Open SOA Ontology

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THE Open GROUP

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THE Open GROUP
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The SOA Working Group

- The SOA Working Group contributes to the Open Group mission of Boundaryless Information Flow, by developing and fostering common understanding of SOA in order to facilitate alignment between the business and information technology communities.
- www.opengroup.org/projects/soa/

Why Develop an Ontology for SOA?

- More precisely define the concepts, terminology and semantics of SOA in both business and technical terms, in order to:
  - Create a foundation for further work in domain-specific areas,
  - Enable communications between business and technical people,
  - Enhance the understanding of SOA concepts in the business and technical communities, and
  - Provide a means to state problems and opportunities clearly and unambiguously to promote mutual understanding; and
- Potentially contribute to model-driven SOA implementation, which will facilitate SOA adoption.
- www.opengroup.org/projects/soa-ontology/

Working Methods

- Protégé approach and toolset
  - http://protege.stanford.edu/
- OWL delivery language
  - http://www.w3.org/2004/OWL/

Agenda

- General Issues
  - Ontologies and Model-Driven Architecture
  - Communities of use
  - Domain ontologies for application of SOA to vertical market areas
  - Modeling information
- The draft Open SOA Ontology
- Discussion
  - Comments and feedback on the generic ontology
  - Relation to domain ontologies
  - How to address communities of use
  - How to model information
  - Next Steps

Ontologies and Model-Driven Architecture

Ontologies and Model-Driven Architecture

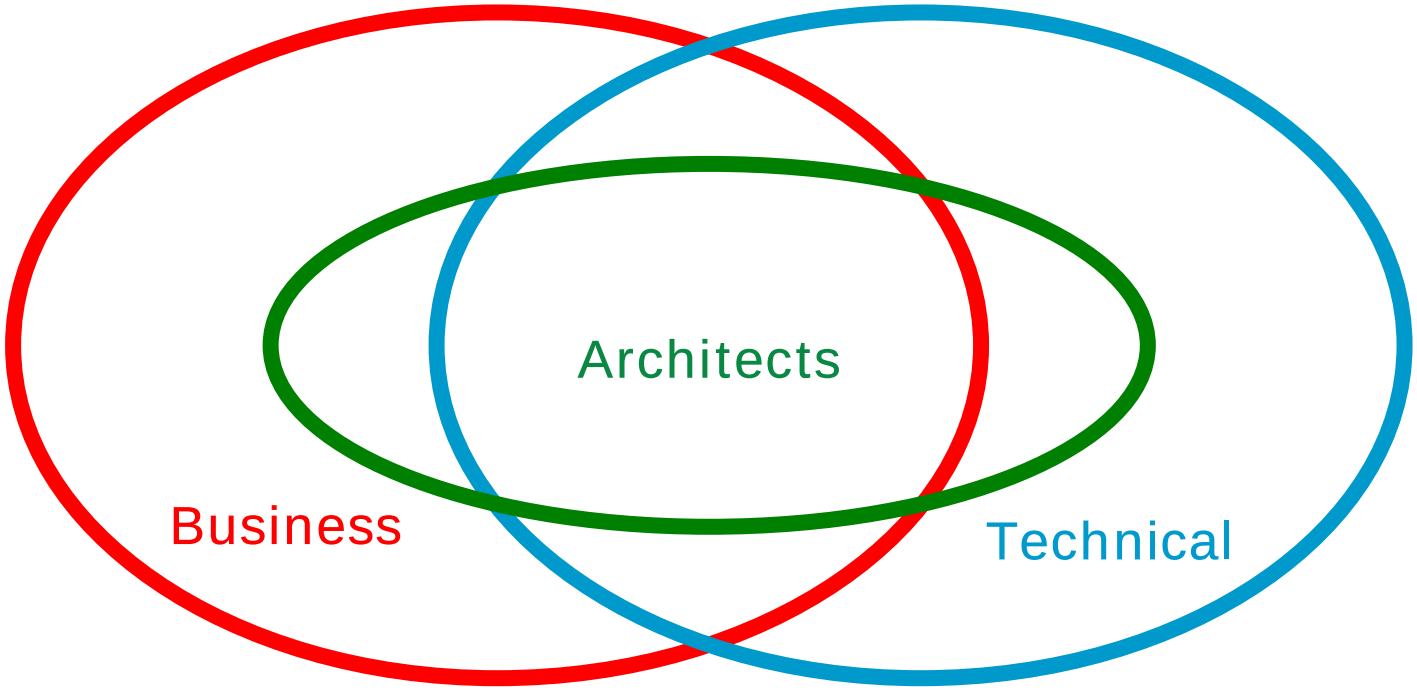
- If the architecture model is sufficiently clear and detailed
- Then interface definitions – and perhaps building block implementations – can be generated automatically
- The web services model is sufficiently clear and detailed
- Clear and detailed models could be developed for other forms of SOA
- This ontology is a generic framework

Communities of Use

Communities of Use

- The ontology should enable different communities to understand each other
- But each community will have its own concepts
- In particular, we want to address business and technical communities

Communities Overlap



Some Business Concepts

- Relation to the Business.
  - Is providing the service a direct part of the organisation's mission? "Banking" and " Cash Dispensing" are directly related to the mission of a bank. Other services, such as internal payroll, may be necessary to the bank's operation, but are not part of its mission.
- Financial Concepts
  - Revenue
  - Cost
  - Profitability
  - . . .

Some Technical Concepts

- Flavors of SOA
  - Web Services (we should be compatible with OWL-S - http://www.daml.org/services/owl-s/)
  - ESB
  - . . .
- Developer concepts
  - Module
  - Interface
  - Data field
  - . . .

Some Architect Concepts

- Granularity.
  - This relates to the "amount of functionality" provided by a service.
  - The higher the granularity, the more specific the service is, and the less functionality it provides. So, for example, "Banking" is a service with low granularity, and "Cash Dispensing" is a higher-granularity service.
- Means of Implementation.
  - Is the service implemented by a software program, by a person, or by some other means?

Domain Ontologies for Application of SOA to Vertical Market Areas

Example Particularization for Healthcare

Open SOA Ontology

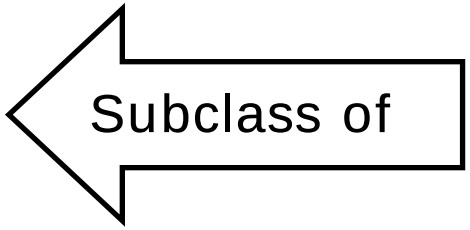
Service

Provider

Consumer

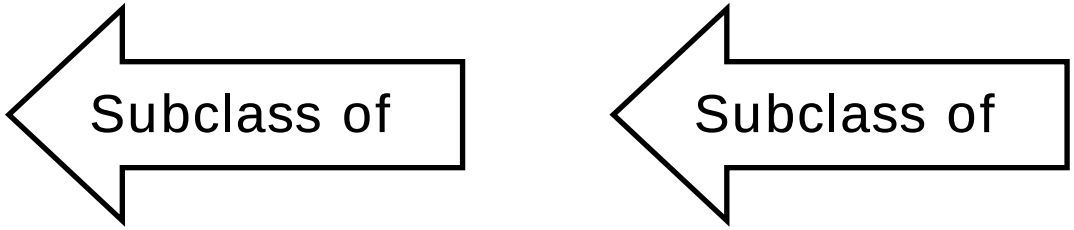
Example Particularization for Healthcare

Open SOA Ontology	Healthcare Standards Body
Service	Surgery
Provider	Hospital
Consumer	Patient



Example Particularization for Healthcare

Open SOA Ontology	Healthcare Standards Body	Acme Healthcare
Service	Surgery	Daycare Surgery
Provider	Hospital	Acme Hospital
Consumer	Patient	Private Patient



Subclassing and Properties

- Provider
  - is identified by
  - . . .

Subclassing and Properties

- Provider
  - is identified by
  - . . .
- Hospital
  - is identified by
  - . . .
  - is located at
  - has beds
  - . . .

Subclassing and Properties

- Provider
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- Hospital
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  - . . .
- Acme Hospital
  - is identified by
  - . . .
  - is located at
  - has beds
  - . . .
  - is managed by
  - . . .

Subclass and Instance Definition

- What are the instances?
  - *The Acme Hospital in Poughkeepsie*?
  - *John Doe*?
  - *Dialysis patient*?
- We don’t know – and don’t care
  - Different particularizations can choose different, perhaps conflicting, ways of defining instances
  - And of defining subclasses
    - Is *Private patient* a subclass or an instance?

What Do We Care About?

- We care about basic SOA classes and their properties
- We don’t care about subclasses or instances in vertical areas or enterprises
- We don’t care about properties or information specific to vertical areas or enterprises
- But we do care about how information is exchanged by services

Modeling Information

La Trahison des Images

(This is not a pipe)

- This is not a picture painted by the Belgian surrealist René Magritte in 1928-9.

The Treachery of Information

- Services exchange information about the number of beds in a hospital
- We need a concept of
  - “this is information about the number of beds in a hospital”
- as distinct from
  - “this the number of beds in a hospital”
- Our ontology must contain *information about information about information*

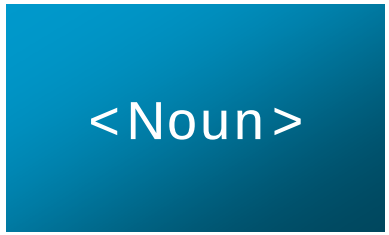
The Draft Open SOA Ontology

The Draft Open SOA Ontology

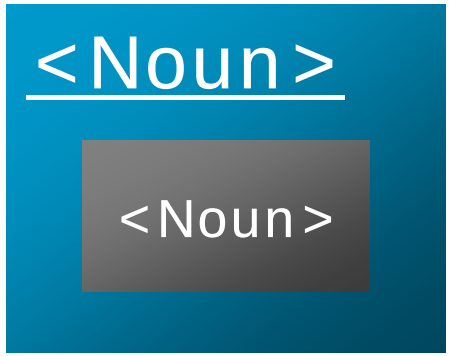
- This is draft 7
- Differences from draft 6 are indicated in red.

Open SOA Ontology Symbolism

- Class



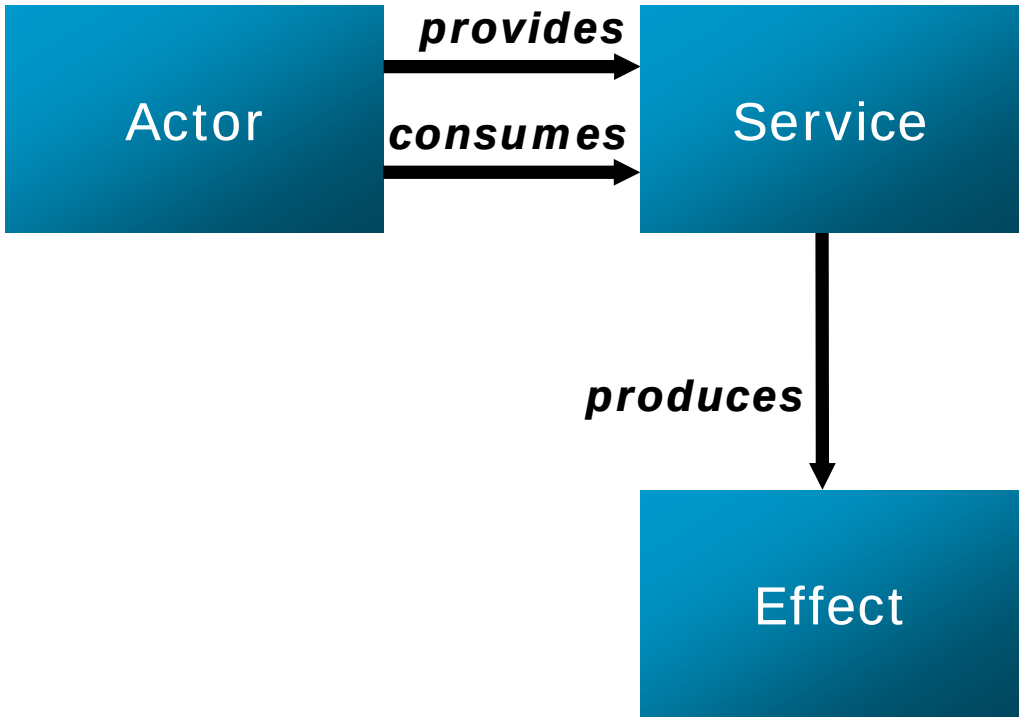
- Subclass



- Property (or Relation)

These slides make many simplifications. They omit some classes and properties – particularly the inverse properties of those shown. See the OWL version on the web for the authoritative description.

Open SOA Ontology - Core Classes and Properties



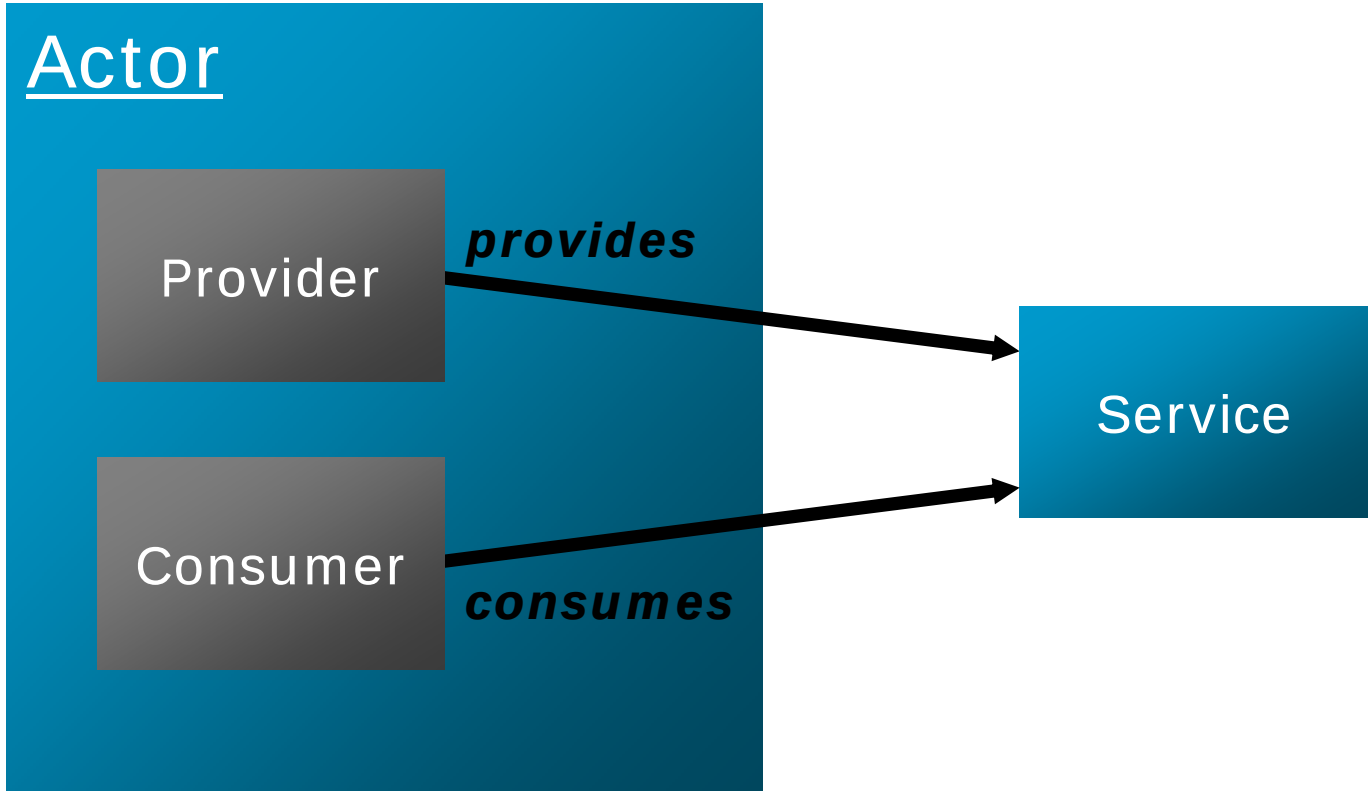
Core Classes and Properties – Notes 1

- An *Actor* can be a person or an organization or a piece of technology – someone or something that does something
- In modeling, an *Actor* represents a role, or class, rather than an individual
  - Eg, “Barber”, rather than “Sweeney Todd”
  - Our usage is wider than this – both “Barber” and “Sweeney Todd”
- An *Actor* can be a *Service*
  - Eg, a *Service* can consume another *Service*
  - Not all *Actors* are *Services*
  - Not all *Services* are *Actors*

Core Classes and Properties – Notes 2

- A *Service* represents a particular, described, pattern of behavior
  - Eg, “haircut”
- Not an instance
  - Eg, not “the haircut that I had yesterday”
- Different patterns of behavior can be different services or the same service, at the discretion of whoever is populating the ontology
  - Eg, “haircut” could include both “normal” and “demon barber” behavior patterns, or
  - “normal haircut” and “demon barber special” could be separate instances of *Service* – perhaps of a “Haircut” subclass of Service
- *Effect* is similar to OASIS *Real-World Effect*

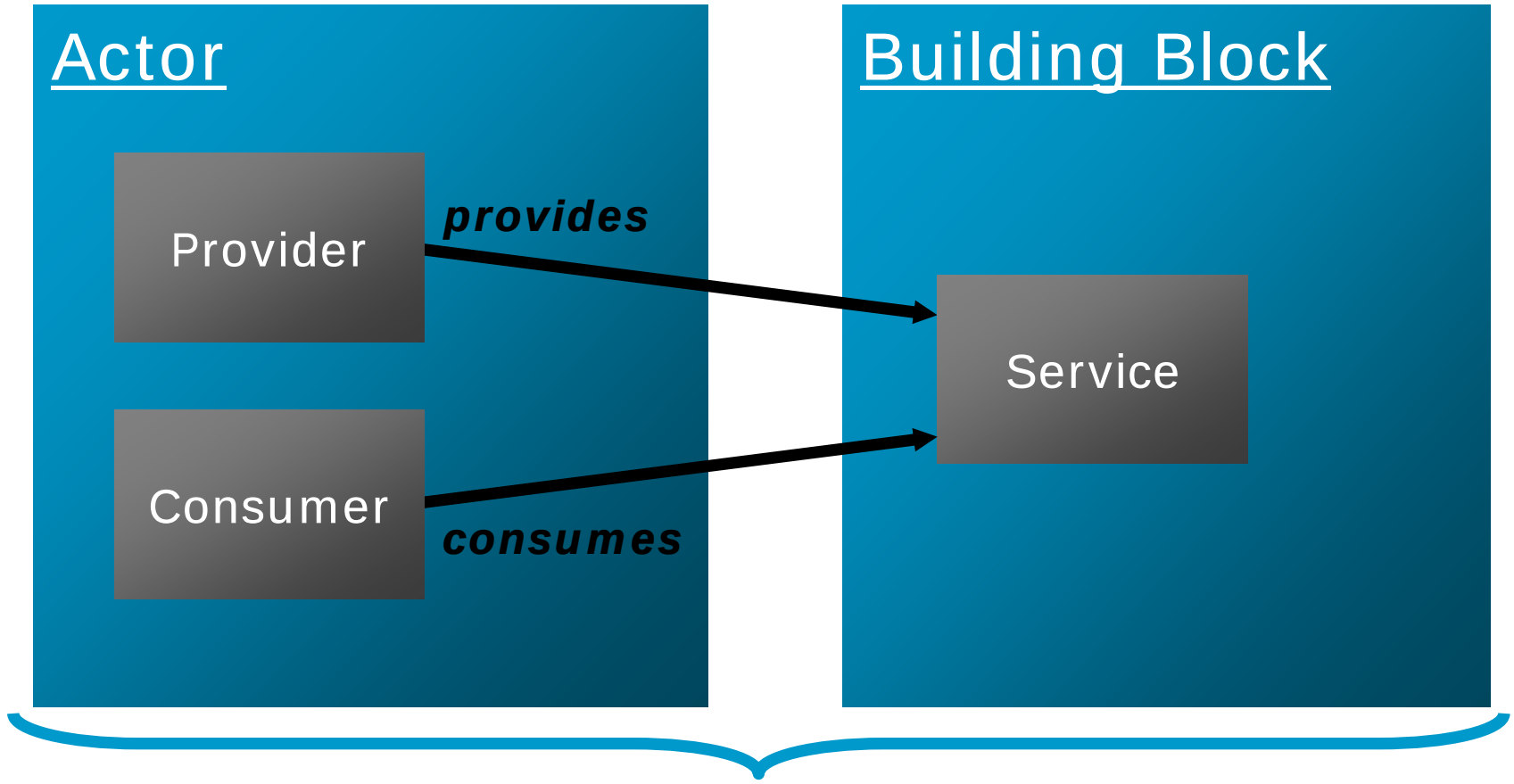
Open SOA Ontology – Provider and Consumer



Provider and Consumer - Notes

- *Provider* and *Consumer* are subclasses of *Actor*
- *Provider* is domain of *provides*
- *Consumer* is domain of *consumes*
- *provides* and *consumes* are not just transient relations
  - *provides* includes *provides at this instant, has provided,* and *may in future provide*
  - *Consumes* is similar

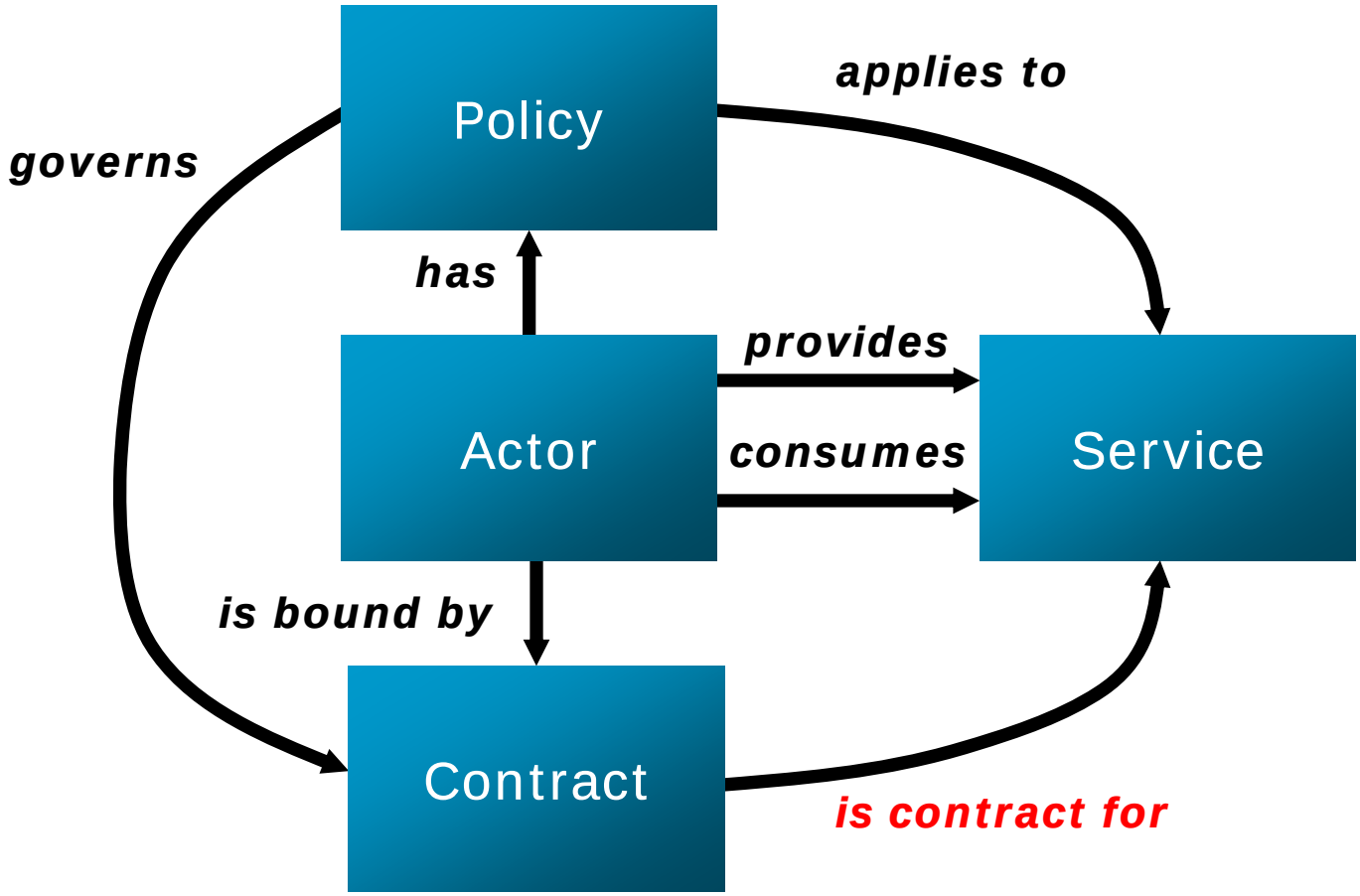
Open SOA Ontology – Relation to TOGAF



Relation to TOGAF - Notes

- TOGAF classifications of *Building Block* – *Business, Technology, Solution, Operation* etc. – define subclasses of *Service*
- TOGAF properties of Building Block – *continuum, domain, input elements*, etc. – are inherited by *Service*

Open SOA Ontology – Contract and Policy



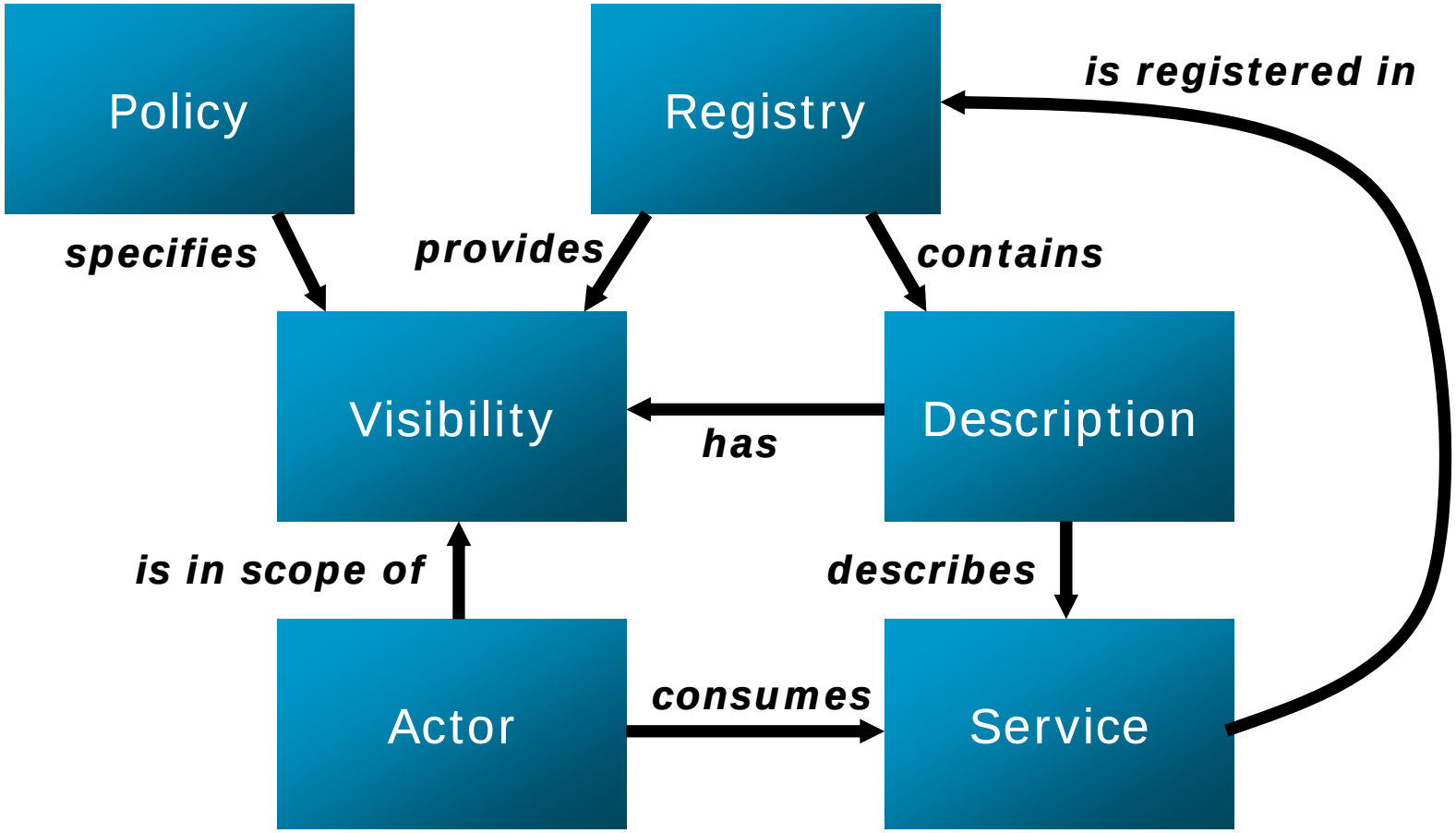
Contract and Policy – Notes 1

- According to OASIS, a *Contract* is agreed between two or more parties, while a *Policy* is operated by a single party.
- The idea of a *Contract* or *Policy* having a *Description* has been omitted. This makes things simpler.
- An applicable *Policy* is not necessarily owned by a service *Provider* – or *Consumer*.
  - Eg, government food and hygiene policy (law) applies to provision of restaurant service
  - In an enterprise, corporate policy may apply to provision of services by divisions or departments

Contract and Policy – Notes 2

- A *Policy* is the policy of a single *Actor*
- A *Policy* can apply to multiple *Services*
- A *contract* binds multiple *Actors*
- A *Contract* is contract for a single *Service*
- The followsPolicy property (with domain *Actor*) was unnecessary and has been removed.

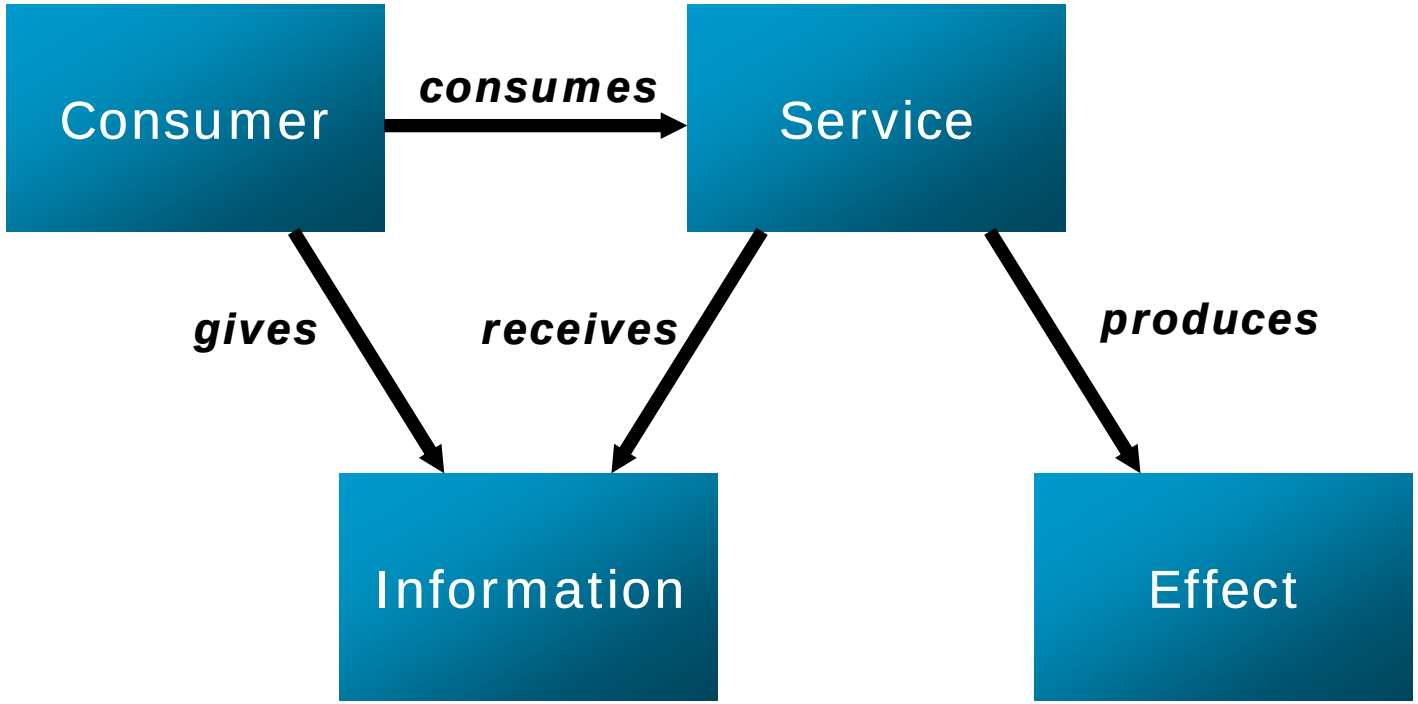
Open SOA Ontology - Visibility



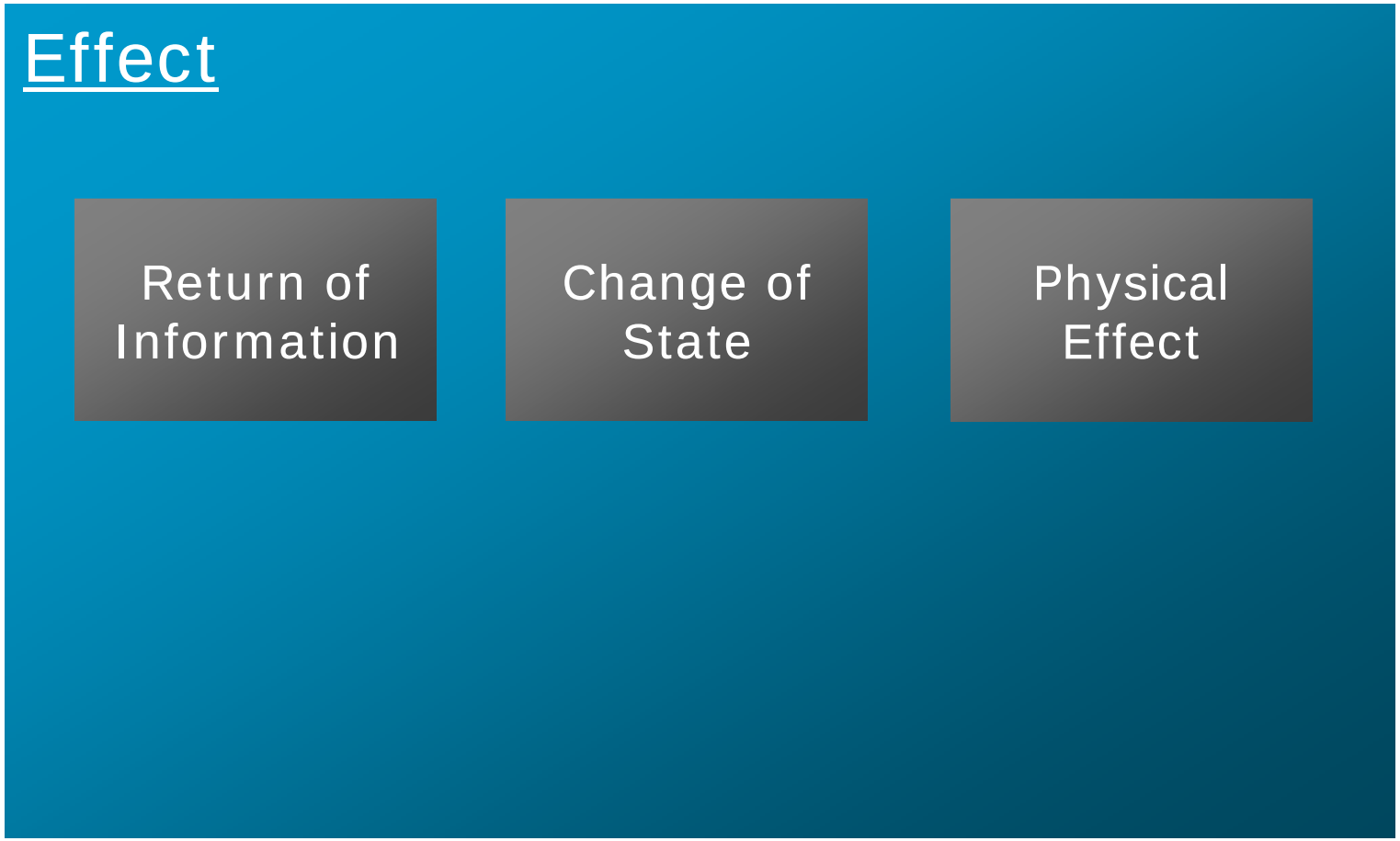
Visibility - Notes

- Instances of *Visibility* could be “Public”, “Acme Inc Enterprise-Wide”, “Members of soa-ontology mail list”, etc.
- A *Description* describes a single *Service*.
- A *Description* can be contained in multiple *Registries*.
- A *Description* can therefore have multiple *Visibilities*.

Open SOA Ontology – Service Consumption



Effect



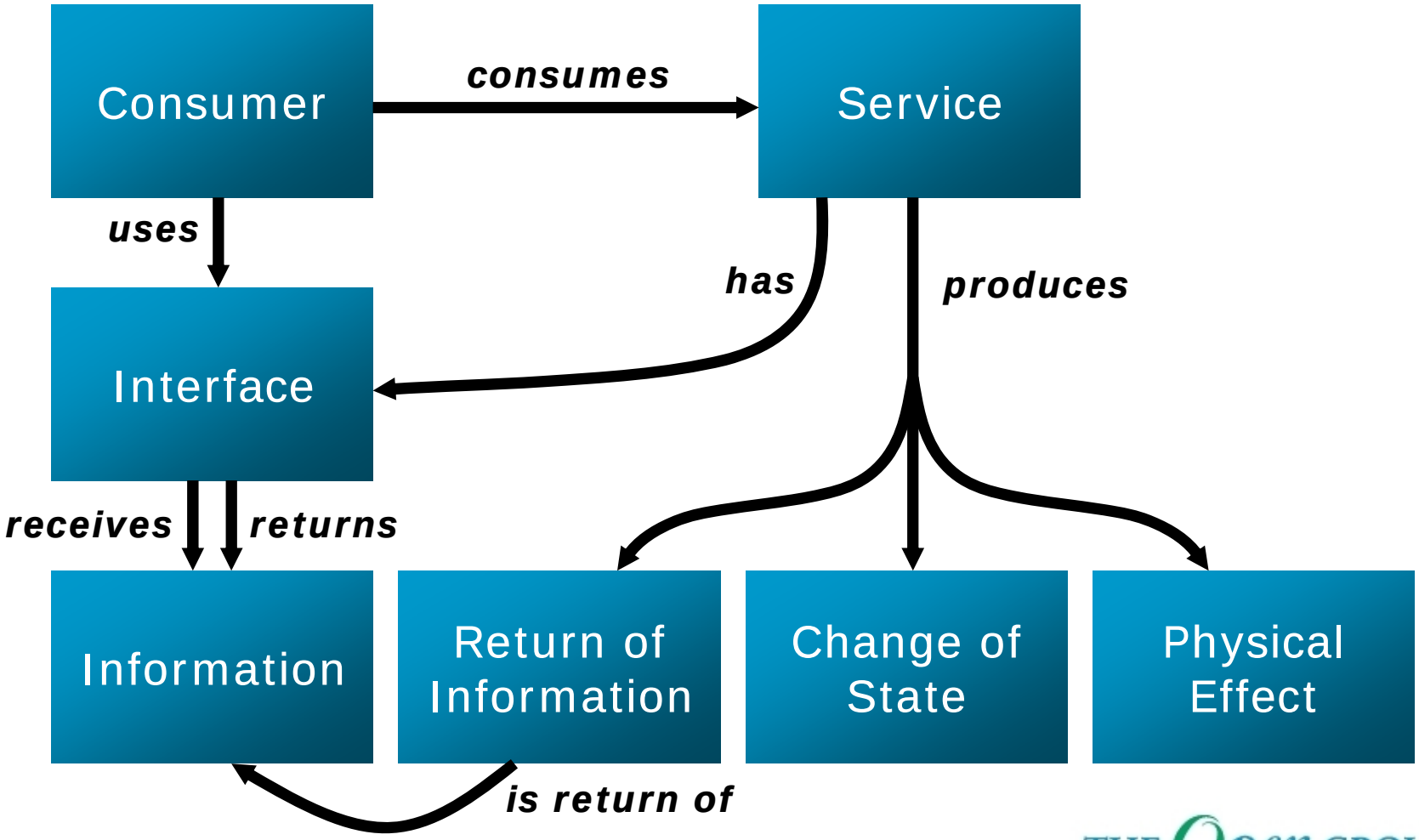
Effect - Notes

- In the OASIS model, a *Real-World Effect* can consist of the return of *Information*.
- OASIS also identifies *Change of Shared State* as a possible *Real-World Effect*
- A *Physical Effect* is clearly another possibility
  - If I consume a haircut service, there is the physical effect that my hair is shorter

Viewpoints

- The preceding slides are all valid from business, technical, and operational viewpoints
- For a model-driven approach, we need to look specifically from a technical – *developer* - viewpoint
- Although we look from a technical viewpoint, implementation is not necessarily restricted to technology.
  - A service could still be provided by a person or organization, for example

Open SOA Ontology – Service Consumption: Developer Viewpoint



Service Consumption: Developer Viewpoint - Notes

- An *Interface* is an interface of a single *Service*.

Web Resources – Open SOA Ontology

- **The Open SOA Ontology, Draft 0.7**
  - http://www.opengroup.org/projects/soa-ontology/uploads/40/12380/soa07.owl
- The Open SOA Ontology, Draft 0.6
  - http://www.opengroup.org/projects/soa-ontology/uploads/40/12147/soa.owl
  - Superseded by Draft 0.7, but used by the examples

Web Resources – Healthcare Examples

- Particular Example Ontology – Healthcare (imports the Open SOA Ontology Draft 0.6)
  - http://www.opengroup.org/projects/soa-ontology/uploads/40/12148/healthcare.owl
- Particular Example Ontology – Acme Healthcare (imports the Open SOA Ontology Draft 0.6 and the Example Healthcare Ontology
  - http://www.opengroup.org/projects/soa-ontology/uploads/40/12149/acmehealth.owl

Web Resources – Example Business Ontologies

- What kind of business service do I need?
  - http://www.opengroup.org/projects/soa-ontology/uploads/40/12150/business-types.owl
- I know what kind of service I need - how do I find one?
  - http://www.opengroup.org/projects/soa-ontology/uploads/40/12151/businesses.owl

(Very incomplete, but should indicate what such ontologies might look like)

Web Resources – Credit Risk Assessment

- Imports the Open SOA Ontology (Draft 0.6), but does not add any classes or properties
- Gives instances of two services:
  - a lending service operated by a bank and implemented through a combination of people and technology
  - a credit risk assessment service operated by a credit bureau and purely technology based, with a description in a service registry through which it can be discovered, and an interface via which it can be consumed.
- Includes instances of consumers, providers, policies and other concepts related to the service instances.
  - http://www.opengroup.org/projects/soa-ontology/uploads/40/12152/risk-assessment.owl

Discussion

Comments and Feedback on the Draft Open SOA Ontology

Relation to Domain Ontologies

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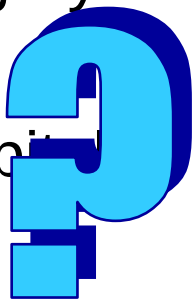

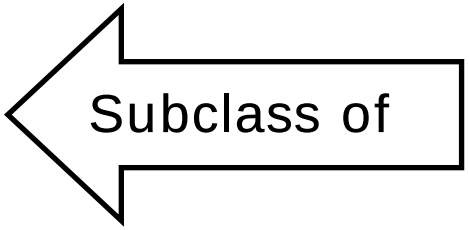

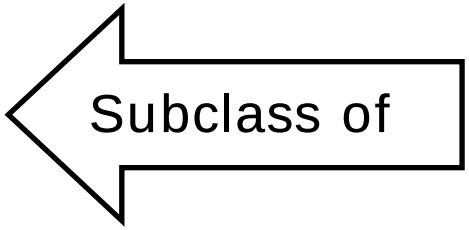

Communities of Use

- Each community will have its own concepts
  - Should these all be included in a single ontology?
  - Or should we have a group of related ontologies, one for each community?

What is *Information*?

- Need to define subclasses and properties
- Beware of “the treachery of information” – we are modeling *information about information*
  - Do we need OWL-FULL?
    - To relate our *Information* class to RDF/OWL *Class* and *Property* classes
  - Do we use the approach of OWL-S – see http://www.ai.sri.com/daml/services/owl-s/1.2/Process.owl
  - Would an ISO 11179 approach help?

Next Steps

- The Open Group
  - Absorb feedback
  - Develop the generic ontology further
- Collaboration
  - Discussion of issues
  - Ongoing review and feedback on the ontology

Open SOA Ontology

Thank you!