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Informatica® B2B Data Transformation
10.1

Agent for IBM Integration Bus User Guide

Informatica B2B Data Transformation Agent for IBM Integration Bus User Guide
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Preface

The *Data Transformation Agent for IBM Integration Bus User Guide* explains how to install, configure, and use the Data Transformation Agent for the IBM Integration Bus. This guide is written for developers who want to transform structured or unstructured data in the IBM Integration Bus environment. This guide assumes the reader is familiar with IBM Integration Bus and Data Transformation.

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CHAPTER 1

Introduction to Data Transformation Agent for IBM Integration Bus

This chapter includes the following topics:

- Overview, 8
- Installation, 8

Overview

Use Data Transformation Agent for IBM Integration Bus to run a Data Transformation service in a IBM Integration Bus message flow. The Data Transformation service receives and processes messages from IBM Integration Bus. IBM Integration Bus moves the messages to output destinations.

Use Informatica Developer to configure and deploy a Data Transformation service. The IBM Integration Bus workbench contains a CM Transformer node that represents the Data Transformation service. The CM Transformer node can process BLOB messages and XML messages.

Installation

You can install Data Transformation Agent for IBM Integration Bus on Windows or Linux platforms.

Confirm that the Data Transformation license is installed, and configure Data Transformation to use the same JRE that IBM Integration Bus uses.

If Data Transformation is configured to run out of process, you must configure it to run in process. The default configuration is in process.

On Linux platforms, you must ensure that the required environment variables are set in the scripts that call Data Transformation Engine.

System Requirements

You can install the Data Transformation Agent for IBM Integration Bus on a platform that meets the following requirements:

- IBM Integration Bus 10.0
- A Windows or Linux platform that supports Data Transformation Engine and IBM Integration Bus.
- Microsoft Visual C++ 2008 SP1 Redistributable Package (x64), if you use a Windows platform. You can obtain the package at the following link:
  https://www.microsoft.com/en-us/download/details.aspx?id=2092

Installing the Agent for IBM Integration Bus on Windows

You can install the Agent for IBM Integration Bus on a Windows platform.

1. Verify that IBM Integration Bus is not running.
2. Unzip the installation ZIP file.

   The files appear in a `/bin` folder and an `/eclipse` folder.
3. From the `/bin` folder of the installation ZIP file, copy `CMNode.lil` to the following directory:

   ```
   <IIB_Installation_Directory>\<version>\server\bin
   ```

   The default IIB installation directory is `C:\Program Files\IBM\IIB`.
4. From the `/bin` folder of the installation ZIP file, copy `CMNodeMsg.dll` to the following directory:

   ```
   <DataTransformation_Installation_Directory>\DataTransformation\bin
   ```

   The default Data Transformation installation directory is `C:\Informatica\10.1\`.
5. Edit the `eventlog.reg` file. Change the value of *EventMessageFile* to the following value:

   ```
   <DataTransformation_Installation_Directory>\\DataTransformation\\bin\\CMNodeMsg.dll
   ```
6. Double-click `eventlog.reg`.
7. From the `/eclipse` folder of the installation ZIP file, copy the file `com.itemfield.nodegroup_1.0.0.jar` to the following directory:

   ```
   <IIB_Installation_Directory>\<version>\tools\plugins
   ```
8. Restart IBM Integration Bus.

Installing the Agent for IBM Integration Bus on Linux

You can install the Agent for IBM Integration Bus on a Linux platform.

▶ Deploy `libCMNode.lil` according to the following IBM guide:
http://www.ibm.com/support/knowledgecenter/SSMKHH_10.0.0/com.ibm.etools.mft.doc/as10004_.htm

CHAPTER 2

CM Transformer Node

This chapter includes the following topics:

- CM Transformer Node Overview, 10
- CM Transformer Node Terminals, 11
- Input Parameters, 12
- Multiple Outputs, 13
- Failure Handling, 15
- Troubleshooting With the Windows Event Log, 16
- Sample Message Flows, 17

CM Transformer Node Overview

The CM Transformer node runs a Data Transformation service.

Use Informatica Developer to configure and deploy a service. When you add a CM Transformer node to an IBM Integration Bus message flow, you must configure the input parameters. You can also direct the output and error messages to the local environment or to message queues.

The CM Transformer node defines a default Data Transformation service to run. The input message can contain an MQRFH2 header that defines a different Data Transformation service.

CM Transformer Node Terminals

The CM Transformer node graphically represents the terminals where it can connect to other nodes in a IBM Integration Bus message flow.

The following table describes the terminals on the CM Transformer node:

Terminal	Location	Description
In	Left	Corresponds to the main input of the Data Transformation service.
Failure	Upper Right	Corresponds to the error output of the Data Transformation service.
Out	Lower Right	Corresponds to the main output of the Data Transformation service.

You can add additional output terminals that correspond to the addtional output ports of the Data Transformation service.

CM Transformer Node Properties

The following table describes the properties of the CM Transformer node:

Tab	Field	Description
Description	Node Name	Defines the display name of the CM Transformer node.
General	Default Service	Defines the default Data Transformation service.
General	Output Message Domain	Sets the format of the output message. The **Output Message Domain** property has the following options: - XML. The format of the Data Transformation service output is XML. - BLOB. The format of the Data Transformation service output is any format.
General	Add CM Header	Adds an MQRFH2 header to the output message.
General	Failure Terminal Output	Defines the output of the failure terminal. The **Failure Terminal Output** property has the following options: - Original Message. The original input message. The error description appears in the local environment. - Error Description. The XML error message from Data Transformation Engine. **Note:** The failure terminal does not report Agent errors.
Options	Trace On	Enable tracing. Configure tracing only on the advice of Informatica Global Customer Support.

Configuring a CM Transformer Node

Set the properties and connect the terminals.

1. To add a CM Transformer node, select **Data Transformation** in the IBM Integration Bus toolbox, and then drag a CM Transformer node to the workspace.
2. Click the CM Transformer node.

The properties of the CM Transformer node appear in the **Properties** view.

3. Set the properties.
4. Connect each terminal by dragging a line from it to the input or output terminal of another node.

Input Message MQRFH2 Header

The optional MQRFH2 message header defines the Data Transformation service to run. You can add the header to a IBM Integration Bus message that did not originate in WebSphere MQ.

The <usr> element of the MQRFH2 header must have the following structure:

```
<usr>
  <Itemfield_0DBC3E75-4B06-487a-8621-1B11D9495C1E>
    <srvin>[ServiceName]</srvin>
  </Itemfield_0DBC3E75-4B06-487a-8621-1B11D9495C1E>
</usr>
```

If you do not define a Data Transformation service in the MQRFH2 message header, the CM Transformer node runs the default Data Transformation service defined for the node.

Output Message MQRFH2 Header

The optional MQRFH2 message header defines the Data Transformation service to run. You can add the header to an output message that is routed to another CM Transformer node.

The <usr> element of the MQRFH2 header has the following structure:

```
<usr>
  <Itemfield_0DBC3E75-4B06-487a-8621-1B11D9495C1E>
    <srvout>[ServiceName]</srvout>
  </Itemfield_0DBC3E75-4B06-487a-8621-1B11D9495C1E>
</usr>
```

Input Parameters

Input parameters are values that control the behavior of the Data Transformation service.

When a Data Transformation service defines an input parameter, you must configure the IBM Integration Bus flow to define the same parameter. The name of the input parameter must match the name of the variable defined in the Data Transformation service.

Note: The names of input parameters are case sensitive.

Input parameters for the Data Transformation service are transferred through the local environment. Input parameters have a character data type. You can access each parameter through the *Variables.DT.ServiceParameters.[ParamName]* variable. You can set the value of a parameter with a Compute node.

Setting Input Parameters With a Compute Node

You can configure a Compute node to set the values of input parameters.

1. Add a Compute node between the input queue node and the CM Transformer node.
2. Right-click the Compute node.

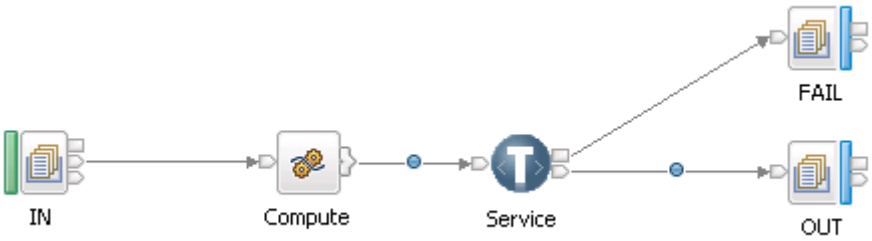
The ESQL for the node appears in the editor area.

3. Add the following ESQL code to the definition of the Main() function:

```
CREATE FUNCTION Main() RETURNS BOOLEAN
BEGIN
    CALL CopyEntireMessage()
    set OutputLocalEnvironment.Variables.DT.ServiceParameters.[Param1Name] =
'[value]'
    set OutputLocalEnvironment.Variables.DT.ServiceParameters.[Param2Name] =
'[value]'
    set OutputLocalEnvironment.Variables.DT.ServiceParameters.[Param3Name] =
'[value]'
    set OutputLocalEnvironment.Variables.DT.ServiceParameters.[Param4Name] =
'[value]'
    RETURN TRUE;
END;
```

4. Save the modified ESQL code.

The following figure shows the configuration for input parameters:



Note: In this example, if the transformation succeeds, output appears in a message queue, and if output fails, the original message appears in a failure queue and the error message appears in the local environment.

The nodes have the following connections:

- The output terminal of the input message queue node connects to the input terminal of the Compute node.
- The output terminal of the Compute node connects to the input terminal of the CM Transformer node.
- The failure terminal of the CM Transformer node connects to the input terminal of the failure queue node.
- The standard output terminal of the CM Transformer node connects to the input terminal of the OUT message queue node.

Multiple Outputs

A Data Transformation service can define output to multiple documents. For each output after the standard output, the script for the service defines an additional output port.

The default CM Transformer configuration directs standard output to the Out terminal, and all other outputs appear in the local environment. To direct output from an additional output port to an output terminal, add an output terminal to the CM Transformer node.

Note: The output terminal must have the same name as an additional output port in the Data Transformation service. The name is case sensitive.

Additional outputs have a BLOB data type. You can access additional output ports through the *Variables.DT.OutputPorts.[PortName]* environment variable.

Adding an Output Terminal to a CM Transformer Node

The CM Transformer node routes the output of each additional output port to a message queue.

1. Right-click the CM Transformer node, and then select **Add Output Terminal**.

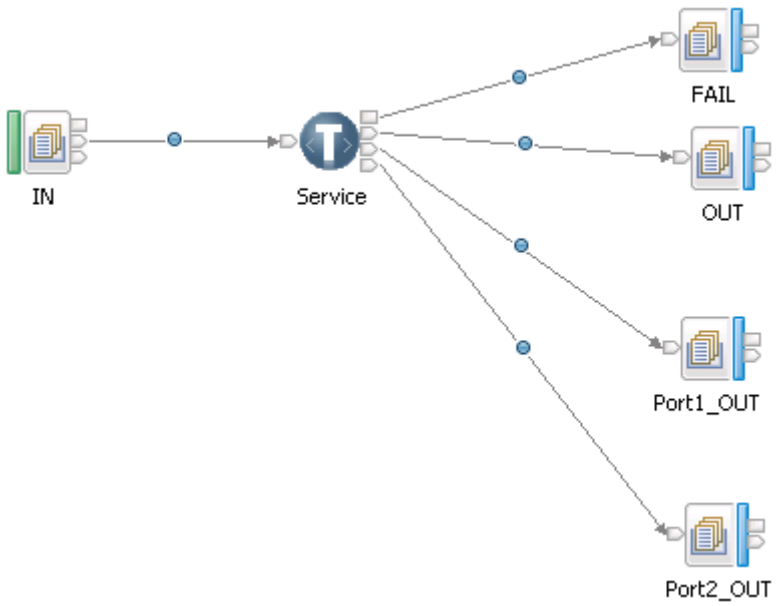
   The **Add Output Terminal** dialog box appears.

2. Enter the name of the output terminal, and then click **OK**.

   The output terminal appears on the CM Transformer node.

3. Drag a connecting line from the output terminal of the CM Transformer node to the input terminal of a message queue.

The following figure shows a CM Transformer node with two additional output terminals:



The nodes have the following connections:

- The output terminal of the input message queue node connects to the input terminal of the CM Transformer node.
- The failure terminal of the CM Transformer node connects to the input terminal of the failure queue node.
- The standard output terminal of the CM Transformer node connects to the input terminal of the OUT message queue node.
- The first additional output terminal of the CM Transformer node connects to the input terminal of the Port1_OUT message queue node.
- The second additional output terminal of the CM Transformer node connects to the input terminal of the Port2_OUT message queue node.

Failure Handling

When a CM Transformer node fails, the original message appears in the failure output queue and the XML error description from Data Transformation Engine appears as an XML tree in the local environment in the *Variables.DT.Error* variable.

You can route the error description and the original message to message queues.

Routing Failure Output to the Local Environment

When the transformation succeeds, output appears in a message queue. When the transformation fails, the original message appears in the failure queue and the error message appears in the local environment. This is the default configuration.

1. Add a CM Transformer node to the IBM Integration Bus message flow.
2. Connect the output terminal of the input message queue node to the input terminal of the CM Transformer node.
3. Connect the output terminal of the CM Transformer node to the input terminal of the output message queue node.

   Output appears in the message queue.
4. Connect the failure terminal of the CM Transformer node to the input terminal of the failure queue node.

   The original message appears in the failure queue and the error message appears in the local environment.

Routing Failure Output and Original Message to Output Queues

In the event of a failure of the CM Transformer node, the original message appears in an output message queue and the XML error description from Data Transformation Engine appears in another output message queue.

1. Add a **Compute** node between the failure terminal of the CM Transformer node input terminal of the failure queue node.
2. Connect the output terminal of the CM Transformer node to the input terminal of an output message queue node.
3. Right-click the **Compute** node.

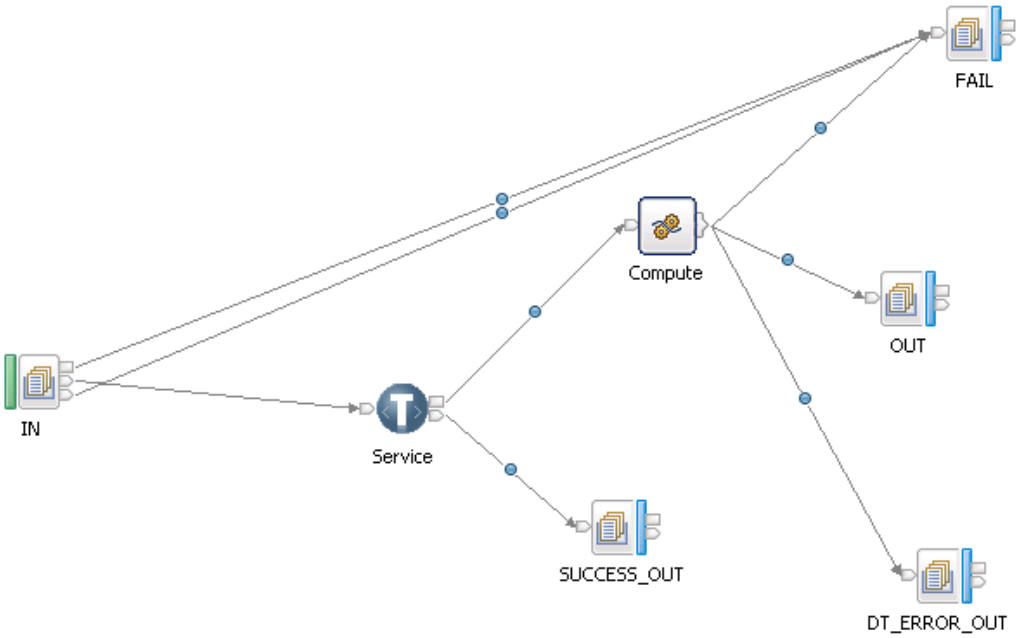
   The ESQL for the node appears in an editor in the editor area.
4. Add the following ESQL code to the definition of the Main() function:

```
CREATE FUNCTION Main() RETURNS BOOLEAN
BEGIN
    CALL CopyMessageHeaders();
    SET OutputRoot.XML = InputLocalEnvironment.Variables.DT.Error.XML;
    PROPAGATE TO terminal '[Queue1Name]';
    CALL CopyEntireMessage()
    RETURN TRUE;
END;
```

5. Save the modified ESQL code.
6. To connect the output of the Compute node to the input terminal of a message queue, click the output terminal group of the Compute node, and then select the message queue you want for the original message.
7. Repeat step 6 for the destination of the error description.

8. Save the modified ESQL code.

The following figure shows the connections:



The nodes have the following connections:

- The failure terminal and the catch terminal of the input message queue node connect to the input terminal of the failure queue node.
- The output terminal of the input message queue node connects to the input terminal of the CM Transformer node.
- The failure terminal of the CM Transformer node connects to the input terminal of the Compute node.
- The standard output terminal of the CM Transformer node connects to the input terminal of the SUCCESS_OUT message queue node.
- The FAIL output terminal of the Compute node connects to the input terminal of the failure queue node.
- The OUT output terminal of the Compute node connects to the input terminal of the OUT message queue node.
- The DT_ERROR_OUT output terminal of the Compute node connects to the input terminal of the DT_ERROR_OUT message queue node.

Troubleshooting With the Windows Event Log

On a Windows system, if the CM Transformer node encounters a processing error, it writes a message in the Windows application event log. You can open the log in the Windows Event Viewer.

The CM Transformer messages are labeled with the source identifier CMNode.

Sample Message Flows

The Data Transformation Agent for IBM Integration Bus package includes the following sample message flows:

- RunCMStatically. Runs the Data Transformation service defined as the default service in the CM Transformer node.
- RunCMDynamically. Runs the Data Transformation service defined in the input message.

You can find the sample message flows in the following directories of the installation ZIP file:

```
Samples7\CMA_WMB_Projects\RunCMStatically
Samples7\CMA_WMB_Projects\RunCMDynamically
```

Deploying the TestCME Service

The sample flows use a Data Transformation project called testCME. The project defines a parser that processes a text file and outputs a success message. You can find the project in the following directory:

```
<DataTransformation_Install_Dir>\setupTests\testCME
```

Before you can run the sample applications, you must deploy the testCME project as a service.

Location of Sample Input File

The input file for the sample flows is `hl7-obs.txt`. You can find the file in the following directory:

```
<DataTransformation_Install_Dir>\setupTests\testCME
```

RunCMStatically Sample Project

Runs the Data Transformation service defined as the default service in the CM Transformer node.

1. Open IBM Integration Bus.
2. Click **File** > **Import**.
3. Click **Import an Existing Project into Workspace**, and then click **Next**.
4. On the next page of the wizard, browse to the RunCMStatically sample flow.

   The sample is loaded into the workspace.
5. Create queues called RunCMStatically_IN for input, RunCMStatically_OUT for normal output, and RunCMStatically_FAIL for failure output.

   Right-click the Queues node, and then click **New** > **Local Queue**.
6. Create a bar file and deploy the message flow.
7. Place the input file, `hl7-obs.txt`, on the input queue, `RunCMStatically_IN`.

   The following output appears on the output queue:

   ```
   <Result>Test Succeeded</Result>
   ```

RunCMDynamically Sample Project

Runs the Data Transformation service defined in the input message.

The message flow adds an MQRFH2 header to the input message. The header specifies the name of the service.

1. Open IBM Integration Bus.
2. Click **File** > **Import**.
3. Click **Import an Existing Project into Workspace**, and then click **Next**.
4. On the next page of the wizard, browse to RunCMDynamically.
5. Create queues called RunCMDynamically_IN, RunCMDynamically_OUT, and RunCMDynamically_FAIL.
6. Create a bar file and deploy the message flow.
7. Place the input file, `hl7-obs.txt`, on the input queue, RunCMDynamically_IN.

   The following output appears on the output queue:

   ```
   <Result>Test Succeeded</Result>
   ```

Source Code

The following example code is the ESQL code of the Compute1 node. The code adds the MQRFH2 header to the input message. To view the code, right-click the Compute1 node and click **Open ESQL**.

The bold line of code sets the service name, TestCME.

You can edit the line and change the service name. You can insert logic that sets the service name according to the type of input message. After you edit the code, you must publish the flow again as a new execution group. You can then run the modified flow on an appropriate input.

```
CREATE COMPUTE MODULE TstSqlMf_Compute
  CREATE FUNCTION Main() RETURNS BOOLEAN
  BEGIN
    DECLARE RES BOOLEAN FALSE;
    DECLARE CM_SERVICE CHARACTER 'TestCME';
    CALL CopyEntireMessage();

    ---- Define the value of CM_SERVICE
    SET CM_SERVICE='TestCME';

    ---- Based on the message content.
    SET RES = SetService(CM_SERVICE);
    RETURN RES;
  END;

  CREATE PROCEDURE CopyEntireMessage() BEGIN
    SET OutputRoot = InputRoot;
  END;

  ---------------------------------------------------------------------------
  -- This function adds or modifies the MQRFH2 header, inserting the
  -- service name to parse the message.
  ---------------------------------------------------------------------------
  CREATE FUNCTION SetService (ServiceName CHARACTER)
    RETURNS BOOLEAN
  BEGIN
    DECLARE I INTEGER 1;
    DECLARE K INTEGER 0; -- MQRFH2 location
    DECLARE L INTEGER 0; -- MQMD location
    DECLARE M INTEGER 0; -- BLOB location
    -- Locate the MQRFH2, MQMD, BLOB locations
    DECLARE J INTEGER CARDINALITY(InputRoot.*[]);
    WHILE I <= J DO
      IF (FIELDNAME(OutputRoot.[I]) = 'MQRFH2') THEN
```

```
        SET K = I;
      ELSEIF (FIELDNAME(OutputRoot.[I]) = 'MQMD') THEN
        SET L = I;
      ELSEIF (FIELDNAME(OutputRoot.[I]) = 'BLOB') THEN
        SET M = I;
      END IF;
      SET I = I + 1;
    END WHILE;
    -- NO MQMD or NO BLOB
    IF (L = 0 OR M = 0) THEN
      RETURN FALSE;
    END IF;
    -- NO MQRFH2 found so add it after MQMD
    IF (K = 0) THEN
      CREATE NEXTSIBLING OF OutputRoot.MQMD DOMAIN 'MQRFH2';
      SET K = L+1;
      SET OutputRoot.[K].(MQRFH2.Field)Version = 2;
      SET OutputRoot.[K].(MQRFH2.Field)NameValueCCSID = 1208;
    END IF;
    -- Add the service header
    -- The following:
    -- "Invalid message field reference
    -- OutputRoot.[K].usr.
    -- Itemfield_0DBC3E75-4B06-487a-8621-1B11D9495C1E.srvin."
    -- Ignore
    SET OutputRoot.[K].usr.
      "Itemfield_0DBC3E75-4B06-487a-8621-1B11D9495C1E".srvin =
      ServiceName;
    RETURN TRUE;
  END;
END MODULE;
```

Routing Additional Output Through the Local Environment to an Output Queue

In this example, the CM Transformer node routes the output of each additional output port to the local environment and then to a message queue.

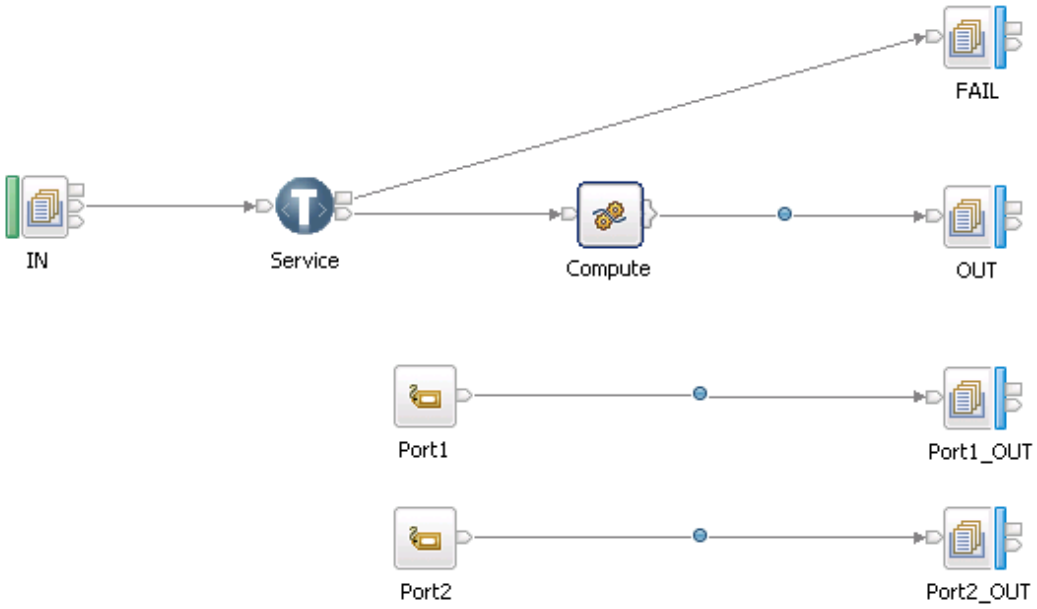
1. Add a **Compute** node between the input queue node and the CM Transformer node.
2. Add a **Label** node and connect it to an output message queue node.
3. Right-click the **Compute** node.

   The ESQL for the node appears in the editor area.
4. Add the following ESQL code to the definition of the Main() function:

```
CREATE FUNCTION Main() RETURNS BOOLEAN
BEGIN
    DECLARE [Port1NameShortcut] BLOB;
    CALL CopyMessageHeaders();
    SET [Port1NameShortcut] = InputLocalEnvironment.Variables.DT.OutputPorts.
[Port1Name];
    SET OutputRoot.BLOB.BLOB = [Port1NameShortcut];
    PROPAGATE TO LABEL '[Label1Name]';
    CALL CopyEntireMessage()
    RETURN TRUE;
END;
```

   Note: The name of the additional output port must match the name of the *DT.OutputPorts* variable. Port names are case sensitive.
5. Save the modified ESQL code.
6. Connect the output of the Compute node to the input of a message queue.
7. Save the modified ESQL code.

The following figure shows a CM Transformer node that routes the output of two additional output ports through the local environment to message queues:



The nodes have the following connections:

- The output terminal of the input message queue node connects to the input terminal of the CM Transformer node.
- The failure terminal of the CM Transformer node connects to the input terminal of the failure queue node.
- The standard output terminal of the CM Transformer node connects to the input terminal of a Compute node.
- The output terminal of the Compute node connects to the input terminal of the OUT message queue node. The ESQL code of the Compute node defines the connections to the Port1 Label node and the Port2 Label node.
- The output terminal of the Port1 Label node connects to the input terminal of the Port1_OUT message queue node.
- The output terminal of the Port2 Label node connects to the input terminal of the Port2_OUT message queue node.

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