SOAP implementation technologies

Oxford University
Software Engineering Programme
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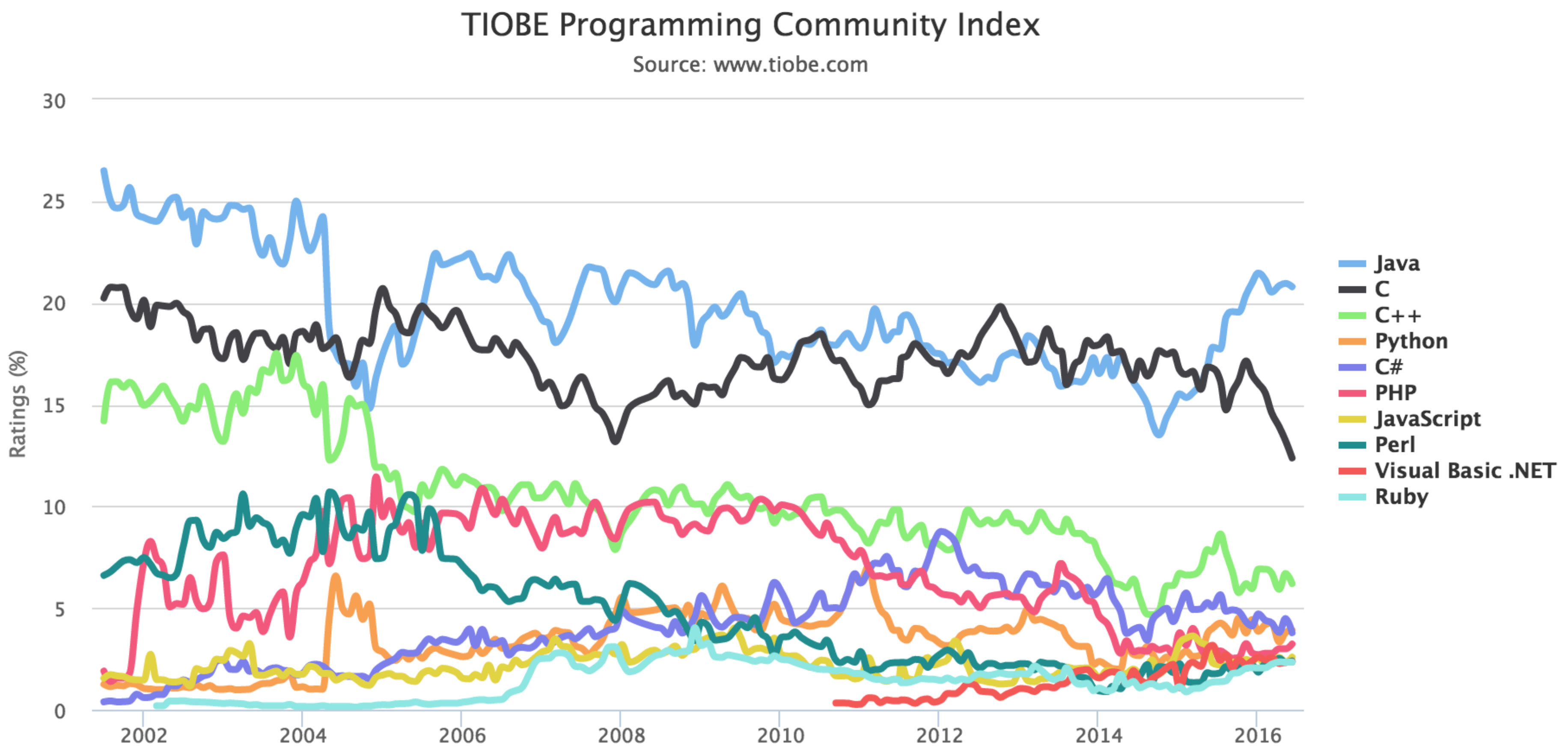
Why use a library?

- WSDL tooling
  - Make it quick and easy
- WS-* extensions
  - WS-Security and related
  - Much less: WS-RM, WS-AT, WS-Addressing

The two major toolkits

- .NET WCF
  - Two implementations
    - Windows
    - Mono
- JAX-WS
  - Multiple implementations
    - Sun, CXF, Axis2, etc

Poor support in other languages is one reason for SOAP's decline



JAX-WS Motivation

- Java API for XML Web Services
  - Currently version 2.2
- Create a standard Java approach to creating and consuming SOAP/WSDL web services
- Based on annotations
- Work with WS-I Basic Profile
- Work with JAX-B (Java API for XML Binding)
- Replaced the (broken) JAX-RPC specification

Two approaches

- Code first:
  - – Create Java code, annotate
  - – Run Java2WS to create WSDL / XSD etc
- Contract first:
  - – Create (or re-use) WSDL / XSD etc
  - – run WSDL2Java to create the Java artefacts

Code first
(annotated POJOs)

- Start with a **P**lain **O**ld **J**ava **O**bject
- Create annotations that document the service definition, binding approach, etc

Common Annotations

- @WebService
- @SOAPBinding
- @WebMethod
- @WebParam
- @OneWay
- @HandlerChain

WebService

Applies to class or interface

All parameters are optional

```
@WebService
    (name = “OrderService”,
    serviceName = "OrderProcess",
     portName = "OrderProcessPort",
    targetNamespace = "http://freo.me/
order",
    wsdlLocation=“path to existing wsdl”)
```

WebService continued

@WebService(endpointInterface = “me.freo.OrderProcess") applies to class only

This allows you to create an interface defining the service/WSDL and a separate implementation. This is especially important for WSDL first operation

SOAPBinding

Applies to class or interface

```
@SOAPBinding(
  style=SOAPBinding.Style.DOCUMENT,
  use=SOAPBinding.Use.LITERAL,
     parameterStyle=
     SOAPBinding.ParameterStyle.WRAPPED)
```

My hint: ALWAYS use Doc/Lit/Wrapped

see http://pzf.fremantle.org/2007/05/handlign.html

Second hint: this is the default so don't use @SOAPBinding!

WebMethod

Applies to Method

```
@WebMethod(
action=“MySOAPAction”, //optional
operationName=“myWSDLop”,
exclude=true) // do NOT expose this
          //  inherited method
```

OneWay

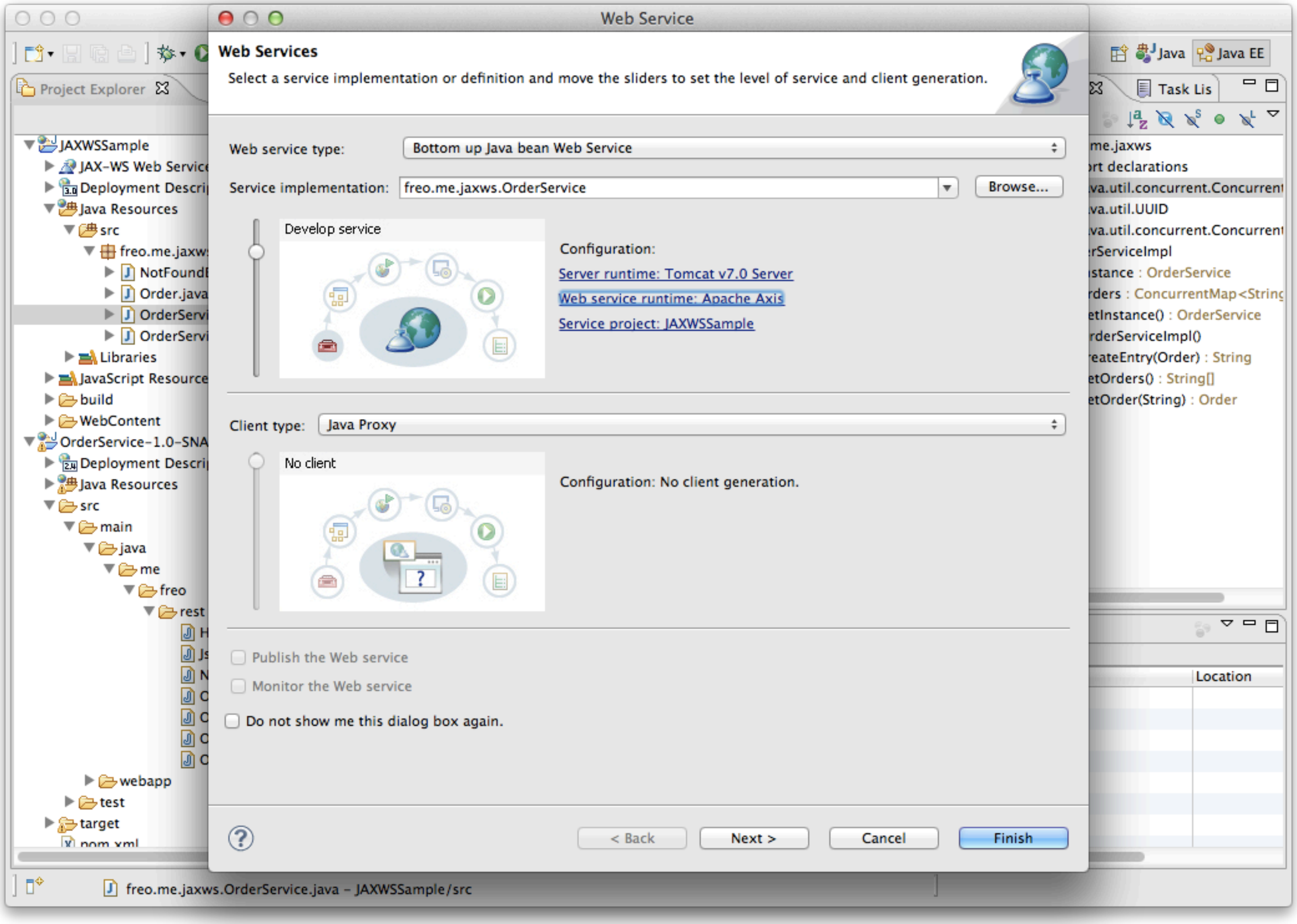
- Applies to a method that is marked @WebMethod
- Indicates that there is no response expected
- Assuming this is over HTTP, there should just be a HTTP 202 Accepted response
- Over JMS, no response message expected

WebParam

- A way of defining the mapping between the XML/SOAP message and the Java Parameters

```
@WebParam(
    name=“nameOfXMLElement”,
    partName=“nameOfWSDLPart”,
    targetNamespace=“xmlNamespace”,
    mode=“IN|OUT|INOUT”,
    header=true|false)
```

Eclipse Web Tools platform



Web Service

Web Services

Select a service implementation or definition and move the sliders to set the level of service and client generation.

Web service type: Bottom up Java bean Web Service

Service implementation: freo.me.jaxws.OrderService

Develop service

Configuration:

Server runtime: Tomcat v7.0 Server

Web service runtime: Apache Axis

Service project: JAXWSSample

Client type: Java Proxy

No client

Configuration: No client generation.

□ Publish the Web service

□ Monitor the Web service

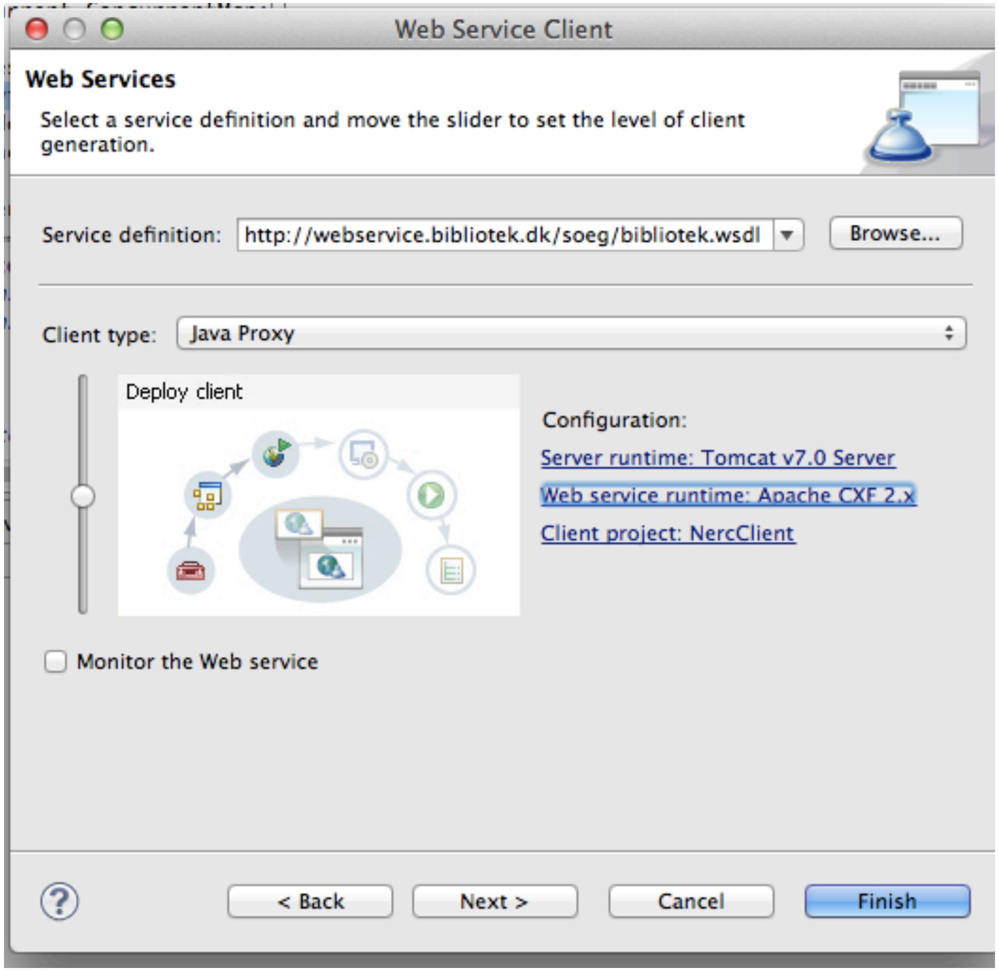
□ Do not show me this dialog box again.

freo.me.jaxws.OrderService.java - JAXWSSample/src

WSDL first

- Again there is a tool for this
- You might want to create a service
  - Contract-first (design the WSDL, then implement)
  - Implement a standard WSDL
  - Re-architect an existing service
  - Copy a competitor’s service (though this is a thorny issue!)
- Very likely you need to call a service

Eclipse tooling



Web Service Client

Web Services

Select a service definition and move the slider to set the level of client generation.

Service definition: http://webservice.bibliotek.dk/soeg/bibliotek.wsdl

Client type: Java Proxy

Deploy client

Configuration:

Server runtime: Tomcat v7.0 Server

Web service runtime: Apache CXF 2.x

Client project: NercClient

□ Monitor the Web service

Resources

- The Labs
- The Spec
  - http://jcp.org/aboutJava/communityprocess/mrel/jsr224/index3.html
- The CXF documentation
  - http://cxf.apache.org/docs/a-simple-jax-ws-service.html
- The Reference Implementation
  - http://jax-ws.java.net/