

# BIAS WSDL Review :: 2010-08-11

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## Initial Notes

Changes to the WSDL in this update have been made to conform to the specifications set out in the W3 Web Services Description Language (WSDL) 1.1 specification, WS-I Basic Profile 1.1 specification, ANSI INCITS 442-2008 Biometric Identity Assurances Services (BIAS), ISO 19785-3 Common Biometric Exchange Formats Framework (CBEFF), and OASIS Biometric Identity Assurance Services (BIAS) SOAP Profile 1.0. In addition, the tools used provided documentation and recommendations on how to best design the WSDL to allow for better code generation.

## Platform

All of research is currently being performed on a PC with Windows Server 2008 R2 Standard x64 as the primary operating system.

## Validation and Code Generation tools

As each different implementation of an XML/WSDL validation and/or code generation tool handles different elements/attributes differently, I decided to use multiple widely tools to cover a wider range of inconsistencies.

## XSV

### Information

- o Version: 3.1-1
- o URL: <http://www.w3.org/2001/03/webdata/xsv>

XSV is an XML Schema Validation tool, with a web front-end and a standalone executable, supported by the W3 organization.

### Input

xsv working.wsd1

### Initial Output

```
<?xml version='1.0'?>
<xsv xmlns="http://www.w3.org/2000/05/xsv"
      docElt="{http://schemas.xmlsoap.org/wsdl/}definitions"
      instanceAssessed="true" instanceErrors="0"
      rootType="{http://schemas.xmlsoap.org/wsdl/}:tDefinitions"
      schemaErrors="0"

      target="file:///C:/kmangold/BIAS/wsdl/working.wsd1"
validation="strict"
      version="XSV 3.1-1 of 2007/12/11 16:20:05">
  <schemaDocAttempt URI="http://schemas.xmlsoap.org/wsdl/"
                    namespace="http://schemas.xmlsoap.org/wsdl/"
                    outcome="success" source="docElt"/>
  <schemaDocAttempt URI="http://schemas.xmlsoap.org/wsdl/soap/"
```

```

        namespace="http://schemas.xmlsoap.org/wsdl/soap/"
        outcome="success" source="new namespace"/>
<schemaDocAttempt URI="http://schemas.xmlsoap.org/wsdl/"
        namespace="http://schemas.xmlsoap.org/wsdl/"
        outcome="redundant" source="import"/>
</xsv>

```

### Final Output

```

<?xml version='1.0'?>
<xsv xmlns="http://www.w3.org/2000/05/xsv"
    docElt="{http://schemas.xmlsoap.org/wsdl/}definitions"
    instanceAssessed="true" instanceErrors="0"
    rootType="{http://schemas.xmlsoap.org/wsdl/}:tDefinitions"
    schemaErrors="0"

    target="file:///C:/kmangold/BIAS/wsdl/working.wsdl"
validation="strict"
    version="XSV 3.1-1 of 2007/12/11 16:20:05">
    <schemaDocAttempt URI="http://schemas.xmlsoap.org/wsdl/"
        namespace="http://schemas.xmlsoap.org/wsdl/"
        outcome="success" source="docElt"/>
    <schemaDocAttempt URI="http://schemas.xmlsoap.org/wsdl/soap/"
        namespace="http://schemas.xmlsoap.org/wsdl/soap/"
        outcome="success" source="new namespace"/>
    <schemaDocAttempt URI="http://schemas.xmlsoap.org/wsdl/"
        namespace="http://schemas.xmlsoap.org/wsdl/"
        outcome="redundant" source="import"/>
</xsv>

```

## Eclipse IDE for Java EE Developers (with Web Developer Tools)

### Information

- IDE Version: Eclipse Helios Release (1.3.0.20100617-0521)
- Web Developer Tools Version 3.2.0.v201005241510
- URL: <http://www.eclipse.org/downloads/moreinfo/jee.php>

The Eclipse IDE is a very popular integrated development environment (IDE) for developing in the Java programming language. It has been extended to support XML, Schema, WSDL, and web service development in the Java EE version of the IDE.

### Input

File -> Open File

Navigate and select the original WSDL file.

Click "Open"

## Initial Output

Please note the gray arrows on the right side of the image and how they are “broken”; this shows that the messages which are mapped to the portType’s operations are not properly mapped to the element in the schema.

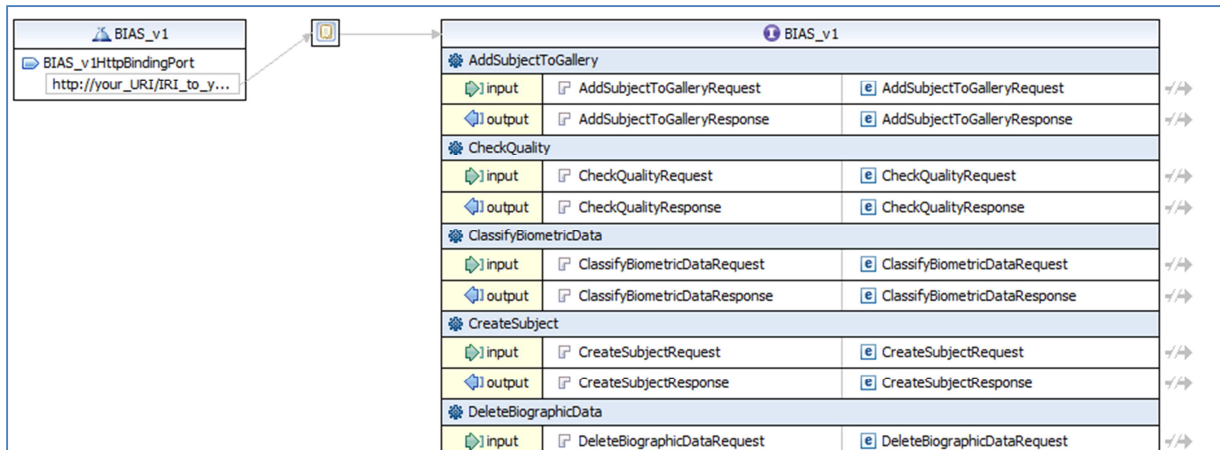


Figure 1 - Partial Screenshot of the Eclipse visual representation of the original WSDL

## Final Output

Figure 2 shows the corrected WSDL file. The gray arrows are not “broken” anymore. The mouse cursor is hidden, but the blue arrow shows that the mouse is hovering over it. A popup box displays with the message’s mapping as well as the element’s properties.

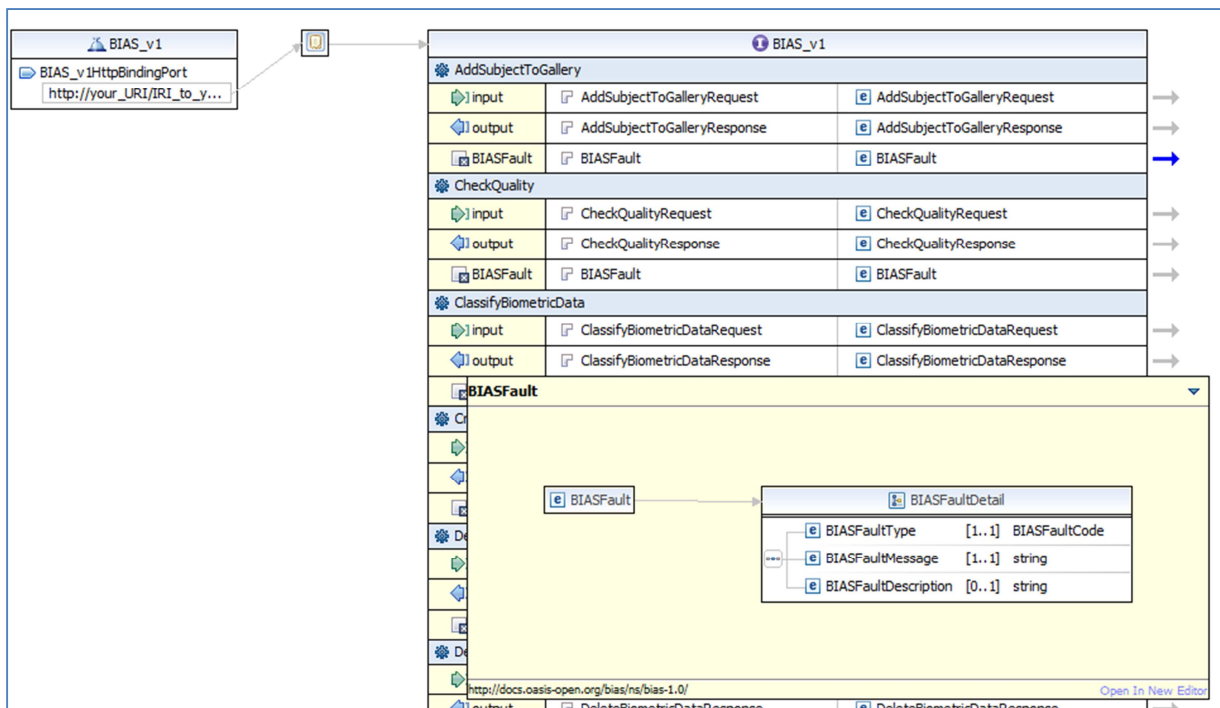


Figure 3 - Partial Screenshot of the Eclipse visual representation of the modified WSDL

## Java SE 1.6.0 SDK (JAX-WS)

### Information

- o Java Version: 1.6.0\_21
- o JAX-WS Version: 2.1.6
- o URL: <http://www.oracle.com/technetwork/java/javase/downloads/index.html>

The Java 1.6.0 SDK comes with its own code generation tools relating to web services. The tool used for generating Java code from a WSDL is called "wsimport" which reads and parses a WSDL file and generates Java classes which can be used when sending and receiving web service messages.

### Input

```
wsimport -d %CD%\wsimport working.wsdl
```

### Initial Output

parsing WSDL...

```
[WARNING] src-resolve.4.1: Error resolving component
'RequestTemplate'. It was detected that 'RequestTemplate' has no
namespace, but components with no target namespace are not
referenceable from schema document
'file:/C:/kmangold/BIAS/wsdl/working.wsdl#types?schema1'. If
'RequestTemplate' is intended to have a namespace, perhaps a prefix
needs to be provided. If it is intended that 'RequestTemplate' has no
namespace, then an 'import' without a "namespace" attribute should be
added to 'file:/C:/kmangold/BIAS/wsdl/working.wsdl#types?schema1'.
    line 17 of file:/C:/kmangold/BIAS/wsdl/working.wsdl#types?schema1
```

```
[WARNING] enumeration-valid-restriction: Enumeration value
'UNKNOWN_ERROR' is not in the value space of the base type,
unsignedLong.
    line 103 of file:/C:/kmangold/BIAS/wsdl/working.wsdl#types?schema1
```

```
[WARNING] src-resolve.4.2: Error resolving component 'iso-iec19785-3-
7:Registered-int'. It was detected that 'iso-iec19785-3-7:Registered-
int' is in namespace 'urn:oid:1.1.19785.0.257.1.7.0', but components
from this namespace are not referenceable from schema document
'file:/C:/kmangold/BIAS/wsdl/working.wsdl#types?schema1'. If this is
the incorrect namespace, perhaps the prefix of 'iso-iec19785-3-
7:Registered-int' needs to be changed. If this is the correct
namespace, then an appropriate 'import' tag should be added to
'file:/C:/kmangold/BIAS/wsdl/working.wsdl#types?schema1'.
    line 606 of file:/C:/kmangold/BIAS/wsdl/working.wsdl#types?schema1
```

[WARNING] src-resolve: Cannot resolve the name 'iso-iec19785-3-7:Registered-int' to a(n) 'simpleType definition' component.  
line 606 of file:/C:/kmangold/BIAS/wsdl/working.wsdl#types?schema1

[WARNING] src-resolve: Cannot resolve the name 'iso-iec19785-3-7:Registered-int' to a(n) 'simpleType definition' component.  
line 607 of file:/C:/kmangold/BIAS/wsdl/working.wsdl#types?schema1

[WARNING] cos-ct-extends.1.4.3.2.2.1.a: The content type of a derived type and that of its base must both be mixed or both be element-only. Type '#AnonType\_VerifyRequest' is element only, but its base type is not.  
line 2089 of file:/C:/kmangold/BIAS/wsdl/working.wsdl#types?schema1

[ERROR] undefined simple or complex type 'RequestTemplate'  
line 17 of file:/C:/kmangold/BIAS/wsdl/working.wsdl

[ERROR] undefined simple or complex type 'ProcessingOptionsType'  
line 19 of file:/C:/kmangold/BIAS/wsdl/working.wsdl

[ERROR] undefined simple or complex type 'InformationType'  
line 24 of file:/C:/kmangold/BIAS/wsdl/working.wsdl

[ERROR] undefined simple or complex type 'iso-iec19785-3-7:Multiple-types'  
line 355 of file:/C:/kmangold/BIAS/wsdl/working.wsdl

[ERROR] undefined simple or complex type 'iso-iec19785-3-7:Subtype'  
line 365 of file:/C:/kmangold/BIAS/wsdl/working.wsdl

[ERROR] undefined simple or complex type 'iso-iec19785-3-7:Registered-int'  
line 370 of file:/C:/kmangold/BIAS/wsdl/working.wsdl

[ERROR] undefined simple or complex type 'iso-iec19785-3-7:Registered-int'  
line 375 of file:/C:/kmangold/BIAS/wsdl/working.wsdl

[ERROR] undefined simple or complex type 'iso-iec19785-3-7:BIR-info'  
line 590 of file:/C:/kmangold/BIAS/wsdl/working.wsdl

[ERROR] undefined simple or complex type 'iso-iec19785-3-7:BDB-info'  
line 591 of file:/C:/kmangold/BIAS/wsdl/working.wsdl

[ERROR] undefined simple or complex type 'iso-iec19785-3-7:SB-info'

line 592 of file:/C:/kmangold/BIAS/wsdl/working.wsdl

[ERROR] undefined simple or complex type 'iso-iec19785-3-7:BIR'  
line 601 of file:/C:/kmangold/BIAS/wsdl/working.wsdl

[ERROR] undefined simple type 'iso-iec19785-3-7:Registered-int'  
line 606 of file:/C:/kmangold/BIAS/wsdl/working.wsdl

[ERROR] undefined simple type 'iso-iec19785-3-7:Registered-int'  
line 607 of file:/C:/kmangold/BIAS/wsdl/working.wsdl

[ERROR] undefined simple or complex type 'iso-iec19785-3-7:Multiple-  
types'  
line 670 of file:/C:/kmangold/BIAS/wsdl/working.wsdl

[ERROR] undefined simple or complex type 'iso-iec19785-3-7:Subtype'  
line 675 of file:/C:/kmangold/BIAS/wsdl/working.wsdl

[ERROR] undefined simple or complex type 'iso-iec19785-3-7:Multiple-  
types'  
line 745 of file:/C:/kmangold/BIAS/wsdl/working.wsdl

[ERROR] undefined simple or complex type 'iso-iec19785-3-7:Quality'  
line 792 of file:/C:/kmangold/BIAS/wsdl/working.wsdl

[ERROR] undefined simple or complex type 'iso-iec19785-3-7:Multiple-  
types'  
line 1554 of file:/C:/kmangold/BIAS/wsdl/working.wsdl

[ERROR] undefined simple or complex type 'Score'  
line 1984 of file:/C:/kmangold/BIAS/wsdl/working.wsdl

[ERROR] undefined simple or complex type 'Score'  
line 2118 of file:/C:/kmangold/BIAS/wsdl/working.wsdl

### Final Output

parsing WSDL...

generating code...

compiling code...

Note:

C:\kmangold\BIAS\wsdl\wsimport\org\oasis\_open\docs\bias\ns\bias\_1\ObjectFa

ctory.java uses unchecked or unsafe operations.

Note: Recompile with -Xlint:unchecked for details.

## Apache Axis 2

### Information

- o Version: 1.5.1
- o URL: <http://ws.apache.org/axis2/>

Apache Axis 2 is a popular open source Web Service/WSDL/SOAP engine developed and maintained by the Apache development community. The tool used, wsdl2java, does precisely what its name says: takes a WSDL file and creates Java code from it.

### Input

```
wsdl2java -o %CD%\axis2 -uri %CD%\working.wsdl
```

### Initial Output

```
Using AXIS2_HOME: C:\kmangold\System\axis2-1.5.1
```

```
Using JAVA_HOME: C:\Program Files\Java\jdk1.6.0_21
```

```
Retrieving document at 'C:\kmangold\BIAS\wsdl\working.wsdl'.
```

```
[ERROR] Can not find the corresponding fault element in wsdl operation  
AddSubjectToGallery for the fault name BIASFault
```

```
org.apache.axis2.AxisFault: Can not find the corresponding fault  
element in wsdl operation AddSubjectToGallery for the fault name  
BIASFault
```

```
at
```

```
org.apache.axis2.description.WSDL11ToAxisServiceBuilder.populateBindin  
g(WSDL11ToAxisServiceBuilder.java:758)
```

```
at
```

```
org.apache.axis2.description.WSDL11ToAxisServiceBuilder.populateEndpoi  
nt(WSDL11ToAxisServiceBuilder.java:537)
```

```
at
```

```
org.apache.axis2.description.WSDL11ToAxisServiceBuilder.populateEndpoi  
nts(WSDL11ToAxisServiceBuilder.java:488)
```

```
at
```

```
org.apache.axis2.description.WSDL11ToAxisServiceBuilder.populateServic  
e(WSDL11ToAxisServiceBuilder.java:362)
```

```
at
```

```
org.apache.axis2.description.WSDL11ToAllAxisServicesBuilder.populateAl  
lServices(WSDL11ToAllAxisServicesBuilder.java:107)
```

```
at
```

```
org.apache.axis2.wsdl.codegen.CodeGenerationEngine.<init>(CodeGenerati  
onEngine.java:147)
```

```

        at org.apache.axis2.wsdl.WSDL2Code.main(WSDL2Code.java:35)
        at org.apache.axis2.wsdl.WSDL2Java.main(WSDL2Java.java:24)
Exception in thread "main"
org.apache.axis2.wsdl.codegen.CodeGenerationException: Error parsing
WSDL
    at
org.apache.axis2.wsdl.codegen.CodeGenerationEngine.<init>(CodeGenerati
onEngine.java:153)
        at org.apache.axis2.wsdl.WSDL2Code.main(WSDL2Code.java:35)
        at org.apache.axis2.wsdl.WSDL2Java.main(WSDL2Java.java:24)
Caused by: org.apache.axis2.AxisFault: Can not find the corresponding
fault element in wsdl operation AddSubjectToGallery for the fault name
BIASFault
    at
org.apache.axis2.description.WSDL11ToAxisServiceBuilder.populateBindin
g(WSDL11ToAxisServiceBuilder.java:758)
        at
org.apache.axis2.description.WSDL11ToAxisServiceBuilder.populateEndpoi
nt(WSDL11ToAxisServiceBuilder.java:537)
        at
org.apache.axis2.description.WSDL11ToAxisServiceBuilder.populateEndpoi
nts(WSDL11ToAxisServiceBuilder.java:488)
        at
org.apache.axis2.description.WSDL11ToAxisServiceBuilder.populateServic
e(WSDL11ToAxisServiceBuilder.java:362)
        at
org.apache.axis2.description.WSDL11ToAllAxisServicesBuilder.populateAl
lServices(WSDL11ToAllAxisServicesBuilder.java:107)
        at
org.apache.axis2.wsdl.codegen.CodeGenerationEngine.<init>(CodeGenerati
onEngine.java:147)
    ... 2 more

```

### Final Output

```

Using AXIS2_HOME:    C:\kmangold\System\axis2-1.5.1
Using JAVA_HOME:     C:\Program Files\Java\jdk1.6.0_21
Retrieving document at 'C:\kmangold\BIAS\wsdl\working.wsdl'.
Retrieving schema at 'cbeff.xsd', relative to
'file:/C:/kmangold/BIAS/wsdl/worki
ng.wsdl'.

```

## Microsoft Visual Studio 2010 Premium

### Information

- o Version: 10.0.30319.1
- o .NET Framework Version: 4.0.30319

- URL: <http://www.microsoft.com/visualstudio/en-us/products/2010-editions/premium>

Microsoft Visual Studio (MSVS) 2010 Premium is an integrated development environment (IDE) for VB.NET, C#, and other .NET programming languages. MSVS does have a command line tool for generating code from a WSDL file; however, to keep things simple for now and to provide different scenarios, I kept with the GUI implementation.

### Input

File -> Open -> File...

Navigate and select the original WSDL file.

Click "Open"

### Initial Output

```
Warning      1      Undefined complexType 'RequestTemplate' is used as a
base for complex type extension. C:\kmangold\BIAS\wsdl\working.wsdl
      17      7
Warning      21      Namespace '' is not available to be referenced in this
schema.      C:\kmangold\BIAS\wsdl\working.wsdl      17      7
Warning      22      Namespace '' is not available to be referenced in this
schema.      C:\kmangold\BIAS\wsdl\working.wsdl      19      9
Warning      23      Namespace '' is not available to be referenced in this
schema.      C:\kmangold\BIAS\wsdl\working.wsdl      24      9
Warning      2      The Enumeration constraining facet is invalid - The
string 'UNKNOWN_ERROR' is not a valid UInt64 value.
      C:\kmangold\BIAS\wsdl\working.wsdl      104      7
Warning      17      Type 'urn:oid:1.1.19785.0.257.1.7.0:Multiple-types' is
not declared. C:\kmangold\BIAS\wsdl\working.wsdl      355      7
Warning      24      Namespace 'urn:oid:1.1.19785.0.257.1.7.0' is not
available to be referenced in this schema.
      C:\kmangold\BIAS\wsdl\working.wsdl      355      7
Warning      18      Type 'urn:oid:1.1.19785.0.257.1.7.0:Subtype' is not
declared. C:\kmangold\BIAS\wsdl\working.wsdl      365      7
Warning      25      Namespace 'urn:oid:1.1.19785.0.257.1.7.0' is not
available to be referenced in this schema.
      C:\kmangold\BIAS\wsdl\working.wsdl      365      7
Warning      19      Type 'urn:oid:1.1.19785.0.257.1.7.0:Registered-int' is
not declared. C:\kmangold\BIAS\wsdl\working.wsdl      370      7
Warning      26      Namespace 'urn:oid:1.1.19785.0.257.1.7.0' is not
available to be referenced in this schema.
      C:\kmangold\BIAS\wsdl\working.wsdl      370      7
Warning      20      Type 'urn:oid:1.1.19785.0.257.1.7.0:Registered-int' is
not declared. C:\kmangold\BIAS\wsdl\working.wsdl      375      7
Warning      27      Namespace 'urn:oid:1.1.19785.0.257.1.7.0' is not
available to be referenced in this schema.
      C:\kmangold\BIAS\wsdl\working.wsdl      375      7
```

Warning 14 Type 'urn:oid:1.1.19785.0.257.1.7.0:BIR-info' is not declared. C:\kmangold\BIAS\wsdl\working.wsdl 590 10

Warning 28 Namespace 'urn:oid:1.1.19785.0.257.1.7.0' is not available to be referenced in this schema.  
C:\kmangold\BIAS\wsdl\working.wsdl 590 10

Warning 15 Type 'urn:oid:1.1.19785.0.257.1.7.0:BDB-info' is not declared. C:\kmangold\BIAS\wsdl\working.wsdl 591 10

Warning 29 Namespace 'urn:oid:1.1.19785.0.257.1.7.0' is not available to be referenced in this schema.  
C:\kmangold\BIAS\wsdl\working.wsdl 591 10

Warning 16 Type 'urn:oid:1.1.19785.0.257.1.7.0:SB-info' is not declared. C:\kmangold\BIAS\wsdl\working.wsdl 592 10

Warning 30 Namespace 'urn:oid:1.1.19785.0.257.1.7.0' is not available to be referenced in this schema.  
C:\kmangold\BIAS\wsdl\working.wsdl 592 10

Warning 13 Type 'urn:oid:1.1.19785.0.257.1.7.0:BIR' is not declared. C:\kmangold\BIAS\wsdl\working.wsdl 601 10

Warning 31 Namespace 'urn:oid:1.1.19785.0.257.1.7.0' is not available to be referenced in this schema.  
C:\kmangold\BIAS\wsdl\working.wsdl 601 10

Warning 3 Type 'urn:oid:1.1.19785.0.257.1.7.0:Registered-int' is not declared, or is not a simple type.  
C:\kmangold\BIAS\wsdl\working.wsdl 606 6

Warning 32 Namespace 'urn:oid:1.1.19785.0.257.1.7.0' is not available to be referenced in this schema.  
C:\kmangold\BIAS\wsdl\working.wsdl 606 6

Warning 4 Type 'urn:oid:1.1.19785.0.257.1.7.0:Registered-int' is not declared, or is not a simple type.  
C:\kmangold\BIAS\wsdl\working.wsdl 607 6

Warning 33 Namespace 'urn:oid:1.1.19785.0.257.1.7.0' is not available to be referenced in this schema.  
C:\kmangold\BIAS\wsdl\working.wsdl 607 6

Warning 11 Type 'urn:oid:1.1.19785.0.257.1.7.0:Multiple-types' is not declared. C:\kmangold\BIAS\wsdl\working.wsdl 670 7

Warning 34 Namespace 'urn:oid:1.1.19785.0.257.1.7.0' is not available to be referenced in this schema.  
C:\kmangold\BIAS\wsdl\working.wsdl 670 7

Warning 12 Type 'urn:oid:1.1.19785.0.257.1.7.0:Subtype' is not declared. C:\kmangold\BIAS\wsdl\working.wsdl 675 7

Warning 35 Namespace 'urn:oid:1.1.19785.0.257.1.7.0' is not available to be referenced in this schema.  
C:\kmangold\BIAS\wsdl\working.wsdl 675 7

Warning 10 Type 'urn:oid:1.1.19785.0.257.1.7.0:Multiple-types' is not declared. C:\kmangold\BIAS\wsdl\working.wsdl 745 7

```

Warning    36    Namespace 'urn:oid:1.1.19785.0.257.1.7.0' is not
available to be referenced in this schema.
      C:\kmangold\BIAS\wsdl\working.wsdl      745    7
Warning    9     Type 'urn:oid:1.1.19785.0.257.1.7.0:Quality' is not
declared.   C:\kmangold\BIAS\wsdl\working.wsdl      792    7
Warning   37     Namespace 'urn:oid:1.1.19785.0.257.1.7.0' is not
available to be referenced in this schema.
      C:\kmangold\BIAS\wsdl\working.wsdl      792    7
Warning    8     Type 'urn:oid:1.1.19785.0.257.1.7.0:Multiple-types' is
not declared. C:\kmangold\BIAS\wsdl\working.wsdl    1554   10
Warning   38     Namespace 'urn:oid:1.1.19785.0.257.1.7.0' is not
available to be referenced in this schema.
      C:\kmangold\BIAS\wsdl\working.wsdl    1554   10
Warning    7     Type 'Score' is not declared.
      C:\kmangold\BIAS\wsdl\working.wsdl    1984   10
Warning   39     Namespace '' is not available to be referenced in this
schema.     C:\kmangold\BIAS\wsdl\working.wsdl    1984   10
Warning    5     The derived type and the base type must have the same
content type. C:\kmangold\BIAS\wsdl\working.wsdl    2070    6
Warning    6     Type 'Score' is not declared.
      C:\kmangold\BIAS\wsdl\working.wsdl    2118   10
Warning   40     Namespace '' is not available to be referenced in this
schema.     C:\kmangold\BIAS\wsdl\working.wsdl    2118   10

```

### Final Output

No errors or warnings.

## IBM Schema Quality

### Information

- o Version: 2.2.1
- o URL: <http://www.alphaworks.ibm.com/tech/xmls qc>

IBM Schema Quality is similar to XSV, in that it verifies that a schema file has been correctly written. This tool also has a `-wsdl` flag which allows a WSDL file to be processed and validated.

### Input

```
SQC.bat -wsdl \kmangold\BIAS\wsdl\working.wsdl
```

### Initial Output

See "TC\_20100811\_SQC\_OUTPUT.txt"



TC\_20100811\_SQC\_OUTPUT.txt

### Final Output

See "TC\_20100811\_SQC\_OUTPUT\_FINAL.txt"



TC\_20100811\_SQC\_OUTPUT\_FINAL.txt

## Identified Issues

### Code Generation with xsd:any

#### Problem

Adding wildcards, such as the `xsd:any` type, to an XML schema may be a good idea as it allows a loose coupling between implementation-specific instances, it is not fully supported by many WSDL to Code generation tools. The extent that most of the popular tools support the *any* type is that it will generate a class member of the type: *XmlElement*, *SOAPElement*, or the language-specific class name. This means that the developers writing up against this WSDL/API will need to manually create an XML tree structure from within the code. This can be very tedious and painstaking, especially if the expected element is fairly complex in structure. Additionally, it is impossible to *extend* the *any* type for future versioning as there are no requirements on the base element.

#### Solution/Intended Approach

A common and recommended approach is to replace `xsd:any` with a base type. Elements will then derive from the base type by extension and possibly restriction. I will have to look at the generated code from the aforementioned tools before I am comfortable saying this isn't an issue anymore.

### Faults not fully mapped in WSDL

#### Problem

The fault element in the WSDL's binding section does not match any fault in the portType's operation element. Each element in the portType's operation's element maps to a WSDL message; there is no message which wraps the `BIASFault` element.

#### Solution

Create a message type which contains the `tns:BIASFault` element as part of the message. Add a fault element to each of the operations in the portType; the message attribute must be the QName for the previously created message type.

### Namespace Inconsistencies

#### Problem

1. Missing namespace import from external schema
2. There were a few places in the WSDL which did not specify a namespace prefix.
3. The "xs" and "xsd" prefix were referencing the same namespace

#### Solution

1. Adding in import element to the schema to reference an external schema
2. Added the prefix to the missing places
3. Changed instances of "xs" to "xsd"

## Concluding Notes

The issues talked about in this review might not be the absolute list. Certain issues might come up during the development of a reference implementation(s). The big obstacle now will be finding a useful and logical way around using the `xsd:any` element. Additionally, due to time constraints, not all issues have been fixed as of writing this document.

## References

- Ballinger, K., Ehnebuske, D., Ferris, C., Gudgin, M., Liu, C. K., Nottingham, M., et al. (2006, 04 10). *Basic Profile - Version 1.1 (Final)*. Retrieved from WS-I Organization: <http://www.ws-i.org/Profiles/BasicProfile-1.1.html>
- Butek, R. (2005, 12 13). *Tip: xsd:any: A cautionary tale*. Retrieved from IBM: <http://www.ibm.com/developerworks/xml/library/ws-tip-xsdcaution.html>
- Butek, R. (2008, 03 25). *Web services hints and tips: Design reusable WSDL faults*. Retrieved from IBM: <http://www.ibm.com/developerworks/webservices/library/ws-tip-wsdlfaults/index.html>
- Christensen, E., Curbera, F., Meredith, G., & Sanjiva, W. (2001, 03 15). *Web Service Definition Language (WSDL) 1.1*. Retrieved from World Wide Web Consortium: <http://www.w3.org/TR/wsdl>
- Nottingham, M. (2004, 08 24). *Simple SOAP Binding Profile - Version 1.0 (Final)*. Retrieved from WS-I Organization: <http://www.ws-i.org/Profiles/SimpleSoapBindingProfile-1.0.html>

## Appendix A: Updated WSDL

See "BIAS.wsdl"

