

HOW TO USE THE PURESQL WITH DYNAMIC ROUTING IN ESB

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1.2 Use Case

1.2.1 Description

The client has more than one database instances that are used to store their customer related data. The CRM system is a 3rd party system installed separately on different machines in every geographical region. The CRM system database schema cannot be modified or enriched (for example by creating db views and snapshots) , because the support contracts with the 3rd party CRM vendor will be accused.

Each CRM database has an identical schema and will be processing exactly the same queries in all of the applications/ services. Rather than have to create and maintain six different database adapters (one for each data source) for every query, it would be would meaningful to be able to pass in the data source to use for a given call at runtime (e.g., in a SOAP header) so that they can create a single adapter for each query.

No DML statements are allowed for updating the CRM data using DB Adapter services.

1.2.2 Goals

- Ease of maintenance in case of modifications in the query input and output parameters.

1.3 Setting up the use case

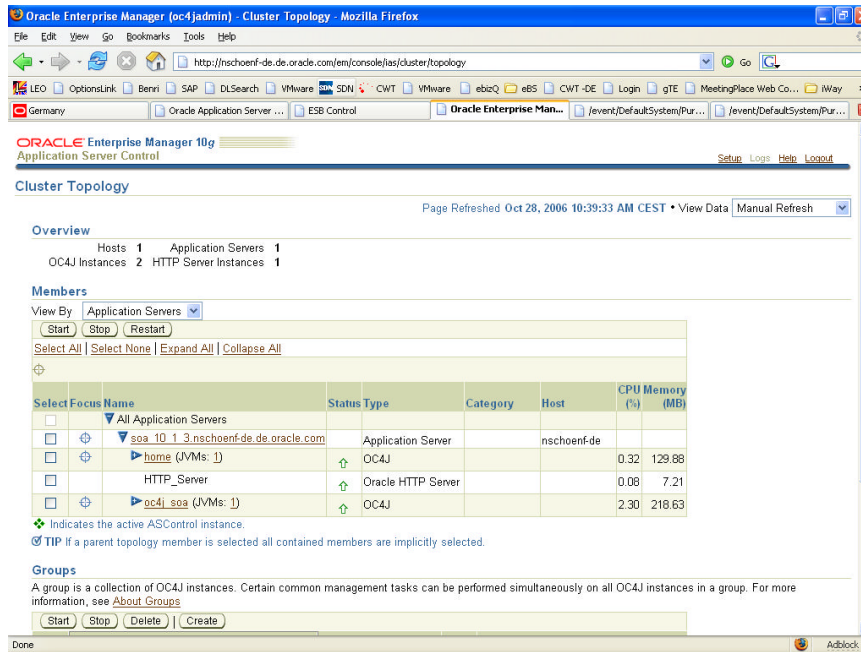
1.3.1 Setup the database

Copy and paste these sql statements in a sqlplus session.

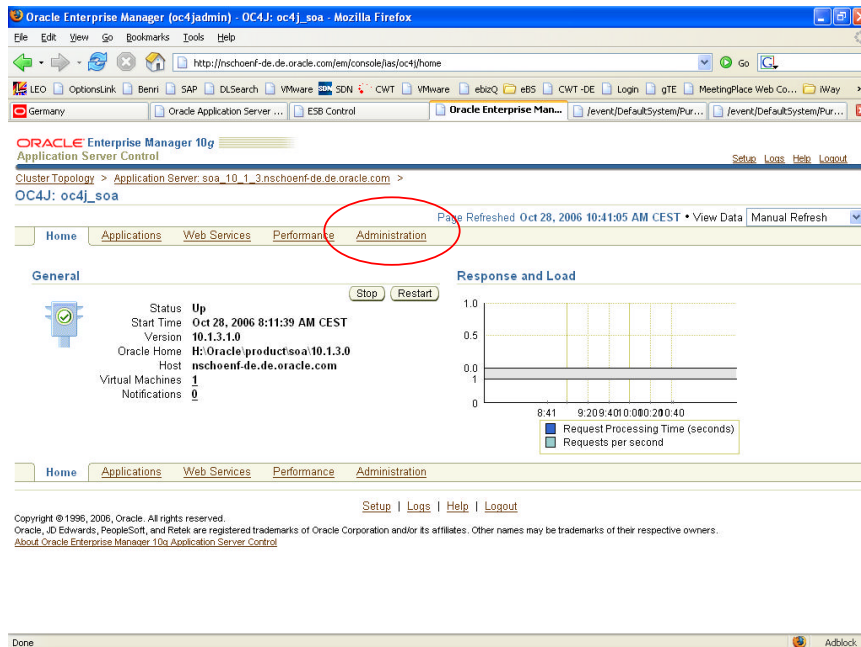
```
connect sys/oracle10g@soa
/
create user kabel1 identified by oracle10g default tablespace users temporary
tablespace temp
/
grant connect, resource to kabel1
/
grant unlimited tablespace on users to kabel1
/
create user kabel2 identified by oracle10g default tablespace users temporary
tablespace temp
/
grant connect, resource to kabel2
/
grant unlimited tablespace on users to kabel2
/
connect kabel1/oracle10g@soa
/
CREATE TABLE "TEST1"
(
    "A" VARCHAR2(10) ,
    "B" VARCHAR2(10)
)
TABLESPACE "USERS"
/
insert into test1 (a,b) values ('R1','Region1')
/
commit
/
connect kabel2/oracle10g@soa
/
CREATE TABLE "TEST1"
(
    "A" VARCHAR2(10) ,
    "B" VARCHAR2(10)
)
TABLESPACE "USERS"
/
insert into test1 (a,b) values ('R2','Region2')
/
commit
/
```

1.3.2 Setup the Datasources

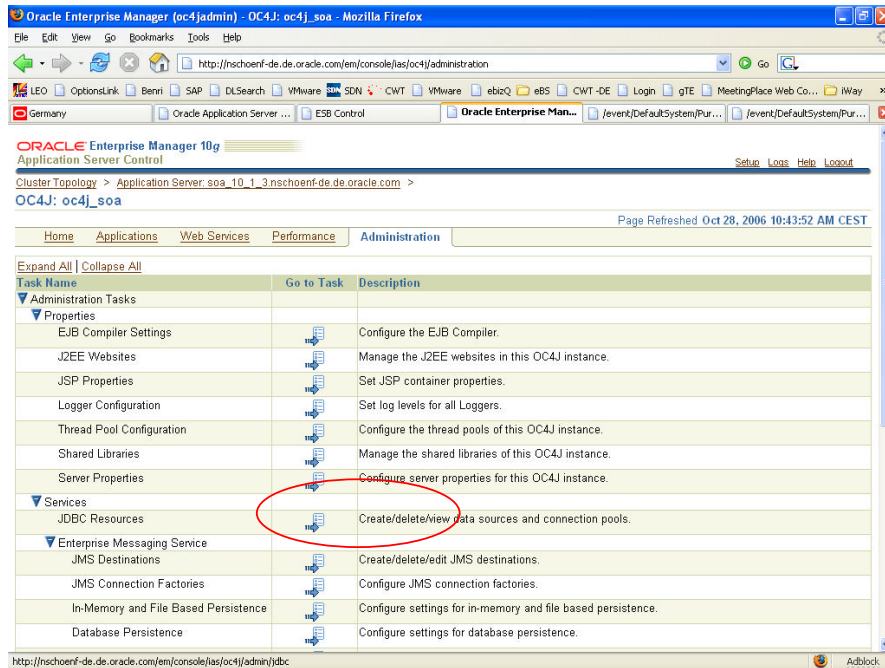
1. Startup the SOA Suite
2. Navicate to Oracle Application Server Control
[http:// <yourHost>:<yourHTTPPort>/ em/ console](http://<yourHost>:<yourHTTPPort>/em/console)



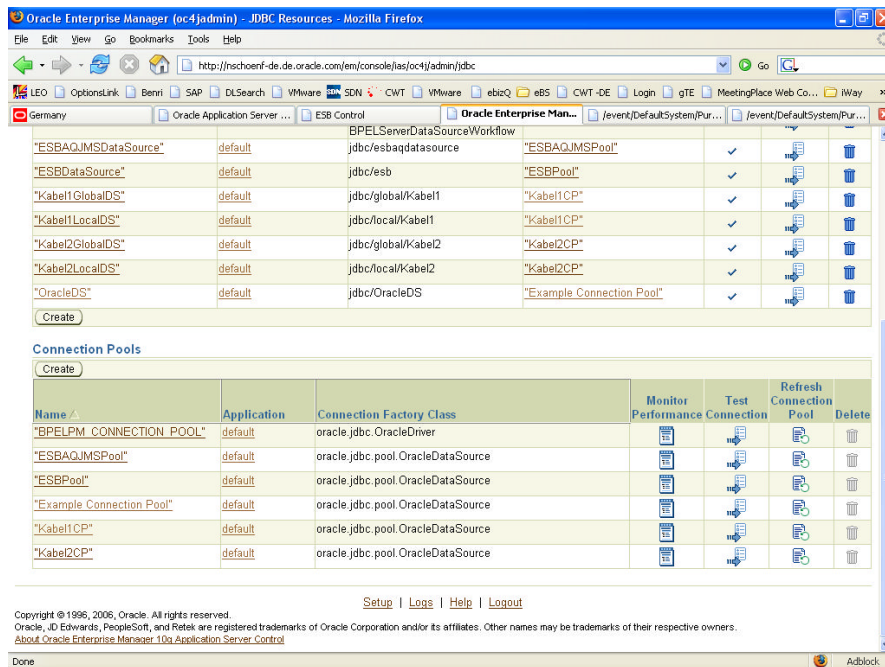
3. Navigate to the oc4j container where the soa suite components are installed



4. Navigate to Administration Tab



5. Navigate to JDBC Resources



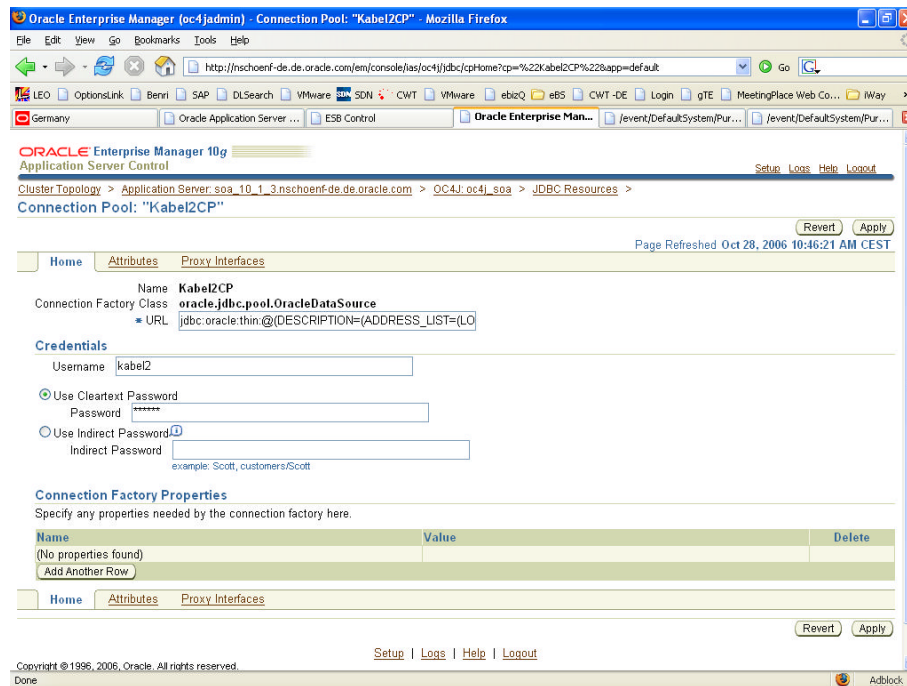
- Create two Connection Pools for user Kabel1 and Kabel2 created. After Creating the connection pools the data-sources.xml file (located under %SOA_HOME%\j2ee\<oc4j_soa_container>\config) should include 2 additional entries like following example:

```
<connection-pool name="Kabel1CP">
  <connection-factory factory-class="oracle.jdbc.pool.OracleDataSource"
    user="kabel1" password="oracle10g"
    url="jdbc:oracle:thin:@(DESCRIPTION=(ADDRESS_LIST=(LOAD_BALANCE=on)(ADDRESS=(PROTOCOL=tc)(HOST=nschoenf-de)(PORT=1521)))(CONNECT_DATA=(SERVICE_NAME=soa)))"/>
```

```

</connection-pool>
<connection-pool name="Kabel2CP">
  <connection-factory factory-class="oracle.jdbc.pool.OracleDataSource"
    user="kabel2" password="oracle10g"
    url="jdbc:oracle:thin:@(DESCRIPTION=(ADDRESS_LIST=(LOAD_BALANCE=on)(ADDRESS=(PROTOCOL=tcp)(HOST=nschoenf-de)(PORT=1521)))(CONNECT_DATA=(SERVICE_NAME=soa)))/">
</connection-pool>

```



7. Create to new data sources using either the Oracle Application Server Control or manually editing the data-sources.xml file (located under %SOA_HOME%\j2ee\<oc4j_soa_container>\config) should include 2 additional entries like following example:

```

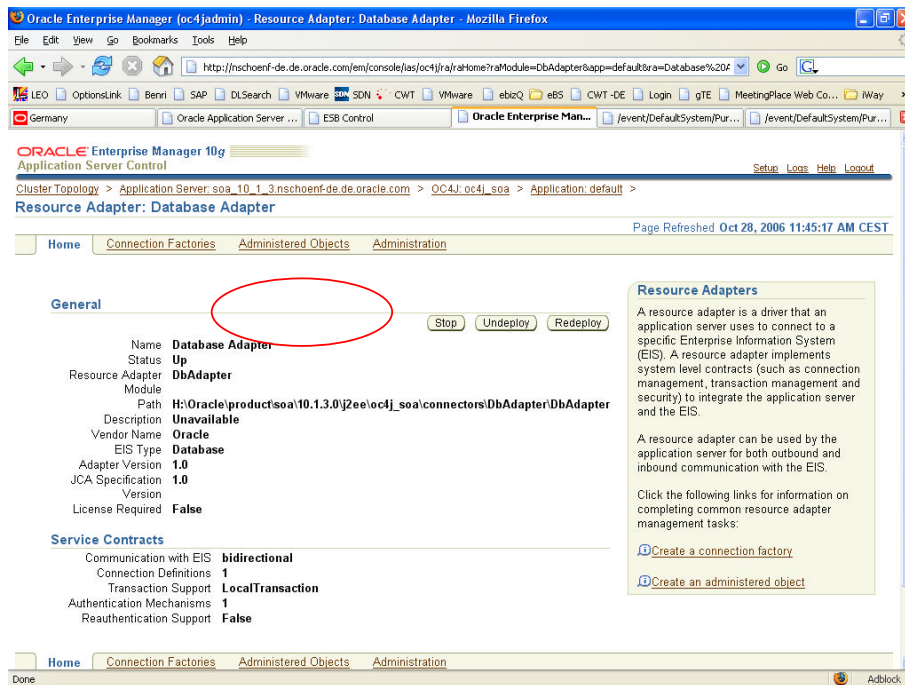
<managed-data-source connection-pool-name="Kabel1CP" jndi-
  name="jdbc/local/Kabel1" name="Kabel1LocalDS" tx-level="local"/>
<managed-data-source connection-pool-name="Kabel2CP" jndi-
  name="jdbc/local/Kabel2" name="Kabel2LocalDS" tx-level="local"/>

```

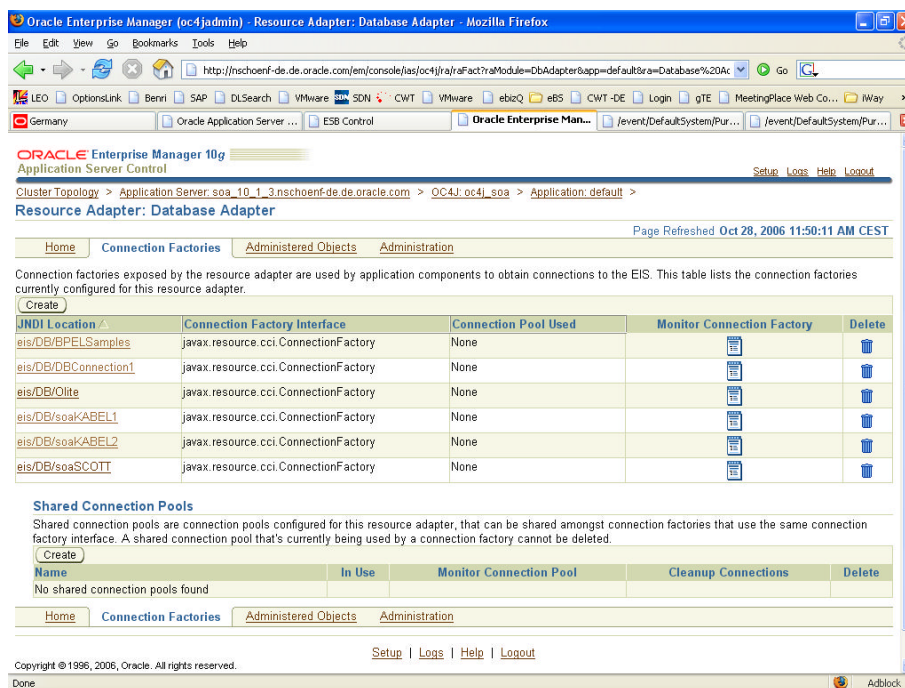
Note: We use here local transaction because we need only to query the data from the different datasources. The sample is not tested with XA datasources.

1.3.3 Setup the Database Adapter

8. Navigate to http://<yourserver>:<yourHTTPPort>/em/console/ias/oc4j/applications
9. Select 'Modules' from the drop-down Menu
10. Select 'DbAdapter'.



11. Click on Tab 'Connection Factories'
12. In the following screen you must configure a new connection factory for the database Adapter, to point in the previously created Datasource.

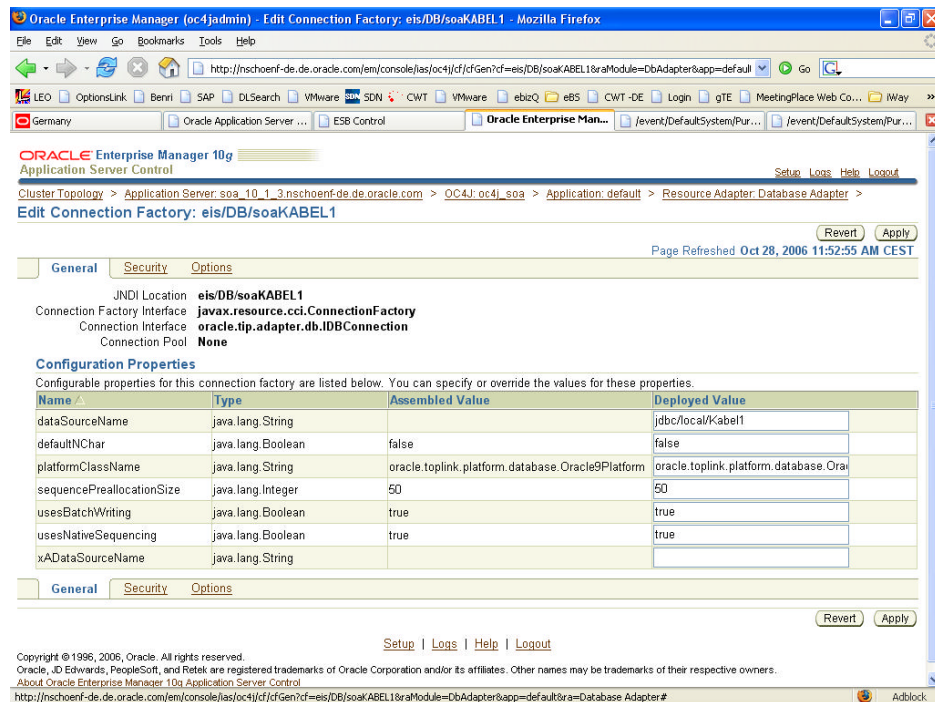


13. Click on 'Create'
14. Configure the new connection factory for the database Adapter as below. Note: You can manually modify the oc4j-ra.xml (located under %SOA_HOME%\j2ee\ <soa_container>\ application-deployments\ DbAdapter) by adding following entry:

```

<connector-factory location="eis/DB/soaKABEL1" connector-name="DbAdapter">
  <config-property name="xDataSourceName" value="" />
  <config-property name="dataSourceName" value="jdbc/local/Kabel1" />
  <config-property name="platformClassName"
value="oracle.toplink.platform.database.Oracle9Platform" />
  <config-property name="usesNativeSequencing" value="true" />
  <config-property name="sequencePreallocationSize" value="50" />
  <config-property name="defaultNChar" value="false" />
  <config-property name="usesBatchWriting" value="true" />
  <connection-pooling use="none" />
  </connection-pooling>
  <security-config use="none" />
  </security-config>
  <connectionfactory-
interface>javax.resource.cci.ConnectionFactory</connectionfactory-interface>
</connector-factory>

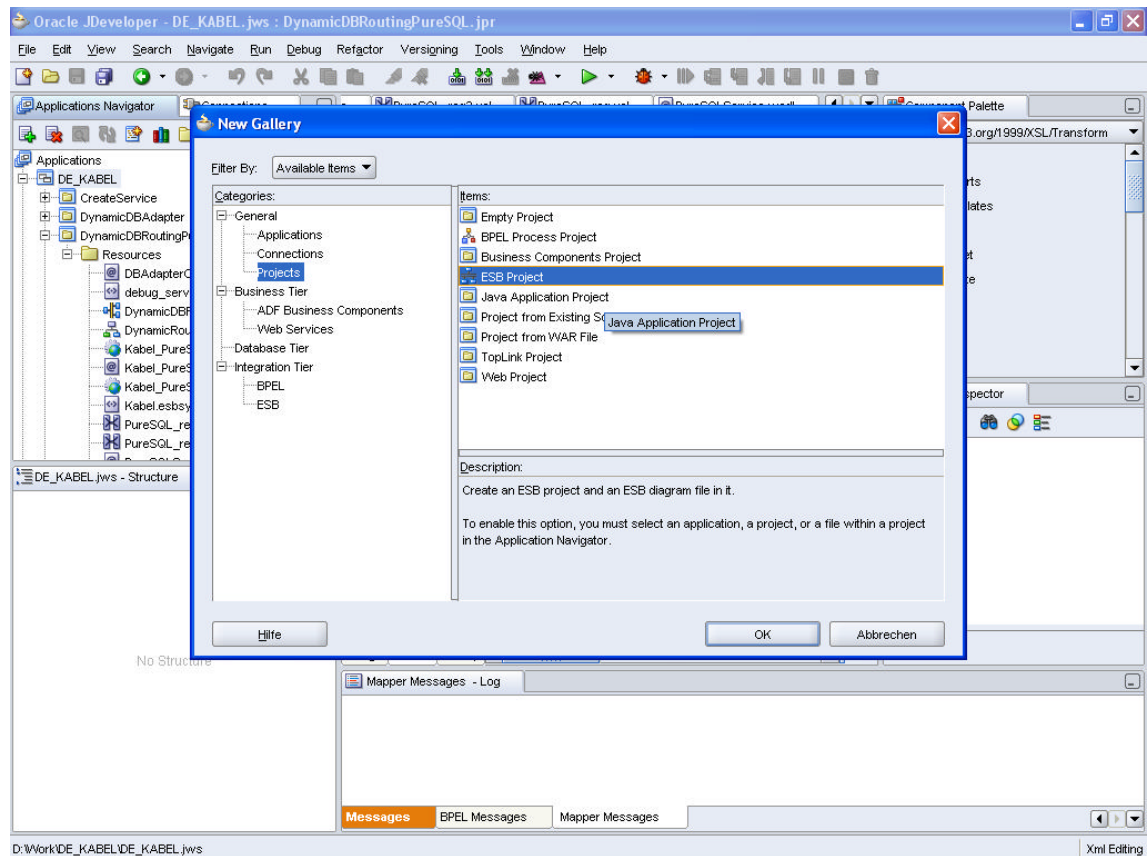
```



- Restart the Application Server.

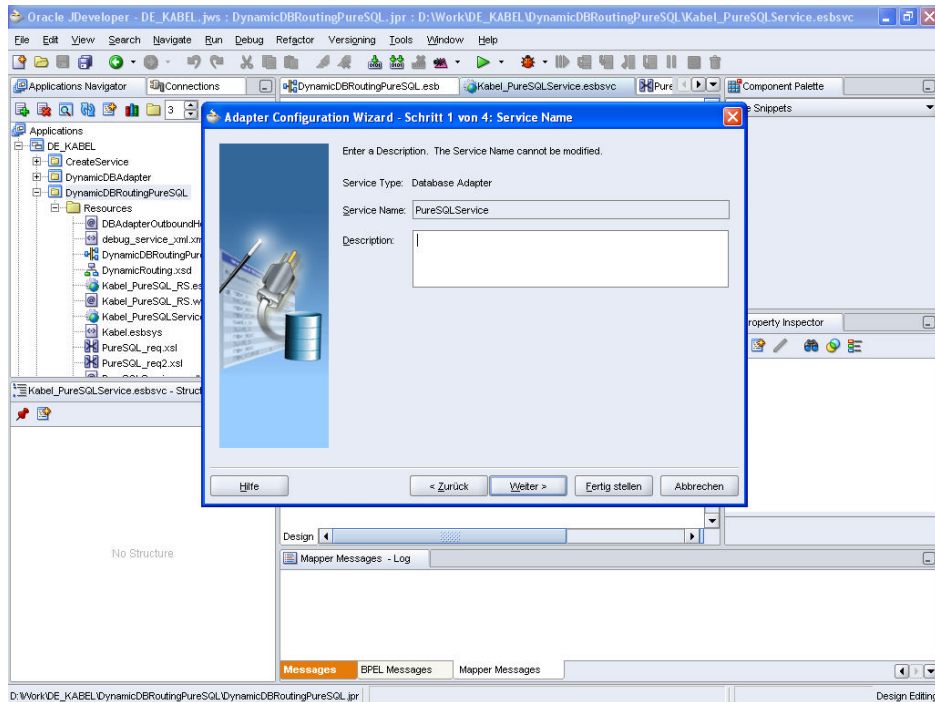
1.3.4 Modelling the Use Case with ESB Designer

- Start the Jdeveloper
- Navigate to Applications and create a workspace (i.e. TestPureSql)
- Create a new ESB Project

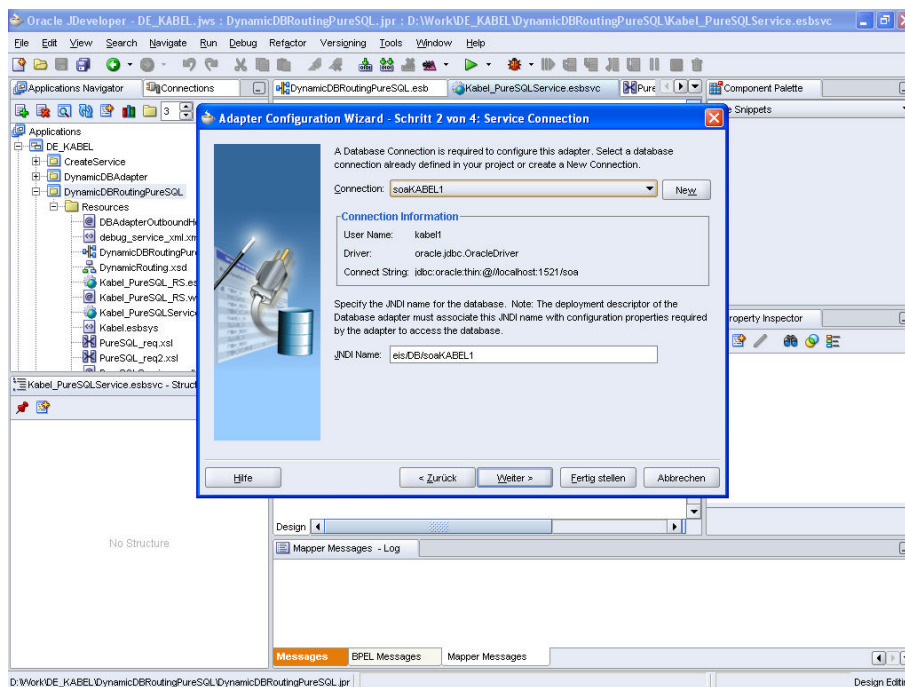


1.3.4.1 Creating the DB Adapter Service

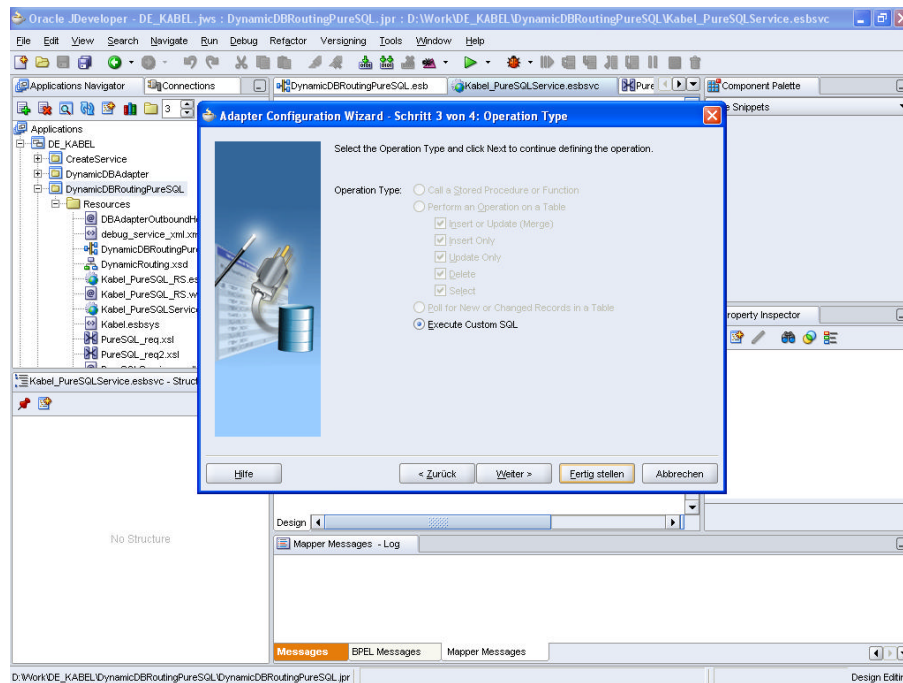
19. Select Adapter Services in the component palette.
20. Drag and drop into the ESB Project Area a new DatabaseAdapter. The DB Adapter Wizard appears:



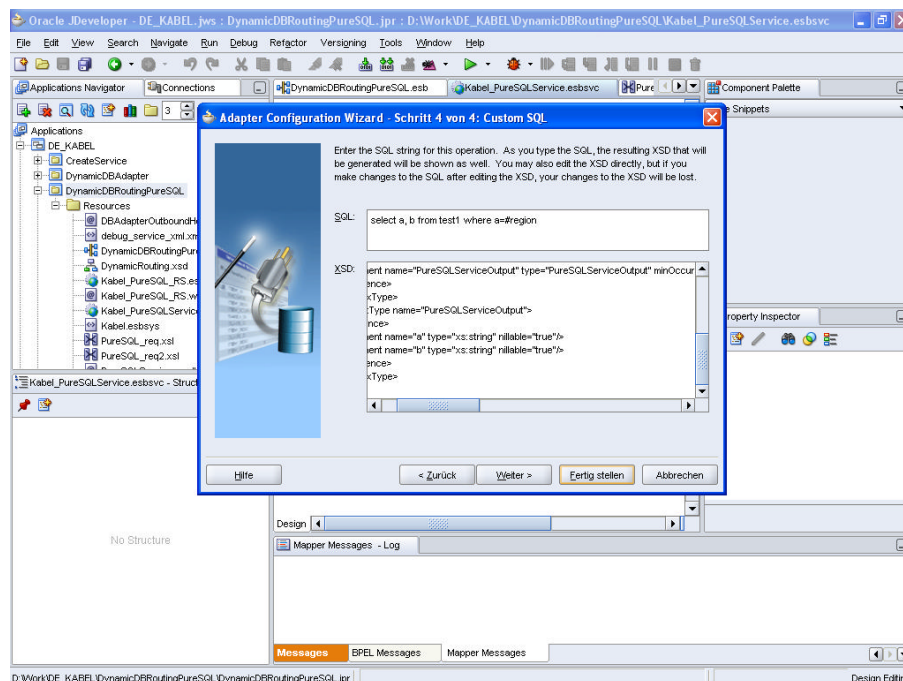
21. Create a new Service based on the previously created database connection to user Kabel1



22. Click on 'ExecuteCustomSQL'



23. Enter the SQL Statement you wish to use i.e 'select a,b from test1 where a=#region'. *Note:* this simple statement is used because the focus is to demonstrate dynamic routing. Complex SQL statements (using union, minus, sub-selects) still have some issues in design time but not in runtime.



24. The XML Schema is now generated for input and output parameters. The file with the schema is named <AdapterServiceName>.xsd and it is located in your Jdeveloper Project directory.
25. In this step you have to manually copy a valid *DBAdapterOutboundHeader.wsdl* onto your project directory. The file *DBAdapterOutboundHeader.wsdl*, normally created if you use other operations with the DatabaseAdapter, is not automatically created if you use PureSQL.

26. Add the namespace declaration for the DBAdapter Header in the wsdl file created by the database adapter Wizard.

```
<definitions
  name="PureSQLService"
  targetNamespace="http://xmlns.oracle.com/pcbpel/adapter/db/PureSQLService/"
  xmlns="http://schemas.xmlsoap.org/wsdl/"
  xmlns:tns="http://xmlns.oracle.com/pcbpel/adapter/db/PureSQLService/"
  xmlns:db="http://xmlns.oracle.com/pcbpel/adapter/db/PureSQLService"
  xmlns:plt="http://schemas.xmlsoap.org/ws/2003/05/partner-link/"
  xmlns:jca="http://xmlns.oracle.com/pcbpel/wsdl/jca/"
  xmlns:hdr="http://xmlns.oracle.com/pcbpel/adapter/db/"
```

27. You will also need to import the XMLSchema describing the DB Adapter Outbound Header in the wsdl file created by the DBAdapter Wizard.

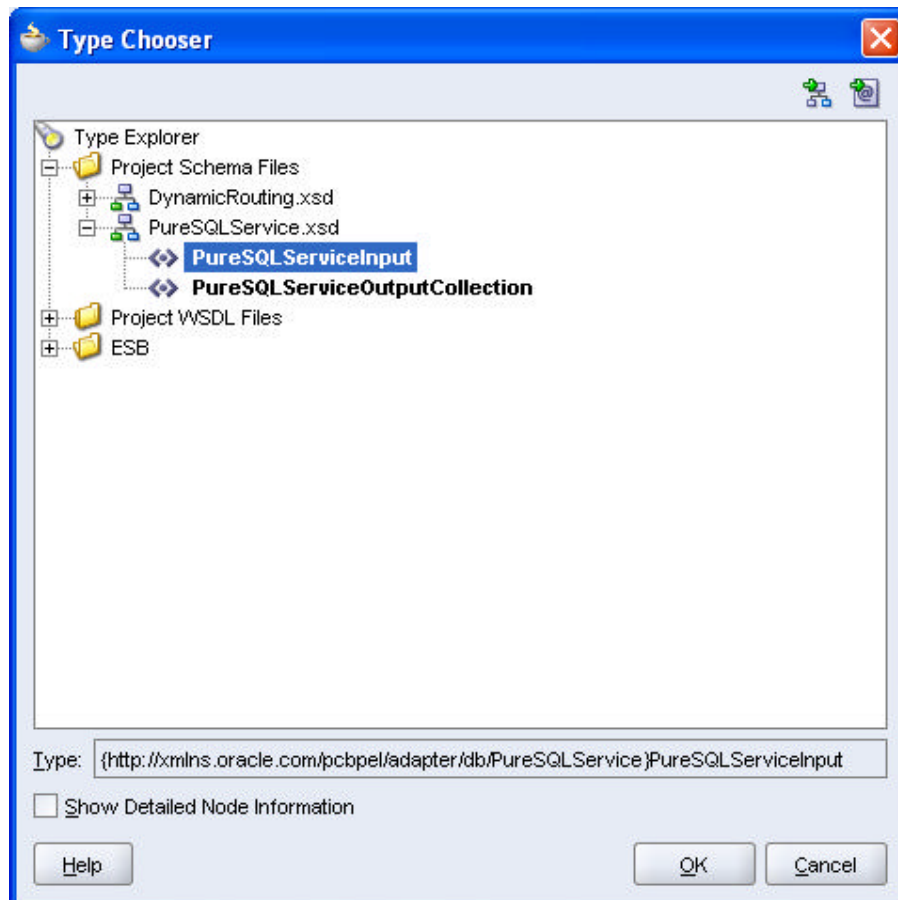
```
<import namespace="http://xmlns.oracle.com/pcbpel/adapter/db/"
  location="DBAdapterOutboundHeader.wsdl"/>
```

28. Add the following line in the wsdl file created by the DBAdapter Wizard:

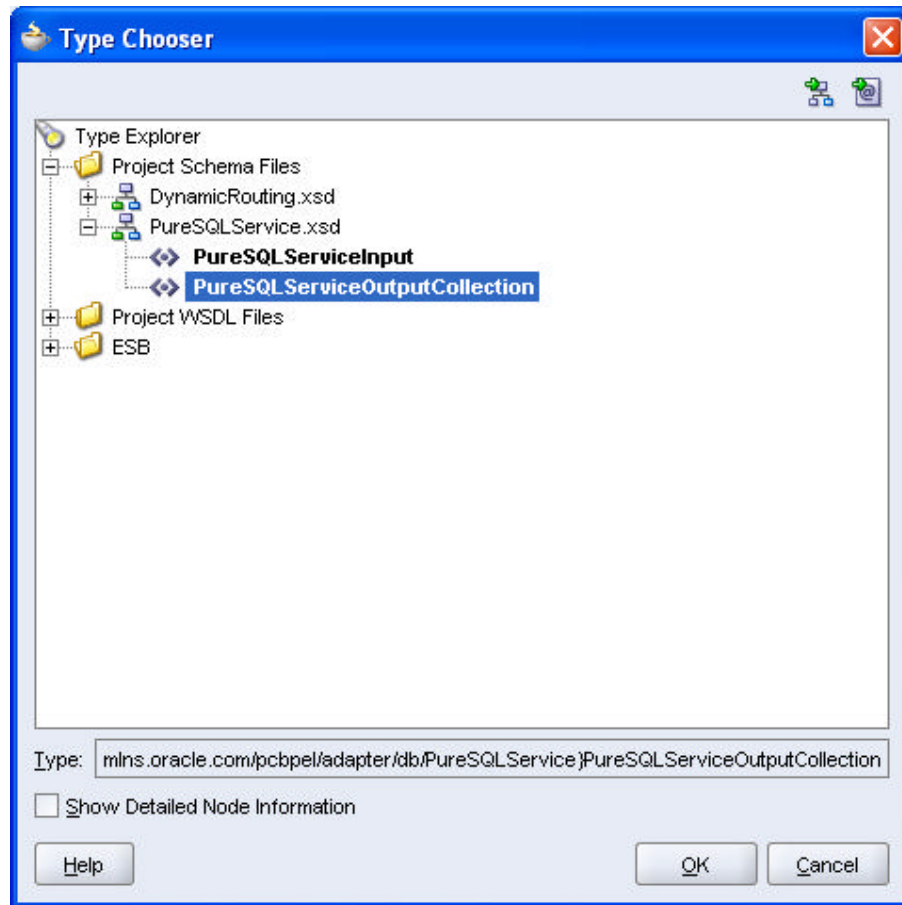
```
<jca:operation
  SqlString="select a, b from test1 where a=#region"
  InteractionSpec="oracle.tip.adapter.db.DBPureSQLInteractionSpec" >
</jca:operation>
<input/>
<jca:header message="hdr:OutboundHeader_msg" part="outboundHeader"/>
<output/>
</operation>
```

1.3.4.2 Creating the Routing Service

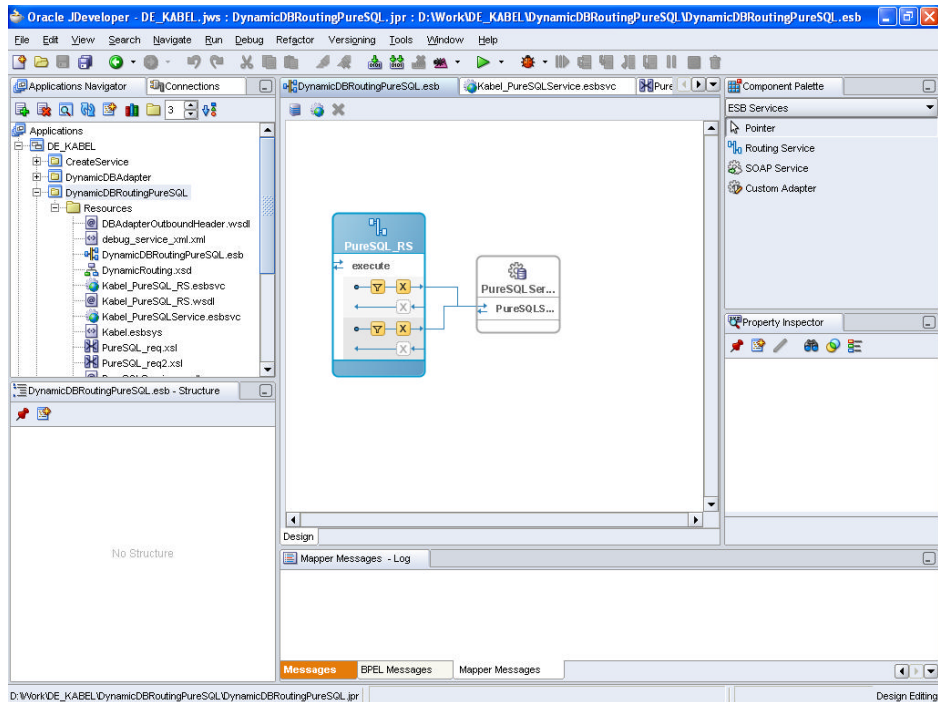
29. Select ESB Services in the component palette.
30. Drag and drop into the ESB Project Area a new Routing Service. The Routing Service Wizard appears:



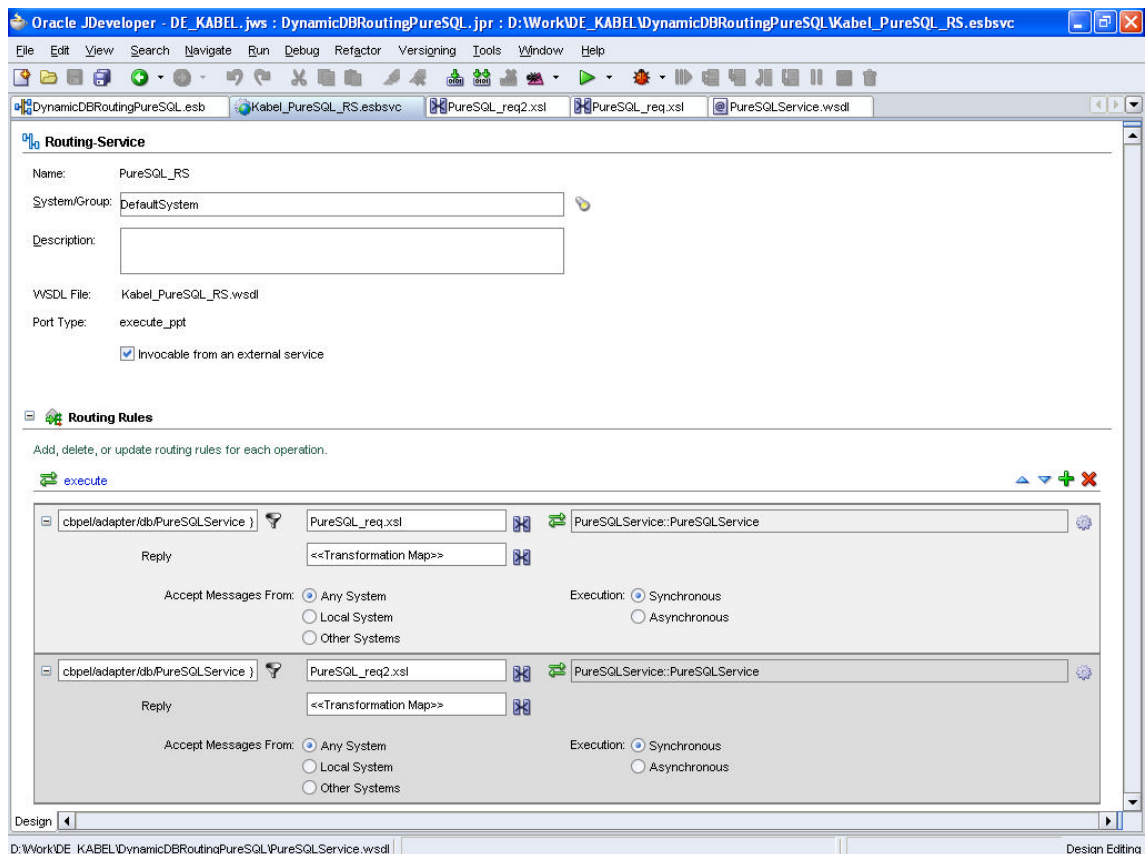
31. Name: *PureSQLRS*
32. SystemGroup: *default* (You can also use a custom defined system group)
33. GenerateWSDLfromSchema->request
34. Click <Browse> and select the XML Schema previously generated by the database adapter wizard in Step#24.
35. Repeat the step#30 for the Reply.



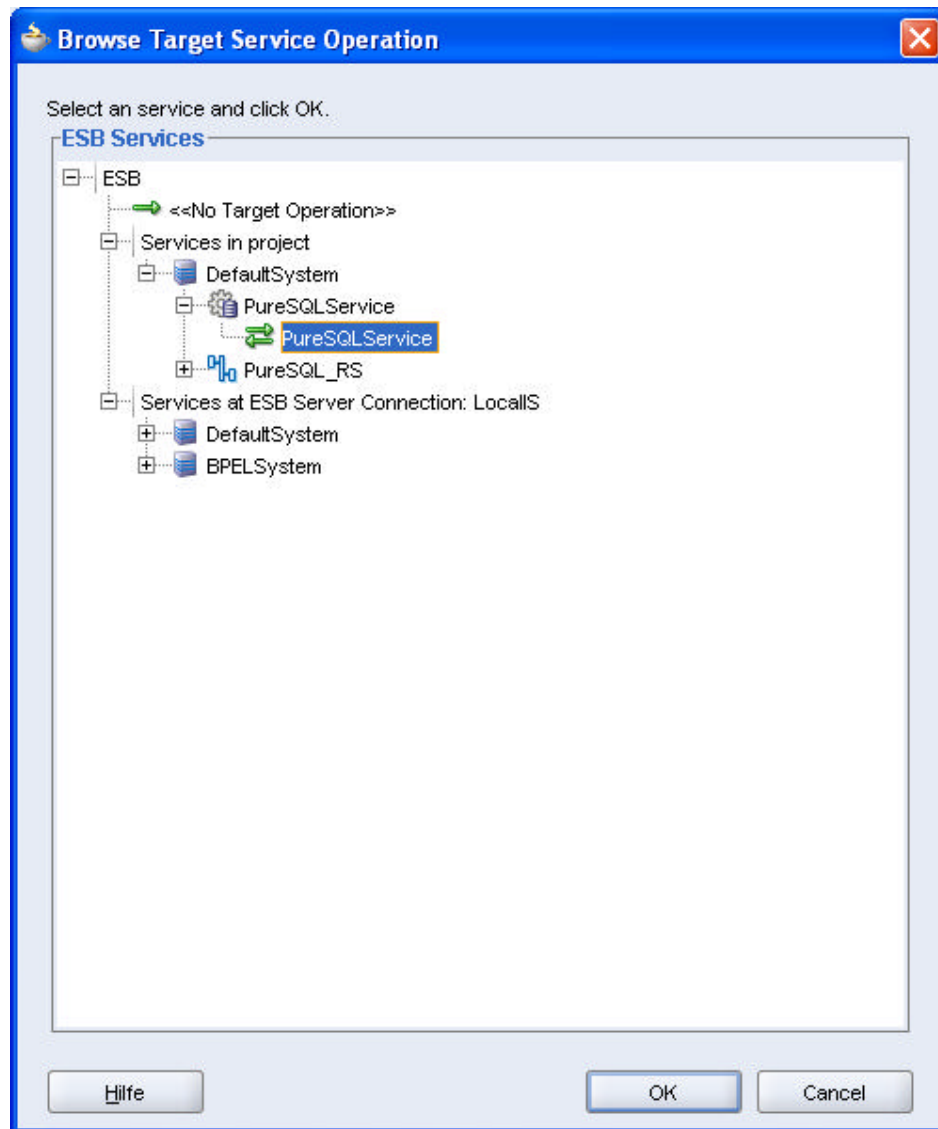
36. Now you have to map the database adapter service to RoutingService.



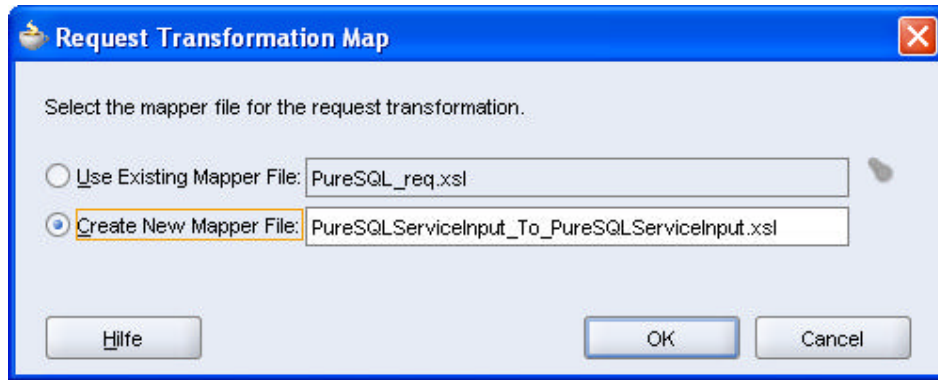
37. Double Click on the RoutingService. You have to add two routing rules, in order to instruct the Database Adapter to execute the query using different datasources. The result should be similar to the screenshot below .



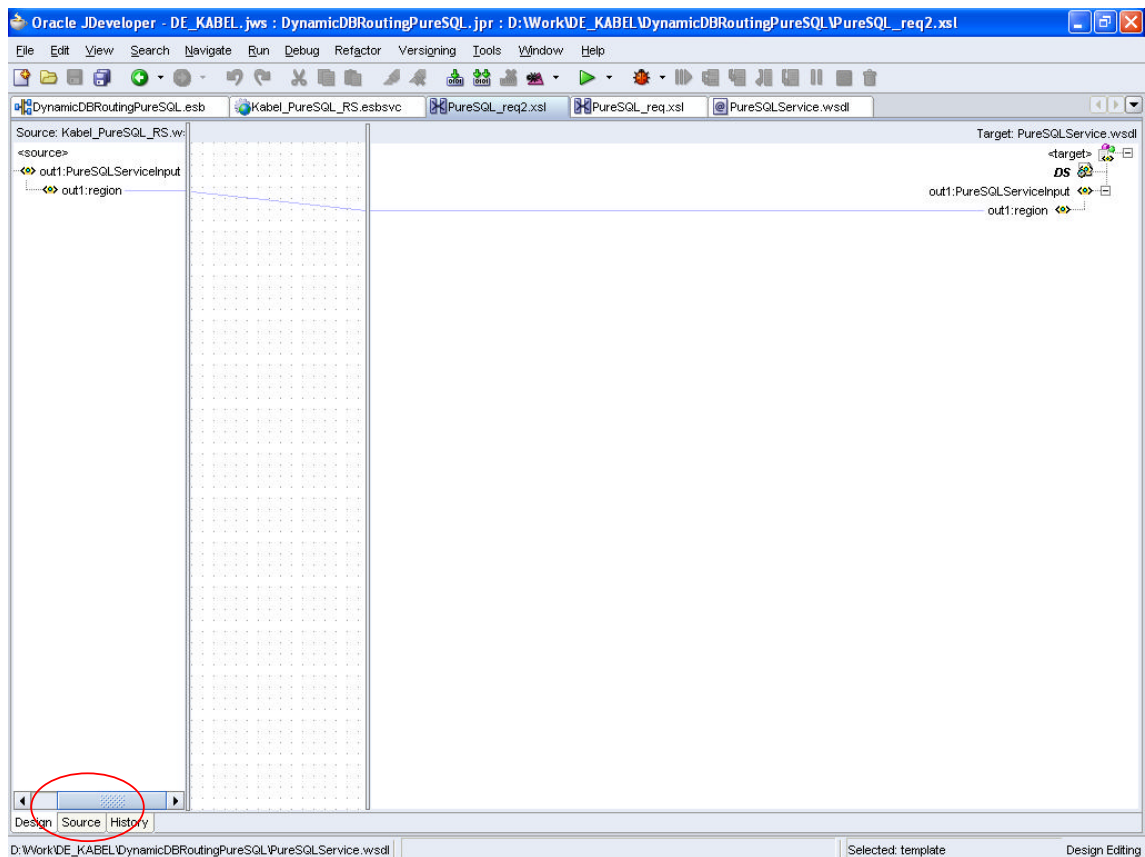
38. Expand the RoutingRules Region and click on the + sign. The RoutingRules configuration wizard appears.



39. Select the DatabaseAdapterService created on Step#23 (In our sample PureSQLService) and click ok. This will bring you back to the routing service configuration wizard.
40. Click on the filter button within the newly created routing rule to add a filter. The expression builder will appear. Use the following expression, in order to route the request to the datasource owned by the database user Kabel1.
- starts-with(/ out1:PureSQLServiceInput/ out1:region,"R1
41. Save your changes.
42. Click on the transform button within the same routing rule area. This will bring up the transformation Map Wizard as in the following screen.



43. From the Application Navigator Panel open the XSL File.
44. Create the mappings for the request by drag and drop.



45. Now you will need to modify the transformation map in order to apply header information. Click on source and add the following line to the XSL Source.

```
<xsl:template match="/" ">
  <xsl:variable name="DS"
    select="ehdr:setOutboundHeader(/ dbhdr:OutboundDBHeaderType/ dbhdr:dataSourceName',
      'jdbc/local/Kabel1', 'dbhdr=http://xmlns.oracle.com/pcbpel/adapter/db/;')"/>
```

46. Add the namespace information:

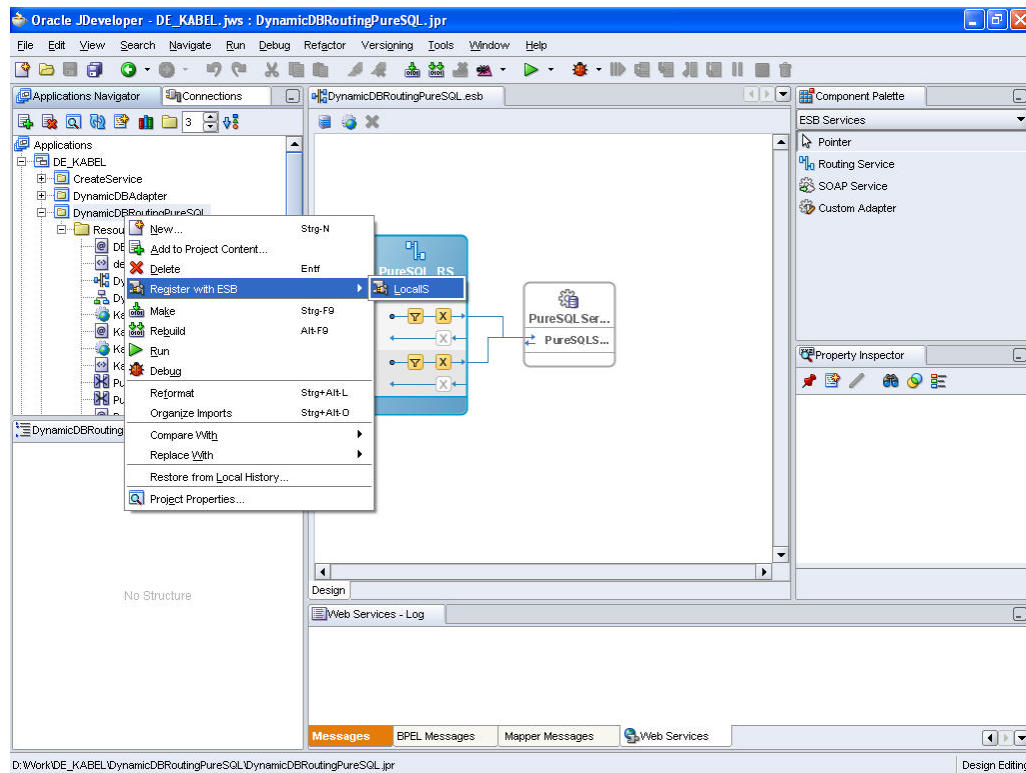
```
.....
xmlns:dbhdr=http://xmlns.oracle.com/pcbpel/adapter/db/
.....
exclude-result-prefixes="xsl out1 ns0 tns plt jca hdr ns1 bpws ehdr hwf xp20 ora ids orcl dbhdr">
```

47. Save your changes.

48. Repeat the Steps #38 to #46 in order to add a new routing rule for selecting data from data source related to db user kabel2. In step #45 replace 'jdbc/local/Kabel1' through 'jdbc/local/Kabel2'.

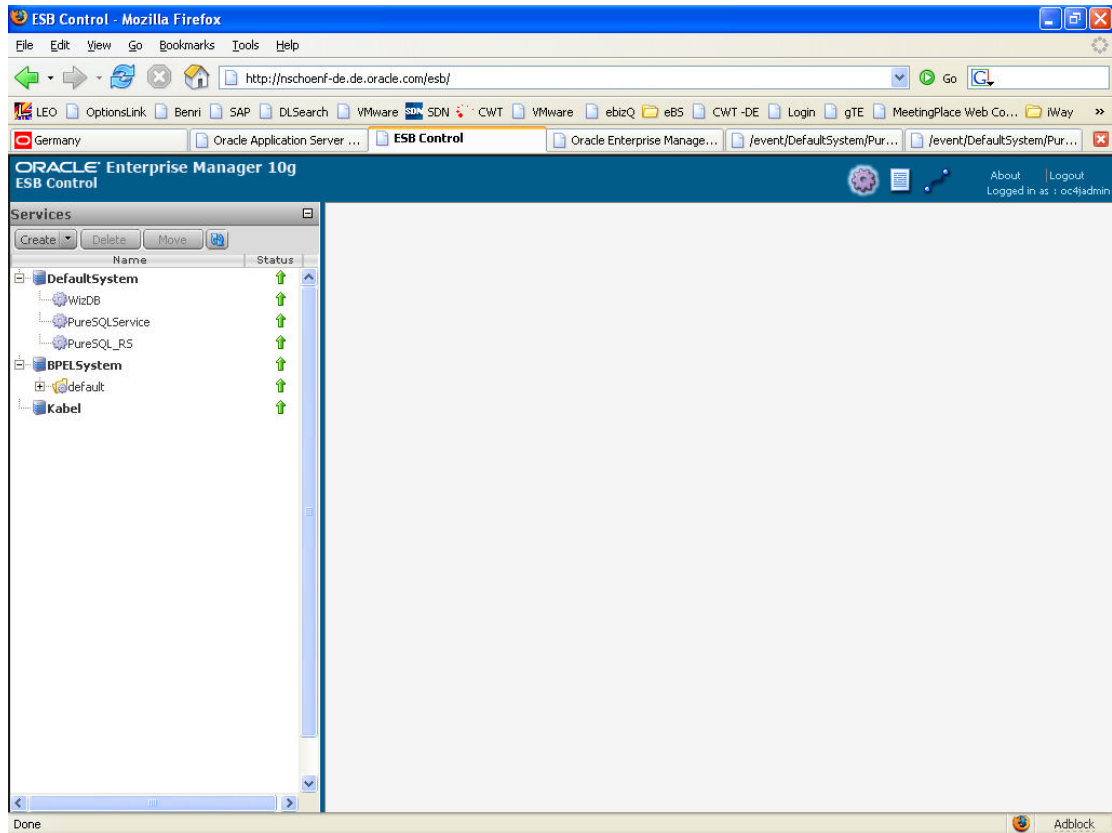
1.3.5 Deploy

49. Right click on your project and select 'Register with ESB' in the context menu. This step requires that you have already setup an Application Server and an Integration Server Connection in Jdeveloper.

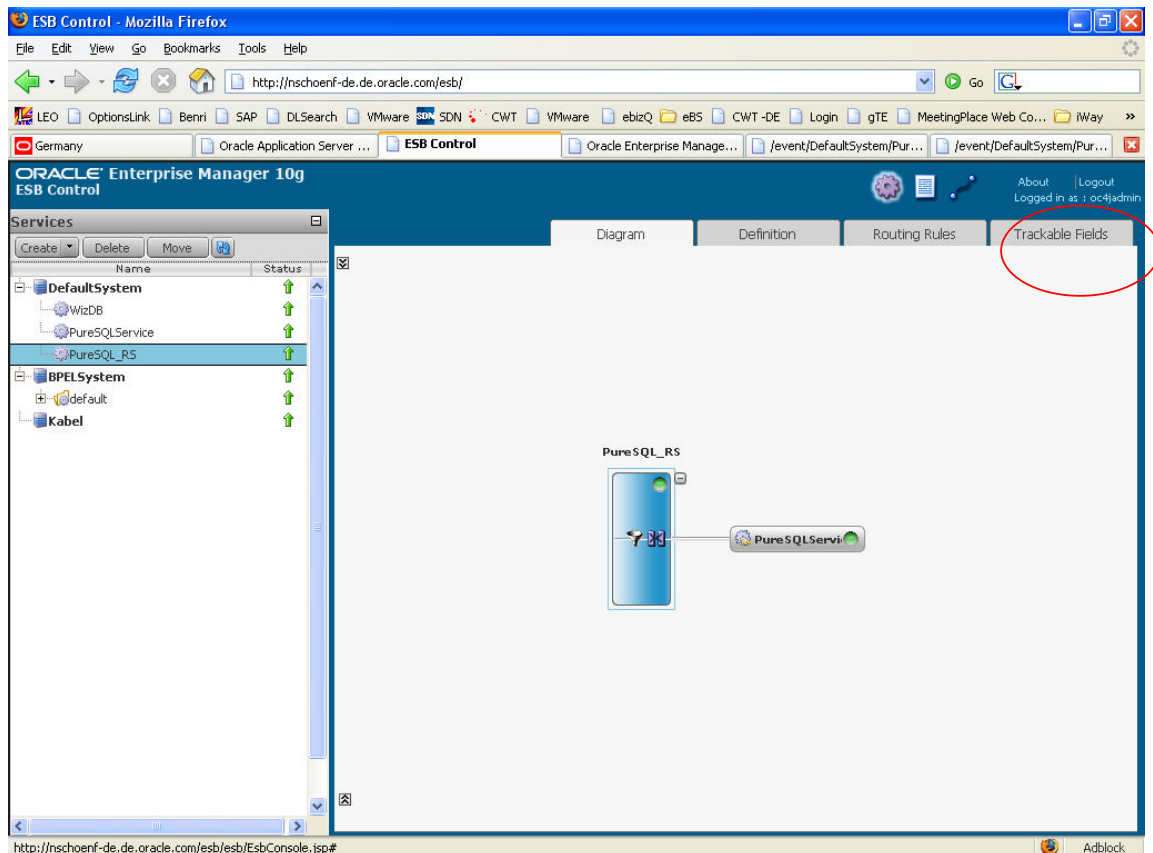


1.3.6 Test

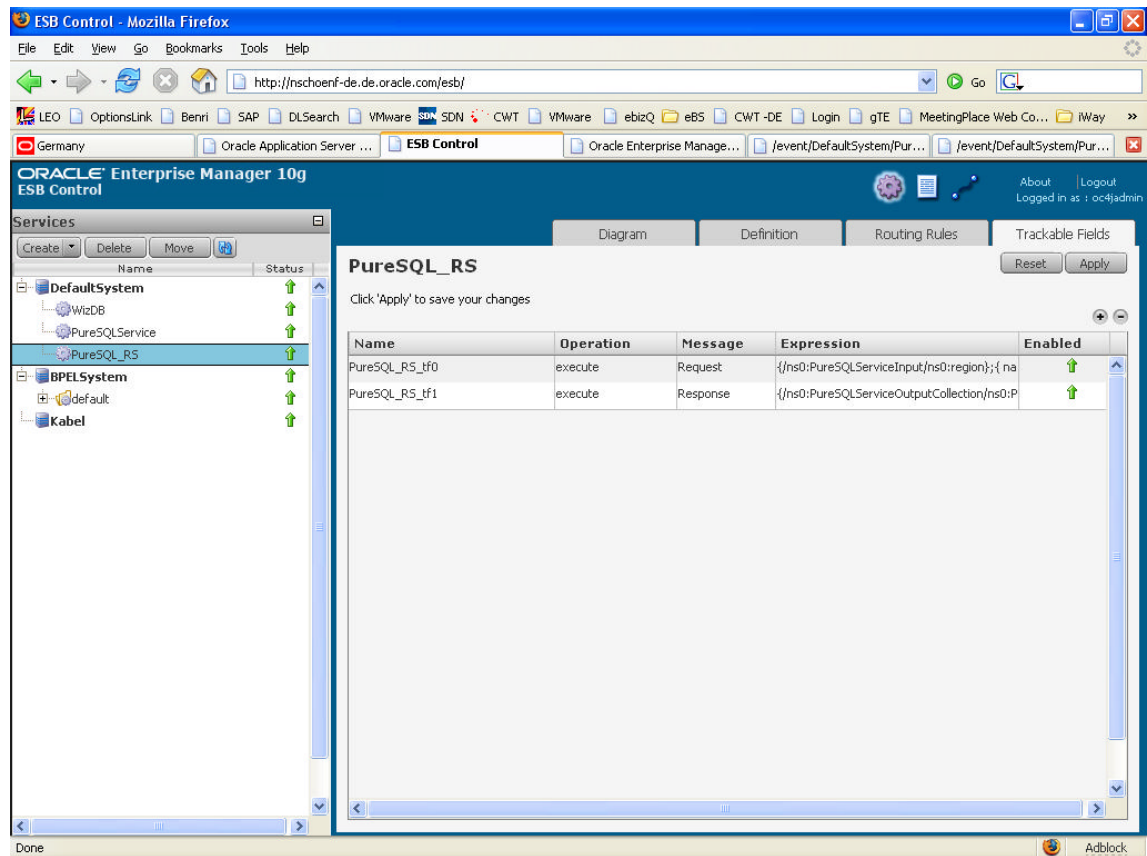
50. Navigate to the ESB Control using [http:// <yourHost><youtHttpPort>/ esb/](http://<yourHost><youtHttpPort>/esb/)
51. In the Services Panel you should see the Routing Service and the Database Adapter Service.



52. Click on your Routing Service. You will see the following screen.



53. Click on Trackable Fields Tab



54. Define two trackable Fields for tracking the request and the response of the routing service.
55. Apply your changes.
56. Navigate to Application Server Control.

Oracle Enterprise Manager (oc4jadmin) - OC4J: oc4j_soa - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://nschoenf-de.de.oracle.com/em/console/las/oc4j/home

LEO OptionsLink Benri SAP DLSearch VMware SDN CWT VMware ebizQ eBS CWT-DE Login gTE MeetingPlace Web Co... iWay

Germany Oracle Application Server ... ESB Control Oracle Enterprise Man... /event/DefaultSystem/Pur... /event/DefaultSystem/Pur...

ORACLE Enterprise Manager 10g

Application Server Control Setup Logs Help Logout

Cluster Topology > Application Server: soa_10_1_3.nschoenf-de.de.oracle.com >

OC4J: oc4j_soa

Page Refreshed Oct 28, 2006 4:35:49 PM CEST • View Data Manual Refresh

Home Applications **Web Services** Performance Administration

General

Status **Up** Stop Restart

Start Time Oct 28, 2006 8:11:39 AM CEST

Version 10.1.3.1.0

Oracle Home H:\Oracle\product\soa\10.1.3.0

Host nschoenf-de.de.oracle.com

Virtual Machines 1

Notifications 0

Response and Load

2:35 3:00 3:20 3:40 4:00 4:20

Request Processing Time (seconds)

Requests per second

Home Applications Web Services Performance Administration

Setup | Logs | Help | Logout

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About Oracle Enterprise Manager 10g Application Server Control

57. Click on WebServices.

Oracle Enterprise Manager (oc4jadmin) - OC4J: oc4j_soa - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://nschoenf-de.de.oracle.com/em/console/las/oc4j/webservices

LEO OptionsLink Benri SAP DLSearch VMware SDN CWT VMware ebizQ eBS CWT-DE Login gTE MeetingPlace Web Co... iWay

Germany Oracle Application Server ... ESB Control Oracle Enterprise Man... /event/DefaultSystem/Pur... /event/DefaultSystem/Pur...

ORACLE Enterprise Manager 10g

Application Server Control Setup Logs Help Logout

Cluster Topology > Application Server: soa_10_1_3.nschoenf-de.de.oracle.com >

OC4J: oc4j_soa

Page Refreshed Oct 28, 2006 4:38:18 PM CEST

Home Applications **Web Services** Performance Administration

Application All

Test Service

Select	Port Name	Web Service	Application	Application Status	Port Enabled	Start Time	Invocations	Response Time (milliseconds)	Faults
<input checked="" type="radio"/>	soap_PureSQL_RS_execute_ptt	execute_pttService	esb-rt	↑	✓	Oct 28, 2006 9:02:14 AM CEST	6	0	0
<input type="radio"/>	soap_PureSQLService_PureSQLService_ptt	PureSQLService_pttService	esb-rt	↑	✓	Oct 28, 2006 8:48:02 AM CEST	0	0	0
<input type="radio"/>	soap_RouteToWizardRS_sendTo_ptt	sendTo_pttService	esb-rt	↑	✓	Oct 28, 2006 8:14:30 AM CEST	0	0	0
<input type="radio"/>	soap_WizDB_WizDB_ptt	WizDB_pttService	esb-rt	↑	✓	Oct 28, 2006 8:14:31 AM CEST	0	0	0
<input type="radio"/>	CreateServicePort	CreateService	orabpel	↑	✓	Oct 28, 2006 8:13:03 AM CEST	0	0	0
<input type="radio"/>	IdentityCreateServicePort	IdentityService	bus-services	↑	✓	Oct 28, 2006 8:13:03 AM CEST	0	0	0

Done Adblock

58. Select the WebService representing your routing service.

The screenshot shows the Oracle Enterprise Manager 10g Application Server Control console. The browser window title is "Oracle Enterprise Manager (oc4jadmin) - Web Service: __soap_PureSQL_RS_execute_ppt - Mozilla Firefox". The address bar shows the URL: http://nschoenf-de.de.oracle.com/em/console/ias/oc4j/ws/wsHome?moduleType=WebModule&wsPort=__soap_PureSQL_R. The breadcrumb navigation is: Cluster Topology > Application Server: soa_10_1_3.nschoenf-de.de.oracle.com > OC4J: oc4j_soa > Application: esb-rt > Web Service: __soap_PureSQL_RS_execute_ppt. The page is refreshed on Oct 28, 2006 4:40:52 PM CEST. The console has tabs for Home, Operations, and Administration. The General tab is selected, showing the following details:

General		Performance	
Application Status	Up	Response Time (milliseconds)	0
Port Enabled	Enabled	Invocations	6
Start Time	Oct 28, 2006 9:02:14 AM CEST	Faults	0
Type	java-class		
Style	document		
Service Name	execute_pptService		
Module	provider-war		
Application	esb-rt		

Below the General tab, the "Related Links" section is circled in red. It contains two links: [Test Service](#) and [View Diagnostic Log Messages](#). At the bottom of the console, there are links for Setup, Logs, Help, and Logout. The footer contains copyright information: Copyright © 1996, 2006, Oracle. All rights reserved. Oracle, JD Edwards, PeopleSoft, and Retek are registered trademarks of Oracle Corporation and/or its affiliates. Other names may be trademarks of their respective owners. About Oracle Enterprise Manager 10g Application Server Control.

59. Click TestService Button and select your http server.

Oracle Enterprise Manager (oc4jadmin) - Test Web Service: execute_pptService - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://nschoenf-de.de.oracle.com/em/console/las/oc4j/httpTest?ctxKey=soa_10_1_3.nschoenf-de.de.oracle.comoc4j_soa. Go

LEO OptionsLink Benri SAP DLSearch VMware SDN CWT VMware ebizQ eBS CWT-DE Login gTE MeetingPlace Web Co... iWay >>

Germany Oracle Application Server ... ESB Control Oracle Enterprise Man... /event/DefaultSystem/Pur... /event/DefaultSystem/Pur...

ORACLE Enterprise Manager 10g Application Server Control Setup Logs Help Logout

Cluster Topology > Application Server: soa_10_1_3.nschoenf-de.de.oracle.com > OC4J: oc4j_soa > Application: esb-rt > Web Service: soap_PureSQL_RS_execute_ppt >

Test Web Service: execute_pptService Page Refreshed Oct 28, 2006 4:42:33 PM CEST

Discovered Websites

This table shows websites that may be used to test this Web Service.

Select	Listener	Protocol	Host	Port
<input type="radio"/>	Oracle HTTP Server	https	nschoenf-de.de.oracle.com	443
<input checked="" type="radio"/>	Oracle HTTP Server	http	nschoenf-de.de.oracle.com	80

TIP The URL field may be modified to test the web service using a custom URL.

Setup | Logs | Help | Logout

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[About Oracle Enterprise Manager 10g Application Server Control](#)

Done Adblock

60. Click TestWebService.

Web Service - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://nschoenf-de.de.oracle.com/event/DefaultSystem/PureSQL_RS

LEO OptionsLink Benri SAP DLSearch VMware SDN CWT VMware ebizQ eBS CWT-DE Login gTE MeetingPlace Web Co... iWay

Germany Oracle Application Server 10g Re... ESB Control Oracle Enterprise Manager (oc4)... Web Service

execute_pptService endpoint

For a formal definition, please review the [Service Description](#).

Download the JavaScript Stub (BETA) for [_soap_PureSQL_RS_execute_ppt](#) and see its [documentation](#).

_soap_PureSQL_RS_execute_ppt

Operation: ☒ HTML Form ☐ XML Source

☐ Reliable Messaging ☐ Include In Header

☐ WS-Security ☐ Include In Header

☐ PureSQLServiceInput

region xsd:string ☒ Include In Message

Note: XML source view contents will not be reflected in the HTML form view

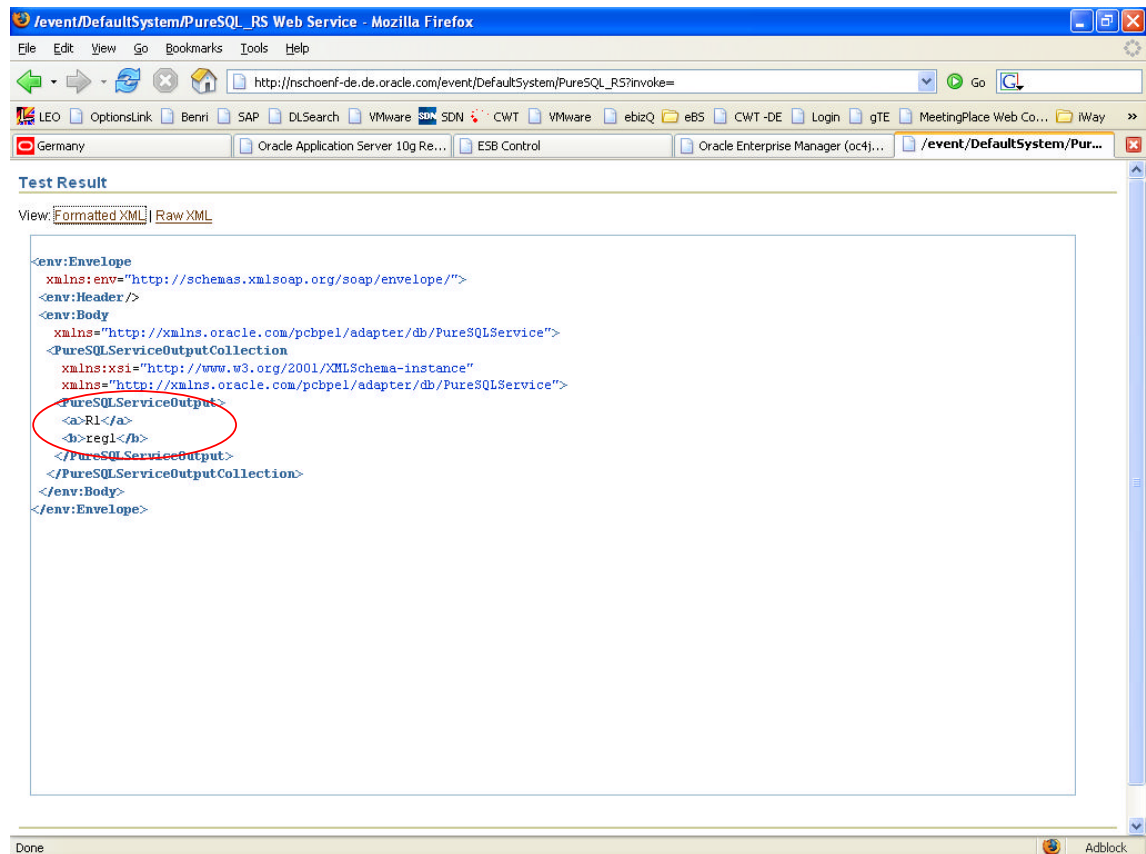
☐ Show Transport Info

☐ Perform stress test ☐ Enable

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Done Adblock

61. Enter R1 in the field region
62. Click Invoke. The Service should return the entries of table TEST1 of user KABEL1.



63. Go to ESB Console and click on the Instances button. In the Instances screen click on the most recently generated instance. This will display the message flow. Additionally click on the arrows to display the content of the tracking fields. The response message corresponds to the contents of the Table TEST1 owned by KABEL1.

ESB Control - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://nschoenf-de.de.oracle.com/esb/

LEO OptionsLink Benri SAP DLSearch VMware SDN CWT VMware ebizQ eBS CWT-DE Login gTE MeetingPlace Web Co... iWay

Germany Oracle Application Server 10g Re... ESB Control Oracle Enterprise Manager (oc4j...) /event/DefaultSystem/PureSQL_...

ORACLE Enterprise Manager 10g
ESB Control

Manage Search Basic

Instances containing

Service <Any> Status Any

Match Any

<Tracking Name> <Tracking Value>

Instances

Initiating Time	Instance ID	Status
10/28/06 4:46:10 PM	0D515020669311D89F4B03579453E7E5	Success
10/28/06 9:10:53 AM	73410000665311D89F4B03579453E7E5	Success
10/28/06 9:10:46 AM	6EDC6D0665311D89F4B03579453E7E5	Success
10/28/06 9:10:38 AM	69DD6F80665311D89F4B03579453E7E5	Success
10/28/06 9:10:24 AM	61CE7280665311D89F4B03579453E7E5	Success
10/28/06 9:04:10 AM	829B2A40665211D89F4B03579453E7E5	Success
10/28/06 9:02:43 AM	4F0B8CB0665211D89F4B03579453E7E5	Success
10/28/06 9:00:29 AM	FF1A0100665111D89F4B03579453E7E5	Success
10/28/06 8:54:03 AM	191A4DE0665111D89F4B03579453E7E5	Success
10/28/06 8:53:12 AM	FAAF2240665011D89F4B03579453E7E5	Success
10/28/06 8:51:29 AM	BD665A20665011D89F4B03579453E7E5	Success
10/28/06 8:51:00 AM	AC10F190665011D89F4B03579453E7E5	Success

PureSQL_RS

execute

PureSQLService

PureSQLService

Service PureSQL_RS

Status Successful

Activity Time 10/28/06 4:46:10 PM

Tracking data

PureSQL_RS_tf0 R1

PureSQL_RS_tf1 R1reg1

Navigator Details Overlay

http://nschoenf-de.de.oracle.com/esb/esb/EsbConsole.jsp#

Adblock

64. Repeat the steps #60 to #63. Enter in step #61 "R2".

ESB Control - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://nschoenf-de.de.oracle.com/esb/

LEO OptionsLink Benri SAP DLSearch VMware SDN CWT VMware ebizQ eBS CWT-DE Login gTE MeetingPlace Web Co... iWay

Germany Oracle Application Se... ESB Control Login to Oracle Appli... /event/DefaultSyste... Oracle Enterprise Ma... /event/DefaultSyste...

ORACLE Enterprise Manager 10g
ESB Control

Manage Search Basic

Instances containing

Service <Any> Status Any

Match Any

<Tracking Name> <Tracking Value>

Instances

Initiating Time	Instance ID	Status
10/28/06 5:24:11 PM	5CB6D630669811D89F4B03579453E7E5	Success
10/28/06 4:46:10 PM	0D515020669311D89F4B03579453E7E5	Success
10/28/06 9:10:53 AM	73410000665311D89F4B03579453E7E5	Success
10/28/06 9:10:46 AM	6EDC6D0665311D89F4B03579453E7E5	Success
10/28/06 9:10:38 AM	69DD6F80665311D89F4B03579453E7E5	Success
10/28/06 9:10:24 AM	61CE7280665311D89F4B03579453E7E5	Success
10/28/06 9:04:10 AM	829B2A40665211D89F4B03579453E7E5	Success
10/28/06 9:02:43 AM	4F0B8CB0665211D89F4B03579453E7E5	Success
10/28/06 9:00:29 AM	FF1A0100665111D89F4B03579453E7E5	Success
10/28/06 8:54:03 AM	191A4DE0665111D89F4B03579453E7E5	Success
10/28/06 8:53:12 AM	FAAF2240665011D89F4B03579453E7E5	Success
10/28/06 8:51:29 AM	BD665A20665011D89F4B03579453E7E5	Success
10/28/06 8:51:00 AM	AC10F190665011D89F4B03579453E7E5	Success

PureSQL_RS

execute

PureSQLService

PureSQLService

Service PureSQL_RS

Status Successful

Activity Time 10/28/06 5:24:11 PM

Tracking data

PureSQL_RS_tf0 R2

PureSQL_RS_tf1 R2Reg2

Navigator Details Overlay

http://nschoenf-de.de.oracle.com/esb/esb/EsbConsole.jsp#

Adblock

65. The results displayed in the tracking fields of the ESB Control reflect the content of the Table TEST1 owned by the user KABEL2.

1.3.7 Restrictions

- The sample was not tested with XA datasources.