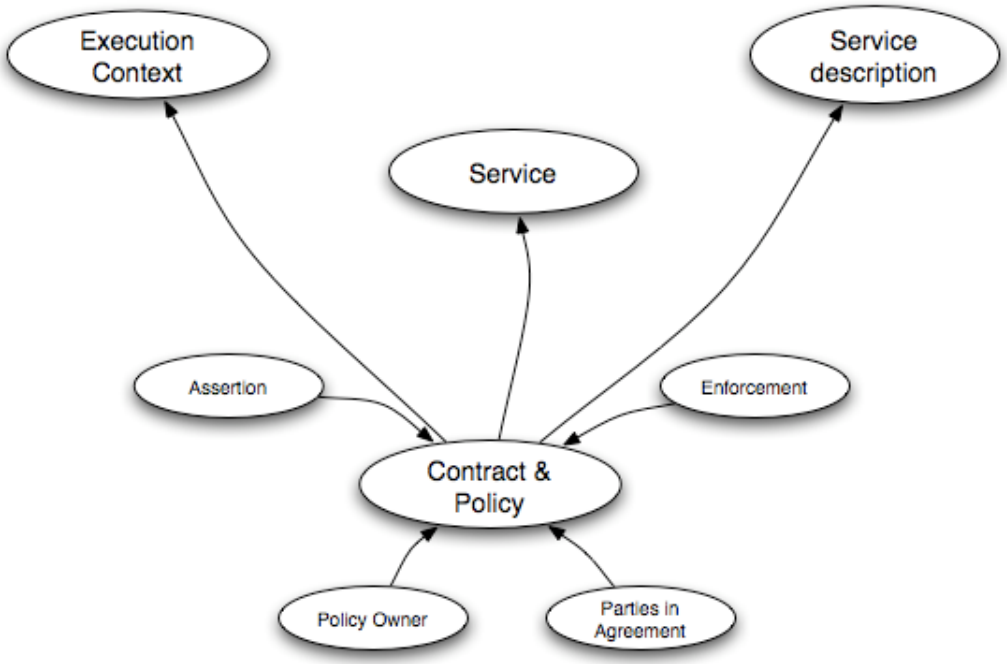
- **Service Reachability**
  - Sufficient data to enable interaction
    - Location of the service
    - Supported/required protocols
- **Service Functionality**
  - Express the function(s) of the service and the real world effects
    - Generally understandable
    - Sufficiently expressive for the domain of discourse
  - Includes:
    - Textual description (for humans)
    - Identifiers and keyword to machine-processable definitions
- **Policies Related to Services**
  - Support for associating policies
- **Service Interface**
  - Means for interacting with the service
  - Include
    - Specific protocols, Commands, Information exch.
  - Syntactically represented in a standard reference format

About Services
Policies and Contracts (I)



Service Policy

- **Policy assertion**
  - Measurable (true/false)
  - E.g. “All messages are encrypted”
  - Relation between the service and their execution context
- **Policy owner**
  - Adopt the assertion of their policy
  - A policy can be asserted without an agreement from the other party
- **Policy enforcement**
  - Ensuring that the policy is consistent with the real world
  - Preventing:
    - Unauthorized actions to be performed
    - Unauthorized to be entered into
  - Initiating compensatory actions when a policy violation has been detected
  - *Unenforceable constraint is not a policy*

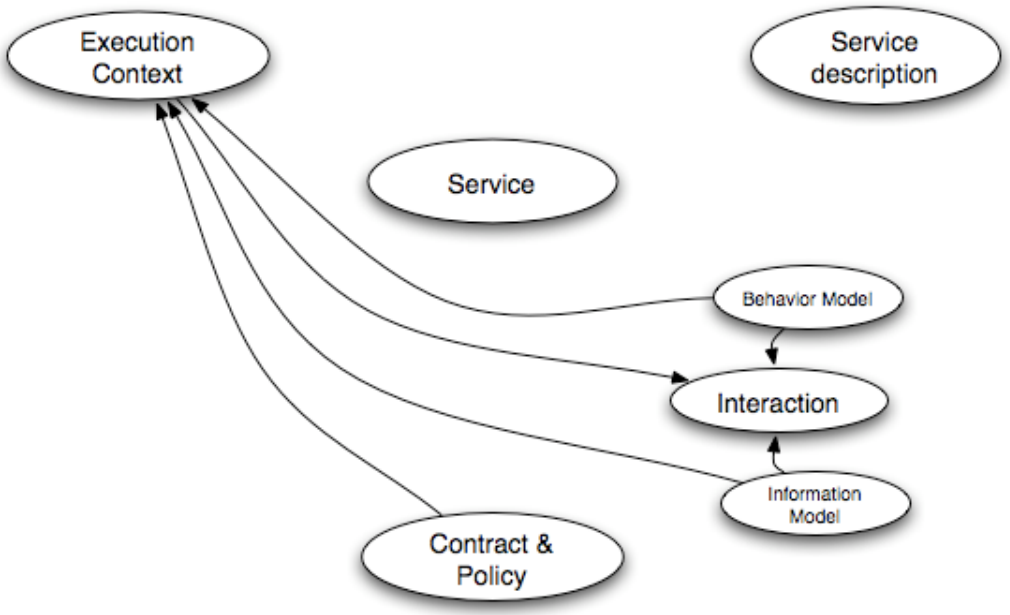


Service Contract

- Measurable assertions that governs the requirements and expectations of two or more parties
- Can cover:
  - QoS, Interface and choreography, commercial agreements
- May involve resolving disputes between the parties

- Policies and contracts should permit automated interpretation
  - When contracts codify the results of an interaction
    - Useful in composition

About Services
Execution Context



- Path between needs and capabilities
  - Temporary connection
  - Well-defined coordination
- Totality of interaction
  - Includes
    - Requester
    - Provider
    - Infrastructure
    - Third parties
- Allows to distinguish one service from another
  - Different instances of a service are part of different contexts
- Associated with a data interpretation
- Evolves during the interaction
  - Infrastructure elements, the policies and agreements may change
    - E.g. future comm. to be encrypted

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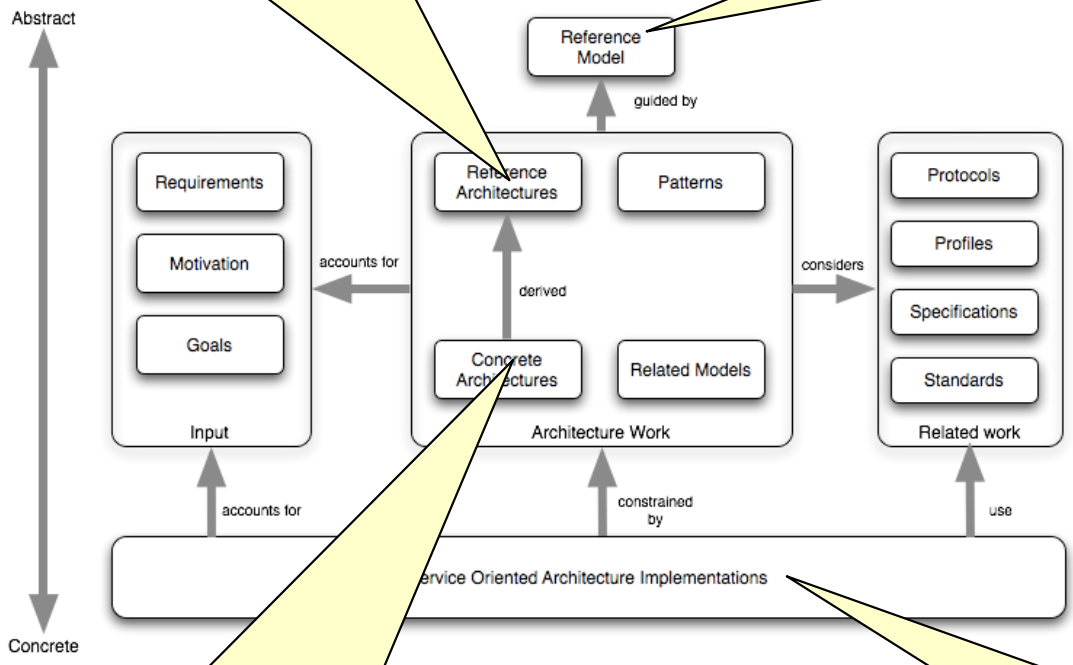


Architectural styles, windows arrangements, construction materials, etc.

A concrete house

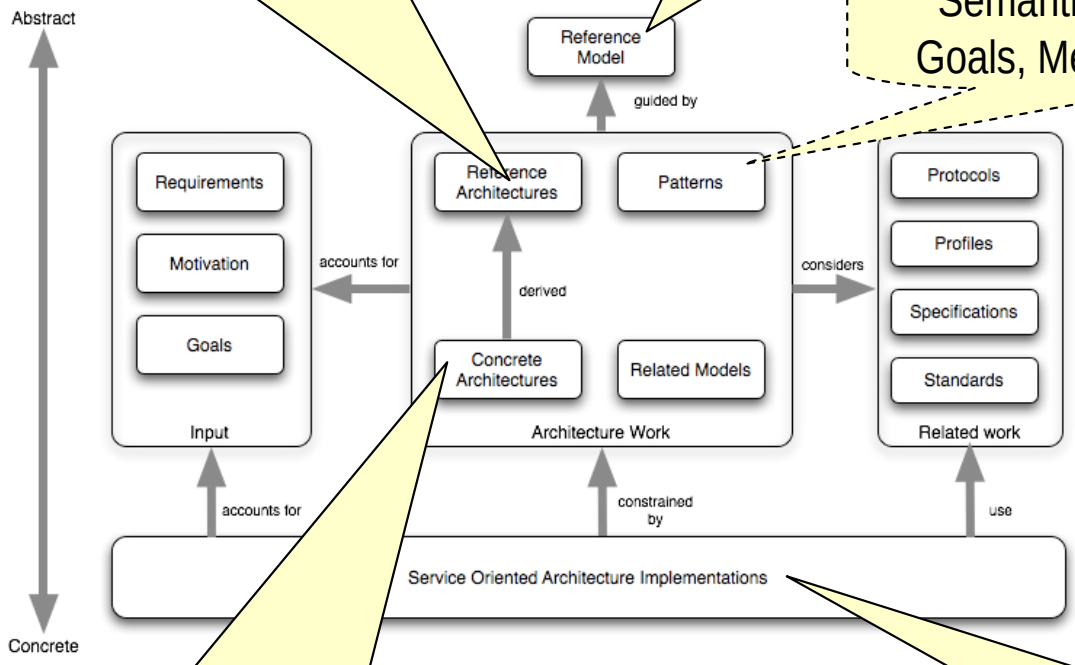
SEE and SOA-RM

Tentative…

Execution Semantics, Platform Services (Discovery, Mediation, etc.) - SEE

Services, Interaction, Service Descriptions, etc.

Semantic Web Services, Ontologies, Goals, Mediators (WSMO)



Implementation of Execution Semantics and Platform Services - WSMX, IRS-III

Concrete systems implemented based on WSMX and IRS-III: e-Health, e-Banking, PA

Discussions and Comments

- Discussions
  - Discussions
    - Discussions
      - Discussions
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