

Overview of Web Service Technology

Lapps Grid Group

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Outline

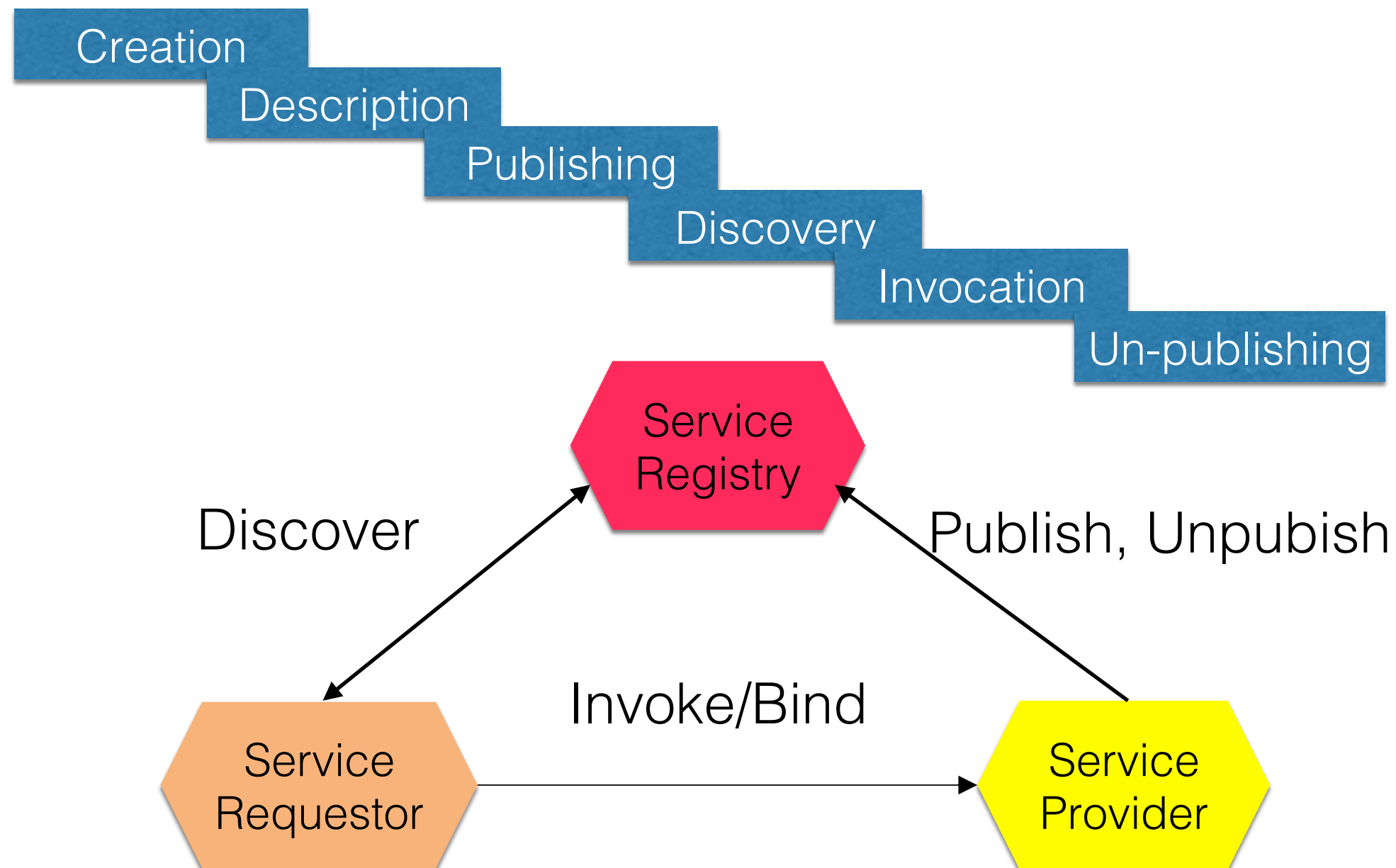
- Introduction
- Web Service Model
- Web Service Techniques
- Service Oriented Architecture
- Conclusion

What is Web Service

- A Web service is a software system designed to support **interoperable** machine-to-machine interaction over a network (W3C).
- Web Services are **self-contained, modular, distributed, dynamic** applications that can be described, published, located, or invoked over the network to create products, processes, and supply chains (IBM).
- A Web service is a collection of **open protocols** and **standards** used for exchanging data between applications or systems (tutorials point).

Web Service Model

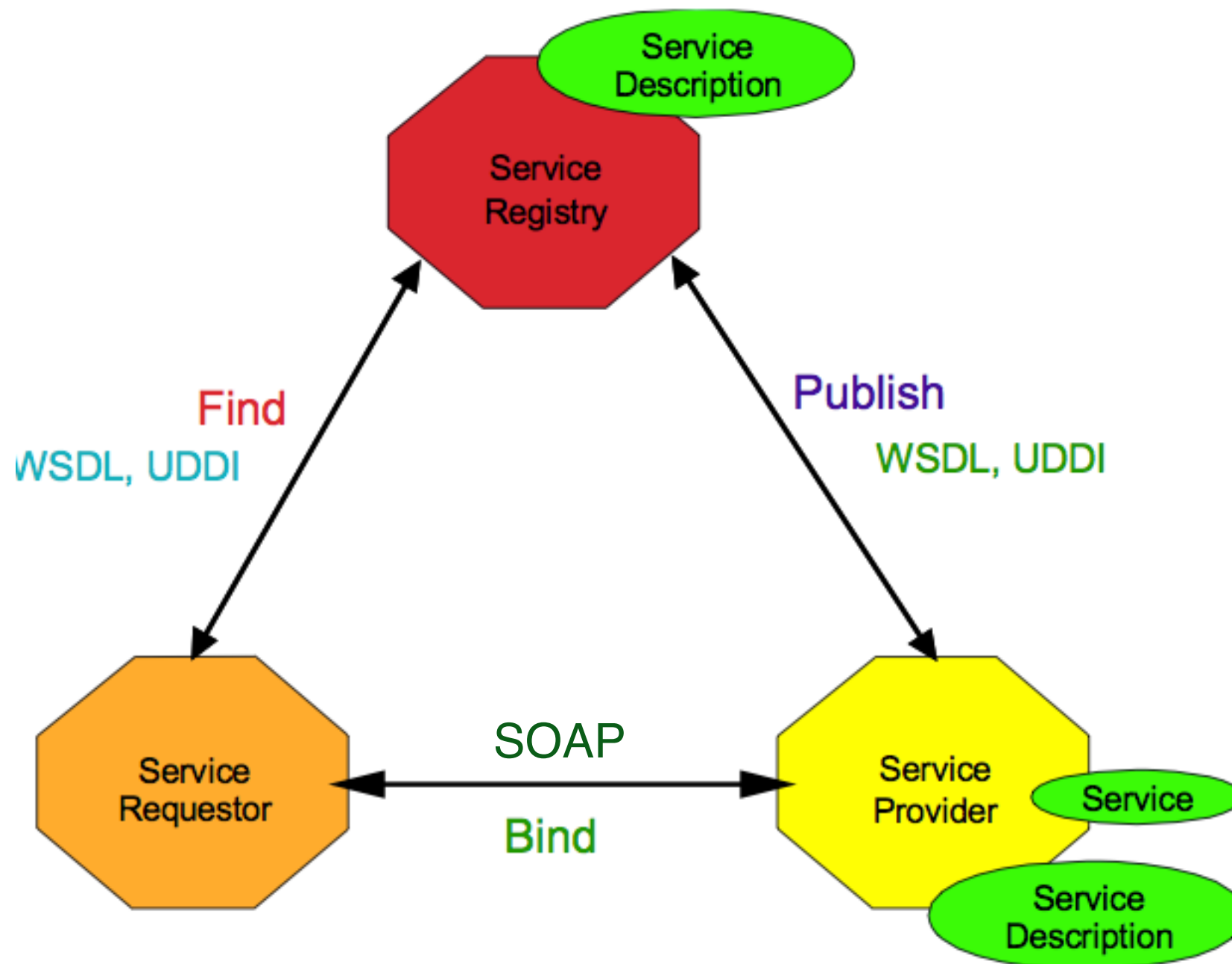
- Basic Activities and Three-Role Model



Web Service Techniques

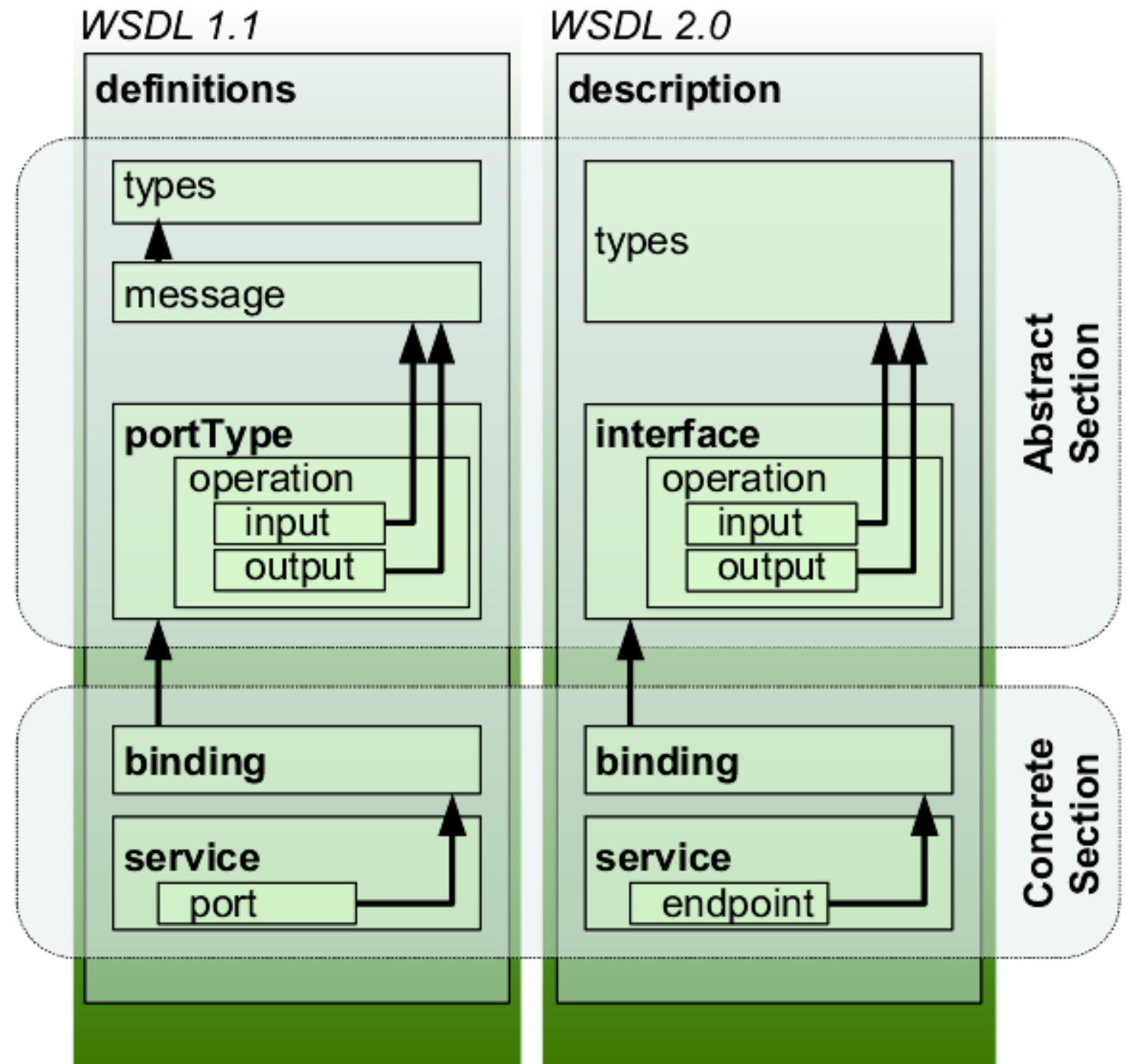
- The web services description language (WSDL)
 - WSDL plays a role analogous to **Interface Definition Language** (IDL) used in distributed programming
- The simple object access protocol (SOAP)
 - SOAP is a standard for **sending messages and making remote procedure calls** over the Internet. It is independent of the programming language, object model, operating system and platform.
- Universal description, discovery, integration (UDDI)
 - UDDI defines a **common means to publish information** (type of service, locate information) about businesses and services.

How SOAP, WSDL and UDDI are Related?



WSDL

- **types**: “a container for data type definitions using some type system (such as XSD)”.
- **portType/interface**: “an abstract set of operations supported by one or more endpoints”.
- **binding**: “a concrete protocol and data format specification for a particular port type”.
- **port/endpoint**: “a single endpoint defined as a combination of a binding and a network address”.



```

<definitions.... >
  <types>
    <xsd:schema .... />
  </types>
  <import namespace="http://www.xml.com/tls/schema"
    Location=http://www.xml.com/tls/schema/car.xsd/>
  <message name="getID">
    <part type="xsd:intger"/>
  </message>
  <portType name="CarInterface">
    <documentation>
      Get Car Details operation.
    </documentation>
    <operation name="getCarDetails">
      <input message="tns:rentCar"/>
      <output message="tns:rentCarResponse"/>
    </operation>
    <operation name="UpdateCarDetails">
      .....
    </operation>
  </portType>
  <binding name="CarBinding" type="tns:CarInterface">
    <soap:binding style="document"
      Transport=http://schemas.xmlsoap.org/soap/http/>
    <operation name="GetCarDetails">
      .....
    </operation>
  </binding>
  <service name="CarService">
    <port binding="tns:CarBinding" name="CarPort">
      <soap:address location=http://www.localhost:8080/car/>
    </port>
  </service>
</definitions>

```

WSDL 1.1 elements

Type

Message

PortType

Binding

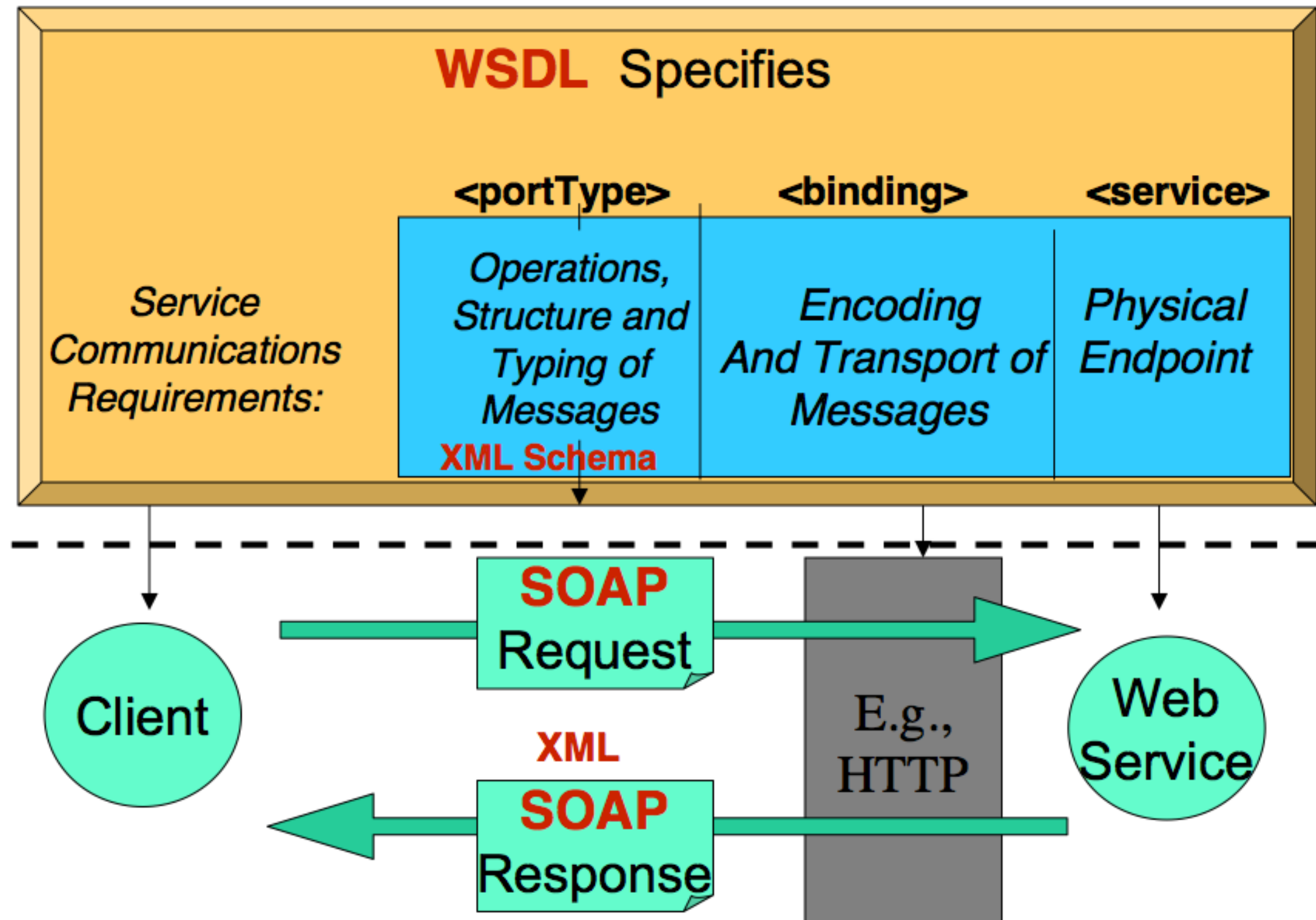
Service
Interface
Definition

Service

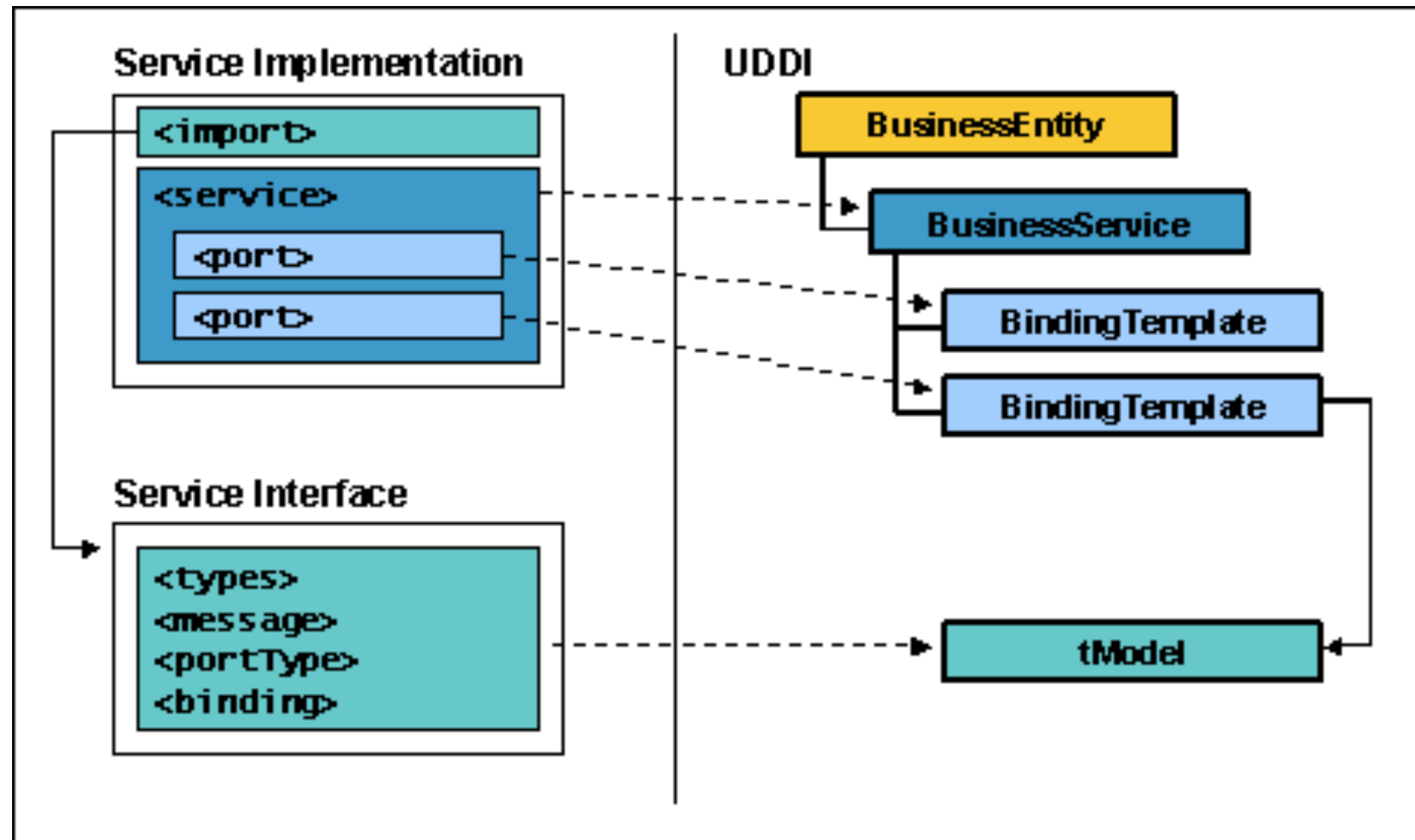
Port

Service
Implementation
Definition

WSDL to SOAP Mapping

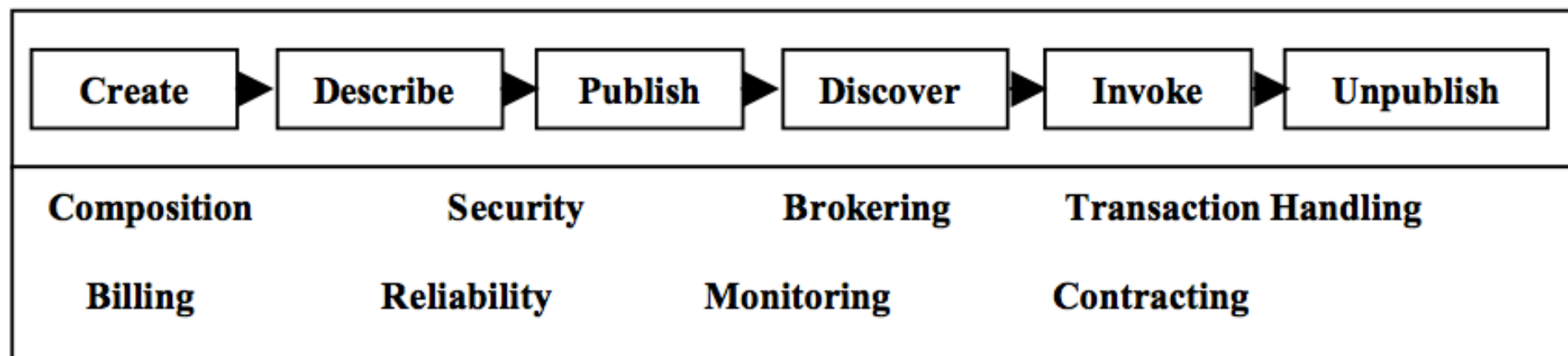


WSDL to UDDI Mapping

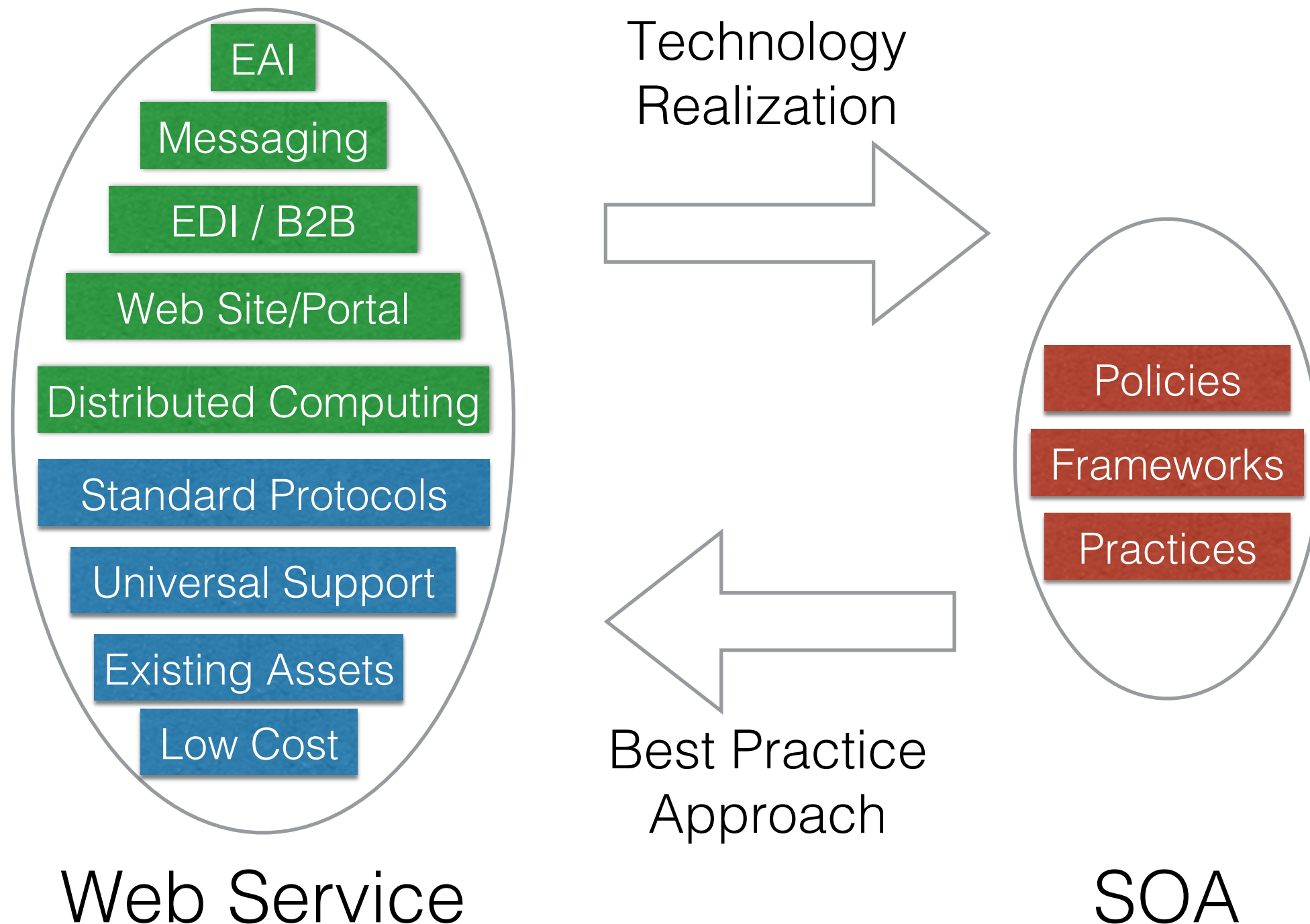


Service Oriented Architecture

- Definition:
 - Service-oriented architecture (SOA) is a software design and software architecture design pattern based on discrete pieces of software providing application functionality as services to other applications.
- Characteristics
 - Interoperable, Loosely Coupled, Reusable, Scalable
- Value-Added Layer

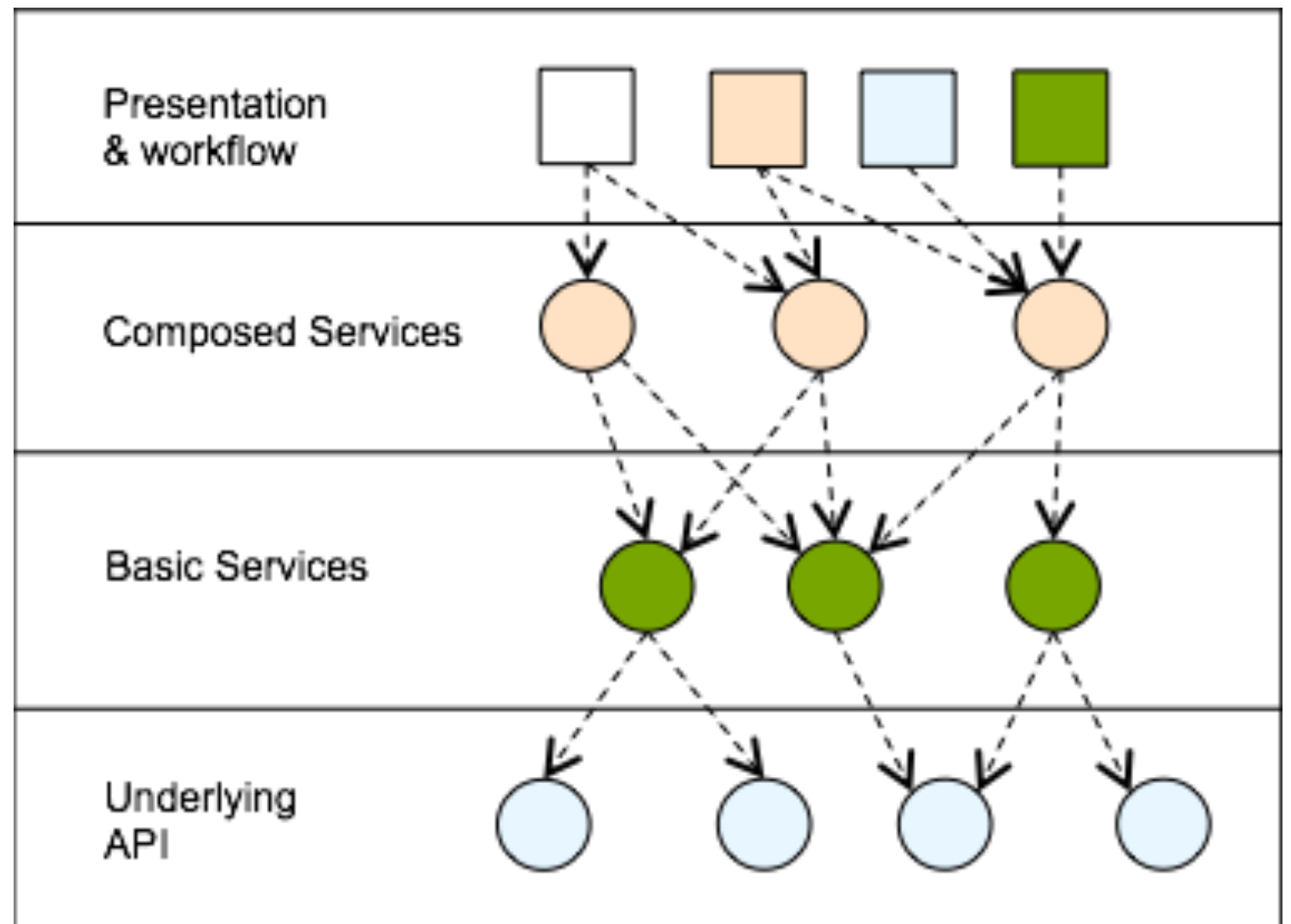


Web Service and SOA



Layers of SOA

- Flexible composition.
- Reuse.
- Functional standardization in lower levels
- Customization in higher layers
- Separation of concerns.
- Policies may vary by layer



Conclusion

- Web Service
 - Available, interoperable, self-contained, modular, distributed, dynamic, of open protocols and standards
- Web Service Techniques
 - SOAP, WSDL, UDDI
- Service Oriented Architecture
 - Greater added value that applications become more flexible
 - Interoperable, loosely coupled, reusable, scalable

Reference

- Wikipedia: http://en.wikipedia.org/wiki/Web_Services_Description_Language
- Wikipedia: [http://en.wikipedia.org/wiki/SOAP_\(protocol\)](http://en.wikipedia.org/wiki/SOAP_(protocol))
- Wikipedia: http://en.wikipedia.org/wiki/Web_service
- Wikipedia: <http://en.wikipedia.org/wiki/XML-RPC>
- Wikipedia: http://en.wikipedia.org/wiki/Service-oriented_architecture
- Web Services Conceptual Architecture (WSCA 1.0) May 2001. By Heather Kreger IBM Software Group.
- Web Services Technologies : State of the Art. Albreshne, Abdaldhem; Fuhrer, Patrik; Pasquier, Jacques. September 2009.
- Web Services Technologies XML and SOAP WSDL and UDDI Version 16, Object Management Group, http://www.omg.org/news/meetings/workshops/MDA-SOA-WS_Manual/00-T1_Newcomer/CH2-WSTechnologies_V16-Standard.pdf
- Understanding WSDL in a UDDI registry, <http://www.ibm.com/developerworks/library/ws-wsdl/>
- Service Oriented Architecture: Right on Track, TechNet & MSDN, Microsoft.
<http://download.microsoft.com/download/e/9/d/e9d163db-5c96-46bc-9263-aac62fc38831/Service%20Oriented%20Architecture.pdf>