SOAP and WSDL

Oxford University
Software Engineering
Programme
June 2016

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- Understanding WS-*
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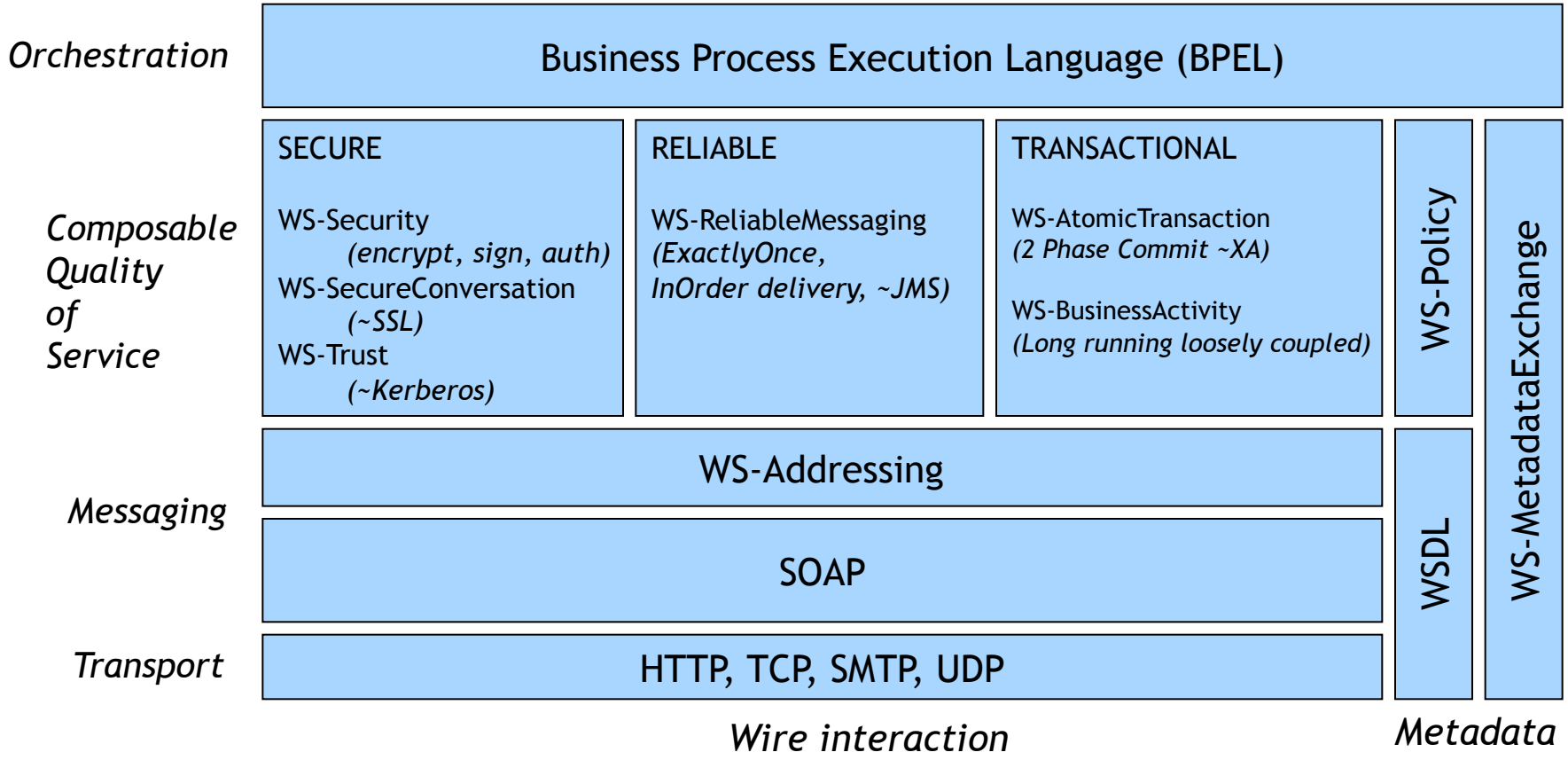
- SOAP examples
- WSDL

WS-* Standards

- A set of *extensible* and *composable* standards that work together
- Providing a common, standard, interoperable base to implement SOA

Key Web Services Standards



The Web services platform forms a complete framework for open standards enterprise middleware

Representational state transfer
Protocol

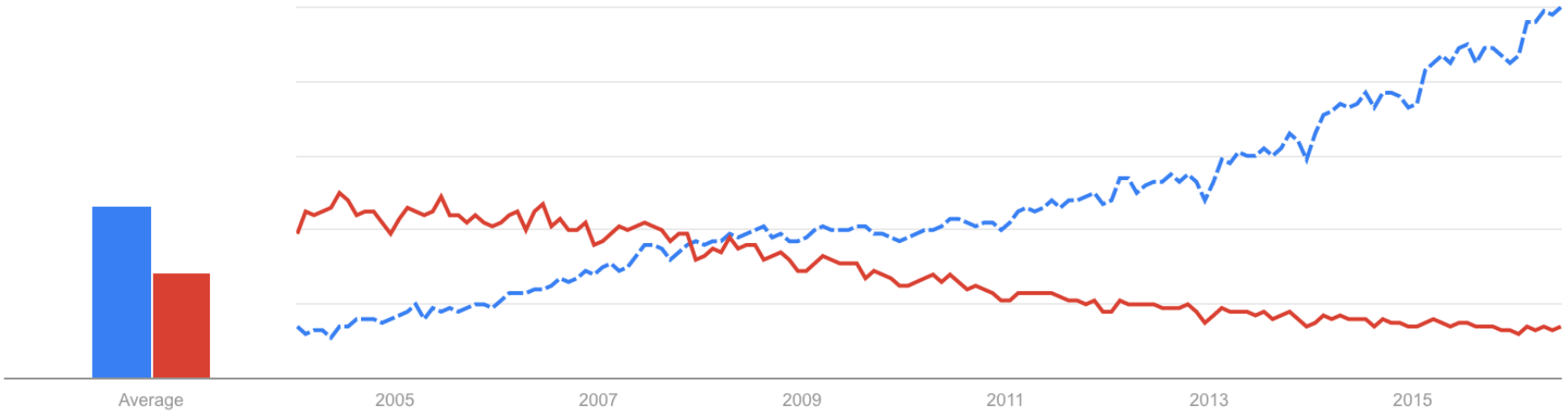
wsdl
Search term

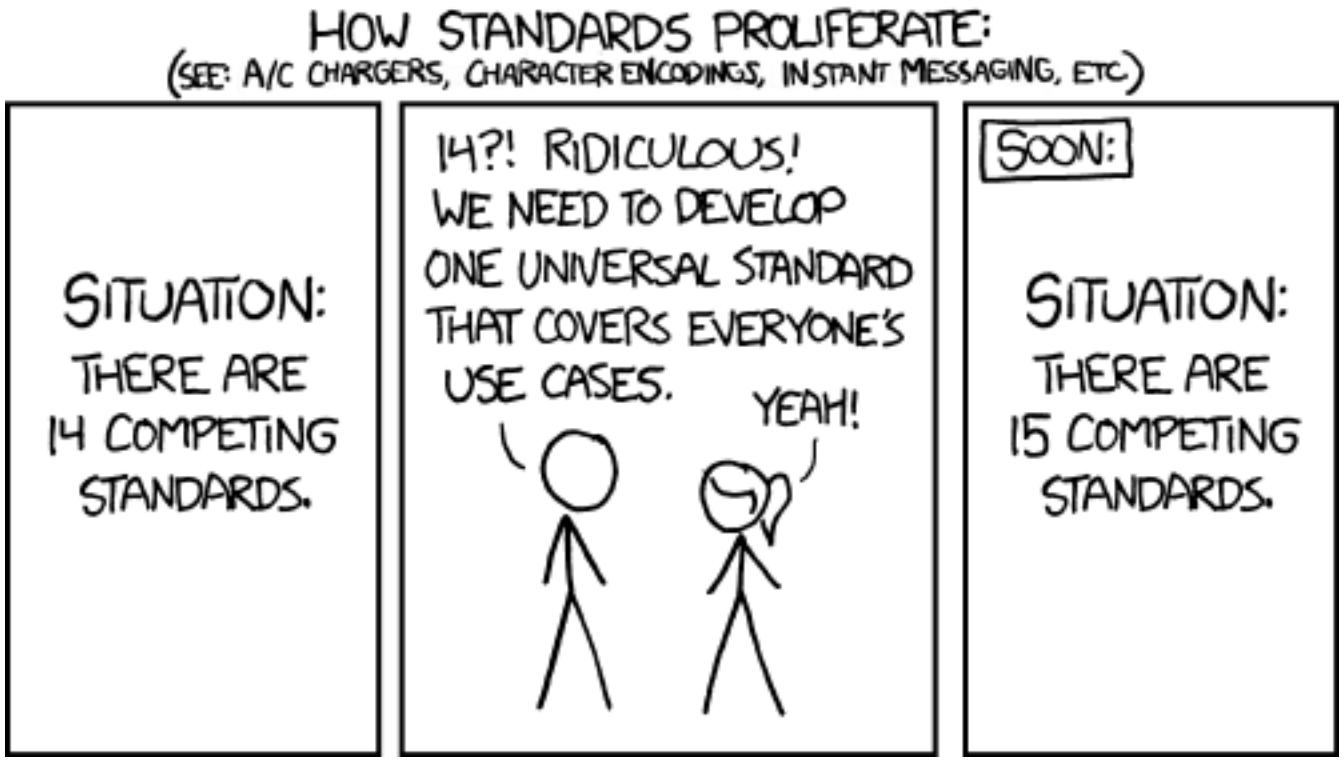
+ Add term

Beta: Measuring search interest in *topics* is a beta feature which quickly provides accurate measurements of overall search interest. To measure search interest for a specific *query*, select the "search term" option.

Interest over time

News headlines Forecast





A Sample SOAP Message

```
<soap:Envelope xmlns:soap="http://
  schemas.xmlsoap.org/soap/envelope/">
 <soap:Header/>
 <soap:Body>
  <getProductDetails       xmlns="http://
  warehouse.example.com/ws">
   <productID>827635</productID> </
  getProductDetails>
  </soap:Body>
</soap:Envelope>
```

A Sample SOAP Message (cont)

```
<soap:Envelope xmlns:soap="http://
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  </soap:Body>
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```

The SOAP header provides a space for arbitrary headers to be added to the message`

A Sample SOAP Message (cont)

```
<soap:Envelope xmlns:soap="http://
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   </soap:Body>
</soap:Envelope>
```

The contents of the SOAP body element can be any valid XML that the parties wish to interchange

Using SOAP Headers

- Some simple examples
  - Add a signature to ensure the message isn't modified
  - Add a process identifier to track this message as part of a wider process
  - Add a userid so that end-to-end security can be guaranteed
  - Add a message number so messages can be resent if lost

What is a service definition?

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- What does it do?
- Where is it?
- Who owns and runs it?
- Is it going to be up on Monday?
- What do I have to do to use it?
- How much does it cost?

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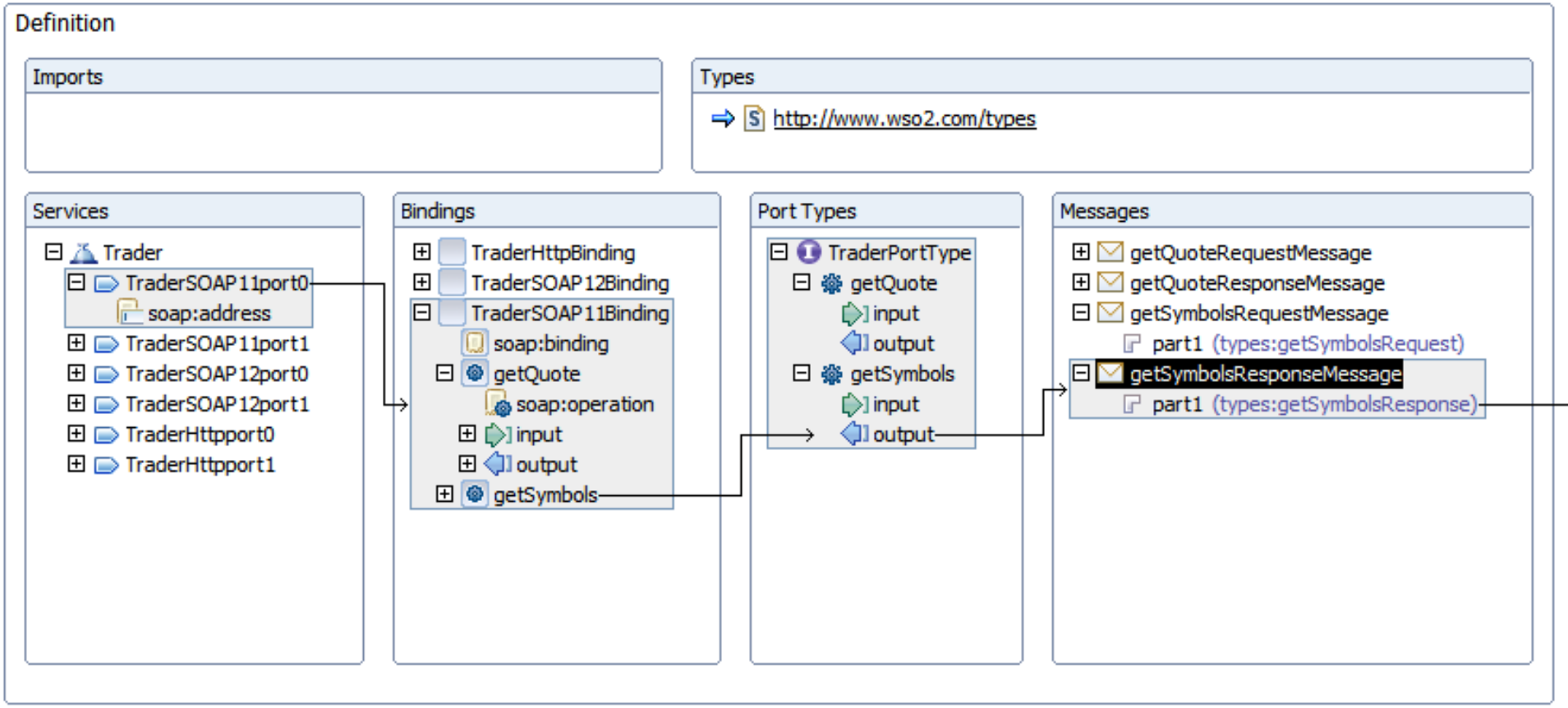
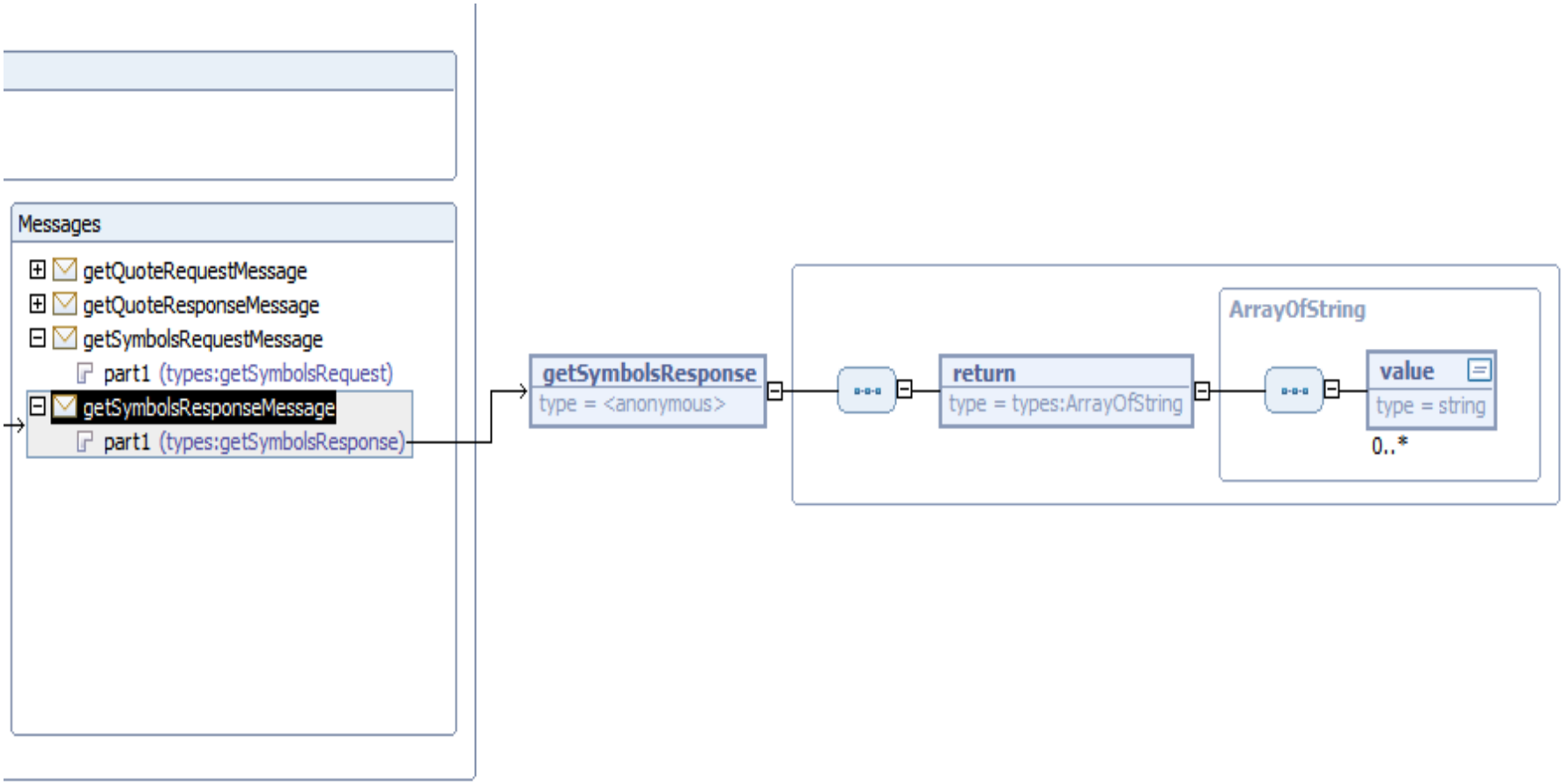
Abstraction

- WSDL splits into:
  - Interface / PortType
    - The abstract interface
  - The Binding
    - The mapping into SOAP or XML/HTTP (or +++)
  - The port
    - The actual endpoint or location

Graphical view of WSDL



WSDL link to Schema



WSDL type definitions

```
<wsdl:types>
   <schema>
   <element name="getQuoteRequest">
    ...
   </element>
   </schema>
</wsdl:types>
```

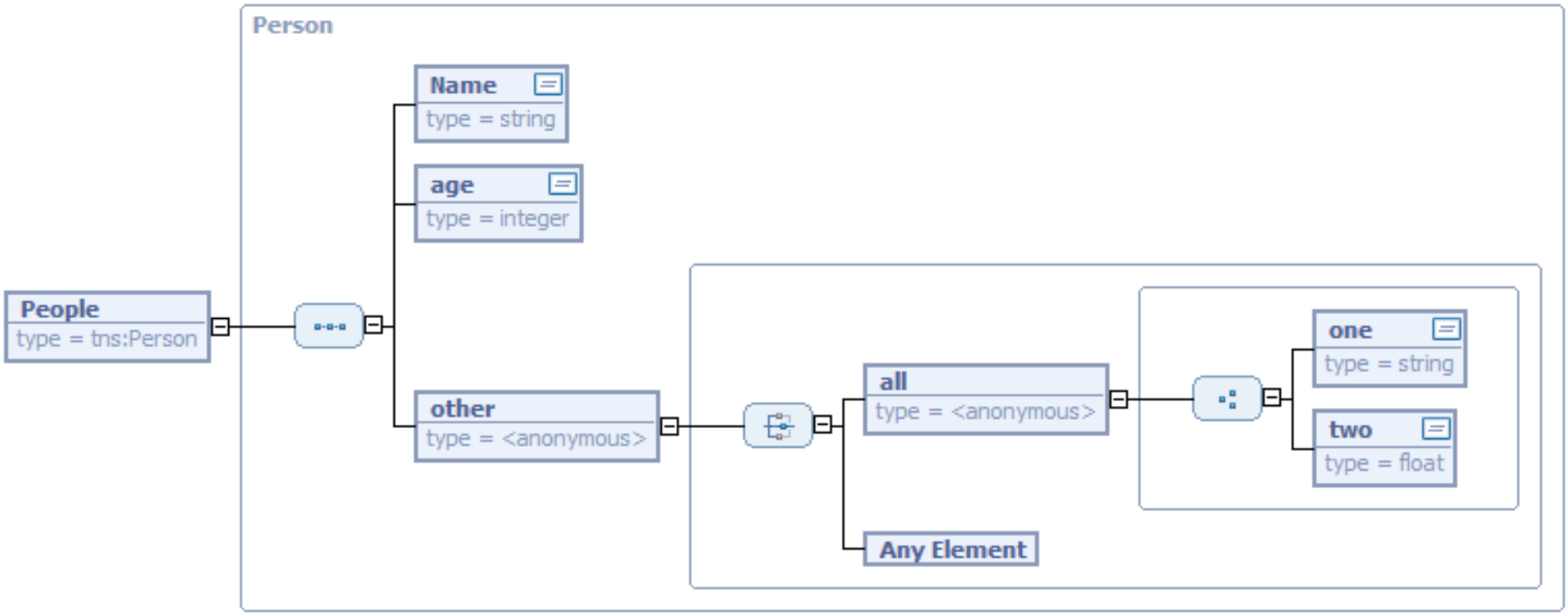
A simple schema

```
<?xml version="1.0" encoding="UTF-8"?>
<schema>
  <complexType name="Person">
    <sequence>
      <element name="Name" type="string“/>
      <element name="Company" type="string”/>
    </sequence>
  </complexType>
  <element name="People" type="tns:Person”/>
</schema>
```

Schema

- Simple types
  - e.g: integer, decimal, string, short, time, unsignedLong, date, any, hexBinary
- ComplexTypes
  - Named or inline
  - sequence, choice, all
- Multiplicity
  - 0..1,1..1,etc

Graphically



Granularity

- Fine-grained
- Are you exposing services or the internals of your application?
- Often the result of taking existing APIs and “service-enabling” them
- Coarse grained
- Generally considered better
- But can be too big
  - Require too much data passed in every request
  - Need to be useful in your enterprise

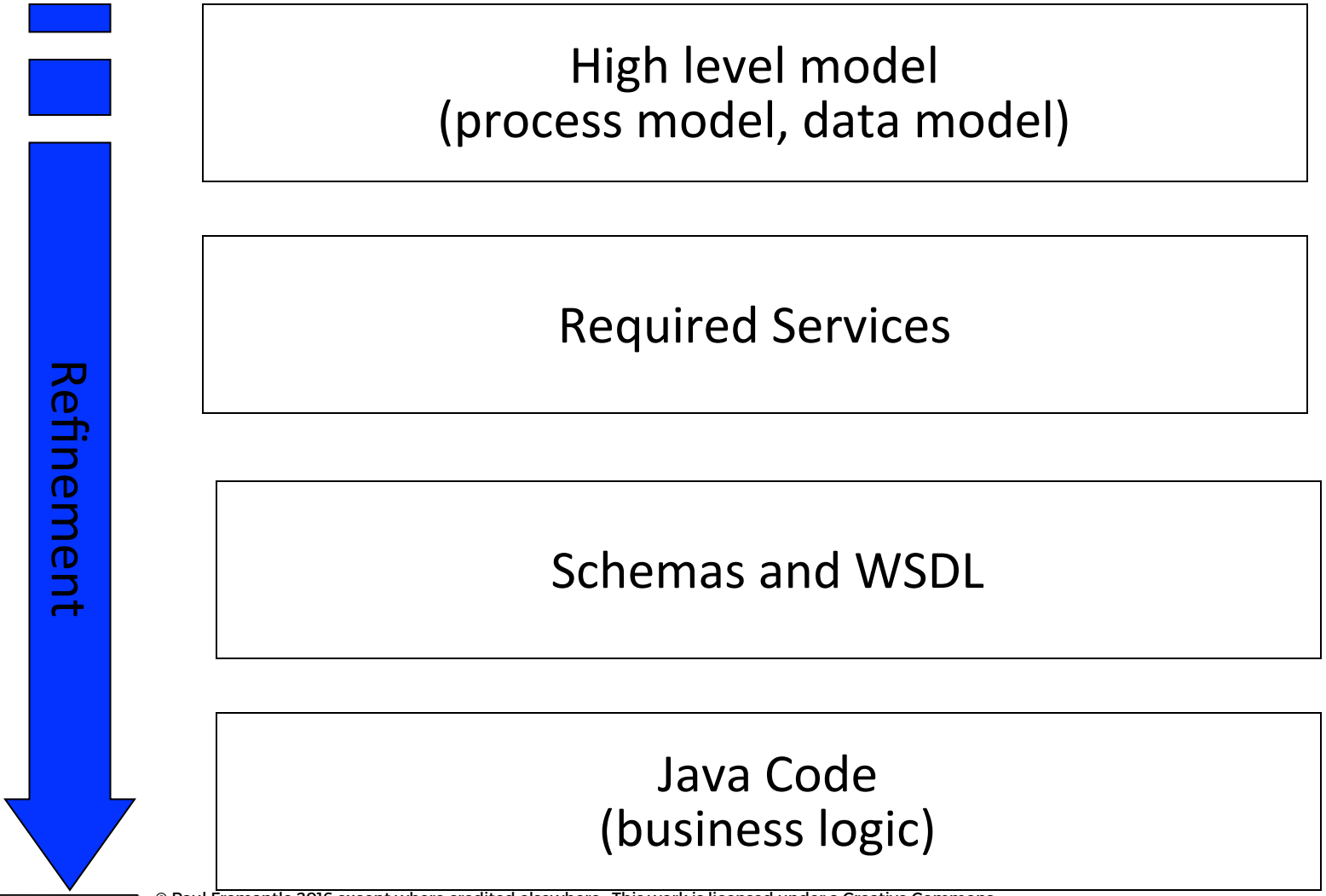
Bottom-up modelling

- Take existing code and expose as services
- Unlikely to expose *re-usable* services
  - Because the existing code was designed to be used within the application
- Quick way to get started

Top-down modelling

- A major undertaking
- Requires a good understanding of the business and business processes
- Various methodologies exist:
  - IBM's SOMA – Service Oriented Modeling Architecture
    - Based on a very high level business analysis
    - Refined down to processes and services
  - A simpler approach is BPEL process modeling and evolve the service definitions from the processes
- If this is a long process it may be counter-productive

Top down design



Why Contract First?

- *Advantages*
  - Agree the external interface
    - Good design principle
    - How Service Oriented Architecture is meant to be
    - Focus the mind on what is most important
  - Improves interoperability
    - WSDL first design leads to much more interop
- *Disadvantages*
  - Need to know WSDL and Schema syntax!

Summary

- SOAP was designed to be a simpler alternative to CORBA
- SOAP has good descriptions and tooling
- However, RESTful approaches rapidly disrupting the market