Salesforce Integration Using PI: How to Perform Query and Other DML Operations Using the Enterprise WSDL

Applies to:

SAP NetWeaver Process Integration 7.1

Summary

A case study for integrating Salesforce.com for query and create webservice operation using PI 7.1

Author: Unnamalai Arunachalam

Company: Wipro Technologies

Created on: 8 July 2010

Author Bio

Unnamalai Arunachalam is currently working in Wipro Technologies as SAP XI/PI consultant.

Table of Contents

Introduction

In my current project we are using PI as the Enterprise wide service bus. Our client is evaluating the use of salesforce.com as the CRM tool. As part of this evaluation exercise, client wanted us to do a prototype interface to integrate their core ERP (SAP ECC) with Salesforce.com (SFDC).

I would like to thank Bhavesh Kantilal, Saravana Kuppusamy, Santosh Kumar Vellingiri, Harsh Chawla, Prasanna Vittal and Pragya Sharma for their valuable inputs and helping me in developing this prototype successfully.

Overview

For this POC we developed a scenario to integrate the ECC system with salesforce.com via PI. We implemented two scenarios as part of this POC,

1. Perform a query operation on an SFDC Account object
2. Perform Create operation of an SFDC Account object.

We opted for the web services approach to perform the above POC. SFDC provides an enterprise WSDL, which can be downloaded and imported to Repository.

Steps to be followed for performing a DML operation:

1. Download Enterprise WSDL from SFDC.
2. Modify the DML operation object in the Enterprise WSDL according to the webservice performed.
3. Create Repository objects.
4. Create Directory objects.
5. Configure either an outbound proxy or RFC call.

Perform Query Operation on a SFDC Account Object

Download Enterprise WSDL from SFDC

In the first place we need to have an account registered in salesforce.com (free developer account) to download the WSDL. Login in to SFDC with user credentials and download the WSDL from API. Also refer to this Article on **"Salesforce.com Integration Using SAP PI: A Case Study"** for the detail description on how to create an account in SFDC and call a simple webservice 'getServerTimestamp'.

Modify Query Object in the Enterprise WSDL

Query operation executes a query against the specified "Account" object and returns data as response. Account Data type has multiple elements or fields of which we can query 'n' number of fields according to our requirement.

Screenshot of Account Data type with elements from the enterprise WSDL.

```
- <complexType name="Account">
  - <complexContent>
    - <extension base="ens:sObject">
      - <sequence>
          <element name="AccountContactRoles" nillable="true" minOccurs="0" type="tns:QueryResult" />
          <element name="AccountNumber" nillable="true" minOccurs="0" type="xsd:string" />
          <element name="AccountPartnersFrom" nillable="true" minOccurs="0" type="tns:QueryResult" />
          <element name="AccountPartnersTo" nillable="true" minOccurs="0" type="tns:QueryResult" />
          <element name="Active__c" nillable="true" minOccurs="0" type="xsd:string" />
          <element name="ActivityHistories" nillable="true" minOccurs="0" type="tns:QueryResult" />
          <element name="AnnualRevenue" nillable="true" minOccurs="0" type="xsd:double" />
          <element name="Assets" nillable="true" minOccurs="0" type="tns:QueryResult" />
          <element name="Attachments" nillable="true" minOccurs="0" type="tns:QueryResult" />
          <element name="BillingCity" nillable="true" minOccurs="0" type="xsd:string" />
          <element name="BillingCountry" nillable="true" minOccurs="0" type="xsd:string" />
          <element name="BillingPostalCode" nillable="true" minOccurs="0" type="xsd:string" />
          <element name="BillingState" nillable="true" minOccurs="0" type="xsd:string" />
          <element name="BillingStreet" nillable="true" minOccurs="0" type="xsd:string" />
          <element name="Cases" nillable="true" minOccurs="0" type="tns:QueryResult" />
          <element name="Contacts" nillable="true" minOccurs="0" type="tns:QueryResult" />
          <element name="Contracts" nillable="true" minOccurs="0" type="tns:QueryResult" />
          <element name="CreatedBy" nillable="true" minOccurs="0" type="ens:User" />
          <element name="CreatedById" nillable="true" minOccurs="0" type="tns:ID" />
          <element name="CreatedDate" nillable="true" minOccurs="0" type="xsd:dateTime" />
          <element name="CustomerPriority__c" nillable="true" minOccurs="0" type="xsd:string" />
          <element name="Description" nillable="true" minOccurs="0" type="xsd:string" />
          <element name="Events" nillable="true" minOccurs="0" type="tns:QueryResult" />
          <element name="Fax" nillable="true" minOccurs="0" type="xsd:string" />
          <element name="Histories" nillable="true" minOccurs="0" type="tns:QueryResult" />
          <element name="Industry" nillable="true" minOccurs="0" type="xsd:string" />
          <element name="IsDeleted" nillable="true" minOccurs="0" type="xsd:boolean" />
          <element name="LastActivityDate" nillable="true" minOccurs="0" type="xsd:date" />
          <element name="LastModifiedBy" nillable="true" minOccurs="0" type="ens:User" />
          <element name="LastModifiedById" nillable="true" minOccurs="0" type="tns:ID" />
```

For example, we take elements NAME, OWNERID, WEBSITE, and PHONE from the ACCOUNT data type to perform a query operation in SFDC. The WSDL will have a query action and query response as shown below.

```
- <element name="query">
  - <complexType>
    - <sequence>
        <element name="queryString" type="xsd:string" />
      </sequence>
    </complexType>
  </element>
- <element name="queryResponse">
  - <complexType>
    - <sequence>
        <element name="result" type="tns:QueryResult" />
      </sequence>
    </complexType>
  </element>
```

The QueryResult is of data type ‘sObject’. By default all the action would point to data type sObject in this WSDL. To query Account related details, we change the data type of QueryResult to “Account”.

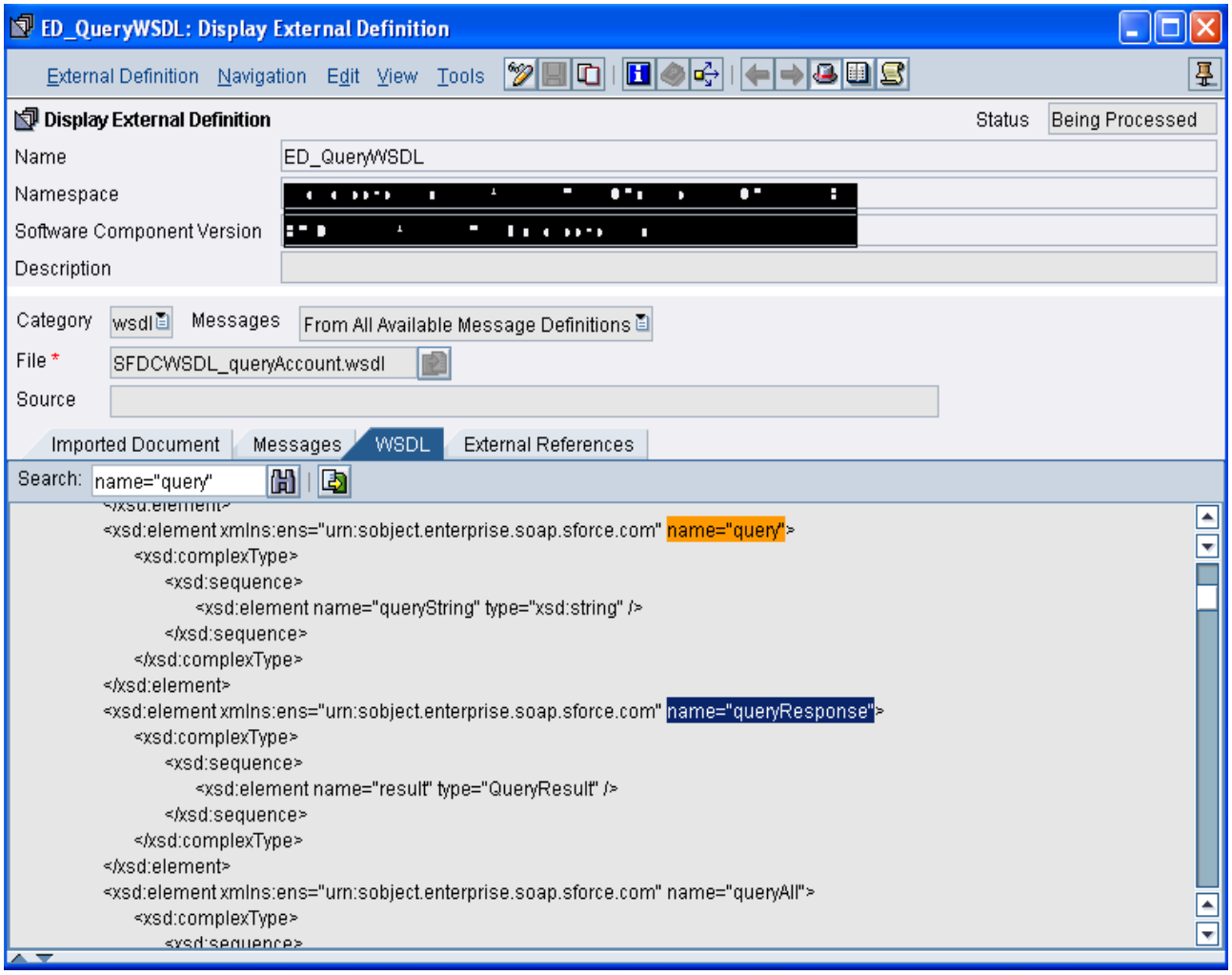
```
- <complexType name="QueryResult">
  - <sequence>
      <element name="done" type="xsd:boolean" />
      <element name="queryLocator" type="tns:QueryLocator" nillable="true" />
      <element name="records" type="ens:sObject" nillable="true" minOccurs="0" maxOccurs="unbounded" />
      <element name="size" type="xsd:int" />
    </sequence>
  </complexType>
```

Open the WSDL in text editor and change the data type of QueryResult from “sObject” to “Account”.

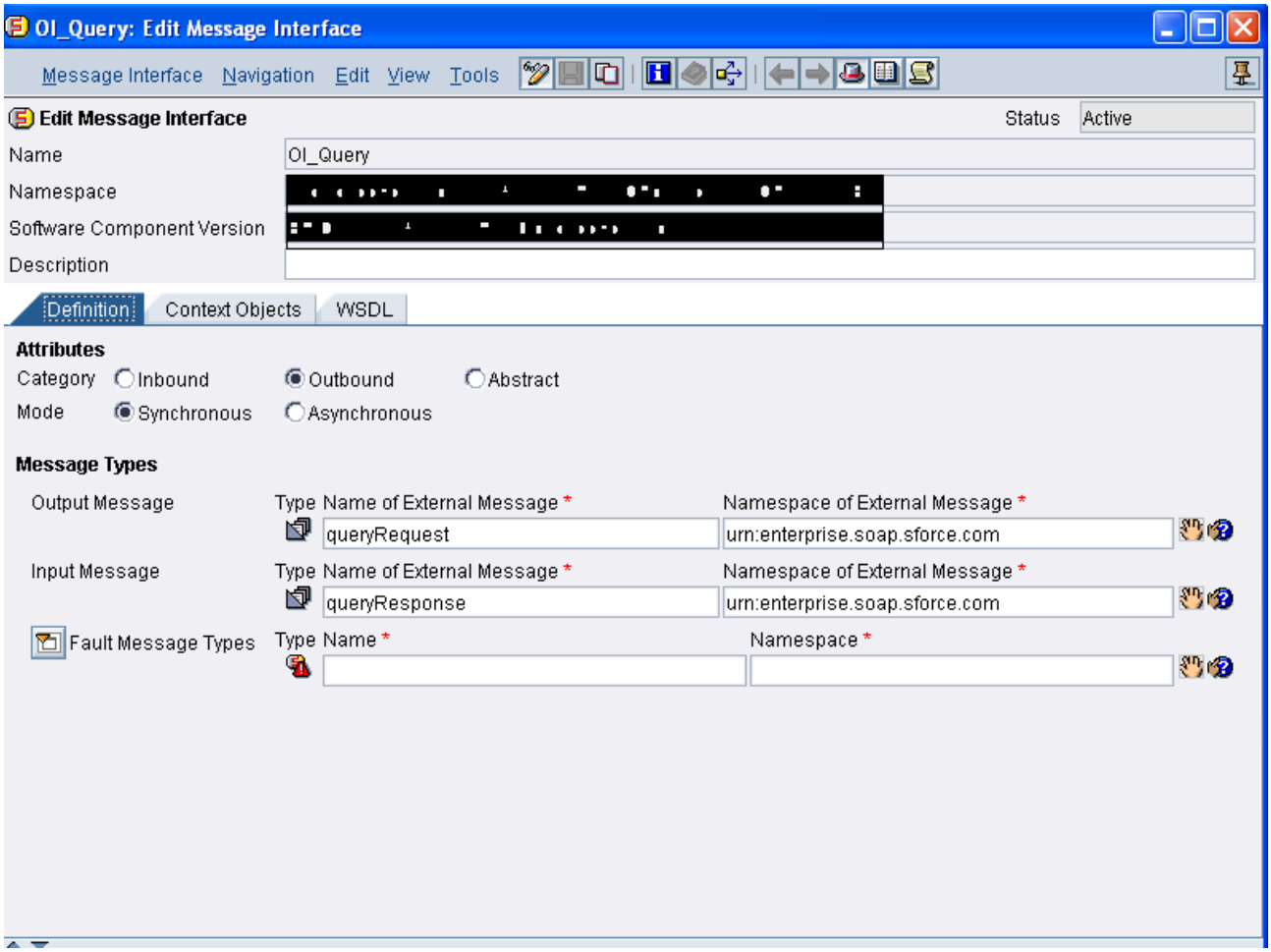
```
- <complexType name="QueryResult">
  - <sequence>
      <element name="done" type="xsd:boolean" />
      <element name="queryLocator" type="tns:QueryLocator" nillable="true" />
      <element name="records" type="ens:Account" nillable="true" minOccurs="0" maxOccurs="unbounded" />
      <element name="size" type="xsd:int" />
    </sequence>
  </complexType>
```

Repository Objects

Import the Query WSDL in to repository as an external definition ED_QueryWSDL.



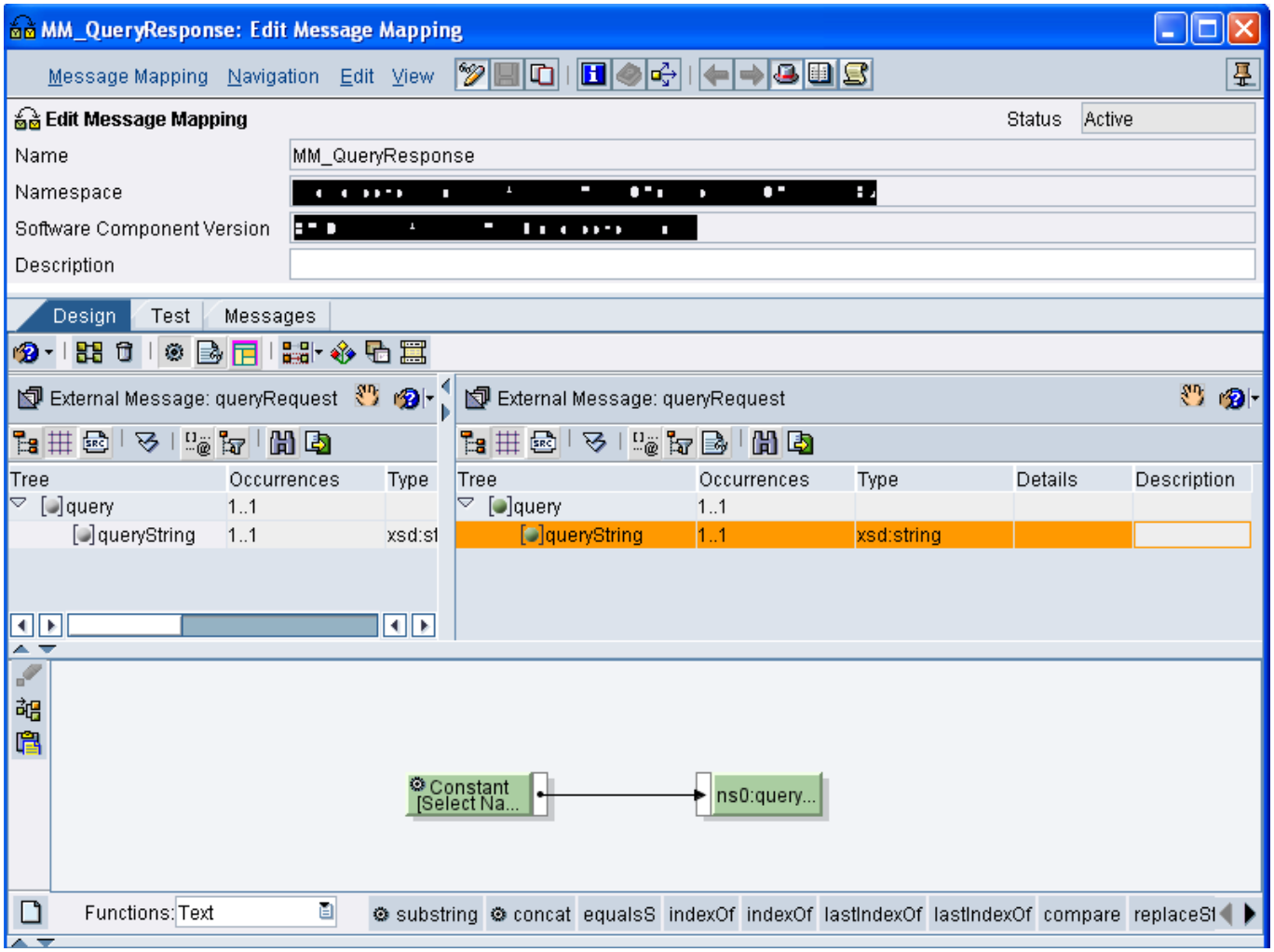
Create outbound synchronous interface which contains QueryResponse and QueryRequest as input and output messages respectively, chose from the external definition ED_QueryWSDL.

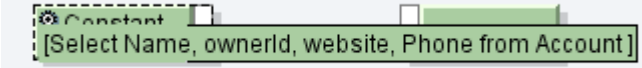


Similarly create an inbound synchronous interface with query request and query response as input and output messages respectively from the external definition ED_QueryWSDL.

Create Message Mapping with the query string as input and also dynamically pass the server URL in a UDF.

Below is the Screenshot of the message mapping which shows that the query string is supplied as a constant to the target message.



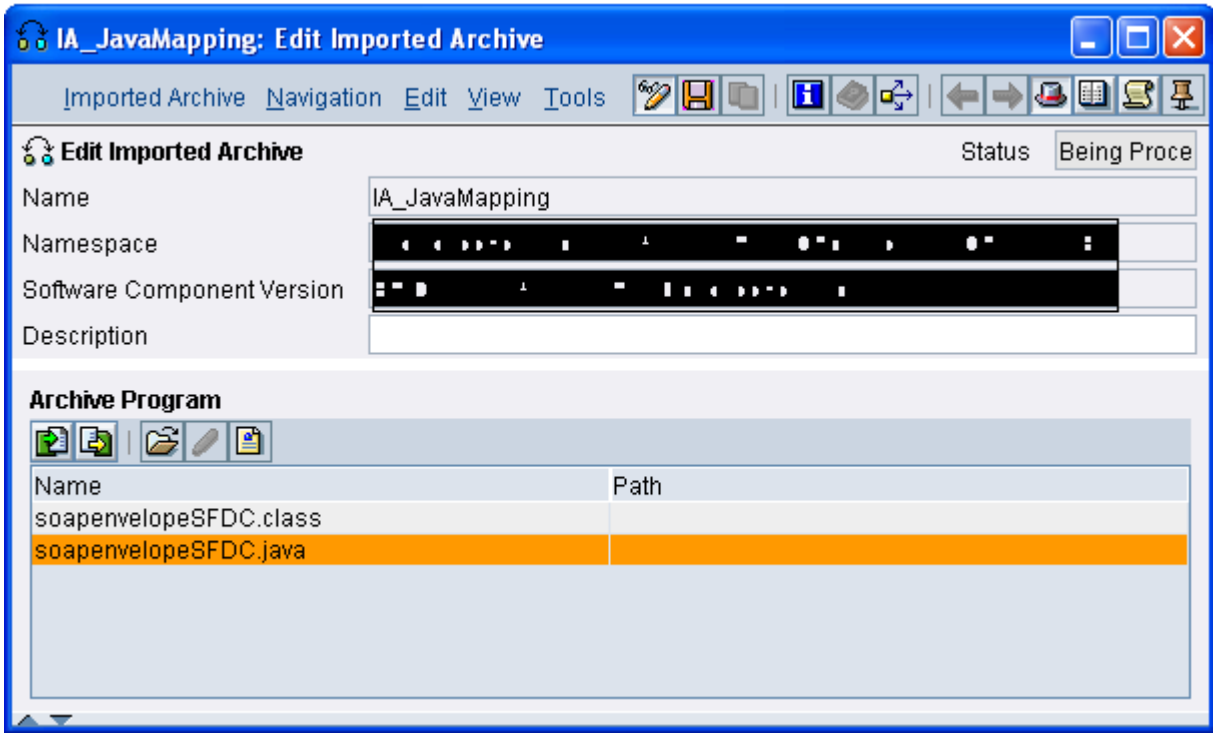


We see that the server URL remains the same for all the operations performed in the WSDL. So we decided to go with the UDF, to set the Server URL dynamically at the header using TServerLocation parameter.

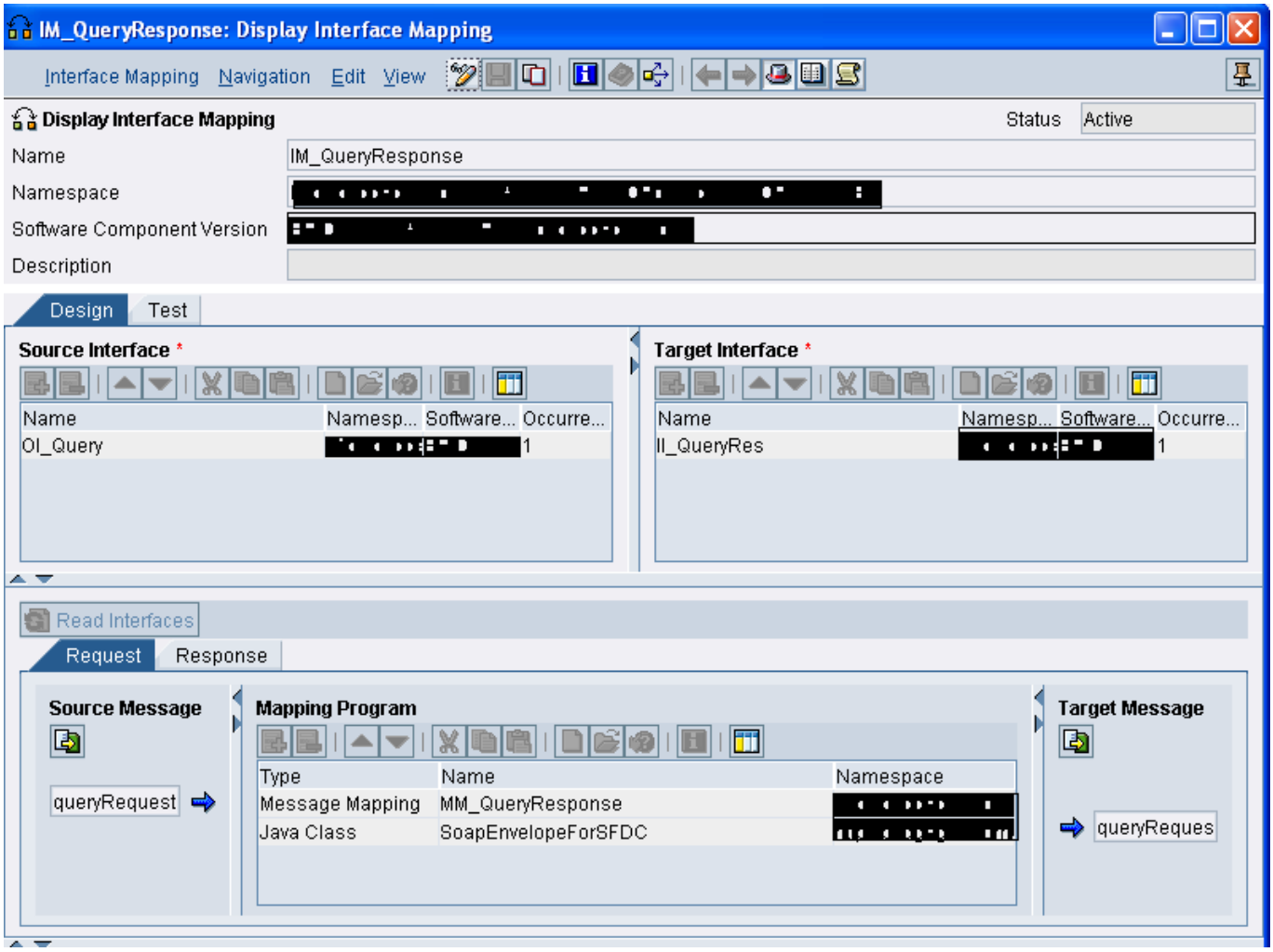
```
public String setTargetURL(Container container){
DynamicConfiguration conf = (DynamicConfiguration)
container.getTransformationParameters().get(StreamTransformationConstants.DYNAMIC_CON
FIGURATION);

DynamicConfigurationKey key2 =
DynamicConfigurationKey.create("http://sap.com/xi/XI/System/SOAP","TServerLocation");


conf.put(key2, "https://ap1-
api.salesforce.com/services/Soap/c/18.0/00D90000000ISZc");

return " ";
}
```

Import the Java mapping. This Java Code will do a Soap lookup to get the session ID. Also build the soap envelope manually because the query webservice expects few other attributes to be set explicitly. Please refer this Java code for the SOAP Lookup and to build the Envelope.

Screenshot of Java mapping imported in to repository:

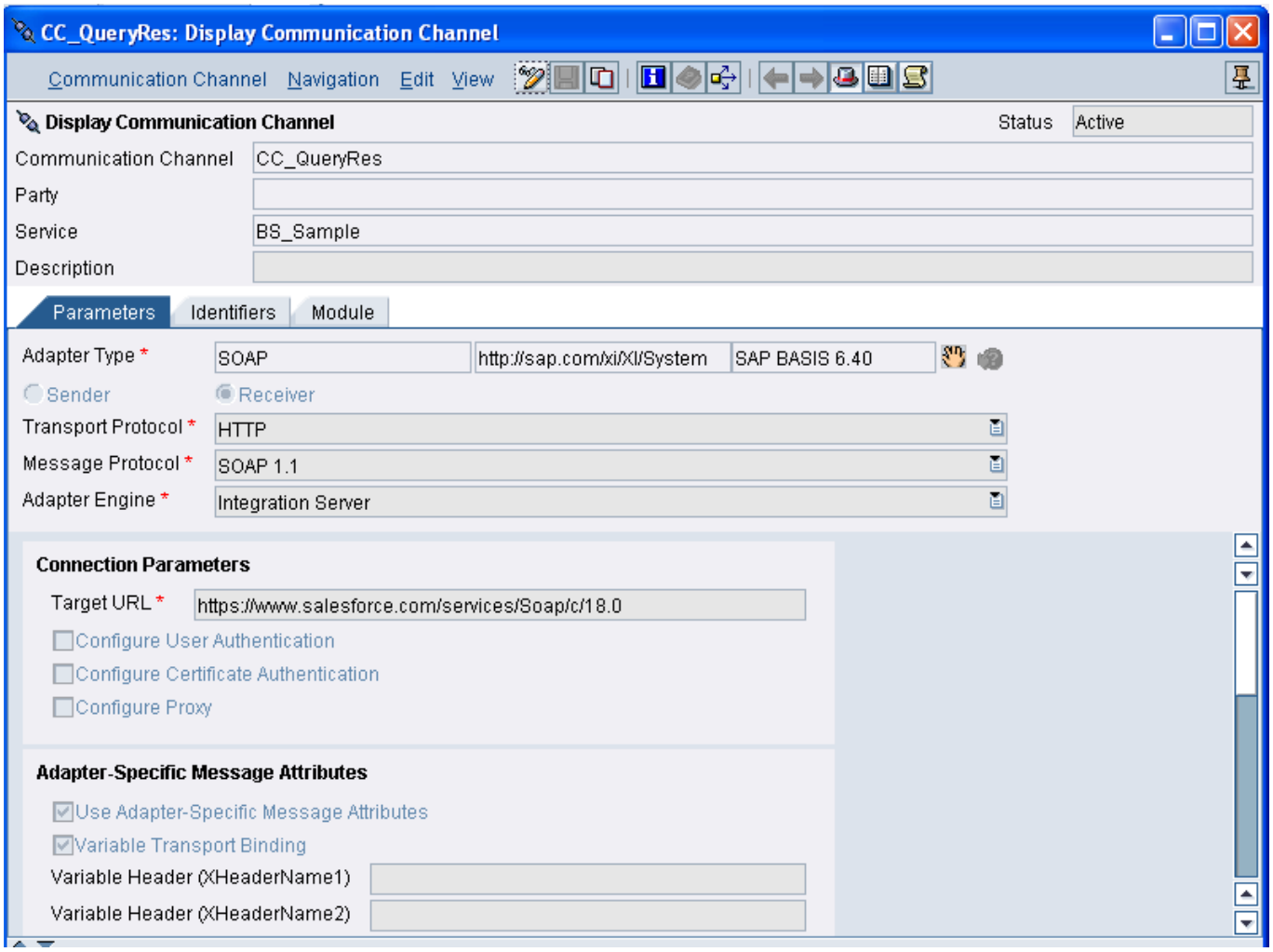


Create an operation mapping with both message mapping and java mapping in subsequent order in the mapping program, as shown below,



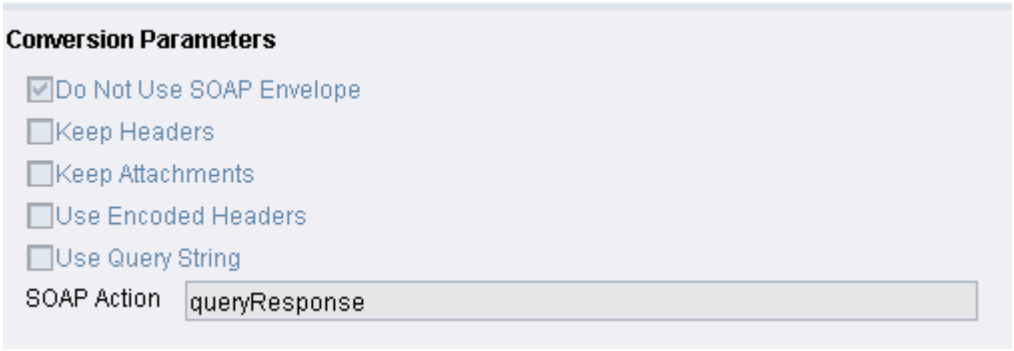
Design Objects

Create SOAP receiver communication channel for query response.

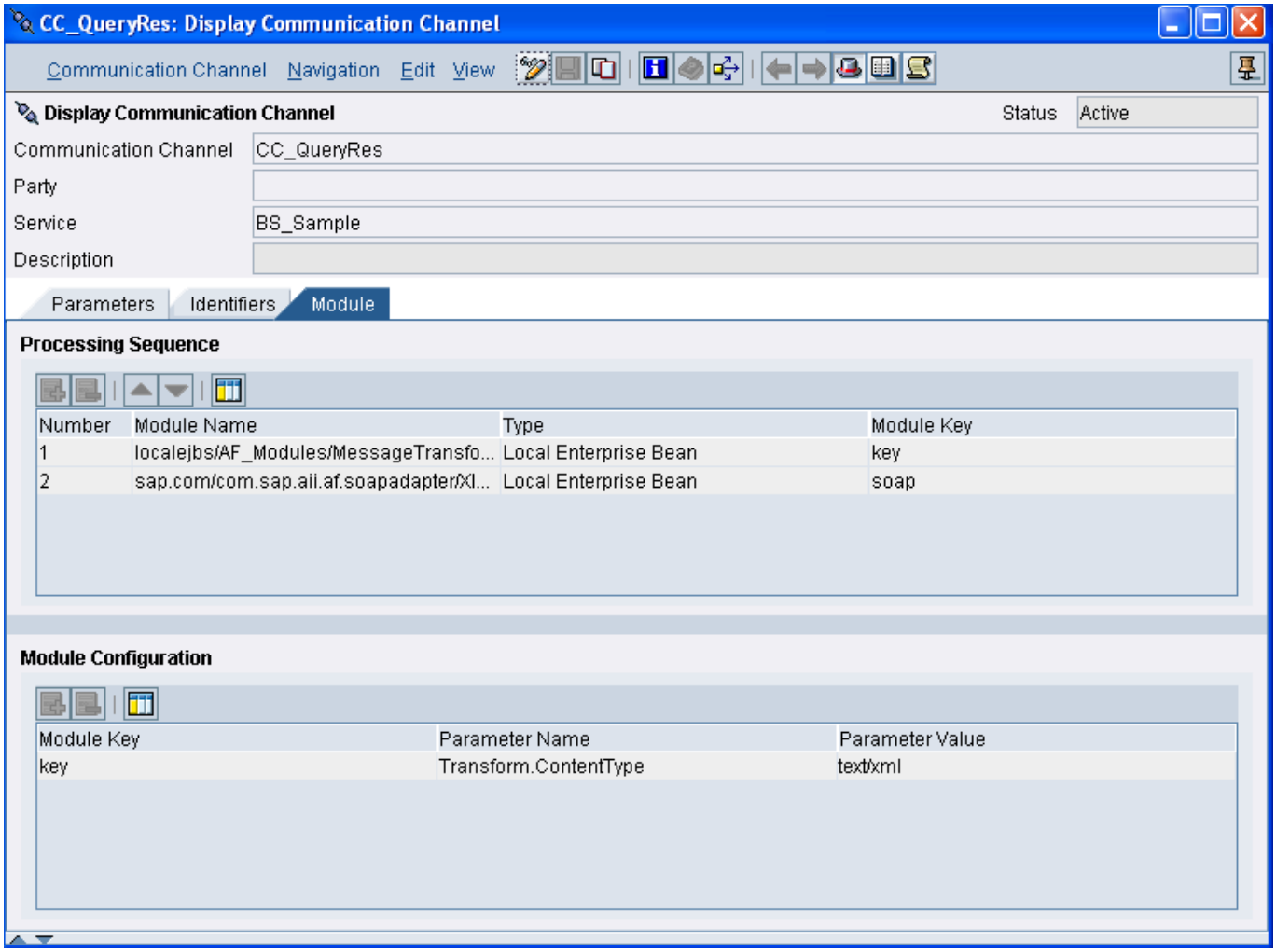


Please check the option “Do not use SOAP Envelope” in the receiver communication Channel for query response.

Provide the SOAP Action as “queryResponse” in the Conversion parameters of the Communication channel.



The incoming SOAP Message payload will be of content type “application/xml” this is due to that we checked the option “Do Not use SOAP Envelope”. In order to maintain the content type as “Text/xml” we use the adapter module “MessageTransformBean”.



Create Receiver determination and Interface determination.

Create Receiver agreement.

Configure an Outbound Proxy or RFC Call

We can either configure a proxy or RFC to trigger the scenario. In our case we configured an outbound proxy to trigger. Once the Proxy is triggered the soap envelope and Header is added to the Query Request. We can also test the scenario from Runtime Workbench tool.

Screen shot from SXMB_MONI Request message. The query Request message is embedded with the SOAP Envelope and Header, which is manually built in the Java Mapping.


```
  <?xml version="1.0" encoding="UTF-8" ?>
- <soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/" xmlns:urn="urn:enterprise.soap.sforce.com">
  - <soapenv:Header>
    - <urn:SessionHeader>
        <urn:sessionId>00D90000000ISZc!
          ARUAQDA_mbI7Bh3v8LxL9qSCM04MFq0SqR2zZQmo5yjv4nrHqc7bBX7PANEopzB0KSRBBS0A2yxSWGvPVx8x0tp0eSqn_VsM</urn:sessionId>
      </urn:SessionHeader>
    </soapenv:Header>
  - <soapenv:Body>
    - <ns0:query xmlns:ns0="urn:enterprise.soap.sforce.com">
        <ns0:queryString>Select Name, ownerId, website, Phone from Account</ns0:queryString>
      </ns0:query>
    </soapenv:Body>
  </soapenv:Envelope>
```


Query Response from SFDC which contains the details of the various accounts. Screenshot from SXMB_MONI Response message.


```
  <?xml version="1.0" encoding="UTF-8" ?>
- <soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
    xmlns="urn:enterprise.soap.sforce.com" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:sf="urn:sobject.enterprise.soap.sforce.com">
  - <soapenv:Body>
    - <queryResponse>
      - <result>
          <done>true</done>
          <queryLocator xsi:nil="true" />
        - <records xsi:type="sf:Account">
            <sf:Id xsi:nil="true" />
            <sf:Name>ABC_SFDCTest</sf:Name>
            <sf:OwnerId>00590000000h8N6AAI</sf:OwnerId>
            <sf:Phone>1234567890</sf:Phone>
          </records>
        - <records xsi:type="sf:Account">
            <sf:Id xsi:nil="true" />
            <sf:Name>ABC_SFDCTest</sf:Name>
            <sf:OwnerId>00590000000h8N6AAI</sf:OwnerId>
            <sf:Phone>1234567890</sf:Phone>
          </records>
        - <records xsi:type="sf:Account">
            <sf:Id xsi:nil="true" />
            <sf:Name>ABC_SFDCTest</sf:Name>
            <sf:OwnerId>00590000000h8N6AAI</sf:OwnerId>
            <sf:Phone>1234567890</sf:Phone>
          </records>
        - <records xsi:type="sf:Account">
            <sf:Id xsi:nil="true" />
            <sf:Name>SFDCTest_04</sf:Name>
            <sf:OwnerId>00590000000h8N6AAI</sf:OwnerId>
            <sf:Phone>9731217520</sf:Phone>
```

Perform Create operation of an SFDC Account Object

Download Enterprise WSDL from SFDC

We need to have an account registered in salesforce.com (free developer account) to download the WSDL. Login in to SFDC with user credentials and download the WSDL from API. Also refer to this Article on **"Salesforce.com Integration Using SAP PI: A Case Study"** for the detail description on how to create an account in SFDC and download the WSDL.

Modify Create Object in the Enterprise WSDL

The WSDL will have a create operation and the corresponding create response as a webservice. The Create object is pointing to data type "sObject". Now our requirement is to create an Account object. So we change the data type of create operation.

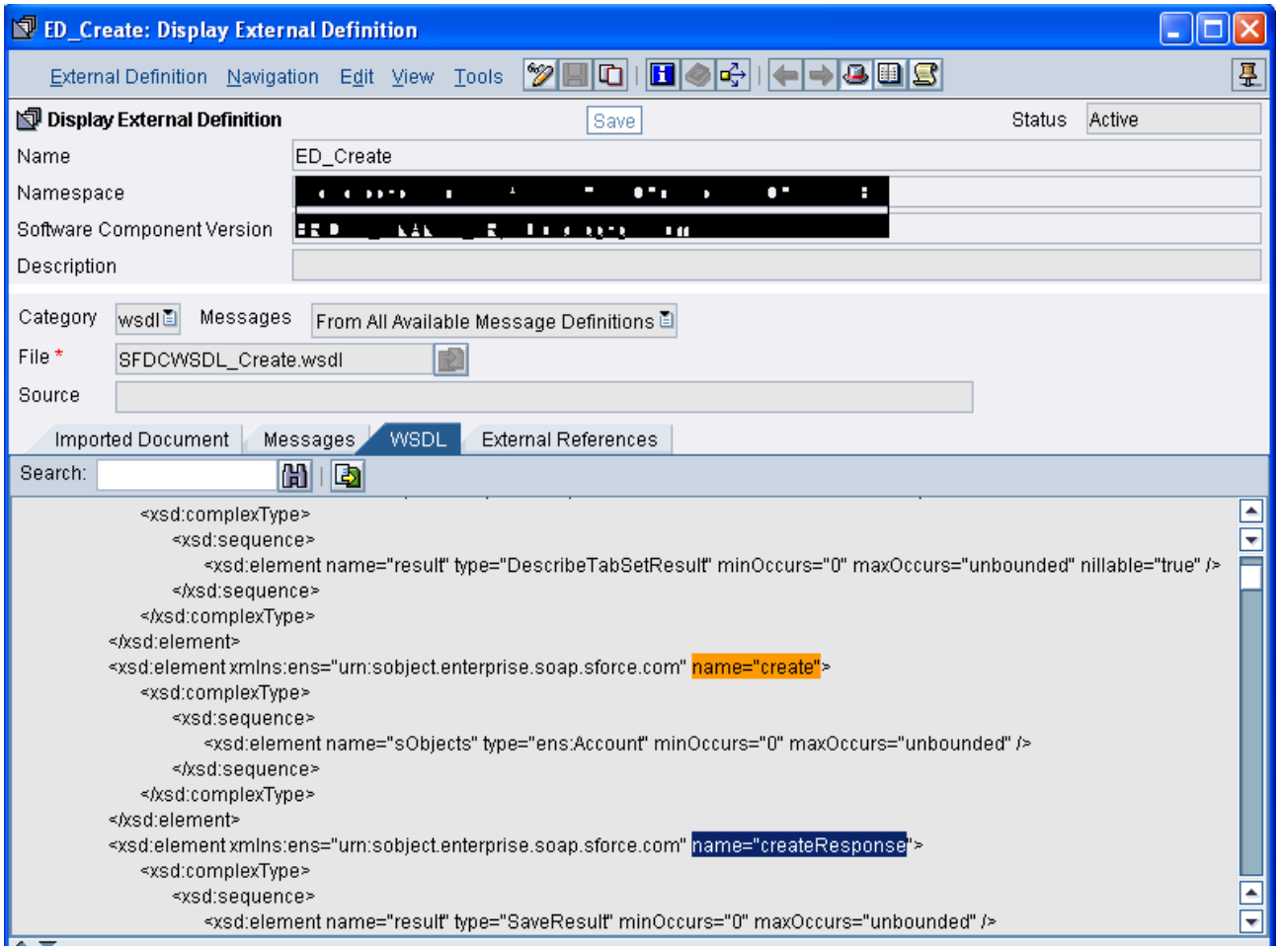
```
- <element name="create">
  - <complexType>
    - <sequence>
        <element name="sObjects" type="ens:sObject" minOccurs="0" maxOccurs="unbounded" />
      </sequence>
    </complexType>
  </element>
- <element name="createResponse">
  - <complexType>
    - <sequence>
        <element name="result" type="tns:SaveResult" minOccurs="0" maxOccurs="unbounded" />
      </sequence>
    </complexType>
  </element>
```

Open the WSDL in the Text editor and change the data type to "Account".

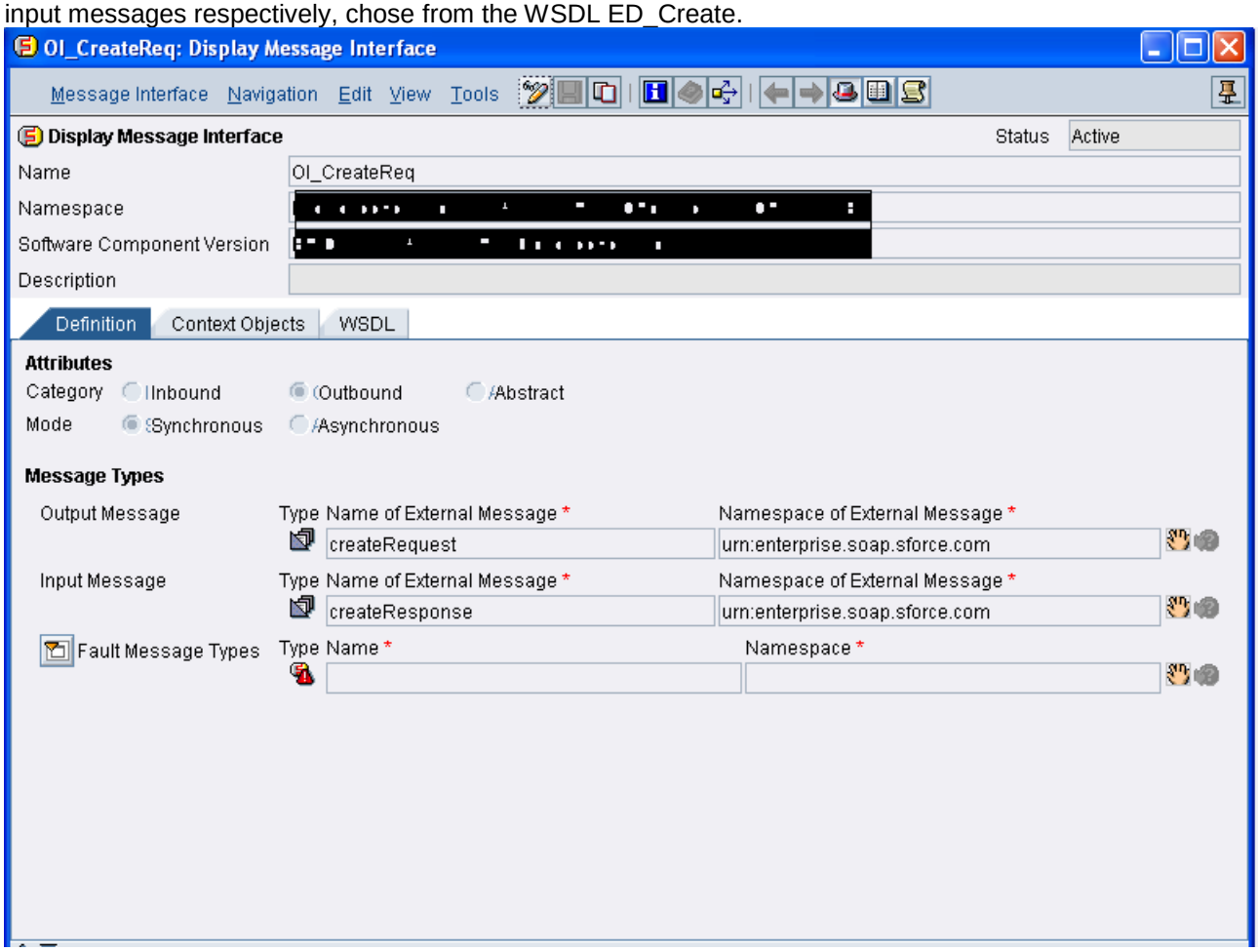
```
- <element name="create">
  - <complexType>
    - <sequence>
        <element name="sObjects" type="ens:Account" minOccurs="0" maxOccurs="unbounded" />
      </sequence>
    </complexType>
  </element>
- <element name="createResponse">
  - <complexType>
    - <sequence>
        <element name="result" type="tns:SaveResult" minOccurs="0" maxOccurs="unbounded" />
      </sequence>
    </complexType>
  </element>
```

Repository Objects

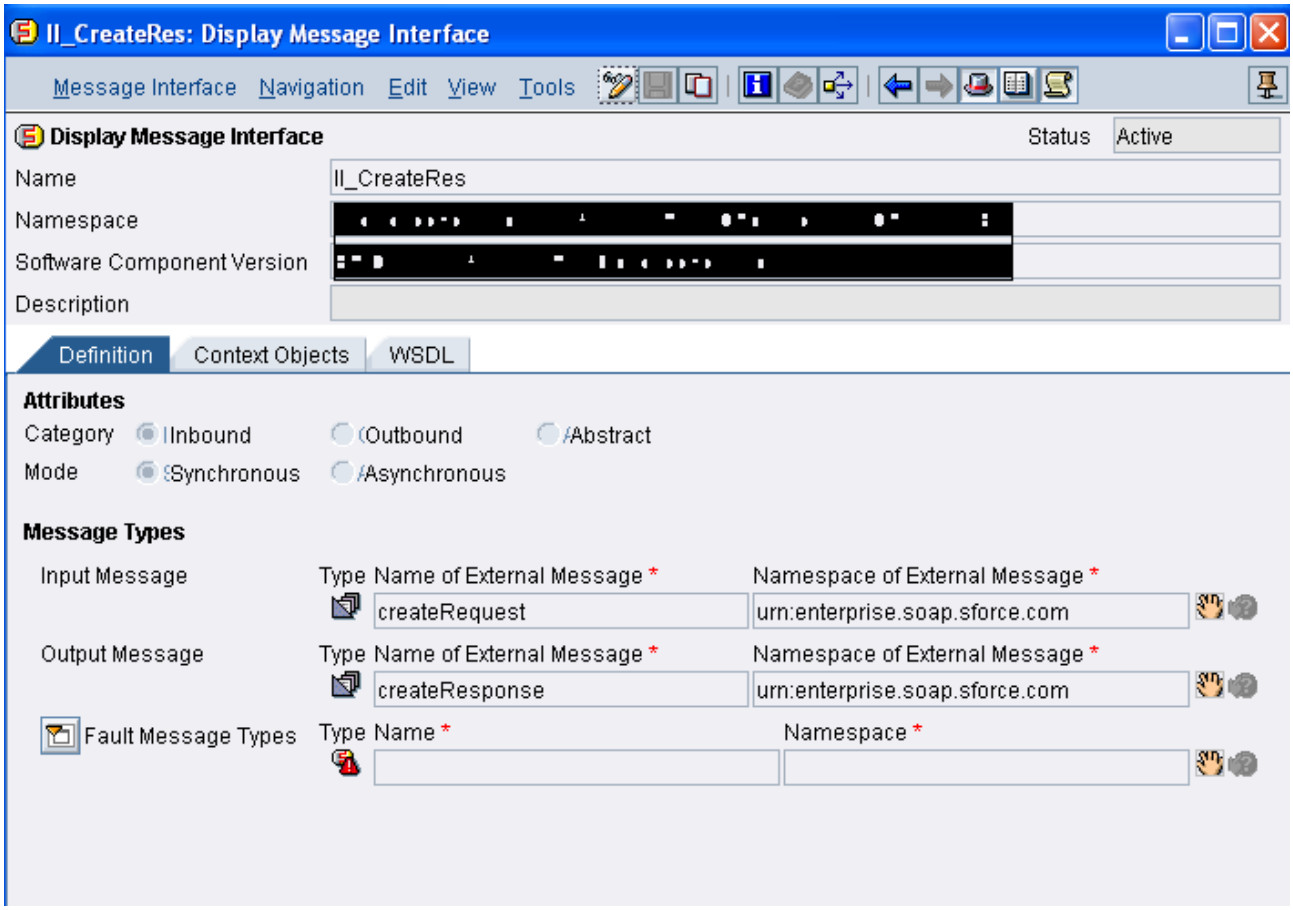
Import the Create WSDL in to repository as external definition ED_Create.



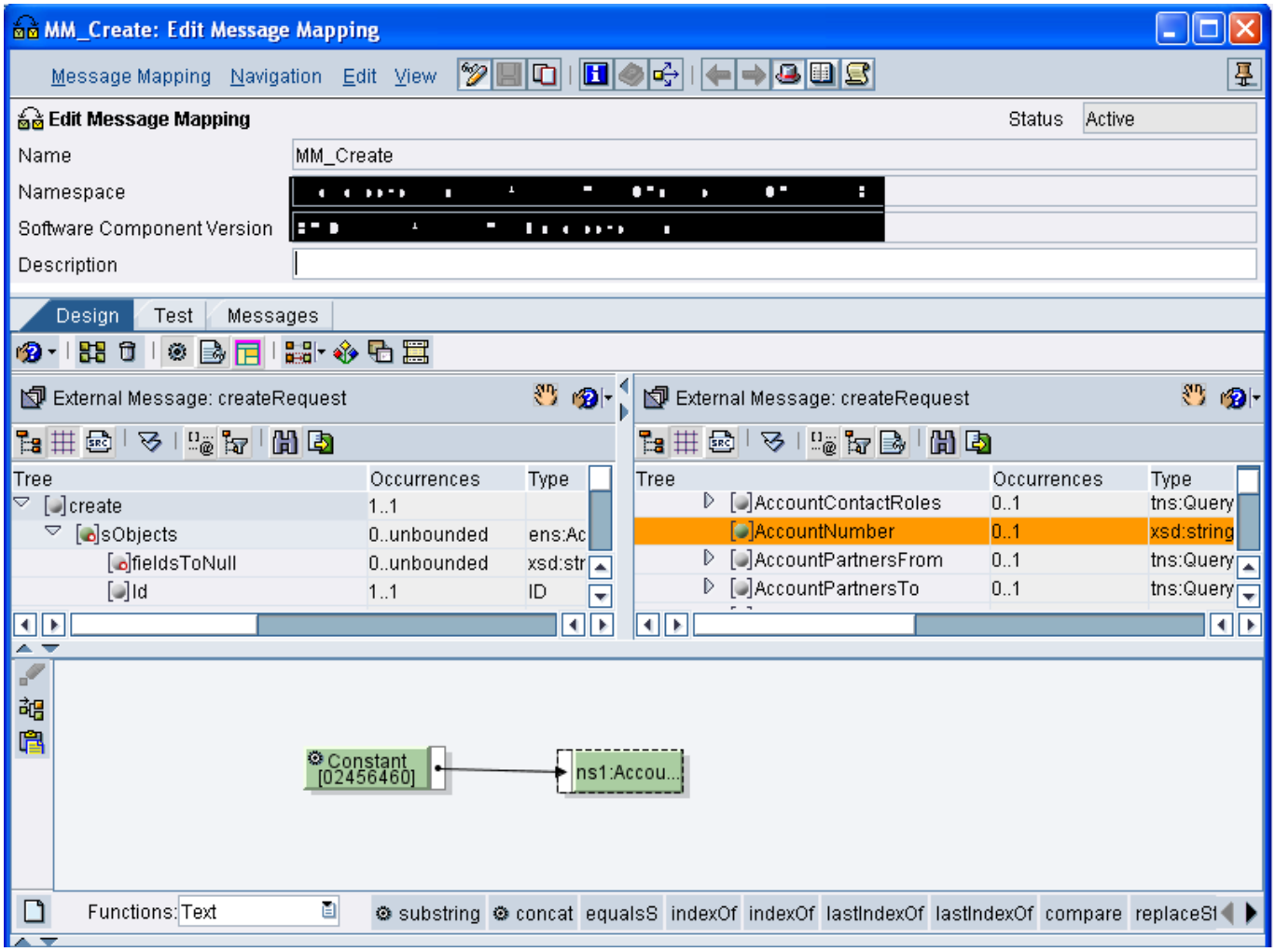
Create outbound synchronous interface which contains CreateRequest and CreateResponse as output and input messages respectively, chose from the WSDL ED_Create.



Similarly create an inbound synchronous interface with query request and query response as input and output messages respectively from the external definition ED_Create.

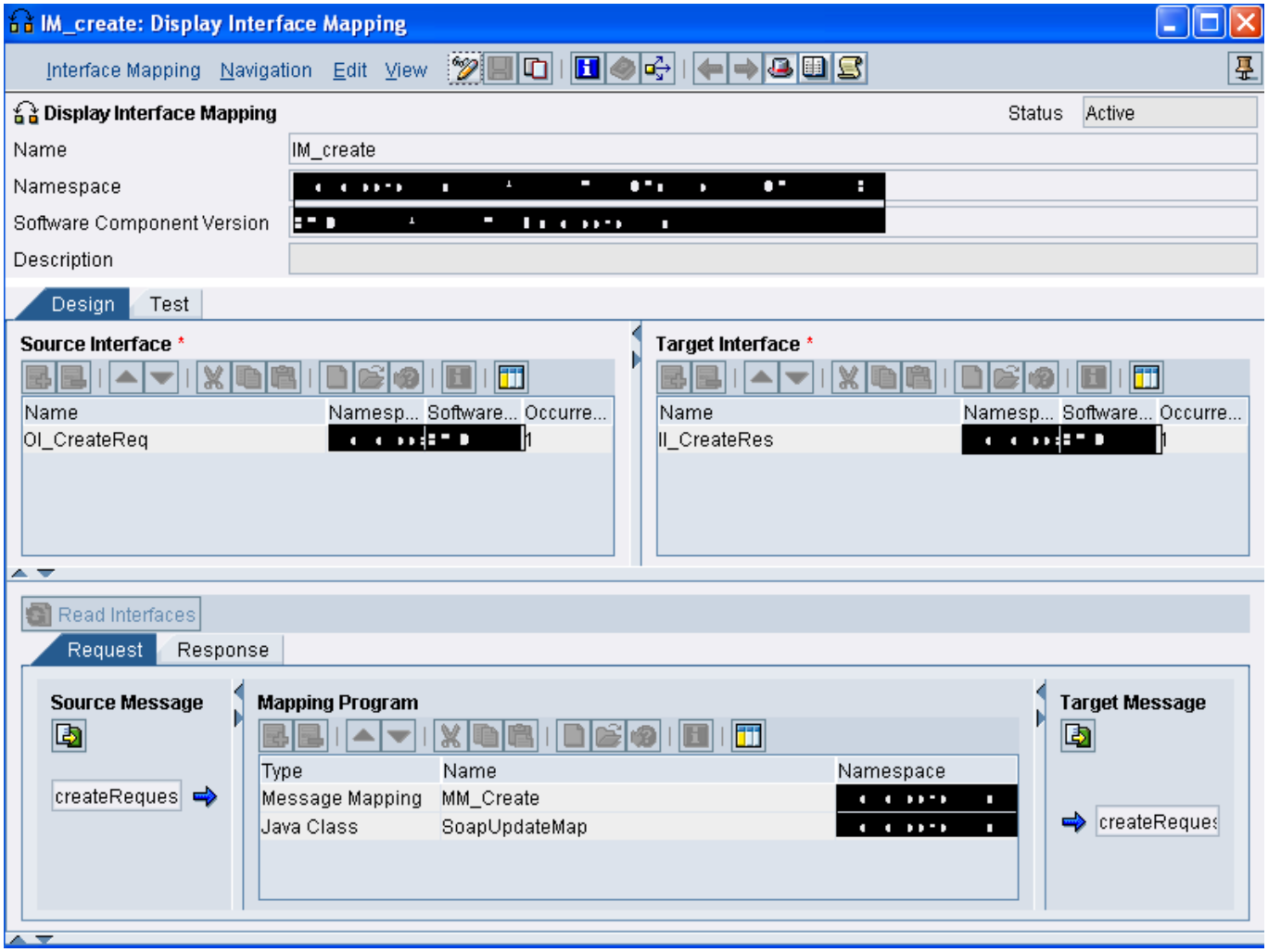


A message mapping which contains the entire account details. The server URL is set dynamically at the Header as it remains constant for all the operation. Create an UDF and set the Server URL to the parameter TServerLocation.



Import the Java mapping. Java Code will do a Soap lookup to get the session ID and build the soap envelope manually because the create webservice expects few other attributes to be set explicitly. Please refer the link for Java code.

Create an operation mapping with both message mapping and java mapping in subsequent order in mapping program. Find below screenshot,



Changes in the Java Mapping

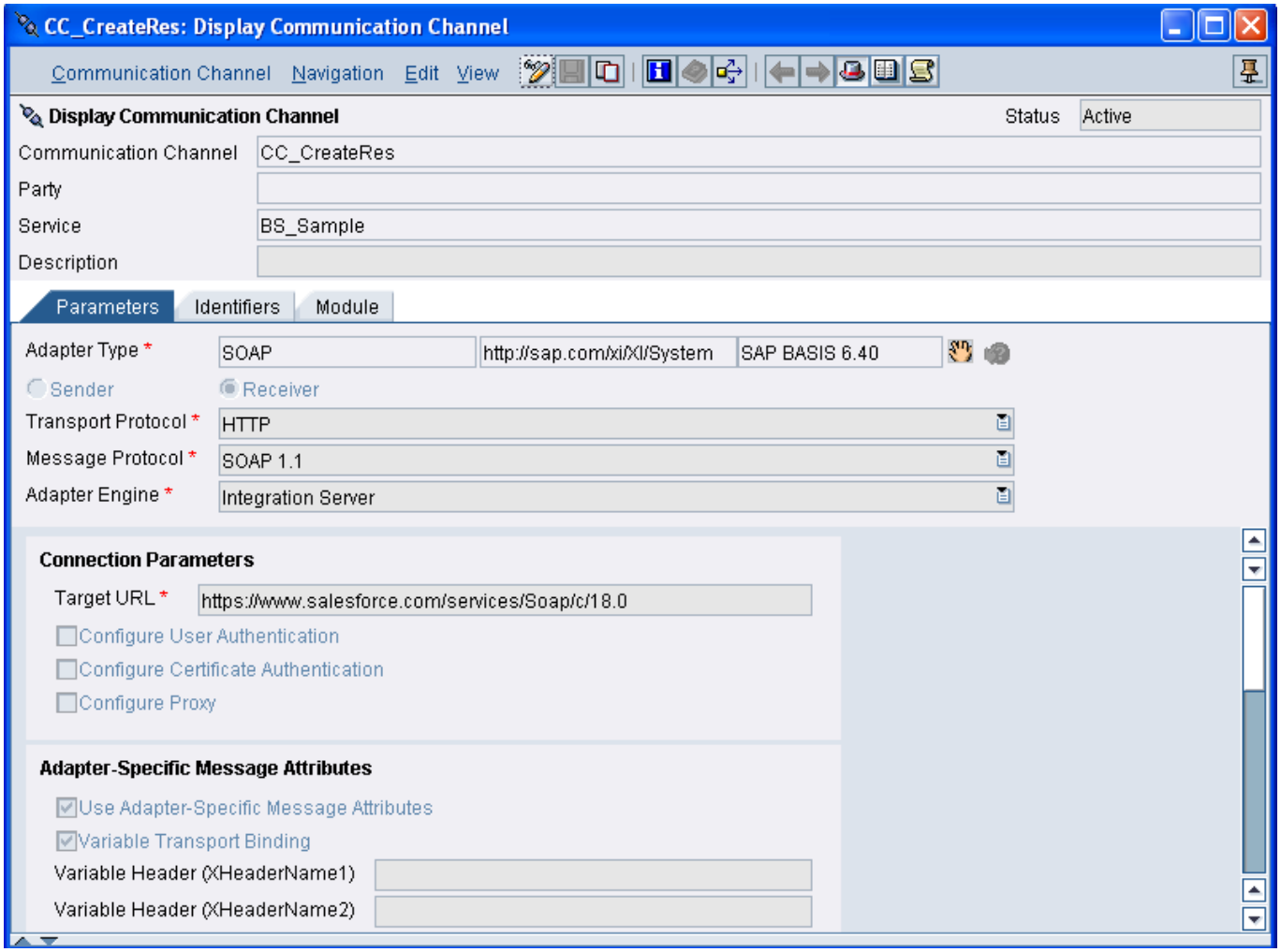
- Certain changes required in Java code in order to create an account. The namespace "**xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance**" is added along with the existing soap envelope. This indicates that elements and the data types used belong to the above namespace.

- The sObjects in the Soap body is modified. This is because the sObjects will have only two elements 'fieldstonull' and 'Id'. To overwrite sObjects with the fields of account we specify the data type as "Account" in the Soap body along with namespace.

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:urn="urn:enterprise.soap.sforce.com"
xmlns:urn1="urn:sobject.enterprise.soap.sforce.com"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
   <soapenv:Header>
     <urn:SessionHeader>

<urn:sessionId>00D90000000ISZc!ARUAQEpopIFBeUMbP_WFLltypkE9I3Gy4m.IxvuZmjKXj2PKIzb.Y
7WOXrza2pwOo72bFtXTOl6zDXn1RHOBe5UmcboS5av0</urn:sessionId>
     </urn:SessionHeader>
   </soapenv:Header>
   <soapenv:Body>
     <urn:create>

       <urn:sObjects xsi:type="Account" xmlns="urn:enterprise.soap.sforce.com">
         <Name>ABC_TEST</Name>
       </urn:sObjects>
     </urn:create>
   </soapenv:Body>
</soapenv:Envelope>
```

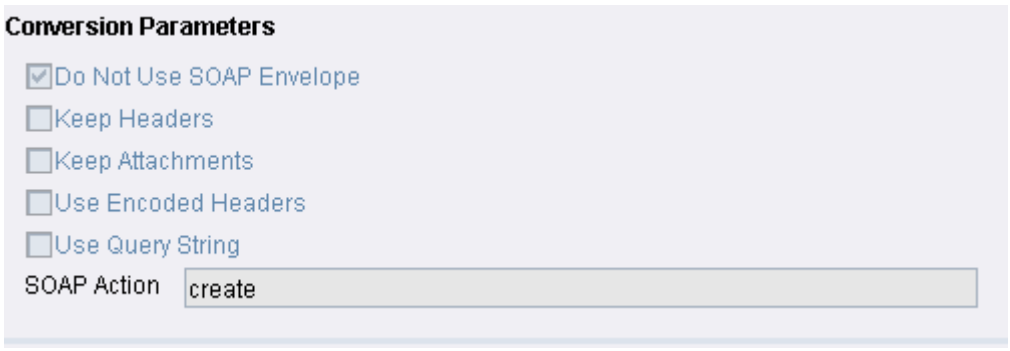
Design Objects

Create SOAP receiver communication channel for create response.



Please check the option “Do not use SOAP Envelope” in the receiver communication Channel for query response.

Provide the SOAP Action as “create” in the conversion parameters of the Communication channel.



The incoming SOAP Message payload will be of content type “application/xml” this is due to that we checked the option “Do Not use SOAP Envelope”. In order to maintain the content type as “Text/xml” we use the adapter module “MessageTransformBean.

Configure an Outbound Proxy or RFC Call

We can either configure a proxy or RFC to trigger the scenario. In our case we configured an outbound proxy to trigger. Once the Proxy is triggered the soap envelope and Header is added to the Create Request

Screen shot from SXMB_MONI Request message. Create Request message payload with the SOAP Envelope and header which is manually built in the Java mapping code.

```
<?xml version="1.0" encoding="UTF-8" ?>
- <soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/" xmlns:urn="urn:enterprise.soap.sforce.com"
    xmlns:urn1="urn:sobject.enterprise.soap.sforce.com" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  - <soapenv:Header>
    - <urn:SessionHeader>
        <urn:sessionId>00D90000000ISZc!
          ARUAQKauHpFnIGwe3WYB9mkwUjKQBcZ9hpYFh0A5tDT0vAl7zN7wuYHLiNqI82NxJgLOkPXHqQHm17qELigItU0iIS6Wu76X</urn:sessionId>
      </urn:SessionHeader>
    </soapenv:Header>
  - <soapenv:Body>
    - <ns0:create xmlns:ns0="urn:enterprise.soap.sforce.com">
      - <ns0:sObjects xsi:type="Account" xmlns="urn:enterprise.soap.sforce.com">
          <ns1:AccountNumber xmlns:ns1="urn:sobject.enterprise.soap.sforce.com">02456460</ns1:AccountNumber>
          <ns1:BillingCountry xmlns:ns1="urn:sobject.enterprise.soap.sforce.com">India</ns1:BillingCountry>
          <ns1:Name xmlns:ns1="urn:sobject.enterprise.soap.sforce.com">ABC_SFDCTest</ns1:Name>
          <ns1:Phone xmlns:ns1="urn:sobject.enterprise.soap.sforce.com">1234567890</ns1:Phone>
        </ns0:sObjects>
      </ns0:create>
    </soapenv:Body>
  </soapenv:Envelope>
```

The response would return a Boolean value, true or false. Along with the Boolean value it would also return an ID for that particular account created in SFDC.

Screenshot from SXMB_MONI Response message indicating that Account is Created in SFDC successfully.

```
<?xml version="1.0" encoding="UTF-8" ?>
- <soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
    xmlns="urn:enterprise.soap.sforce.com">
  - <soapenv:Body>
    - <createResponse>
      - <result>
          <id>00190000003f9rWAAQ</id>
          <success>true</success>
        </result>
      </createResponse>
    </soapenv:Body>
  </soapenv:Envelope>
```

Hope this would help you all in integrating salesforce.com with ECC through PI to perform a query and create DML operation.

Related Content

Article by Prasanna:
http://www.sdn.sap.com/irj/scn/go/portal/prtroot/docs/library/uuid/50a76cfa-4966-2d10-aba7-da496d9b5bcf

Wiki page to Add SOAP envelope and SOAP Lookup:
http://wiki.sdn.sap.com/wiki/display/stage/SFDC+Integration+using+PI+7.1+-+How+to+add+SOAP+Envelope+in+Java+Mapping

Call a webservice from UDF by Bhavesh
http://www.sdn.sap.com/irj/scn/weblogs?blog=/pub/wlg/5001

Disclaimer and Liability Notice

This document may discuss sample coding or other information that does not include SAP official interfaces and therefore is not supported by SAP. Changes made based on this information are not supported and can be overwritten during an upgrade.

SAP will not be held liable for any damages caused by using or misusing the information, code or methods suggested in this document, and anyone using these methods does so at his/her own risk.

SAP offers no guarantees and assumes no responsibility or liability of any type with respect to the content of this technical article or code sample, including any liability resulting from incompatibility between the content within this document and the materials and services offered by SAP. You agree that you will not hold, or seek to hold, SAP responsible or liable with respect to the content of this document.