

Block Chain Adapter API Configuration
Oracle FLEXCUBE Investor Servicing

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Table of Contents

| | | |
|-----------|--|-----------|
| 1. | BLOCKCHAIN ADAPTER CONFIGURATION..... | 1 |
| 1.1 | INTRODUCTION | 1 |
| 1.2 | ADAPTER CONFIGURATION XML [TECHNICAL DETAILS] | 1 |
| 1.2.1 | <i>Configuration in CamelContext.xml</i> | <i>2</i> |
| 1.2.2 | <i>P6: MFHYSENDER-IN-TABLE MFHYSENDER-OUT-HTTP.....</i> | <i>3</i> |
| 1.2.3 | <i>P5: MFHYRECEIVER-IN-HTTP MFHYRECEIVER-OUT-TABLE</i> | <i>8</i> |
| 1.2.4 | <i>P3: MFHYSENDER-IN-HTTP MFHYSENDER-OUT-TABLE.....</i> | <i>11</i> |
| 1.2.5 | <i>P4: MFHYRECEIVER-IN-TABLE MFHYRECEIVER-OUT-HTTP</i> | <i>13</i> |
| 1.2.6 | <i>P2: MFSENDER-IN-TABLE-UPDATE MFSENDER-OUT-HTTP-UPDATE.....</i> | <i>15</i> |
| 1.2.7 | <i>P1: MFRECEIVER-IN-HTTP-UPDATE MFRECEIVER-OUT-TABLE-UPDATE</i> | <i>17</i> |
| 1.3 | APIs | 18 |
| 1.3.1 | <i>Posting new transaction.....</i> | <i>18</i> |
| 1.3.2 | <i>Update transaction</i> | <i>21</i> |
| 1.3.3 | <i>Fund and Entity Configuration.....</i> | <i>22</i> |

1. Blockchain Adapter Configuration

1.1 Introduction

This chapter explains the steps for updating configuration XML files available in Blockchain Adapter WAR.

1.2 Adapter Configuration XML [Technical Details]

Block Chain Java Adapter for Fund Price (FCIS) Use Case. There are 6 Apache Camel routes as follows:

1. P6: MFHYSENDER-IN-TABLE MFHYSENDER-OUT-HTTP
2. P5: MFHYRECEIVER-IN-HTTP MFHYRECEIVER-OUT-TABLE
3. P3: MFHYSENDER-IN-HTTP MFHYSENDER-OUT-TABLE
4. P4: MFHYRECEIVER-IN-TABLE MFHYRECEIVER-OUT-HTTP
5. P2: MFSENDER-IN-TABLE-UPDATE MFSENDER-OUT-HTTP-UPDATE
6. P1: MFRECEIVER-IN-HTTP-UPDATE MFRECEIVER-OUT-TABLE-UPDATE

1.2.1 Configuration in CamelContext.xml

CamelContext.xml

```
<bean id="sqlComponent"
class="org.apache.camel.component.sql.SqlComponent">
    <property name="dataSource" ref="dataSource" />
</bean>

<bean id="transformerMF"
class="oracle.fsgbu.flexcube.bc.fcis.mf.transformer.MFTransformer
" />

<bean id="parserMF"
class="oracle.fsgbu.flexcube.bc.fcis.mf.parser.MFParser" />

<bean id="RestletComponent" class="org.restlet.Component" />

<bean id="RestletComponentService"
class="org.apache.camel.component.restlet.RestletComponent">
    <constructor-arg index="0">
        <ref bean="RestletComponent" />
    </constructor-arg>
</bean>
```

sqlComponent

This bean is used to connect to a database whose credentials are defined in application.properties.

transformMF

MFTransformer class is linked to CamelContext in order to use its methods in the routes.

parserMF

MFParser class is linked to CamelContext in order to use its methods in the routes.

RestletComponent

This bean is used to define REST Endpoints being used in the routes.

RestletComponentService

This bean is used to define REST Endpoints being used in the routes.

1.2.2 P6: MFHYSENDER-IN-TABLE MFHYSENDER-OUT-HTTP

CamelContext.xml

```
<!-- P6: MFHYSENDER-IN-TABLE MFHYSENDER-OUT-HTTP -->

<route id="P6:MFSender_DBtoREST">

  <from uri="sqlComponent:{{sql.newTransactionProcessingT1}}" />

  <transform>

    <method ref="parserMF" method="parse" />

  </transform>

  <log message="1" />

  <log message="${body}" />

  <to
    uri="bean:parserMF?method=setInsertMap(${body},'DLTB_FUNDPRICE')"
  />

  <to uri="sqlComponent:{{sql.newTransactionProcessingT2}}" />

  <log message="11" />

  <log message="${body}" />

  <to

    uri="bean:parserMF?method=setInsertMap(${body},'FUNDPRICEHDRTBL')
    " />

  <to uri="sqlComponent:{{sql.newTransactionProcessingT3}}" />

  <log message="2" />

  <log message="${body}" />

  <to

    uri="bean:parserMF?method=setInsertMap(${body},'FUNDPRICEDETAILTBL')
    " />

  <to uri="sqlComponent:{{sql.newTransactionProcessingT4}}" />

  <log message="3" />

  <log message="${body}" />


```

```

<choice>

<when>

<simple>${body} != ''</simple>

<to
uri="bean:parserMF?method=setInsertMap(${body},'FUNDPRICECOMPONEN
TTBL')" />

</when>

</choice>

<log message="5" />

<log message="${body}" />

<transform>

<method ref="parserMF" method="getInsertMap" />

</transform>

<log message="6" />

<log message="${body}" />

<to uri="freemarker:templateMF3.ftl" />

<log message="7" />

<log message="${body}" />

<setHeader headerName="Content-Type">

<constant>application/json</constant>

</setHeader>

<log message="8" />

<to uri="http:// 10.10.10.10:1010/customer-service/transaction"
/>

<convertBodyTo type="String" />

<choice>

<when>

<simple>${body} contains '200'</simple>

```

```

<log message="\${body}" />

<transform>

<method ref="parserMF" method="getRowID" />

</transform>

<log message="\${body}" />

<log message="4" />

<to
    uri="sqlComponent:{{sql.deleteRecord_Sender_DBToREST_Update
}}}" />

<log message="5" />

<!-- <to uri="sqlComponent:{{sql.increase_New_Txn_Send_Count}}}"
/> -->

<to uri="sqlComponent:{{sql.commitSql}}}" />

</when>

<otherwise>

<transform>

<method ref="parserMF" method="getRowID" />

</transform>

<log message="9" />

<to
    uri="sqlComponent:{{sql.deleteRecord_Sender_DBToREST_Update}}}" />

<log message="10" />

<to uri="sqlComponent:{{sql.commitSql}}}" />

</otherwise>

</choice>

</route>

```

A new record added through Oracle FLEXCUBE Frontend is automatically picked up for processing from the sender database. After being processed by the java adapter, the data is prepared as a freemarker template and then sent to Hyperledger. If a successful response is received then the record is deleted from the ofba table.

MF_SQLConfig.properties

```

sql.newTransactionProcessing = SELECT ROWID AS
ROW_ID,TRANSACTIONNUMBER,SOURCEENTITY,NVL (DESTINATIONENTITY, ' ')
DESTINATIONENTITY,NVL (STATUS, ' ') STATUS,
TO_CHAR (TRANSACTIONDATE, 'DD-MON-YY') AS
TransactionDate,NVL (FUNDID, ' ') FUNDID,NVL (UNITHOLDERIDTYPE, ' ')
UNITHOLDERIDTYPE, NVL (UNITHOLDERIDNUMBER, ' ')
UNITHOLDERIDNUMBER,NVL (TOFUNDID, ' ')
TOFUNDID,NVL (TOUNITHOLDERIDTYPE, ' ')
TOUNITHOLDERIDTYPE,NVL (TOUNITHOLDERIDNUMBER, ' ')
TOUNITHOLDERIDNUMBER,NVL (TRANSACTIONCCY, ' ')
TRANSACTIONCCY,NVL (TRANSACTIONMODE, ' ')
TRANSACTIONMODE,NVL (TRANSACTIONVALUE,0)
TRANSACTIONVALUE,NVL (GROSSORNET, ' ')
GROSSORNET,NVL (UNITSALLOTTED,0) UnitsAlloted,NVL (NAV,0)
NAV,NVL (MESSAGEDIRECTION, ' ') MESSAGEDIRECTION FROM
DLTB_FUNDPRICE_OFBA WHERE TYPE_OF_TRIGGER = 'INSERT' AND ROWNUM
<=1 AND MessageDirection='I' ORDER BY SERIAL_NO ASC

sql.newTransactionProcessingT1 = SELECT ROWIDTOCHAR(ROWID) AS
ROW_ID,SERIAL_NO,FUNDID,TO_CHAR (EFFECTIVEDATE, 'DD-MON-YY') AS
EFFECTIVEDATE,SMART_CONTRACT_ID,SOURCEENTITY,DESTINATIONENTITY,DE
CLAREDNAV,STATUS,MESSAGEDIRECTION,TYPE_OF_TRIGGER FROM
DLTB_FUNDPRICE_OFBA WHERE TYPE_OF_TRIGGER = 'INSERT' AND ROWNUM
<= 1 AND MessageDirection = 'I' ORDER BY SERIAL_NO ASC

sql.newTransactionProcessingT2 = SELECT
fundid,TO_CHAR (EFFECTIVEDATE, 'DD-MON-YY') AS
EFFECTIVEDATE,auth_stat,TO_CHAR (realnavperunit) as
realnavperunit,TO_CHAR (declarednav) as declarednav
,TO_CHAR (totalnetasset) as
totalnetasset,TO_CHAR (outstandingunits) as
outstandingunits,TO_CHAR (fioutstandingunits) as
fioutstandingunits
,noofunitholders,latestprice,TO_CHAR (floorprice) as
floorprice,TO_CHAR (ceilingprice) as
ceilingprice,maker_id,TO_CHAR (maker_dt_stamp, 'DD-MON-YY') AS
maker_dt_stamp,checker_id,TO_CHAR (checker_dt_stamp, 'DD-MON-YY')
AS checker_dt_stamp,nvl (to_char (euroequivalentofnav), '0') as
euroequivalentofnav ,lastmodifieduserid,TO_CHAR (lastmodifieddate,
'DD-MON-YY') AS
lastmodifieddate,mod_no,record_stat,once_auth,amendtxnflag,hurdle
rate,hwmpushhurdle,swingingprice,swingpricebasis FROM
FUNDPRICEHDRTBL WHERE fundid = :#FUNDID AND effectivedate =
: #EFFECTIVEDATE ORDER BY fundid ASC

sql.newTransactionProcessingT3 = SELECT
fundid,TO CHAR (EFFECTIVEDATE, 'DD-MON-YY') AS

```



```

EFFECTIVEDATE,transactiontype,TO_CHAR(transactionbaseprice) as
transactionbaseprice
,basepriceconstant,allocationpervsregcapital,auth_stat FROM
FUNDPRICEDETAILTBL WHERE fundid = :#FUNDID AND effectivedate =
:#EFFECTIVEDATE ORDER BY fundid ASC

sql.newTransactionProcessingT4 = SELECT
fundid,TO_CHAR(EFFECTIVEDATE, 'DD-MON-YY') AS
EFFECTIVEDATE,componentid,componentvalue,auth_stat FROM
FUNDPRICECOMPONENTTBL WHERE fundid = :#FUNDID AND effectivedate =
:#EFFECTIVEDATE ORDER BY fundid ASC

sql.clearingQuery_Sender_DBToREST_Update=SELECT ROWID AS
ROW_ID,SMART_CONTRACT_ID,SOURCEENTITY,NVL (DESTINATIONENTITY, ' ')
DESTINATIONENTITY,NVL (STATUS, ' ') STATUS,TO_CHAR(EFFECTIVEDATE,
'DD-MON-YY') AS EFFECTIVEDATE,NVL (FUNDID, ' ')
FUNDID,NVL (DECLAREDNAV , 0) DECLAREDNAV,NVL (MESSAGEDIRECTION, ' ')
MESSAGEDIRECTION FROM DLTB_FUNDPRICE_OFBA WHERE
TYPE_OF_TRIGGER ='UPDATE' AND ROWNUM <=1 AND
MessageDirection='I' ORDER BY SERIAL_NO ASC

sql.deleteRecord_Sender_DBToREST_Update=delete from
DLTB_FUNDPRICE_OFBA where ROWID=CHARTOROWID(:#{property.rowid})

```

Using SQL query, newly inserted data in the sender database is retrieved and sent for processing to Parser where the row id is extracted and set into a HashMap which is used later in the route. The data from the database is used to prepare a Freemarker template. The output of the template is a JSON request which is sent to the Hyperledger network. Subsequently, the response is checked for error, and on receiving successful response with OK Status, the picked record is removed from the table 'DLTB_FUNDPRICE_OFBA' so that the same record is not repeatedly picked up by Camel.

1.2.3 P5: MFHYRECEIVER-IN-HTTP MFHYRECEIVER-OUT-TABLE

CamelContext.xml

```
<!-- P5: MFHYRECEIVER-IN-HTTP MFHYRECEIVER-OUT-TABLE -->
<route id="P5:MFRcvr_RESTtoDB">
  <from uri="direct:MFTransact" />
  <log message="1" />
  <log message="${body}" />
  <transform>
    <method ref="transformerMF" method="transform2" />
  </transform>
  <log message="2" />
  <log message="${body}" />
  <split>
    <simple>${body['message']['FUNDPRICEHDR_TBL']}</simple>
    <log message="${body}" />
    <to uri="sqlComponent:{{sql.insertQueryT2}}" />
  </split>
  <log message="5" />
  <split>
    <simple>${body['message']['FUNDPRICEDETAIL_TBL']}</simple>
    <log message="${body}" />
    <to uri="sqlComponent:{{sql.insertQueryT3}}" />
  </split>
  <log message="6" />
  <split>
    <simple>${body['message']['FUNDPRICECOMPONENT_TBL']}</simple>
    <log message="${body}" />
    <to uri="sqlComponent:{{sql.insertQueryT4}}" />
  </split>
  <setProperty propertyName="foo">
    <simple>${body}</simple>
  </setProperty>
  <log message="${body}" />
  <setBody>
    <simple>${body['message']['DLTB_FUNDPRICE_PK'][0]}</simple>
  </setBody>
<!-- Calling for DLTB_FUNDPRICE table -->
```

```

</setBody>
    <setProperty propertyName="DestinationEntity">
        <simple>${body['DestinationEntity']}

```

Data posted to REST by Hyperledger is picked up by Camel route and sent to the Transformer. After processing, the record is inserted into 'DLTB_FUNDPRICE','DLTB_FUNDPRICEHDR','DLTB_FUNDPRICEDetail','DLTB_FUNDPRICECOMPONENT' on the receiver side.

MF_SQLConfig.properties

```
sql.insertQueryT1 = INSERT INTO DLTB_FUNDPRICE
(FUNDID,EFFECTIVEDATE,DESTINATIONENTITY,SOURCEENTITY,DECLAREDNAV,S
TATUS,MESSAGEDIRECTION,SMART_CONTRACT_ID)
VALUES (:#FUNDID, :#EFFECTIVEDATE, :#{property.DestinationEntity}, :#
#{property.SourceEntity}, :#DECLAREDNAV, :#Status, 'O', :#{property.S
martContractID})

sql.insertQueryT2 = INSERT INTO DLTB_FUNDPRICEHDR
(FUNDID,EFFECTIVEDATE,AUTH_STAT,REALNAVPERUNIT,DECLAREDNAV,TOTALNE
TASSET,OUTSTANDINGUNITS,FIOUTSTANDINGUNITS,NOOFUNITHOLDERS,LATESTP
RICE,FLOORPRICE,CEILINGPRICE,MAKER_ID,MAKER_DT_STAMP,CHECKER_ID,CH
ECKER_DT_STAMP,EUROEQUIVALENTOFNAV,LASTMODIFIEDUSERID,LASTMODIFIED
DATE,MOD_NO,RECORD_STAT,ONCE_AUTH,AMENDTXNFLAG,HURDLERATE,HWMPLUSH
URDLE,SWINGINGPRICE,SWINGPRICEBASIS)VALUES (:#FUNDID, :#EFFECTIVEDAT
E, :#AUTH_STAT, :#REALNAVPERUNIT, :#DECLAREDNAV, :#TOTALNETASSET, :#OUT
STANDINGUNITS, :#FIOUTSTANDINGUNITS, :#NOOFUNITHOLDERS, :#LATESTPRICE
, :#FLOORPRICE, :#CEILINGPRICE, :#MAKER_ID, :#MAKER_DT_STAMP, :#CHECKER
_ID, :#CHECKER_DT_STAMP, :#EUROEQUIVALENTOFNAV, :#LASTMODIFIEDUSERID,
 :#LASTMODIFIEDDATE, :#MOD_NO, :#RECORD_STAT, :#ONCE_AUTH, :#AMENDTXNFL
AG, :#HURDLERATE, :#HWMPLUSHURDLE, :#SWINGINGPRICE, :#SWINGPRICEBASIS)

sql.insertQueryT3 = INSERT INTO DLTB_FUNDPRICEDetail
(FUNDID,EFFECTIVEDATE,TRANSACTIONTYPE,TRANSACTIONBASEPRICE,BASEPRI
CECONSTANT,ALLOCATIONPERVSREGCAPITAL,AUTH_STAT)VALUES
(:#FUNDID, :#EFFECTIVEDATE,
 :#TRANSACTIONTYPE, :#TRANSACTIONBASEPRICE, :#BASEPRICECONSTANT, :#ALL
OCATIONPERVSREGCAPITAL, :#AUTH_STAT)

sql.insertQueryT4 = INSERT INTO DLTB_FUNDPRICECOMPONENT
(FUNDID,EFFECTIVEDATE,COMPONENTID,COMPONENTVALUE,AUTH_STAT)VALUES (
 :#FUNDID, :#EFFECTIVEDATE,
 :#COMPONENTID, :#COMPONENTVALUE, :#AUTH_STAT)
```

On the receiver side, data (payload-MFTransact) comes from the Hyperledger (REST endpoint), and is sent to the direct component of Apache Camel. From there, data is sent to transform() method of the MFTransformer.java class where the data along with the private data is extracted and converted to a HashMap. This data is inserted in the receiver side 'DLTB_FUNDPRICE', 'DLTB_FUNDPRICEHDR', 'DLTB_FUNDPRICEDetail', 'DLTB_FUNDPRICECOMPONENT' table using the SQL query and the transaction is committed. On successful insertion of the record in database, a JSON string which is first converted to a Map is set as a response.

1.2.4 P3: MFHYSENDER-IN-HTTP MFHYSENDER-OUT-TABLE

CamelContext.xml

```
<!-- P3: MFHYSENDER-IN-HTTP MFHYSENDER-OUT-TABLE -->
<route id="P3:MFSEnder_RESTtoDB">
  <from uri="direct:MFNotifySender" />
  <log message="${body}" />
```

```

<transform>
    <method ref="transformerMF" method="transform2" />
</transform>
<log message="P3 is called" />
<setBody>
    <simple>${body['message']['DLTB_FUNDPRICE_PK'][0]}</simple>
    <!-- Calling for DLTB_FUNDPRICE table -->
</setBody>
<log message="3" />
<log message="${body}" />
<to>
    uri="sqlComponent:{{sql.updateQuery_Sender_RESTToDB_Notification}}" />
<log message="P3-2" />
<to uri="sqlComponent:{{sql.commitSql}}" />
<setBody>
    <simple>{"result":"ok"}</simple>
</setBody>
<transform>
    <method ref="transformerMF" method="stringToMap" />
</transform>
</route>

```

Data posted to REST by Hyperledger is picked up for processing and sent to the Transformer. The returned HashMap output is used to update the record into the sender side database in the table 'DLTB_FUNDPRICE' and the transaction is committed.

MF_SQLConfig.properties

```

sql.updateQuery_Sender_RESTToDB_Notification=UPDATE DLTB_FUNDPRICE
SET SMART_CONTRACT_ID=:#SmartContractID,STATUS=trim(:#Status)
WHERE FUNDID=:#FUNDID AND TO_CHAR(EFFECTIVEDATE,'DD-MON-YY')=:#EFFECTIVEDATE AND MessageDirection='I'

```

On the sender side, data is picked up from the Hyperledger(payload-MFNotifySender) and sent to the Transformer.java where the relevant data is extracted and converted to a HashMap. This data is updated in the sender side 'DLTB_FUNDPRICE' table using the sql query and the transaction is committed.

On successful updating of the record in the sender side database, a JSON string which is first converted to a Map is set as a response.

1.2.5 **P4: MFHYRECEIVER-IN-TABLE MFHYRECEIVER-OUT-HTTP**

Any update in existing record in receiver side database is picked up by below route. This data is sent to parse method of MFParser.java where Row ID is set for later use. The HashMap result of query is then sent to a Freemarker Template which produces the update request for Hyperledger. The template content is appended with a Header and then sent to Hyperledger (URL - <http://localhost:8080/transaction>). The string result of Hyperledger is checked for successful result. Once that condition is passed, Row ID which was set earlier is used to delete the record from table so that route is executed only once. Changes are committed to database.

CamelContext.xml

```
<!-- P4: MFHYRECEIVER-IN-TABLE MFHYRECEIVER-OUT-HTTP -->
<route id="P4:MFRcvr_DBtoREST">
  <from uri="sqlComponent:{{sql.clearingQueryMF1}}" />
  <setProperty propertyName="rowid">
    <simple>${body['ROW_ID']}</simple>
  </setProperty>
  <log message="${body}" />
  <to uri="freemarker:templateMF2.ftl" />
  <setHeader headerName="Content-Type">
    <constant>application/json</constant>
  </setHeader>
  <log message="${body}" />
  <to uri="http:// 10.10.10.10:1010/customer-service/transaction" />
  <convertBodyTo type="String" />
  <choice>
    <when>
      <simple>${body} contains 'ok'</simple>
      <log message="${body}" />
      <to
uri="sqlComponent:{{sql.deleteRecord_Sender_DBtoREST_Update}}" />
      <to uri="sqlComponent:{{sql.commitSql}}" />
    </when>
  </choice>
</route>
```

Database record is picked up from DLTB_FUNDPRICE_OFBA table. Same record is deleted from the table after processing.

MF_SQLConfig.properties

```
sql.clearingQueryMF1 = SELECT ROWID AS  
ROW_ID, SMART_CONTRACT_ID, SOURCEENTITY, NVL (DESTINATIONENTITY, ' ' )  
DESTINATIONENTITY, NVL (STATUS, ' ' ) STATUS, TO_CHAR (EFFECTIVEDATE,  
'DD-MON-YY') AS EFFECTIVEDATE, NVL (FUNDID, ' ' )  
FUNDID, NVL (DECLAREDNAV, 0) DECLAREDNAV, NVL (MESSAGEDIRECTION, ' ' )  
MESSAGEDIRECTION FROM DLTB_FUNDPRICE_OFBA WHERE TYPE_OF_TRIGGER  
='UPDATE' AND ROWNUM <=1 AND STATUS IN ('2','3','4','5') AND  
MessageDirection='O' ORDER BY SERIAL_NO
```

1.2.6 **P2: MFSENDER-IN-TABLE-UPDATE MFSENDER-OUT-HTTP-UPDATE**

Any update in existing record in sender side database is picked up by below route. This data is sent to parse method of MFParser.java where Row ID is set for later use. The HashMap result of query is then sent to a Freemarker Template which produces the update request for Hyperledger. The template content is appended with a Header and then sent to Hyperledger (URL - <http://localhost:8080/transaction>). The string result of Hyperledger is checked for successful result. Once that condition is passed, Row ID which was set earlier is used to delete the record from table so that route is executed only once. Changes are committed to database.

CamelContext.xml

```
<!-- P2: MFSENDER-IN-TABLE-UPDATE MFSENDER-OUT-HTTP-UPDATE -->
<route id="P2:MFSENDER_DBtoRESTUpdate">
  <from
    uri="sqlComponent:{{sql.clearingQuery_Sender_DBToREST_Update}}" />
  <setProperty propertyName="rowid">
    <simple>${body['ROW_ID']}
```

MF_SQLConfig.properties

Database record is picked up from DLTB_FUNDPRICE_OFBA table. Same record is deleted from the table after processing.

```
sql.clearingQuery_Sender_DBToREST_Update=SELECT ROWID AS  
ROW_ID,SMART_CONTRACT_ID,SOURCEENTITY,NVL(DESTINATIONENTITY, ' ')  
DESTINATIONENTITY,NVL(STATUS, ' ') STATUS,TO_CHAR(EFFECTIVEDATE,  
'DD-MON-YY') AS EFFECTIVEDATE,NVL(FUNDID, ' ')  
FUNDID,NVL(DECLAREDNAV , 0) DECLAREDNAV,NVL(MESSAGEIDIRECTION, ' ')  
MESSAGEIDIRECTION FROM DLTB_FUNDPRICE_OFBA WHERE TYPE_OF_TRIGGER  
='UPDATE' AND ROWNUM <=1 AND MessageDirection='I' ORDER BY  
SERIAL_NO ASC  
  
sql.deleteRecord_Sender_DBToREST_Update=delete from  
DLTB_FUNDPRICE_OFBA where ROWID=CHARTOROWID(:#{property.rowid})
```

1.2.7 **P1: MFRECEIVER-IN-HTTP-UPDATE MFRECEIVER-OUT-TABLE-UPDATE**

This route notifies the receiver about successful posting of a transaction from receiver to Hyperledger. Rest Endpoint related configurations are required to access result of that web service in route. Updated record details sent through web service are sent to transform method of MFTransformer.java. This method extracts data from HashMap input and constructs a new HashMap containing required fields only. Receiver side database is then updated using SQL query and changes are committed. A successful response message is then sent back after converting it to HashMap from String datatype.

CamelContext.xml

```
<!-- P1: MFRECEIVER-IN-HTTP-UPDATE MFRECEIVER-OUT-TABLE-UPDATE -->
<route id="P1:MFRcvr_RESTtoDBUpdate">
    <from uri="direct:MFNotifyReceiver" />
    <transform>
        <method ref="transformerMF" method="transform2" />
    </transform>
    <log message="P1 is called" />
    <log message="{body}" />
    <to
uri="sqlComponent:{{sql.updateQuery_Recvr_RESTtoDB_Update}}" />
    <to uri="sqlComponent:{{sql.commitSql}}" />
    <setBody><simple>{"result":"ok"}</simple></setBody>
    <transform>
        <method ref="transformerMF" method="stringToMap" />
    </transform>
</route>
```

MF_SQLConfig.properties

Above query updates DLTB_FUNDPRICE table on receiver side.

```
sql.updateQuery_Recvr_RESTtoDB_Update=UPDATE DLTB_FUNDPRICE SET
SMART_CONTRACT_ID = :#SmartContractID,STATUS=
trim(:#Status),DECLAREDNAV= :#DECALREDNAV WHERE FUNDID=:#FUNDID
AND TO_CHAR(EFFECTIVEDATE,'DD-MON-YY')=:#EFFECTIVEDATE AND
MessageDirection = 'O'
```

1.3 APIs

1.3.1 Posting new transaction

1.3.1.1 Sender's end

Sender adds a new transaction in hyperledger. First an entry is added to the table "DLTB_FUNDPRICE" and "DLTB_FUNDPRICE_OFBA" and this record is processed by the routes which are mentioned above. From the sender's end a request is sent to hyperledger in following format:

Sample Request from sender's adapter to hyperledger

```
{
    "chainCodeName": "OracleTrnsctnChainCode",
```

```

        "functionName": "addTransaction",
        "arguments": [{"\\"DLTB_FUNDPRICE_PK\\": [{"\\"AGBS\\",\\"02-JAN-15\\",\\"AMC\\",\\"DIST1\\"}]}], [{"\\"DLTB_FUNDPRICE\\": [{"\\"11\\",\\"1\\",\\"I\\"}]}], [{"\\"FUNDPRICEHDRTBL\\": [{"\\"A\\",\\"11\\",\\"11\\",\\"0\\",\\"0\\",\\"0\\",\\"0\\",\\"1\\",\\"0\\",\\"100\\",\\"SWATHI1\\",\\"02-JAN-15\\",\\"SWATHI2\\",\\"02-JAN-15\\",\\"0\\",\\"SWATHI1\\",\\"02-JAN-15\\",\\"1\\",\\"O\\",\\"Y\\",\\"0\\",\\"0\\",\\"0\\",\\"\\",\\"\\"}]}], [{"\\"FUNDPRICEDETAILTBL\\": [{"\\"02\\",\\"11\\",\\"0\\",\\"100\\",\\"A\\"}]}]}]
    }

```

If transaction is posted successfully then response from hyperledger is received in following format:

Sample Response from hyperledger to Sender's adapter

```

{
  "payload": {
    "SmartContractID":
    "13347d7276ccfb220efa52ffb5ed78b26fa23c9f0698ecfc185d3a84dec313dc"
  },
  "status": 200
  "result": "ok"
}

```

Smart contract ID is updated in "DLTB_FUNDPRICE" table and the same record is deleted from "DLTB_FUNDPRICE_OFBA" table after processing.

1.3.1.2 Receiver's end

Receiver receives the following message from hyperledger which is processed and an entry is made to "DLTB_FUNDPRICE" table on the receiver's end.

Sample Request from hyperledger to receiver's adapter

```
{message={DLTB_FUNDPRICE=[{DECLAREDNAV=9.246, MessageDirection=I,
Status=1}], DLTB_FUNDPRICE_PK=[{DestinationEntity=DIST1,
EFFECTIVEDATE=05-JAN-15, FUNDID=AGEF, SourceEntity=AMC}],
FUNDPRICECOMPONENTTBL=[],
FUNDPRICEDETAILTBL=[{ALLOCATIONPERVSREGCAPITAL=100, AUTH_STAT=A,
BASEPRICECONSTANT=0, TRANSACTIONBASEPRICE=9.246,
TRANSACTIONTYPE=02}, {ALLOCATIONPERVSREGCAPITAL=100, AUTH_STAT=A,
BASEPRICECONSTANT=0, TRANSACTIONBASEPRICE=9.246,
TRANSACTIONTYPE=03}, {ALLOCATIONPERVSREGCAPITAL=100, AUTH_STAT=A,
BASEPRICECONSTANT=0, TRANSACTIONBASEPRICE=9.246,
TRANSACTIONTYPE=04}, {ALLOCATIONPERVSREGCAPITAL=100, AUTH_STAT=A,
BASEPRICECONSTANT=0, TRANSACTIONBASEPRICE=9.246,
TRANSACTIONTYPE=05}, {ALLOCATIONPERVSREGCAPITAL=100, AUTH_STAT=A,
BASEPRICECONSTANT=0, TRANSACTIONBASEPRICE=9.246,
TRANSACTIONTYPE=06}, {ALLOCATIONPERVSREGCAPITAL=100, AUTH_STAT=A,
BASEPRICECONSTANT=0, TRANSACTIONBASEPRICE=9.246,
TRANSACTIONTYPE=07}, {ALLOCATIONPERVSREGCAPITAL=100, AUTH_STAT=A,
BASEPRICECONSTANT=0, TRANSACTIONBASEPRICE=9.246,
TRANSACTIONTYPE=54}], FUNDPRICEHDRTBL=[{AMENDTXNFLAG=0,
AUTH_STAT=A, CEILINGPRICE=100, CHECKER_DT_STAMP=05-JAN-15,
CHECKER_ID=SWATHI2, DECLAREDNAV=9.246, EUROEQUIVALENTOFNAV=0,
FIOUTSTANDINGUNITS=0, FLOORPRICE=1, HURDLERATE=0,
HWMPLUSHURDLE=0, LASTMODIFIEDDATE=05-JAN-15,
LASTMODIFIEDUSERID=SWATHI2, LATESTPRICE=1, MAKER_DT_STAMP=05-JAN-
15, MAKER_ID=SWATHI2, MOD_NO=1, NOOFUNITHOLDERS=0, ONCE_AUTH=Y,
OUTSTANDINGUNITS=0, REALNAVPERUNIT=9.246, RECORD_STAT=O,
SWINGINGPRICE=, SWINGPRICEBASIS=, TOTALNETASSET=0}],
privateData={}, functionName=addTransaction,
SmartContractID=9519f81fd7c006208b78e9ae97a819ec6600c0fc6c94ab5e2
e9519030ba3f32b}}
```

Following is the response sent from the receiver's adapter to hyperledger:

Response from receiver's adapter to hyperledger

```
{"result": "ok"}
```

At this point add transaction flow gets completed.

1.3.2 Update transaction

1.3.2.1 Receiver's end

When receiver updates few entries in a record which exists in "DLTB_FUNDPRICE" table. First an entry is added to the table "DLTB_FUNDPRICE_OFBA" and this record is processed by the routes which are mentioned above. From the receiver's end a request is sent to hyperledger in following format:

Sample Request from receiver's adapter to hyperledger

```
{
  "chainCodeName": "OracleTrnsctnChainCode",
  "functionName": "mainUpdate",

  "arguments": ["bee64c2c9660d1462ff86d863ab5d33ade552bda16fe8179ae322774ce5308d5",
    "{ \"DLTB_FUNDPRICE\": [ [ \"9.246\", \"2\", \"O\" ] ] }" ]
}
```

If transaction is posted successfully then response from hyperledger is received in following format:

Response from hyperledger to receiver's adapter

```
{"result": "ok"}
```

1.3.2.2 Sender's end

Sender receives the following message from hyperledger which is processed and entry is updated in "DLTB_FUNDPRICE" table.

Sample Response from hyperledger to the sender's adapter

```
{message={DLTB_FUNDPRICE=[{DECLAREDNAV=9.246, MessageDirection=I,
Status=1}], DLTB_FUNDPRICE_PK=[{DestinationEntity=DIST1,
EFFECTIVEDATE=05-JAN-15, FUNDID=AGEF, SourceEntity=AMC}],
FUNDPRICECOMPONENTTBL=[],
FUNDPRICEDETAILTBL=[{ALLOCATIONPERVSREGCAPITAL=100, AUTH_STAT=A,
BASEPRICECONSTANT=0, TRANSACTIONBASEPRICE=9.246, TRANSACTIONTYPE=02},
{ALLOCATIONPERVSREGCAPITAL=100, AUTH_STAT=A, BASEPRICECONSTANT=0,
TRANSACTIONBASEPRICE=9.246, TRANSACTIONTYPE=03},
{ALLOCATIONPERVSREGCAPITAL=100, AUTH_STAT=A, BASEPRICECONSTANT=0,
TRANSACTIONBASEPRICE=9.246, TRANSACTIONTYPE=04},
{ALLOCATIONPERVSREGCAPITAL=100, AUTH_STAT=A, BASEPRICECONSTANT=0,
TRANSACTIONBASEPRICE=9.246, TRANSACTIONTYPE=05},
{ALLOCATIONPERVSREGCAPITAL=100, AUTH_STAT=A, BASEPRICECONSTANT=0,
TRANSACTIONBASEPRICE=9.246, TRANSACTIONTYPE=06},
{ALLOCATIONPERVSREGCAPITAL=100, AUTH_STAT=A, BASEPRICECONSTANT=0,
TRANSACTIONBASEPRICE=9.246, TRANSACTIONTYPE=07},
{ALLOCATIONPERVSREGCAPITAL=100, AUTH_STAT=A, BASEPRICECONSTANT=0,
TRANSACTIONBASEPRICE=9.246, TRANSACTIONTYPE=54}],
FUNDPRICEHDRTBL=[{AMENDTXNFLAG=0, AUTH_STAT=A, CEILINGPRICE=100,
CHECKER_DT_STAMP=05-JAN-15, CHECKER_ID=SWATHI2, DECLAREDNAV=9.246,
EUROEQUIVALENTOFNAV=0, FIOUTSTANDINGUNITS=0, FLOORPRICE=1,
HURDLERATE=0, HWMPLUSHURDLE=0, LASTMODIFIEDDATE=05-JAN-15,
LASTMODIFIEDUSERID=SWATHI2, LATESTPRICE=1, MAKER_DT_STAMP=05-JAN-15,
MAKER_ID=SWATHI2, MOD_NO=1, NOOFUNITHOLDERS=0, ONCE_AUTH=Y,
OUTSTANDINGUNITS=0, REALNAVPERUNIT=9.246, RECORD_STAT=O,
SWINGINGPRICE=, SWINGPRICEBASIS=, TOTALNETASSET=0}], privateData={},
functionName=addTransaction,
SmartContractID=bee64c2c9660d1462ff86d863ab5d33ade552bda16fe8179ae32277
4ce5308d5}}
```

Following is the response sent from the sender's adapter to hyperledger:

Response from sender's adapter to hyperledger

```
{"result": "ok"}
```

At this point add transaction flow gets completed.

1.3.3 Fund and Entity Configuration

There are two different maintenance required.

1. AMC (Source)

An Entry is required in **DLTM_OFFUS_FPMaint** at the AMC side.

The Table should have a valid source entity, destination entity and fund ID.

Based on the above-maintained combination, the transaction will be picked.

1. SOURCE ENTITY – Bank ID given During Distributed Ledger property file
2. DESTINATION ENTITY – Bank ID given During Distributed Ledger property file
3. FUNDID – Fund ID for which Smart contract transaction needs to generate

Note: Distributed Ledger configuration Not in Scope

2. DISTRIBUTOR (Destination)

An Entry is required in **DLTM_ONUS_FPMaint** at the DISTRIBUTOR side.

The above table should have an entry for the transaction to be processed.

- FUND ID – Same as the AMC Fund ID
- DLUSERID – FCIS application User ID. This User will go as maker id for the fund price generated at the Distributor side
- MODULEID- Valid module for the transaction



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