

Web Ontology Language for Service (OWL-S)

The idea of Integration of web
services and semantic web

Introduction

- **OWL-S** is an ontology, within the OWL-based framework of the [Semantic Web](#), for describing [Semantic Web Services](#). It will enable users and software agents to automatically discover, invoke, compose, and monitor Web resources offering services, under specified constraints.

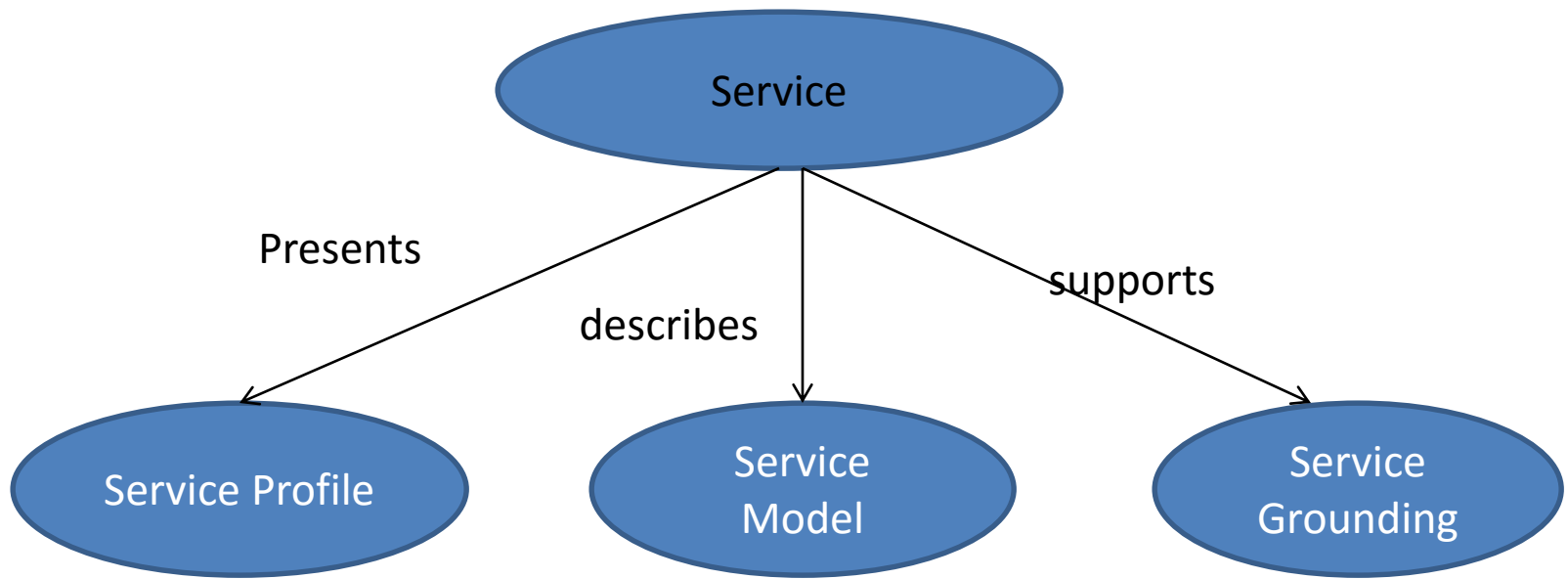
Next generation web services

- OWL and OWL-S are the building blocks for semantic web services
- WSDL(Web services description language) and SOAP(Simple object Access protocol) for the XML- based web services.

OWL-S ontology

- Discovery – Automatically discover a web service
- Invocation – Automatically determine how to invoke a service
- Composition- software should select and combine number of web services
- Monitoring- Agent software must monitor the services.

Ontology of Services



Service Profile

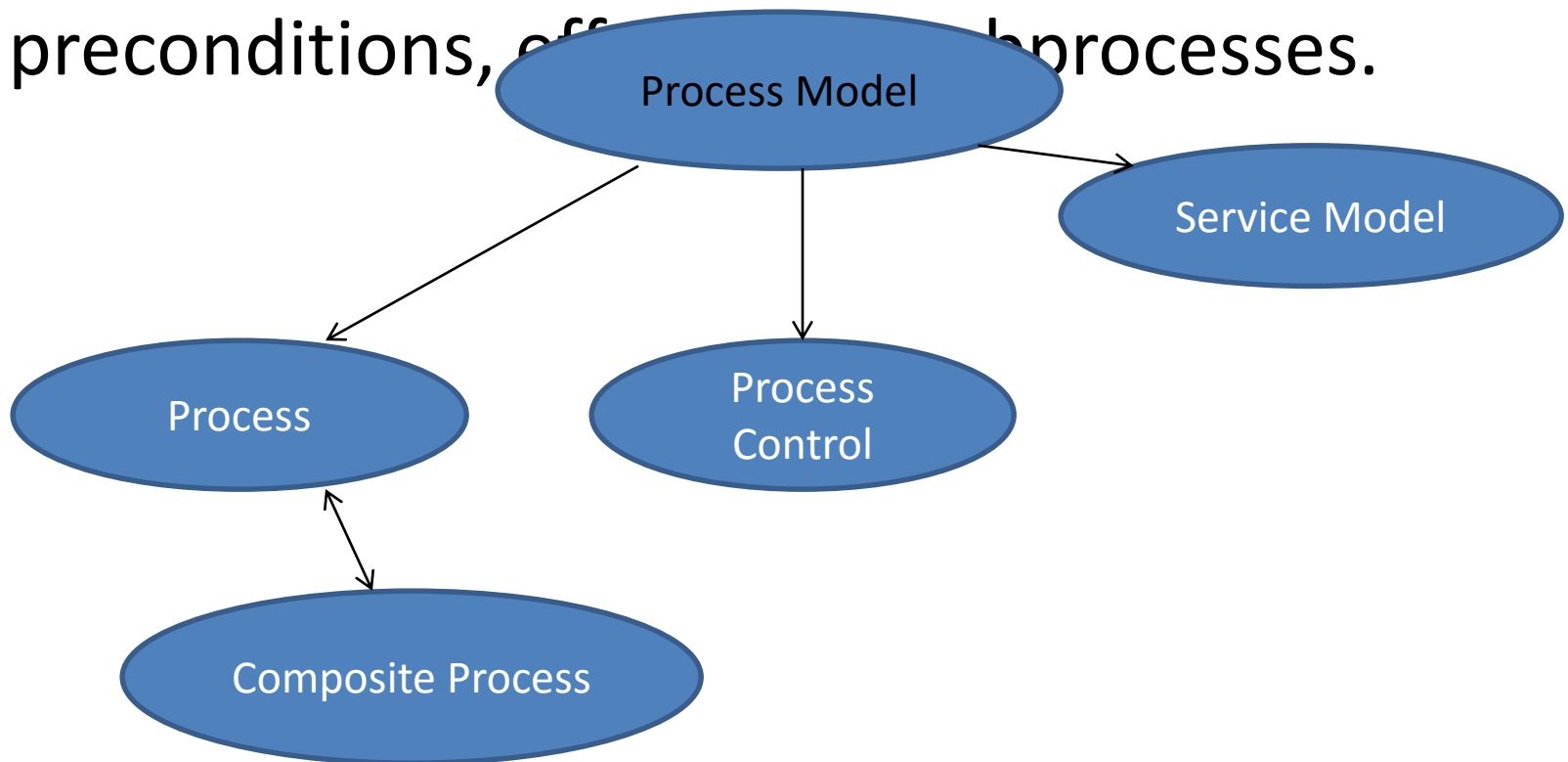
- Service Profile describes service in three terms
 - what service is provided by organisation
 - what functions the service computes
 - what features characterize the service
- Two functions performed by Service profile are
 1. Information transformation
 2. state change produced by execution of service

Service Profile

- Info transformation includes the input and output properties
- The state of execution of service is driven by “precondition and effect properties” where precondition presents logical conditions that must be satisfied prior to the service and effects are the results of the service.

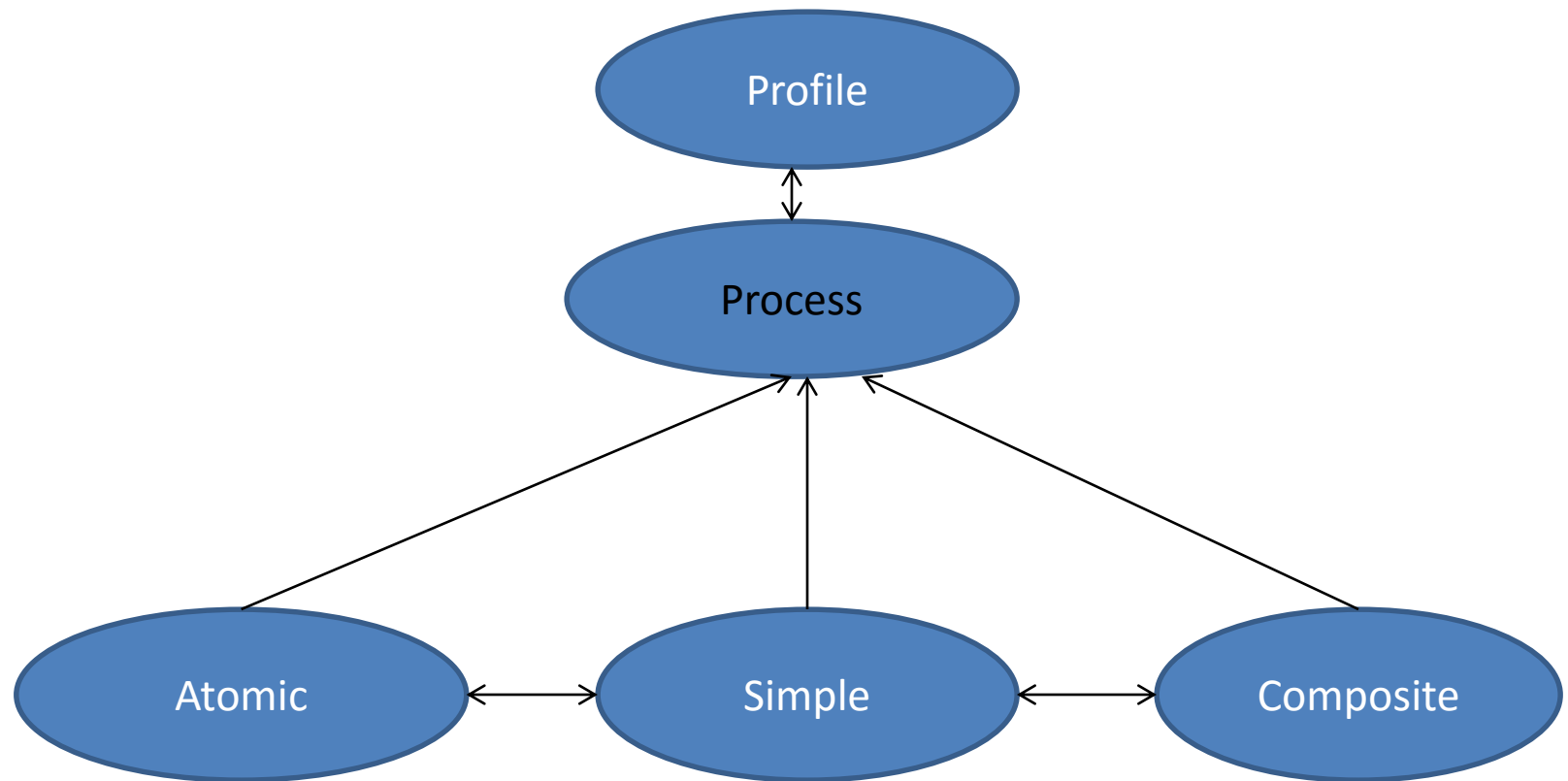
Service Model

- Describes services with inputs, outputs, preconditions, effects, and subprocesses.



Process Ontology

- OWL-S describes three types of processes



Process Ontology

- Atomic Process – invoked directly and executed in single step. Has grounding which enables service requester to construct messages.
- Simple Process – provide either a view of atomic process or a simplified representation of composite process.

Process Ontology

- Composite Process – Decomposable into other processes. Have a “ComposedOf” property which is indicated for the control structure of the composite using a control construct.
- Constructs – associated with components to indicate the ordering and conditional execution of the subprocesses. Has a property that ranges over a “ProcessComponentList”.

Process Ontology

- Process Control Ontology – uses a model with mapping rules for input state properties and preconditions to monitor and control the execution of a process.
- Service Grounding – specifies the details of how to access the service, including protocol and message formats, serialization, transport and addressing.

Relationship between OWL-S, WSDL and SOAP

- WSDL specifies abstract types using XML schema, but OWL-S allows for the definition of logic based OWL classes.
- OWL-s/wSDL grounding uses owl classes as the abstract types
- Its useful to extend existing wSDL bindings for OWL-S such as the SOAP bindings.
- OWL-s concept of grounding is generally consistent with the WSDL concept of binding.

Creating OWL-S ontology for Web services

- Describe individual programs that comprise the service.
- Describe grounding for each atomic process and relate each atomic process to grounding.
- Describe compositions of atomic processes
- Describe a simple process for each service
- Profile description

Conclusion

- Building blocks for next generation of Web services has been discussed
- State of development of Web ontology language for services (OWL-S)
- Discussed related web architectures and grounding OWL-S services with WSDL and SOAP.