Avaya Oceana Email Open Interfaces

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Licensee shall comply with all applicable laws and regulations, including without limitation those applicable to data privacy, intellectual property, trade secret, and fraud. Licensee is advised that the Technical Information is of U.S. origin and subject to the U.S. Export Administration Regulations (“EAR”) and may be subject to applicable local country import/export laws and regulations. Diversion contrary to U.S. and/or applicable local country law and/or regulation is prohibited. Licensee agrees not to directly or indirectly export, re-export, import, download, or transmit the Technical Information to any country, end user or for any use that is contrary to applicable U.S. and/or local country regulation or statute (including but not limited to those countries embargoed by the U.S. government). Licensee represents that any governmental agency has not issued sanctions against Licensee or otherwise suspended, revoked or denied Licensee's import/export privileges. Licensee agrees not to use or transfer the Technical Information for any use relating to nuclear, chemical or biological weapons, or missile technology, unless authorized by the U.S. and/or any applicable local government by regulation or specific written license. Additionally, Licensee is advised that the Technical Information may contain encryption algorithm or source code that may not be exported to government or military end users without a license issued by the U.S. Bureau of Industry and Security and any other country’s governmental agencies, where applicable.

13.0 WAIVER.

The failure to assert any rights under this Agreement, including, but not limited to, the right to terminate in the event of breach or default, will not be deemed to constitute a waiver of the right to enforce each and every provision of this Agreement in accordance with their terms.

14.0 SEVERABILITY.

If any provision of this Agreement is determined to be unenforceable or invalid, this Agreement will not be rendered unenforceable or invalid as a whole, and the provision will be changed and interpreted so as to best accomplish the objectives of the original provision within the limits of applicable law.

15.0 GOVERNING LAW AND DISPUTE RESOLUTION.

15.1 Governing Law. This Agreement and any dispute, claim or controversy arising out of or relating to this Agreement (“Dispute”), including without limitation the formation, interpretation, breach or termination of this Agreement, or any issue regarding whether a Dispute is subject to arbitration under this Agreement, will be governed by New York State laws, excluding conflict of law principles, and the United Nations Convention on Contracts for the International Sale of Goods.

15.2 Dispute Resolution. Any Dispute will be resolved in accordance with the provisions of this Section 15. The disputing party shall give the other party written notice of the Dispute in accordance with the notice provision of this Agreement. The parties will attempt in good faith to resolve each controversy or claim within 30 days, or such other longer period as the parties may mutually agree, following the delivery of such notice, by negotiations between designated representatives of the parties who have dispute resolution authority.

15.3 Arbitration of Non-US Disputes. If a Dispute that arose anywhere other than in the United States or is based upon an alleged breach committed anywhere other than in the United States cannot be settled under the procedures and within the timeframe set forth in Section 15.2, it will be conclusively determined upon request of either party by a final and binding arbitration proceeding to be held in accordance with the Rules of Arbitration of the International Chamber of Commerce by a single arbitrator appointed by the parties or (failing agreement) by an arbitrator appointed by the President of the International Chamber of Commerce (from time to time), except that if the aggregate claims, cross claims and counterclaims by any one party against the other party exceed One Million US Dollars at the time all claims, including cross claims and counterclaims are filed, the proceeding will be held in accordance with the Rules of Arbitration of the International Chamber of Commerce by a panel of three arbitrator(s) appointed in accordance with the Rules of Arbitration of the International Chamber of Commerce. The arbitration will be conducted in the English language, at a location agreed by the parties or (failing agreement) ordered by the arbitrator(s). The arbitrator(s) will have authority only to award compensatory damages within the scope of the limitations of Section 8 and will not award punitive or exemplary damages. The arbitrator(s) will not have the authority to limit, expand or otherwise modify the terms of this Agreement. The ruling by the arbitrator(s)) will be final and binding on the parties and may be entered in any court having jurisdiction over the parties or any of their assets. The parties will evenly split the cost of the arbitrator(s)’ fees, but Avaya and Customer will each bear its own attorneys' fees and other costs associated with the arbitration. The parties, their representatives, other participants and the arbitrator(s) will hold the existence, content and results of the arbitration in strict confidence to the fullest extent permitted by law. Any disclosure of the existence, content and results of the arbitration will be as limited and narrowed as required to comply with the applicable law. By way of illustration, if the applicable law mandates the disclosure of the monetary amount of an arbitration award only, the underlying opinion or rationale for that award may not be disclosed.

15.4 Choice of Forum for US Disputes. If a Dispute by one party against the other that arose in the United States or is based upon an alleged breach committed in the United States cannot be settled under the procedures and within the timeframe set forth in Section 15.2, then either party may bring an action or proceeding solely in either the Supreme Court of the State of New York, New York County, or the United States District Court for the Southern District of New York. Except as otherwise stated in Section 15.3 each party consents to the exclusive jurisdiction of those courts, including their appellate courts, for the purpose of all actions and proceedings arising out of or relating to this Agreement.

15.5 Injunctive Relief. Nothing in this Agreement will be construed to preclude either party from seeking provisional remedies, including, but not limited to, temporary restraining orders and preliminary injunctions from any court of competent jurisdiction in order to protect its rights, including its rights pending arbitration, at any time. The parties agree that the arbitration provision in Section 15.3 may be enforced by injunction or other equitable order, and no bond or security of any kind will be required with respect to any such injunction or order.

15.6 Time Limit. Actions on Disputes between the parties must be brought in accordance with this Section within 2 years after the cause of action arises.

16.0 AGREEMENT IN ENGLISH.

The parties confirm that it is their wish that the Agreement, as well as all other documents relating hereto, including all notices, have been and shall be drawn up in the English language only. Les parties aux présentes confirment leur volonté que cette convention, de même que tous les documents, y compris tout avis, qui s'y rattachent, soient rédigés en langue anglaise.

17.0 ENTIRE AGREEMENT.

This Agreement, its exhibits, schedules and other agreements or documents referenced herein, constitute the full and complete understanding and agreement between the parties and supersede all contemporaneous and prior understandings, agreements and representations relating to the subject matter hereof. No modifications, alterations or amendments shall be effective unless in writing signed by both parties to this Agreement.

18.0 REDISTRIBUTABLE CLIENT FILES.

The list of SDK client files that can be redistributed, if any, are in the SDK in a file called Redistributable.txt.

Schedule 1 to Avaya SDK License Agreement
Third Party Notices

1. **CODECS**: WITH RESPECT TO ANY CODECS IN THE SDK, YOU ACKNOWLEDGE AND AGREE YOU ARE RESPONSIBLE FOR ANY AND ALL RELATED FEES AND/OR ROYALTIES, IF ANY. IT IS YOUR RESPONSIBILITY TO CHECK.

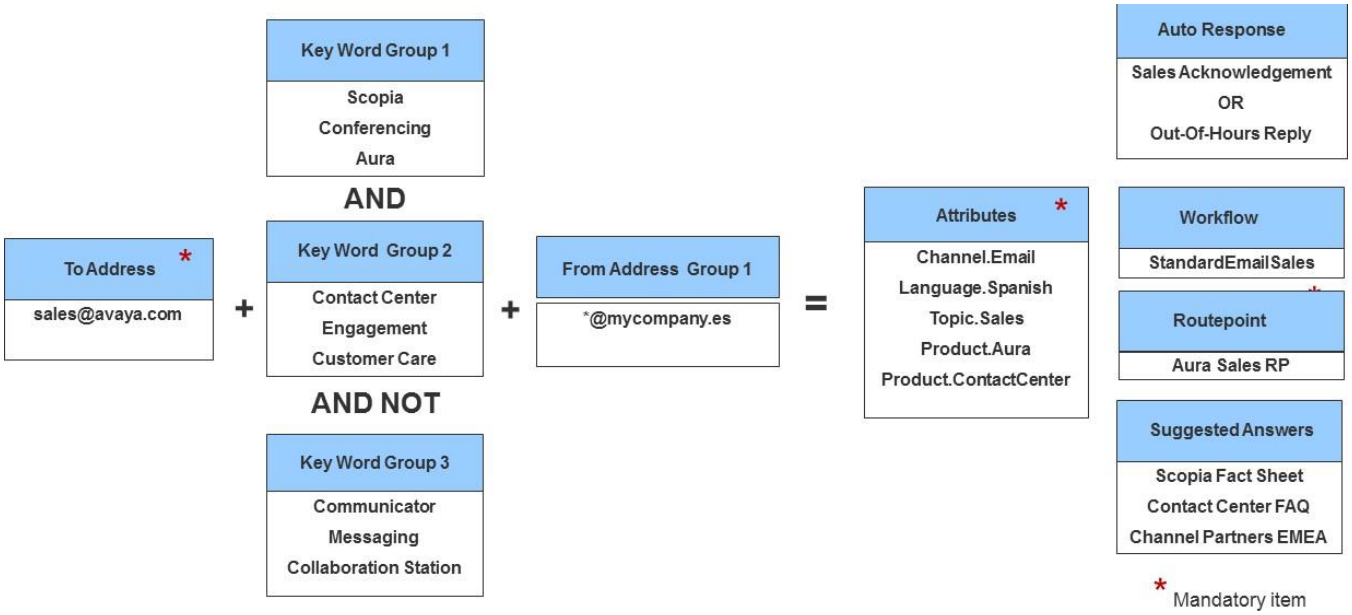
THE H.264 (AVC) CODEC IS LICENSED UNDER THE AVC PATENT PORTFOLIO LICENSE FOR THE PERSONAL USE OF A CONSUMER OR OTHER USES IN WHICH IT DOES NOT RECEIVE REMUNERATION TO: (I) ENCODE VIDEO IN COMPLIANCE WITH THE AVC STANDARD ("AVC VIDEO") AND/OR (II) DECODE AVC VIDEO THAT WAS ENCODED BY A CONSUMER ENGAGED IN A PERSONAL ACTIVITY AND/OR WAS OBTAINED FROM A VIDEO PROVIDER LICENSED TO PROVIDE AVC VIDEO. NO LICENSE IS GRANTED OR SHALL BE IMPLIED FOR ANY OTHER USE. ADDITIONAL INFORMATION FOR THE H.264 (AVC) CODEC MAY BE OBTAINED FROM MPEG LA, L.L.C. SEE HTTP://WWW.MPEGLA.COM.

Introduction

Avaya Oceana Email Open Interfaces is a capability to allow pre-processing of an incoming email to Oceana to enhance its routing or filter its content. This pre-processing step is bespoke to the Oceana deployment and will require custom development. The feature allows Oceana to use this custom code in the manipulation of email content or influence the routing decisions of email.

Email Rules

When an email is retrieved by Oceana from an Email server, it is analyzed by the Oceana email rules and based on the content of the email, a set of routing attributes are applied and a workflow is executed.



Input Criteria to a Rule

Based on the above example, emails To sales@avaya.com are analyzed. Consider the rule to determine True/False output to each part of the rule:

- To Address: If the email being analysed was sent TO sales@avaya.com, this part of the rule analysis will be true. This could be a physical mailbox or an alias.
- Keyword Matching: This part of the rule will return True if it contains any keyword from Keyword Group 1 AND any word from Keyword Group 2 BUT DOES NOT contain any keyword from Keyword Group 3.
    - The use of keyword searching is optional and you can configure if just the subject or the entire body of the email is searched. Up to 3 sets of keywords can be combined using AND & AND NOT operators. This mechanism can be used to filter out of office messages or other emails sent by automated attendants.
- From Address Group: This part of the rule will return True if the email being analyzed was sent from any address in the email address group defined.
    - This is an optional parameter to a rule. It is useful however to prioritize VIP customers/organizations or block emails based on senders or domains.

Assuming that **all** parts of the email rule (To Address, Keyword Matching (if used) and From Address Group (if used)) return True, then the output of the rule is applied to the email. If **any** part returns False, then the next rule is checked. If no rule returns True to **all** parts, the default rule is applied to provide basic default routing and treatment.

Rule Output

The output of a rule will provide the routing parameters to determine how that email should be treated. It is only applied if all parts of the input criteria to the rule holds true for the email being analyzed.

- **Attributes**: These are the routing attributes Oceana will use to attempt to route the email. You must apply attributes to the email.
- **Auto Response**: This is an automated message sent to the sender. It could be an acknowledgement of receipt of the email (and the email is subsequently routed to an agent) or an auto-reply attempting to answer the customer query (and the email is not routed to an agent). It is possible to send an alternate auto-response to the sender based on time of day.
  Auto-responses are optional.
- **Workflow**: This is the Engagement Designer workflow that will be executed to handle this email.
  Setting a workflow is mandatory.
- **Routepoint**: This is the route-point captured in Oceanalytics for reporting on this email. Setting a route-point is mandatory.
- **Suggested Answers**: These are supervisor prepared suggested email answers that are offered to the agent when answering the email. Setting suggested answers is optional.

Email Open Interfaces

An additional rule output to the above is a custom web service which can be called to influence the routing or treatment of the email. For emails matching the input criteria to a rule, a custom web service can be executed to perform custom tasks, examples of which are shown below.

Typical Uses

A custom web service may be called to perform the following:

- Filter the email content before being routed to an agent. In this case, we may want to pass the subject and body of an email to a custom web service that might remove/obfuscate credit card details, social security numbers or other sensitive information from the email. The web service will take the subject and body as input parameters, perform its filtering and return them as output parameters. Oceana will then use the filtered subject and body, discarding the originals.
- Enhance the routing decisions. In this case, a custom service might be passed the senders email address and/or the subject and body. Based on a lookup of the sender or language detection of the body, additional routing attributes could be applied to the email being processed.
- Selectively not route emails based on sender or content. In this case, a custom service might be passed the senders email address and/or body and subject. You may look up this sender in an external system and determine not to route an email from them. Alternatively, you may find abusive text in the subject or body and determine not to route the email. The service would return an output parameter which is mapped to the Auto-Close field. This decides if the workflow is executed or not. Although not routed, auto-closed contacts will be persisted in the database including transcript, and visible in customer history search.
- Find bespoke Ticket IDs in emails and handle accordingly. In this case, the custom service would take the subject and body and input parameters. The pattern of the Ticket ID could be retrieved and used to take a custom action e.g. update a CRM system. The email could then (optionally) be routed by Oceana.

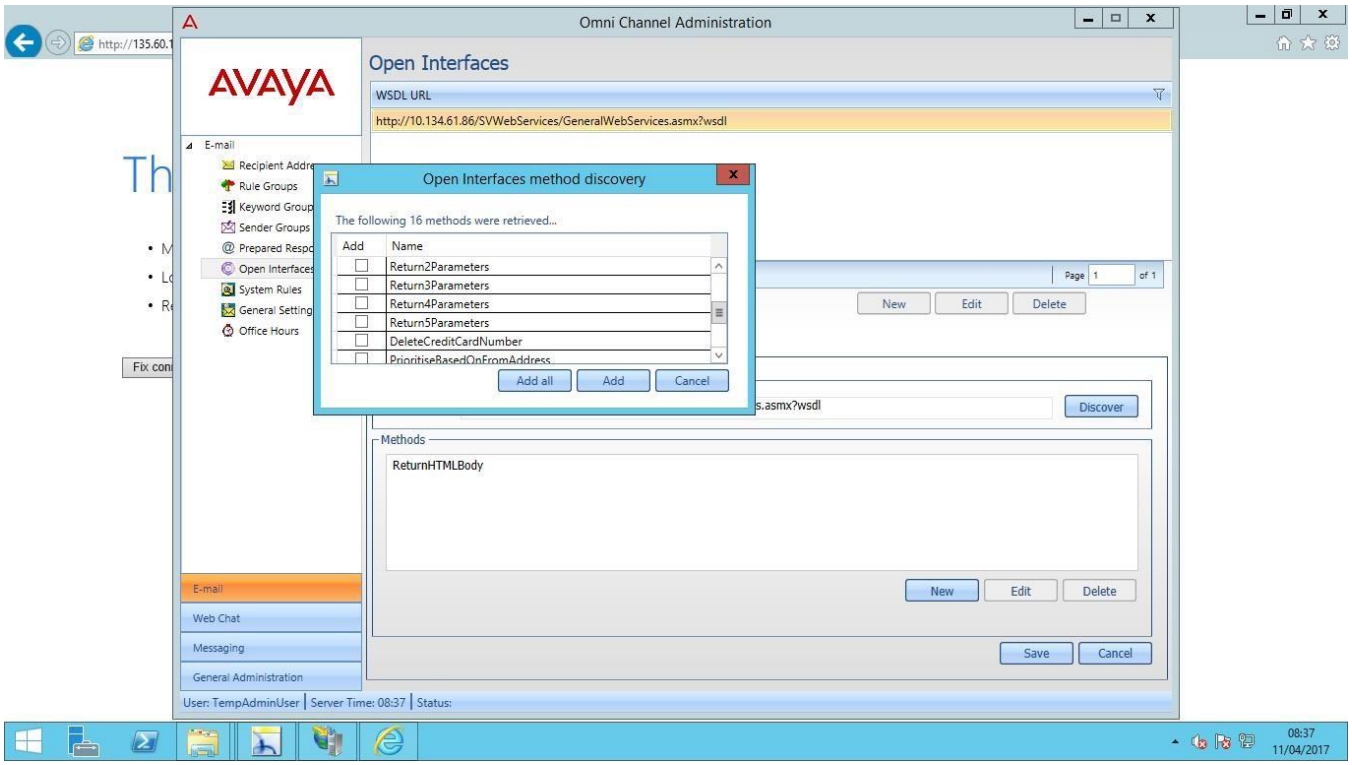
Limitations

- Only SOAP interfaces are supported. RESTful services cannot be called. The service must be developed to WSDL standards.
- The custom service must not be hosted on any Oceana cluster / node. If developing the service as a snap-in, you should provision a cluster outside of Oceana to host this.
- The feature in MM Admin to auto-detect the web service operations is not compatible with all WSDL formats. In some cases, the web service details may need to be entered manually.
- HTTPS redirects: Secure connections to the web service over HTTPS are supported. However if your web service makes the WSDL available over non-secure HTTP but redirects to HTTPS for performing operations, then you must enter a ‘HTTPS’ URL for the WSDL in the MM Admin, even if your WSDL is also available over HTTP. The default ‘http://’ prefix is auto-filled in the URL field by default - be sure to change this to ‘https://’ if your web service operations are secured via SSL. You will find more notes on SSL support including certs later in this document.
- If changes are made to your settings in the Admin, e.g. updated URL, input/output parameter(s) then a reboot is required for the changes to take effect.

Administration

The administration of this feature will be done via the Avaya Control Manager tool. Launch the MM Admin from where the user will be able to enter the WSDL URL and method name, provide other properties if necessary and specify what the input and output parameters should correspond to. When configuring a rule the user will be able to choose which web service should be associated with the rule.

Firstly, add the URL to the custom web service WSDL and click Discover. The administration client will then attempt to parse the SOAP envelope and list the methods retrieved. Select the method to add.

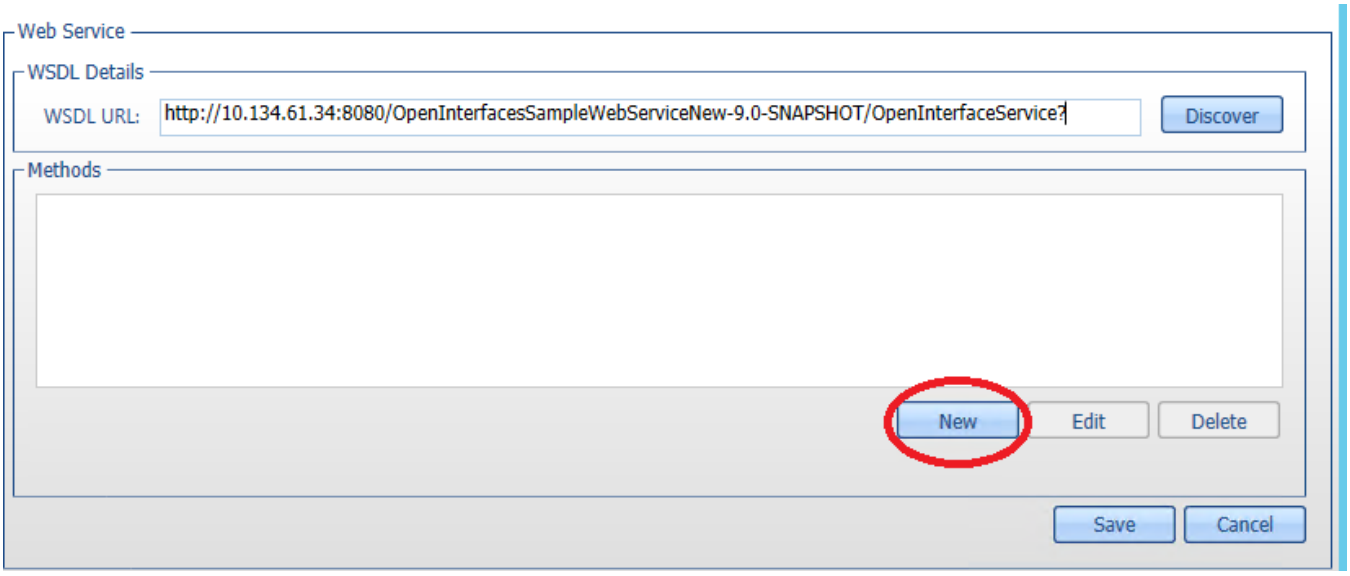


Step 1: Add WSDL details and discover the methods of the custom service.

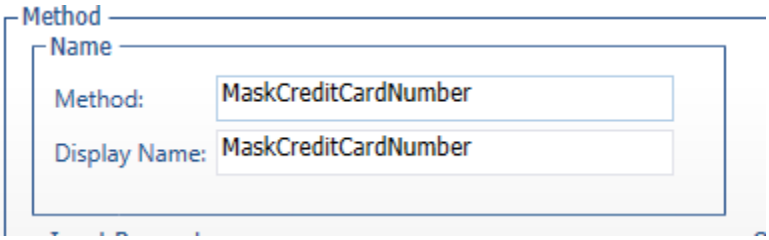
Note: Failure of the discovery feature in the Admin does not in itself indicate that the WSDL is not compatible with Oceana. This is a convenience feature *NOT* a compatibility test.

The Admin 'Discover' feature is limited to a specific WSDL format in order to auto-detect the web service operations successfully. This feature only works on single flat file WSDL format and will NOT work if your WSDL contains imports. In this case, you may simply enter the details manually as described below.

Alternatively, to enter the name(s) of your web service method(s) manually, click 'New' in the 'Methods' pane as shown below.



Y



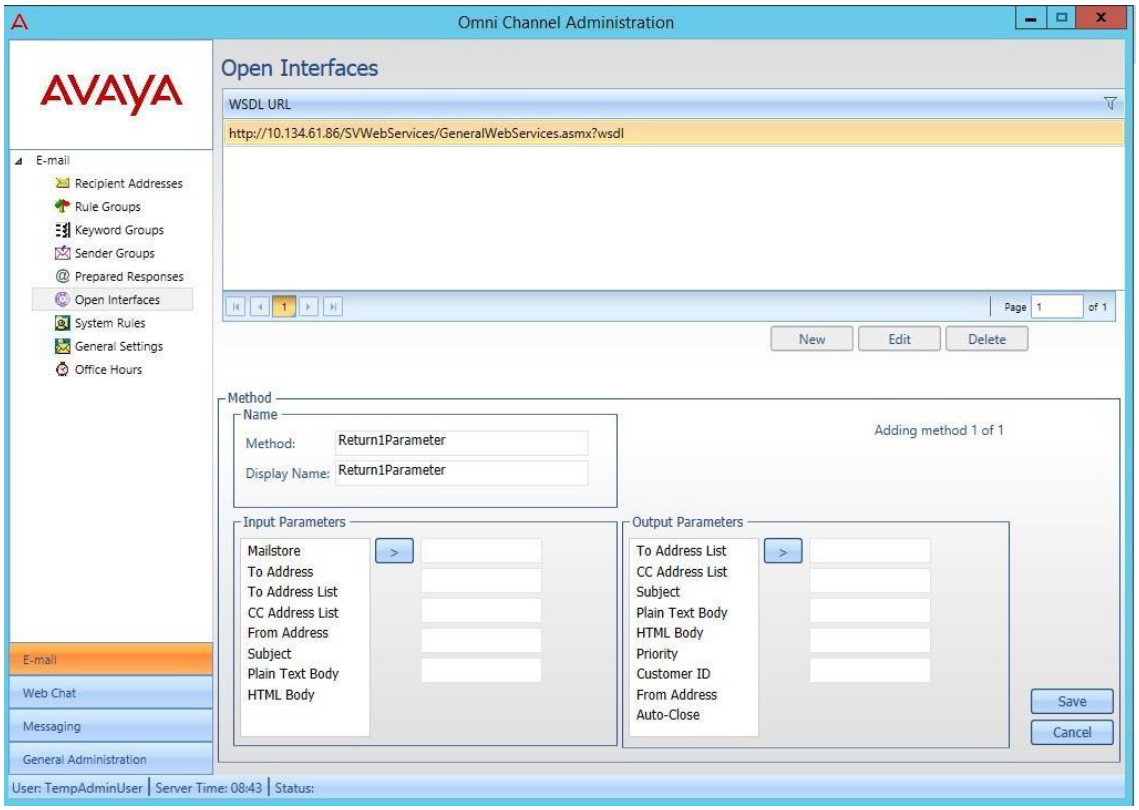
The method name should match the name of the publicly exposed web method name as implemented in the code e.g. MaskCreditCardNumber. This is usually the same as the display name but may not always be the case.

```
@WebMethod(action = "MaskCreditCardNumber", operationName = "MaskCreditCardNumber")
String[] MaskCreditCardNumber(String[] inputParameters);
```

The display name field should match the name of the operation as it appears in the WSDL. In a Java web service this is typically defined in the 'operationName' attribute of the @WebMethod annotation as shown in the code snippet above. In the WSDL, you will find the method display name as an attribute in the 'operation' element tags as shown in the sample WSDL snippet below.

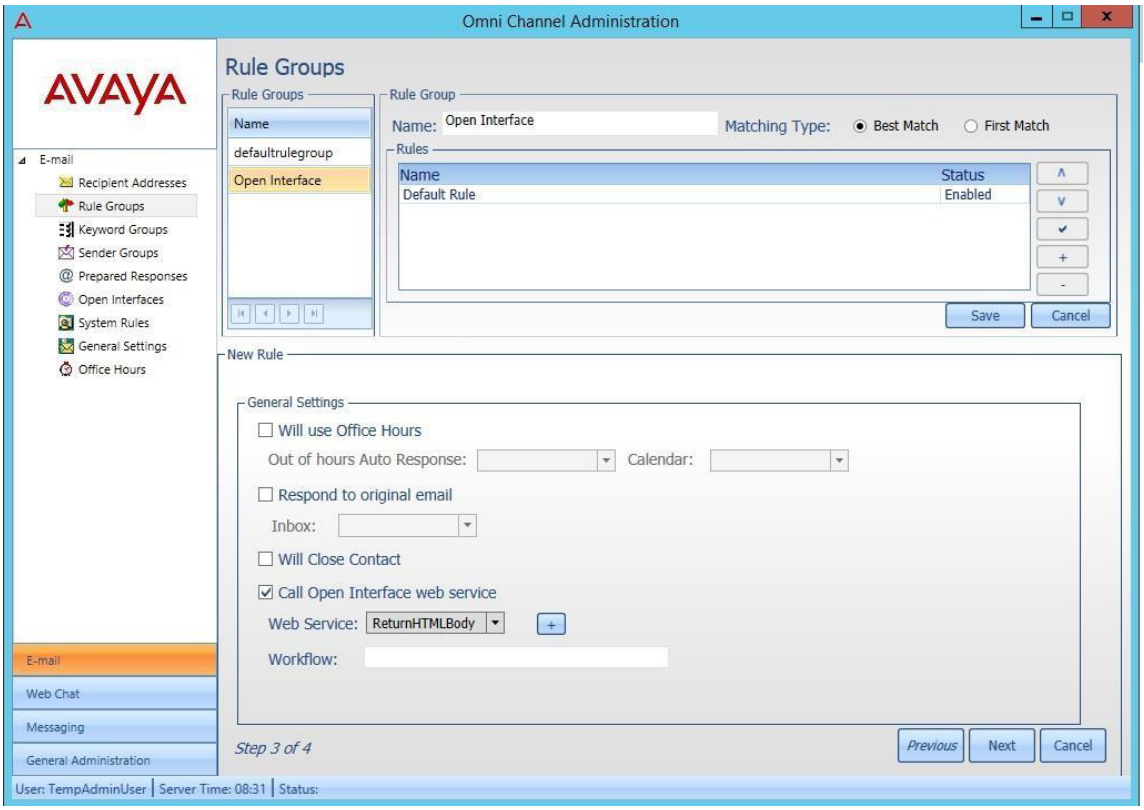
```
<operation name="MaskCreditCardNumber">
  <soap:operation soapAction="MaskCreditCardNumber"/>
  <input>
    <soap:body use="literal"/>
  </input>
  <output>
    <soap:body use="literal"/>
  </output>
</operation>
```

Next, specify what Oceana fields the input parameters of the web service correspond to. For example, the first and second input parameters of the custom service might correspond to the subject and body of the email. Also, specify what Oceana fields the output parameters of the custom web service correspond to. For example, 3 fields might be returned: a filtered subject, a filtered body and an additional set of attributes.



Step 2: Set what the expected input and output parameters map to in Oceana

Lastly, when configuring the email rules, define what custom web service (if any) should be called when an email matches all the input criteria of that rule.



Step 3: Set the web service to be called if the email matches all the input criteria of that rule

Input and output parameters

When the configuring the web service the user will need to specify what the input and output parameters should map to. For example, a web service may take an input parameter of the body of the email and return back a modified body as well as a priority. These output parameters will then be used for the email instead of the original values. Note with Oceana 3.8.1 Release it will be possible to send 7 input parameters (instead of the previous limit of 5).

Input parameters

- Mailstore
- To address
- To address list
- CC address list
- From address
- Subject
- Body
- Message-ID (added in 3.8.1.0 Release)

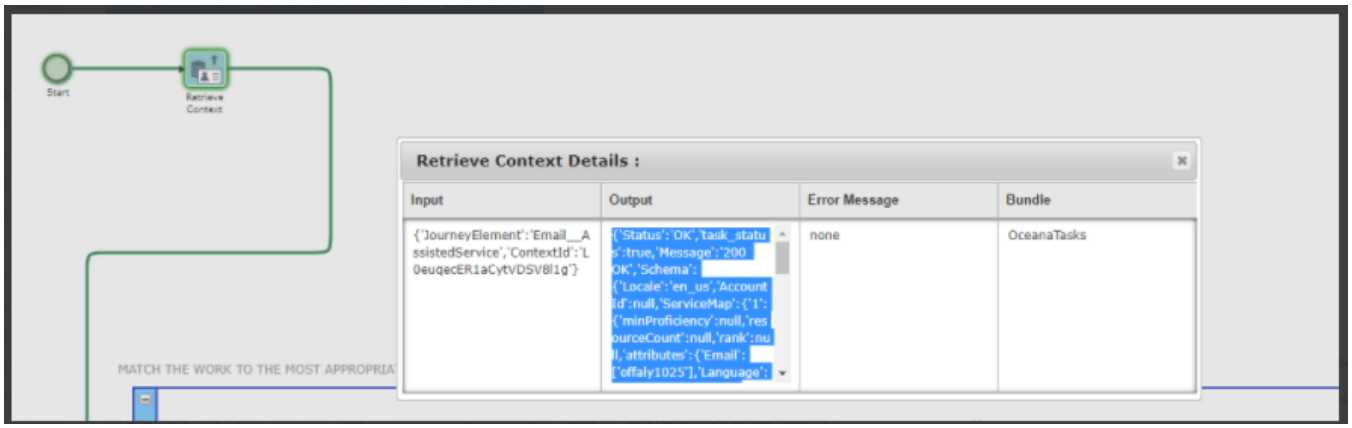
Please note Message-ID will also be available in the CS-Record for each contact.

Output parameters

- To address
- To address list
- CC address list
- Subject
- Body
- Priority
- Auto-close
- Attributes

Message-ID usage (Introduced with 3.8.1.0 release)

To allow matching of EmailOpenInterfaces record with CS records utilized by ED Flows, Message-ID is added to the list of available input parameters and it will also be available as External ID in the ContextStore record for this contact. This will allow customers with bespoke ED Flows to treat individual emails as desired.




```
{
        'Status':'OK',
        'task_status':true,
        'Message':'200 OK',
        'Schema':{
                'Locale':'en_us',
                'AccountId':null,
                'ServiceMap':{
                        '1':{
                                'minProficiency':null,
                                'resourceCount':null,
                                'rank':null,
                                'attributes':{
                                        'Email':['offaly1025'],
                                        'Language':['English'],
                                        'Channel':['Email'],
                                        'Service':['CorporateAccounts'],
                                        'Location':['Inhouse']
                                },
                                'priority':1,
                                'maxProficiency':null
                        }
                },
                'TransferServiceMap':{},
                'MatchingService':null,
                'Rating':null,
                'TransferResourceMap':{},
                'TranscriptRef':'jPjxEPhFTlqp0tzcAYg7hg',
                'CustomerId':'149',
                'ResourceMap':{},
                'DataCenter':'Primary',
                'Deferral':null,
                'CollectedDigits':null,
                'ApproverId':null,
                'Disposition':null,
                'Strategy':'Most Idle',
                'AgentId':null,
                'ApprovalMap':{}
        },
        'ExternalId':'<9b4f5a87-b6af-39fe-1d28-1f715ebbcce1@wf.aura.com>',
        'Data':{},
        'Topic':'EnglishCorporateAccounts'
}
```


Input and output parameters - dealing with Nulls

No nulls should be sent by the client. If a null value is passed from the Email Service the web service client will send a blank string.

If the webservice returns a null or an empty string as one of it's return parameters then the field that it has been matched to will not be changed.

Failure scenarios

There are a number of potential scenarios when the web service specified may not return the expected response. These include:

- Web service not available. For example, the web service may not be running, an incorrect WSDL may have been specified or there may be some network issue.
- Specified method not found. In this scenario a valid WSDL URL has been specified but the WSDL does not contain the method that have been defined.
- The method specified may not have the correct signature, i.e. it does not take an array of strings as input and return an array of strings.

Should any of these scenarios occur then the output of the web service call will be ignored and the email interaction processed without the web service customization. Please refer to the Troubleshooting section at the end of this document to help diagnose and prevent failure scenarios.

Adding additional routing attributes

Any additional attributes returned by a custom web service must:

- Be returned in comma separated string format e.g. “Language.Spanish,Location.Basque”
- The additional attributes must be pre-defined in ACM and returned from the custom service exactly as defined. Otherwise, it will be ignored.
- Be mapped to the Attribute List output parameter in Oceana.

WSDL format

The Web Service Description Language (WSDL) is the XML based document that describes a Web Service. It specifies the location of the service and the operation or methods the service exposes.

The WSDL must be of a standard format. The Operation(s) to be called should take an array of strings as its input parameter. It should return an array of strings.

The recommended format is a single flat file WSDL with no imports. This format promotes compatibility with the Admin ‘Discover’ feature to detect the WSDL details automatically. Please refer to pages 10 /11 of the Administration section for more details.

WCF (.NET) WSDL format

Default WCF projects generate a WSDL with nested internal files. This format is supported provided the operations are manually specified by the user in the admin (refer to page 11). There are a number of methods to ‘flatten’ a WCF WSDL in a single file, including using a custom WCF service host (http://blogs.msdn.com/b/dotnetinterop/archive/2008/09/23/flatten-your-wsdl-with-this-custom- servicehost-for-wcf.aspx) or using WCFExtras (http://wcfextras.codeplex.com/). It can be done natively in .NET 4.5.

Java Web Service WSDL format

Most Java based web service projects generate a WSDL at runtime with import tags by default. This format is supported by Oceana, provided the web service operations are manually entered by the user in the Admin (refer to page 11). In the case of Java web services, support for ‘flattening’ the WSDL into a single file format varies depending on your implementation, libraries used etc. Although not as straight- forward as with .NET projects, there are some options to achieve this format if desired:

Wsgen: The JAX-WS wsgen tool allows for the generated schema to be embedded inside the WSDL file by using the -inlineSchemas command line switch. Using Maven you can configure the JAX-WS Maven plugin to do the same in your POM.xml. As part of your wsgen Maven goal configuration, set the optional ‘inlineSchemas’ element to ‘true’ in your configuration.

```
<plugin>
  <groupId>org.jvnet.jax-ws-commons</groupId>
  <artifactId>jaxws-maven-plugin</artifactId>
  <version>2.2</version>
  <executions>
    <execution>
      <id>SomeId</id>
      <goals>
        <goal>wsgen</goal>
      </goals>
      <phase>prepare-package</phase>
      <configuration>
        <sei>some.class.Name</sei>
        <genWsdl>true</genWsdl>
        <keep>true</keep>
        <resourceDestDir>some/target/dir</resourceDestDir>
        <inlineSchemas>true</inlineSchemas>
      </configuration>
    </execution>
  </executions>
</plugin>
```

More information on wsgen: https://docs.oracle.com/javase/7/docs/technotes/tools/share/wsgen.html

Manual consolidation:

An alternative workaround to achieve a single unified WSDL file can be achieved as follows:

1. Publish your endpoint, then save the generated WSDL and the XSD files for editing manually.
2. Manually copy & paste the content of the XSD file(s) into the 'types' section of your WSDL, replacing the schema 'import' reference with the actual xsd content.
3. Save the merged WSDL file in a resource folder where your application can access it.
4. To configure your application to load the merged WSDL instead, specify the path in the 'wsdllocation' attribute inside the JAX-WS @Webservice annotation.

In the interface you specify the wsdlLocation:

```
@WebService(name = "Echo", targetNamespace = "http://echo/", wsdlLocation="META-INF/wsdl/EchoService.wsdl")
```

Using the ‘wsdlLocation’ attribute of the javax.jws.WebService (@Webservice) annotation, developers can manually specify a location of a relative or absolute URL of their own pre-defined WSDL file. This can be used in place of an auto-generated WSDL, thereby allowing for manual control / editing of the WSDL such as consolidating imports into one single file.

Oceana Email Service supports a broad range of WSDL formats including those with external schema imports, typical of Java web services. However, in the unlikely event that you encounter compatibility issues, simplifying the WSDL format may help to overcome this. The WSDL unification steps outlined above may be helpful if you encounter any difficulties using your WSDL with Oceana.

Sample Web Service

The sample Java project can be used as a reference for building Open Interfaces web services. This section provides an overview of the sample project and a step by step guide to setting it up.

Assumptions

- You are familiar with a modern Object Oriented Programming language and have some knowledge of Java.
- You are familiar with the following Web Technologies:
  - Apache Tomcat (or equivalent)
  - Java EE
  - SOAP web services
- You are using a Windows environment.

Software Requirements

- Java JDK
- Eclipse IDE
- Maven
- Apache Tomcat

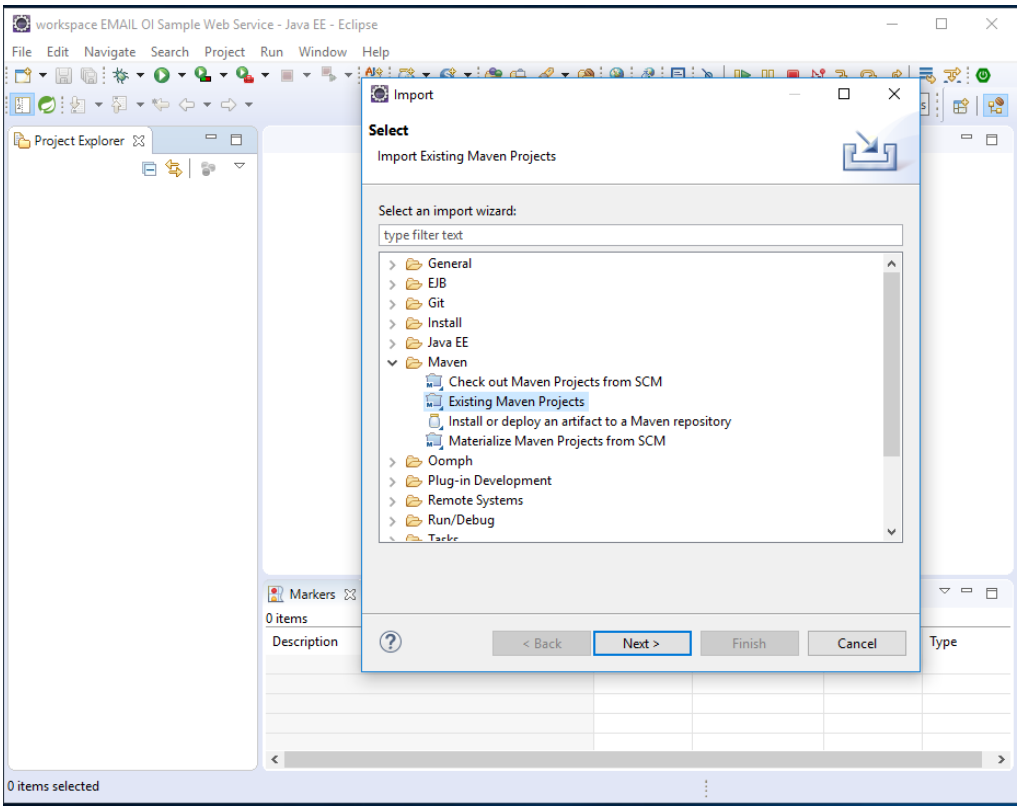
- SoapUI

Environment Set-up

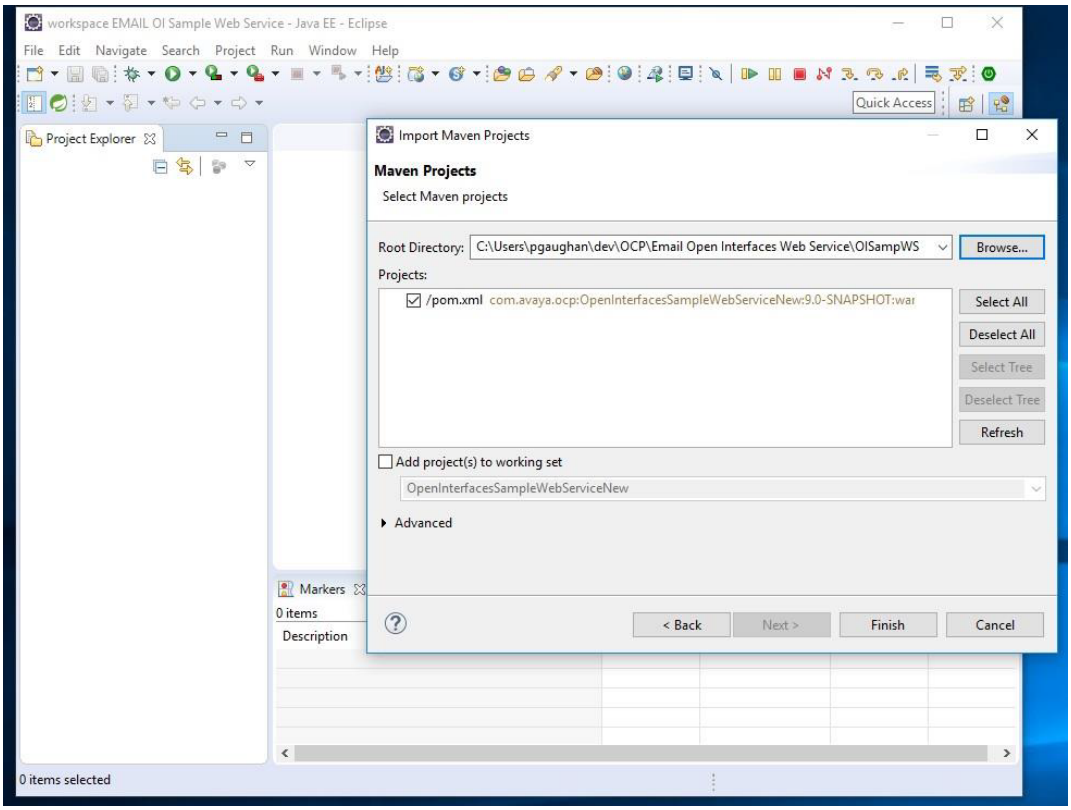
1. Download and install the latest JDK for your environment.
2. Download and install the latest version of Eclipse. You can find the latest version at https://www.eclipse.org/downloads/.
3. Download and install the latest version of Apache Tomcat. You can find the latest version at https://tomcat.apache.org/ . It is recommended that you download the zip artefact. When you have done so, extract it to a convenient location, such as the Desktop folder.

Importing the Project in Eclipse

Open your Eclipse IDE and click on File -> Import. Under Maven, select the Existing Maven Projects option and click Next:

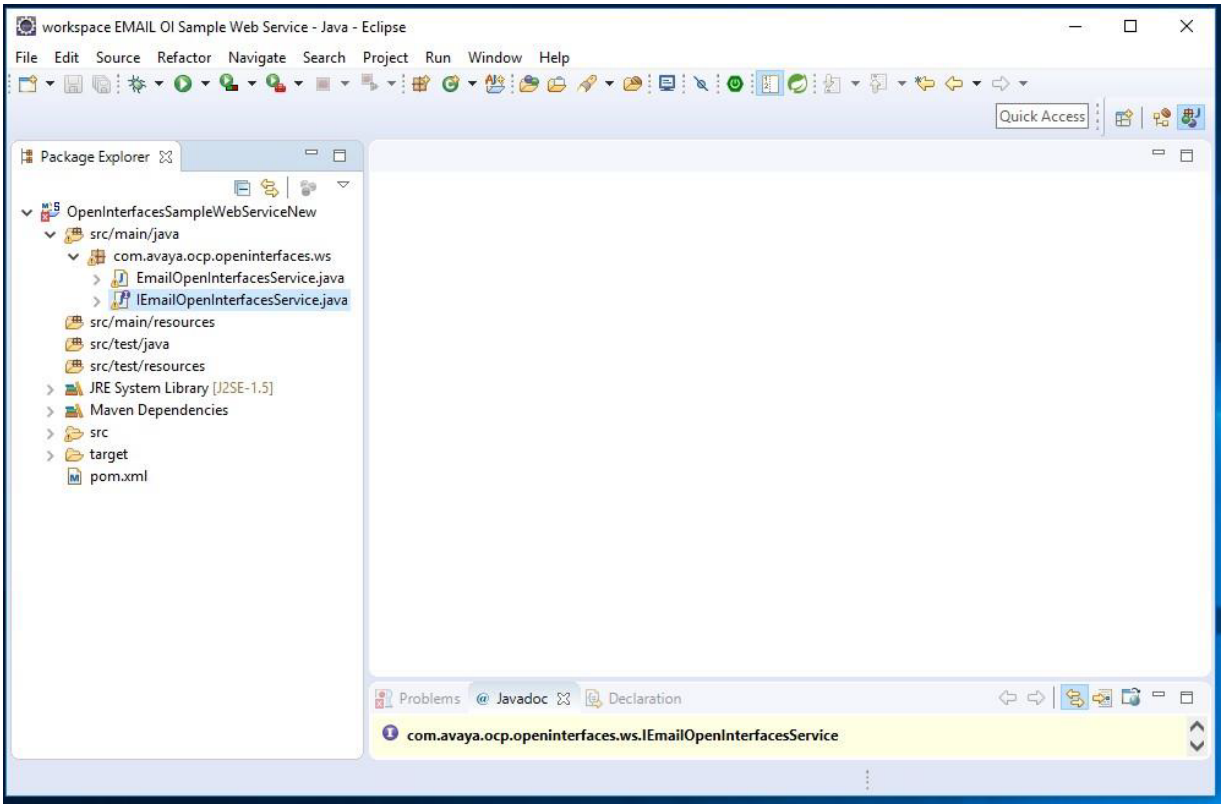


On the next page click Browse and find the Sample Open Interfaces project that you downloaded previously. Select it and click Finish.



Eclipse should then begin importing the project into your workspace. The import will take a few minutes to complete.

When the project has finished importing, you should be presented with something similar to the following:



Overview

The sample project contains 2 .java files in the 'com.avaya.ocp.openinterfaces.ws' package.

- IEmailOpenInterfacesService.java: simple interface to define the contract for the web service method
- EmailOpenInterfacesService.java: Service class implements above and performs the business logic

IEmailOpenInterfacesService.java *EmailOpenInterfacesService.java

```
1  package com.avaya.ocp.openinterfaces.ws;
2
3  import javax.jws.WebMethod;
9
10 @WebService
11 @SOAPBinding(style=Style.DOCUMENT, use=Use.LITERAL, parameterStyle=ParameterStyle.BARE)
12 public interface IEmailOpenInterfacesService {
13
14       /// <summary>
15       /// Input array:
16       ///     [0]: Subject
17       ///     [1]: Plain text Body of email
18       /// Output array:
19       ///     [0]: Subject
20       ///     [1]: Plain text Body of email
21       /// </summary>
22       /// <param name="inputParameters"></param>
23       /// <returns></returns>
24     @WebMethod(action = "MaskCreditCardNumber", operationName = "MaskCreditCardNumber")
25     String[] MaskCreditCardNumber(String[] inputParameters);
26 }
27
28
```

T

'MaskCreditCardNumber' which takes a String Array parameter. Please note that all publicly exposed Open Interfaces web methods must take a String Array parameter and return a String Array.

```
1  package com.avaya.ocp.openinterfaces.ws;
2
3  import java.util.regex.Matcher;
6
7  @WebService(portName="EmailOpenInterfacesServicePort",
8  serviceName = "EmailOpenInterfacesServiceService",
9  targetNamespace = "http://ws.openinterfaces.ocp.avaya.com/",
10 endpointInterface = "com.avaya.ocp.openinterfaces.ws.IEmailOpenInterfacesService")
11 public class EmailOpenInterfacesService implements IEmailOpenInterfacesService{
12
13     private String CreditCardPattern = "^(?:(?<visa>4[0-9]{12}(?:[0-9]{3})?)|" +
14             "(?<mastercard>5[1-5][0-9]{14})|" +
15             "(?<discover>6(?:011|5[0-9]{2})[0-9]{12})|" +
16             "(?<amex>3[47][0-9]{13})|" +
17             "(?<diners>3(?:0[0-5]|[68][0-9])?[0-9]{11})|" +
18             "(?<jcb>(?:2131|1800|35[0-9]{3})[0-9]{11}))$";
19
20
21   /// <summary>
22   /// Input array:
23   ///     [0]: Subject
24   ///     [1]: Plain text Body of email
25   /// Output array:
26   ///     [0]: Subject
27   ///     [1]: Plain text Body of email
28   /// </summary>
29   /// <param name="inputParameters"></param>
30   /// <returns></returns>
31   public String[] MaskCreditCardNumber(String[] inputParameters)
32   {
33       String[] outputParameters = new String[2];
34
35       if (inputParameters != null && inputParameters[0] != null && inputParameters[1] != null)
36       {
37           try{
38               outputParameters[0] = DetectCreditCardNumber(inputParameters[0]);
39               outputParameters[1] = DetectCreditCardNumber(inputParameters[1]);
40           }
41           catch (Exception e)
42           {
43               outputParameters[0] = inputParameters[0];
44               outputParameters[1] = inputParameters[1];
45           }
46       }
47
48       return outputParameters;
49   }
50
```

T

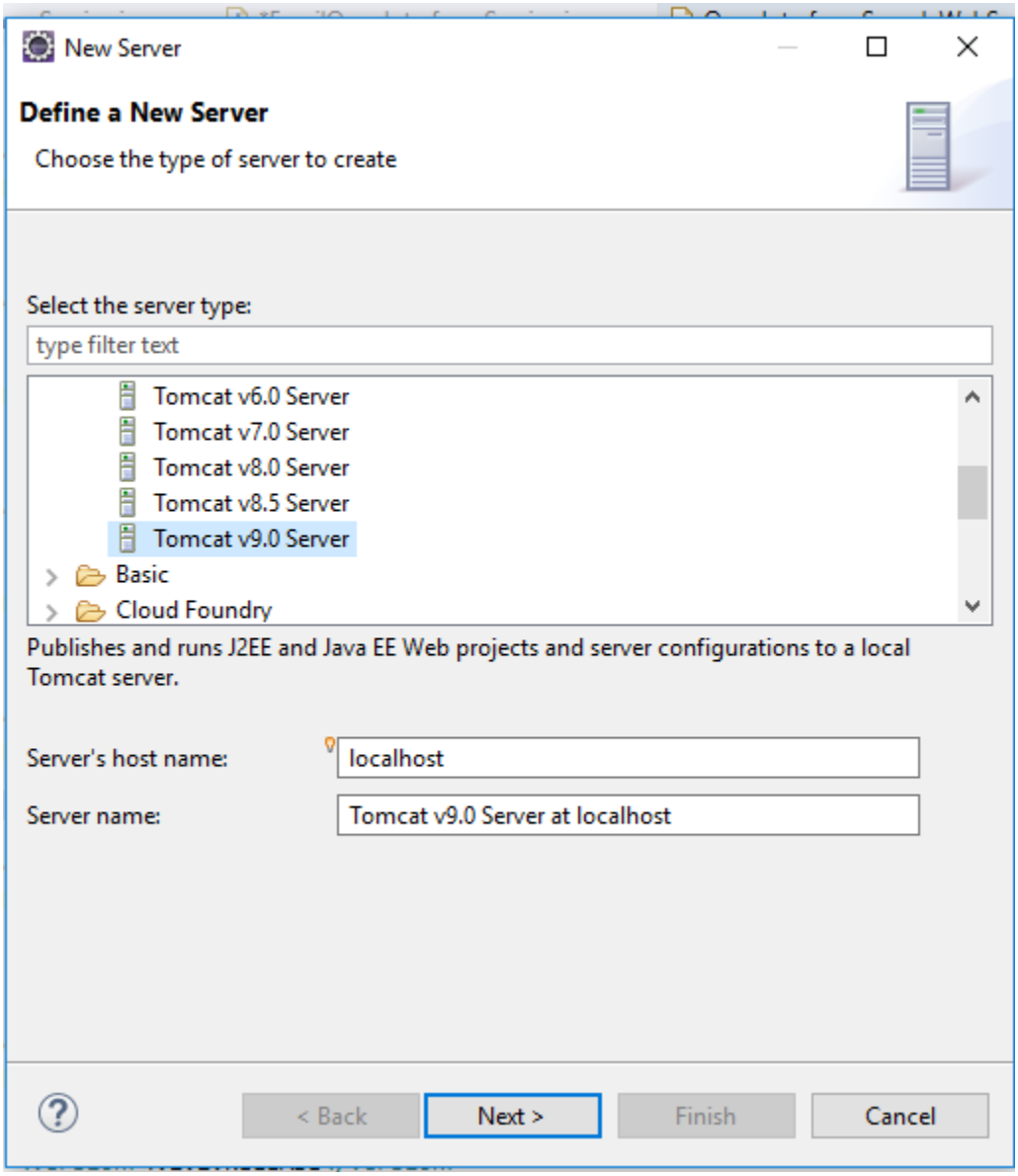
'MaskCreditCardNumber' demo method. This simple example method takes a String array parameter, expecting two entries that map to the subject and body of an email. The service checks these strings for the presence of a credit card number. If a credit card number is detected, the numeric characters will be replaced, to sanitize this sensitive data. The service will return the updated String array with the sensitive credit card data masked. If no card number is found, the strings are simply returned back unmodified.

Configuring Tomcat

Tomcat must be configured in order to run the example web service. Examine the Servers tab at the bottom of your Eclipse IDE. You will be informed that no servers are currently available. Click on the link to configure Tomcat for use with Eclipse:

```
  private String DetectCreditCardNumber(String input){
      String output = null;

      try{
          Pattern pattern = Pattern.compile(CreditCardPattern);
            //Strip all hyphens
            input = input.replaceAll("-", "");
            //Match the card
            Matcher matcher = pattern.matcher(input);

          if (matcher.matches())
          {
              output = ScrubCreditCard(matcher, input);
          }
          else
          {
              output = input;
          }
      }
      catch (Exception e)
      {
          output = input;
      }


      return output;
  }

  private String ScrubCreditCard(Matcher match, String input)
  {
      String output = input;
      Pattern pattern = Pattern.compile(CreditCardPattern);
      output = pattern.matcher(input).replaceAll("++++++++++++++++++");

      return output;
  }
}
```

Under the Tomcat server type, select the version of Tomcat you have downloaded (e.g. 9.0). Leave everything at its default setting and click Next:



On the next page, click Browse. Navigate to the folder where Tomcat is located, then click Next: On the next page you will be asked to upload a WAR file to run on the server. You should see a WAR file with the project name. Select it, then click Add, then click Finish. Go back to the Servers tab, right click the Tomcat server you just configured and click 'Start'.

By default the Tomcat application server will be running on port 8080 at http://localhost:8080 and the example web service WSDL is available at http://localhost:8080/OpenInterfacesSampleWebServiceNew- 9.0-SNAPSHOT/OpenInterfaceService?wsdl

You should see something like the below WSDL in your browser:

```
<!--
    Published by JAX-WS RI at http://jax-ws.dev.java.net. RI's version is JAX-WS RI 2.1.3-b02-.
 -->
<!--
    Generated by JAX-WS RI at http://jax-ws.dev.java.net. RI's version is JAX-WS RI 2.1.3-b02-.
 -->
<definitions xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/" xmlns:tns="http://ws.openinterfaces.ocp.avaya.com/" xmlns:xsd="http://www.w3.org/2001/XMLSchema"
 xmlns="http://schemas.xmlsoap.org/wsdl/" targetNamespace="http://ws.openinterfaces.ocp.avaya.com/" name="EmailOpenInterfacesServiceService">
  <types>
    <xsd:schema>
      <xsd:import namespace="http://ws.openinterfaces.ocp.avaya.com/" schemaLocation="http://10.134.61.34:8080/OpenInterfacesSampleWebServiceNew-9.0-SNAPSHOT/OpenInterfaceService?
      xsd=1"/>
    </xsd:schema>
    <xsd:schema>
      <xsd:import namespace="http://jaxb.dev.java.net/array" schemaLocation="http://10.134.61.34:8080/OpenInterfacesSampleWebServiceNew-9.0-SNAPSHOT/OpenInterfaceService?xsd=2"/>
    </xsd:schema>
  </types>
  <message name="MaskCreditCardNumber">
    <part name="MaskCreditCardNumber" element="tns:MaskCreditCardNumber"/>
  </message>
  <message name="MaskCreditCardNumberResponse">
    <part name="MaskCreditCardNumberResponse" element="tns:MaskCreditCardNumberResponse"/>
  </message>
  <portType name="IEmailOpenInterfacesService">
    <operation name="MaskCreditCardNumber">
      <input message="tns:MaskCreditCardNumber"/>
      <output message="tns:MaskCreditCardNumberResponse"/>
    </operation>
  </portType>
  <binding name="EmailOpenInterfacesServicePortBinding" type="tns:IEmailOpenInterfacesService">
    <soap:binding transport="http://schemas.xmlsoap.org/soap/http" style="document"/>
    <operation name="MaskCreditCardNumber">
      <soap:operation soapAction="MaskCreditCardNumber"/>
      <input>
        <soap:body use="literal"/>
      </input>
      <output>
        <soap:body use="literal"/>
      </output>
    </operation>
  </binding>
  <service name="EmailOpenInterfacesServiceService">
    <port name="EmailOpenInterfacesServicePort" binding="tns:EmailOpenInterfacesServicePortBinding">
      <soap:address location="http://10.134.61.34:8080/OpenInterfacesSampleWebServiceNew-9.0-SNAPSHOT/OpenInterfaceService"/>
    </port>
  </service>
</definitions>
```

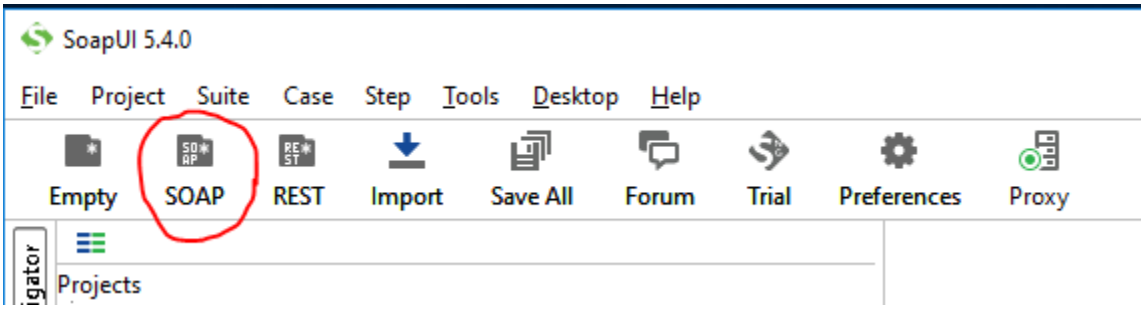
Testing the Web Service Example

To call the service, you can use an open source SOAP web service testing tool such as SoapUI to generate a request and view the response.

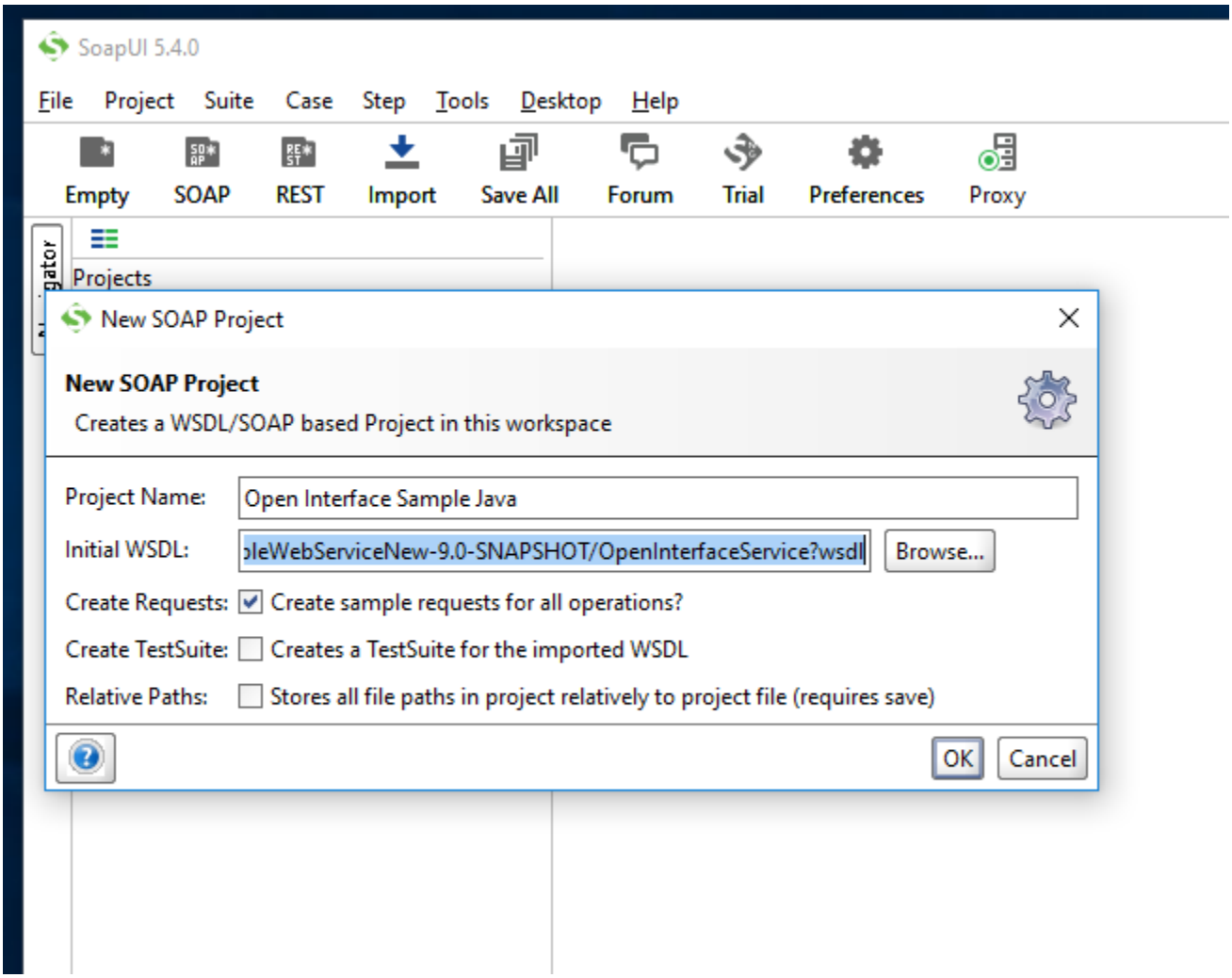
An open source version of SoapUI is available to download from here: https://www.soapui.org/downloads/soapui.html

Testing with SoapUI

To test the web service with SoapUI, click the SOAP icon in the navigation bar to create a new SOAP project:



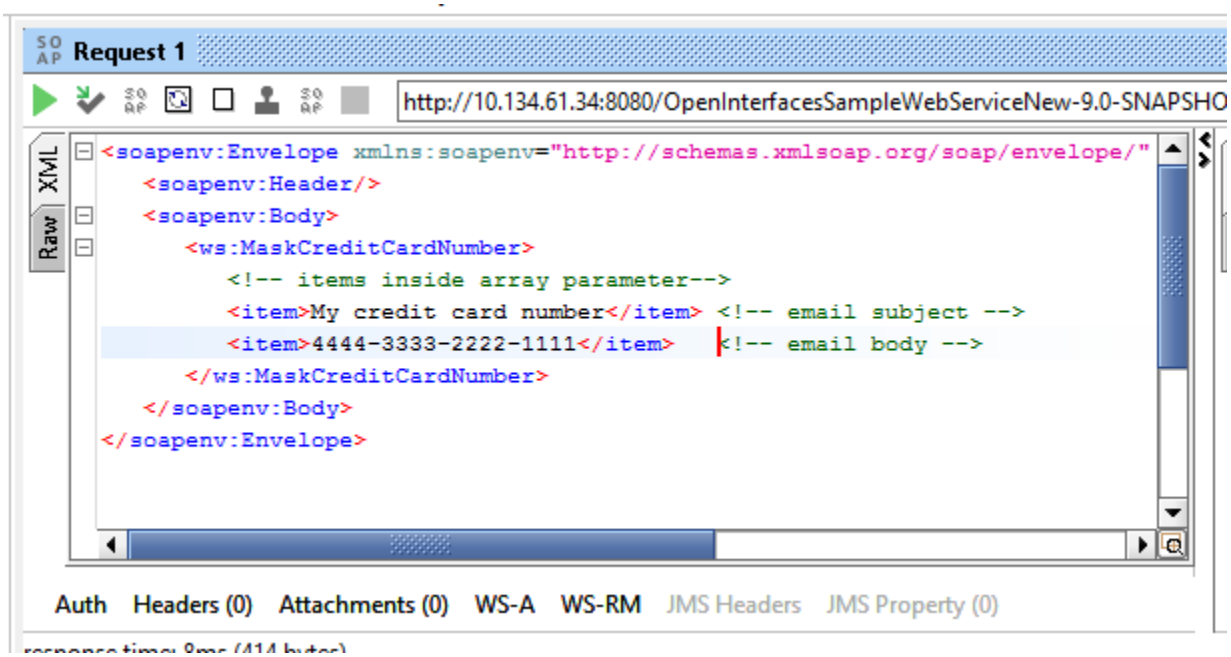
Enter a name for your project and copy and paste your WSDL URL in the ‘initial WSDL’ field as shown:



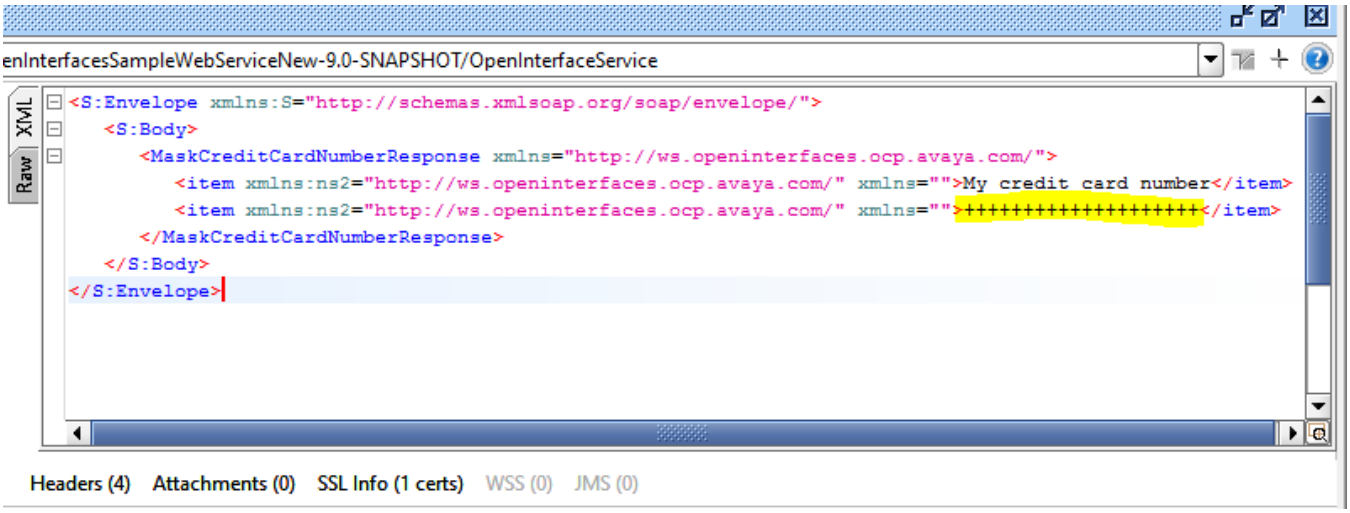
Make sure to leave the 'Create Requests' check box ticked and click OK. SoapUi will then connect and parse the WSDL from your web service and use the details to automatically generate a sample request in the correct format.

The generated request can be edited to enter various parameters of your choice for testing purposes. Remember that for compatibility purposes, the service method signature can only accept a single parameter in the form of a String Array. You may pass multiple strings as needed as long as they reside inside one single String Array collection.

In the example request below, the 'item' tags represent individual Strings inside the String Array parameter. The first 'item' tag represents the subject field and the second represents the body. In the example below, we have entered the text 'My credit card number' for the subject field and '4444-3333- 2222-1111' as an example 16 digit credit card number in the email body.



Upon executing the request, we can view the sample response returned by the service in the right-hand pane. If your service is up and running, you should see something similar to the example response shown below. The subject remains unchanged in this case but the credit card number in the body has been successfully masked in the response.

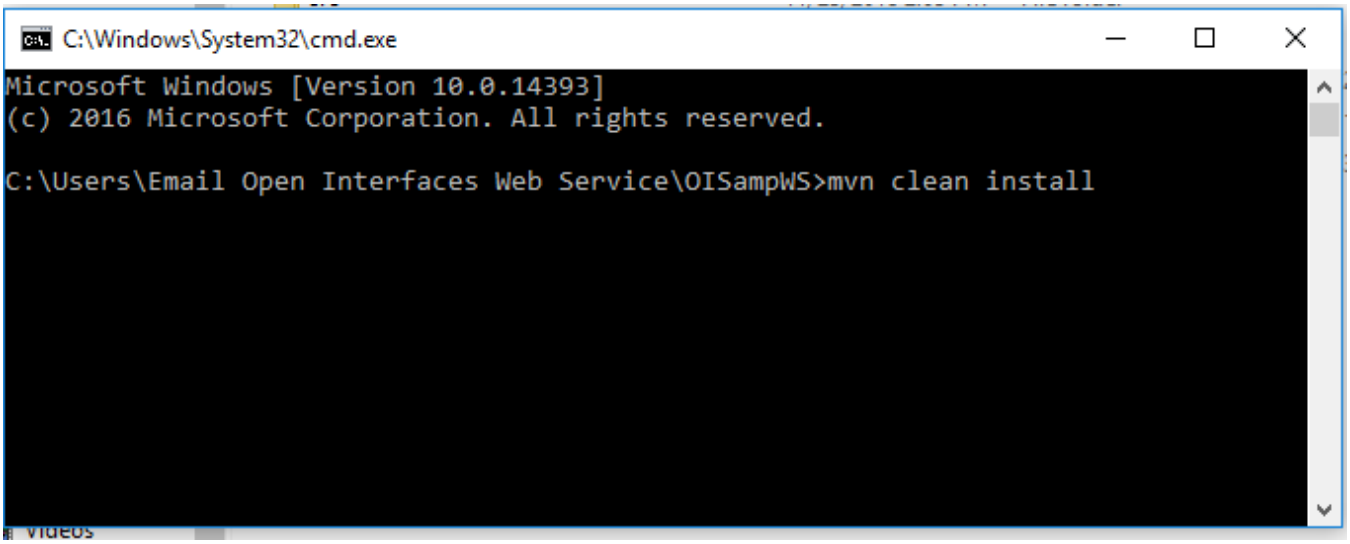


How To Deploy Remotely

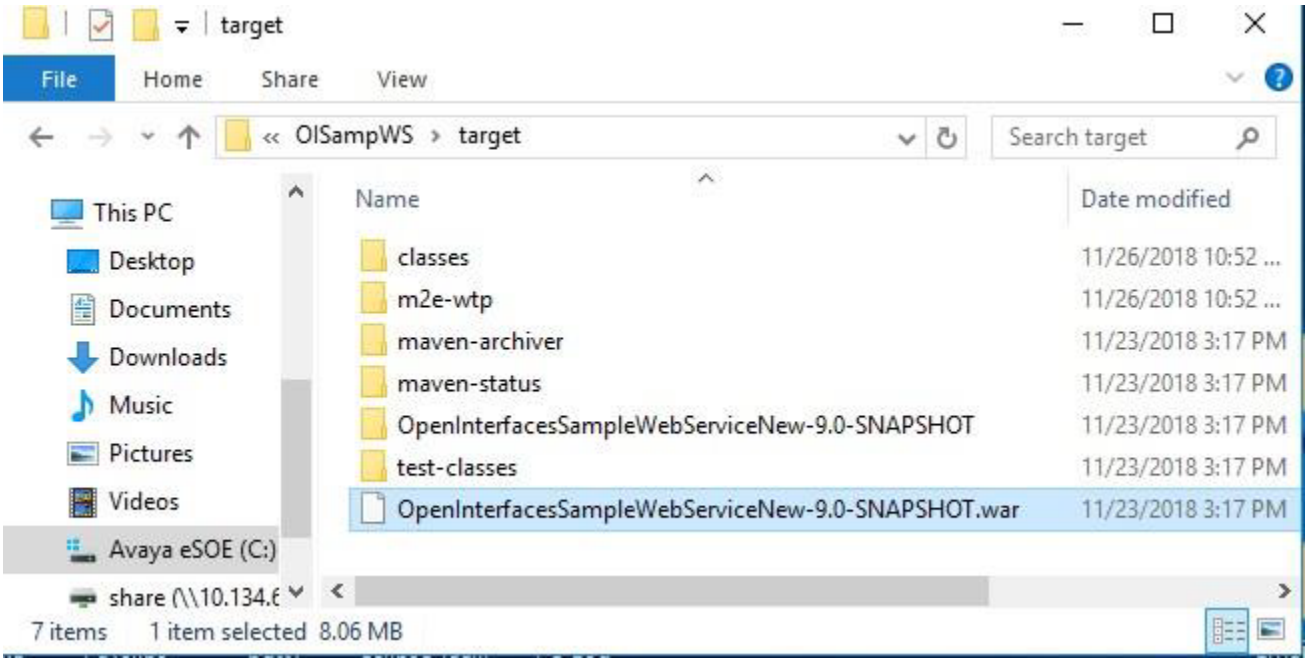
In this section we are going to build a WAR file that will enable us to deploy the web service on a Tomcat server other than our local one. This server will be referred to as a “Remote” Tomcat.

You can download Apache Tomcat from here: http://tomcat.apache.org/ and install it on your local system and / or a remote server of your choice.

To build the WAR file for remote deployment outside of Eclipse, navigate to the directory where you saved the Open Interfaces Web Service project and open a command line interface. Enter the command ‘mvn clean install’ as shown below.



When the build completes, you find the WAR file in the ‘target’ folder of the project.



Go to your Remote Tomcat install directory and find the “webapps” subdirectory, paste the .war file into here. If the Tomcat server is not already running, you can start it via “[tomcat_base]\bin\startup.bat”.
After the Tomcat server has started you should be able to view the WSDL in your browser. The Tomcat server is now running independently of our Eclipse. If you wish to update the web service, simply remove the WAR file and replace it with the updated version. For a more detailed guide on Tomcat web application deployment refer to the Tomcat docs.

Integration with Oceana Email Service

To connect to the sample service via Oceana Email Service you will need to enter the web service details in the OCP Admin, following the steps as described earlier in the Administration section.

Unlike running locally, you will need to explicitly specify the IP address of your web service host in the Admin URL field, replacing ‘localhost’ with the actual IP address. If you are running the service on your local machine via Eclipse or a local Tomcat instance, then you will simply enter your IP address of your local machine. If you have deployed your service on a remote host server, then enter the IP address of your remote host in the URL e.g. http://<ip address>:8080/OpenInterfacesSampleWebServiceNew-9.0- SNAPSHOT/OpenInterfaceService?wsdl

(Hint: on a Windows computer, you can check your IP address in the command terminal using the command ‘ipconfig’).

HTTPS support

Oceana supports secure connections to the Open Interfaces web service via HTTPS.

It is common for a WSDL ‘GET’ request to be accessible over HTTP while only the ‘POST’ requests to call the service require HTTPS.

However, If the web service operations must be called via a secure HTTPS connection, then a HTTPS URL for the WSDL must be entered in the Admin, even if the ‘GET’ request for the WSDL file itself is also available over HTTP.

The non-secure HTTP URL for the WSDL must not be entered in the admin, if the POST requests to call the service are using HTTPS as the redirect to HTTPS from HTTP will cause a failure.

By default, the MM Admin will auto-fill the URL field with the non-secure prefix ‘http://‘ but this must be changed to ‘https:// ’ if the web service operations require a secure connection.

Enabling HTTPS on sample Java web service

To enable HTTP on the example project, open the web.xml file located in the WEB-INF folder.

```
57
58    <security-constraint>
59    <web-resource-collection>
60        <web-resource-name>securedapp</web-resource-name>
61        <url-pattern>/*</url-pattern>
62        <!--
63                JSR-109 specifies that http-method POST must be used.
64                If we include GET here, access to the WSDL will also be
65                protected, otherwise not.
66            -->
67            <http-method>POST</http-method>
68    </web-resource-collection>
69    <user-data-constraint>
70        <transport-guarantee>NONE</transport-guarantee>
71        <!-- To enable HTTPS replace NONE above with CONFIDENTIAL as per below -->
72        <!--  <transport-guarantee>CONFIDENTIAL</transport-guarantee> -->
73    </user-data-constraint>
74 </security-constraint>
75
76 </web-app>
```

HTTPS is not enabled by default. To enable it, simply edit the transport-guarantee element as per the comment shown, replacing NONE with CONFIDENTIAL.

Also note that only POST requests will be secured as per the default settings shown above. The WSDL URL itself will be accessible over via GET requests over non secure HTTP. (This default behaviour can be changed if desired by including GET here also as per the comment shown in blue).

If enabling SSL then you must update the WSDL URL in the Admin with the HTTPS prefix and port number e.g. https://<ip address>:8443 /OpenInterfacesSampleWebServiceNew-9.0- SNAPSHOT/OpenInterfaceService?wsdl

This is required even if GET requests remain unsecured, since redirects from HTTP to HTTPS are currently not supported.

Troubleshooting

The following provides some guidelines for troubleshooting issues with the Open Interfaces service.

Failure to detect WSDL operations in OCP Admin

Don’t be alarmed if auto discovery is not working since this feature is NOT a compatibility test. The Admin auto-discovery feature has limitations and cannot support all WSDL formats. The details can be added manually if auto discovery fails. The WSDL parsing within Oceana is more complex and supports a broader range of formats.

Configuration changes in OCP Admin not picked up

A reboot of both OCP nodes is required after any updates to the Open Interfaces settings in the Admin.

Parameter mismatch

Parameter Sequence: Be sure to take care when setting the sequence of input and output parameters of your web service in the OCP Admin. The order in which you add the input parameters should match the order in which your web service method expects to receive them. Likewise, the sequence of parameters returned back from the web service should match the configuration in the Admin.

Parameter Quantity: Take care to match the quantity of input and output parameters exactly with those received / returned by the web service.

Failure to call HTTPS web service

If you encounter problems calling your HTTPS service, you could try temporarily disabling HTTPS on your service to test and confirm whether the issue is related. If you suspect a possible HTTPS related issue, below are some possible causes:

HTTPS redirect error: Ensure that you have entered a HTTPS URL for the WSDL in MM Admin as a redirect from HTTP to HTTPS is not supported and will cause a connection failure.

Certificate error: Ensure that you have imported the trusted certificate for your web service in System Manager for both OCP nodes.

Ensure the Common Name (CN) / Subject Alternative Name (SAN) field on your certificate matches the host name or IP address of your web service host.