IBM Integration Bus

Business Transaction Monitoring

Featuring:

- Flow Monitoring Events
- Configuring a BTD
- Viewing Business Transaction instances and events
- Securing access to BTM instances using file-based access controls

April 2016

Hands-on lab built at product
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1. Introduction

Business Transaction Monitoring (BTM) enables the monitoring of a transaction through various IIB flows deployed on an integration node, to track and report the lifecycle of a message as it is processed by IIB.

A business transaction is a unit of function that can be seen as a unit from a business point of view, like a purchase, a booking, an auction. It is not a transaction in technical sense, neither a one nor a two-phase transaction, but more like a till transaction. A business transaction instance is a specific order or booking, usually identified by a reference number or ID, such as “order123456″.

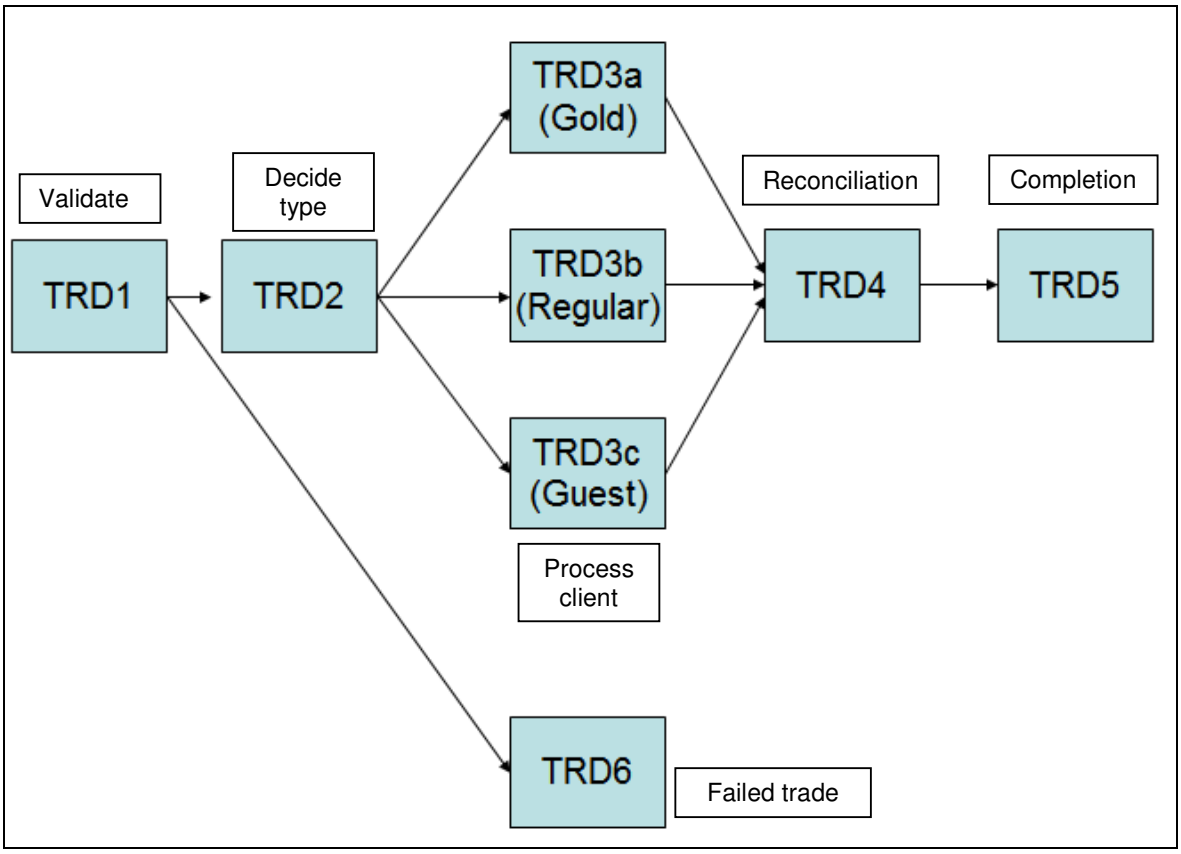
1.1 Scenario

This lab will create and use a business transaction based on the message flows contained within a single application. Schematically, the business transaction can be illustrated as shown below, and is based on a Trade Order scenario.

Each business transaction consists primarily of 5 message flows. The client type is either Gold, Regular or Guest. TRD2 examines the message, determines the client type, and routes the message accordingly. MQ queues are used to pass messages between each message flow.

If TRD1 detects a problem with the incoming message, it is routed directly to TRD6.

The message flows are very simple, and do not contain any significant logic. They do however contain a number of event monitoring points, so that each stage of the overall business transaction can be identified and tracked.



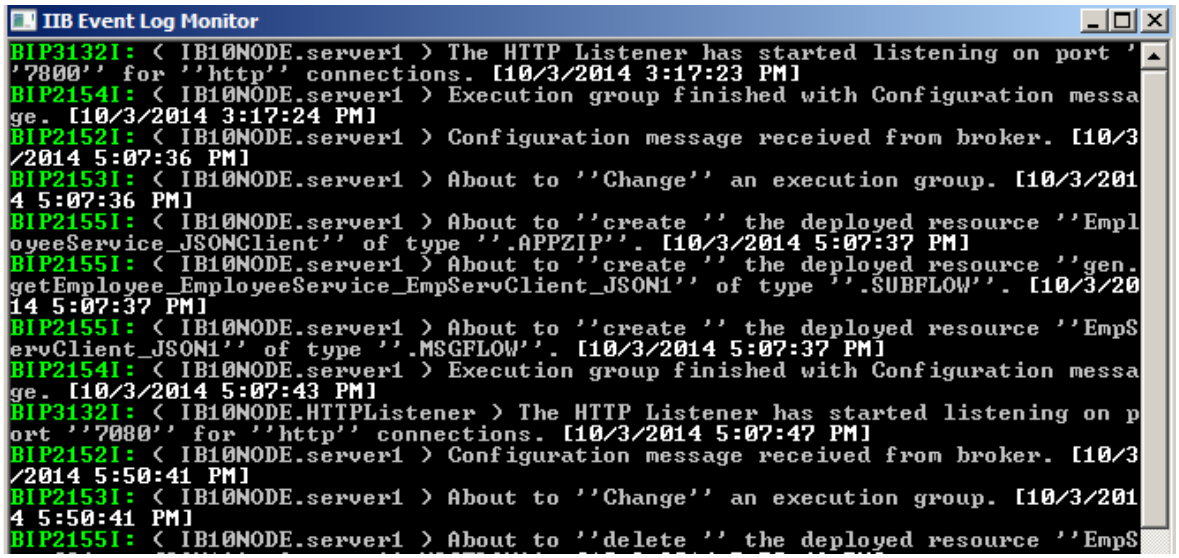
Provided by IBM BetaWorks

2. Prepare the IIB Node

2.1 Open the Windows Log Monitor for IIB

A useful tool for IIB development on Windows is the IIB Log Viewer. This tool continuously monitors the Windows Event Log, and all messages from the log are displayed immediately.

From the Start menu, click IIB Event Log Monitor. The Monitor will open; it is useful to have this always open in the background.



This tool is not shipped as part of the IIB product; please contact us directly if you would like a copy.

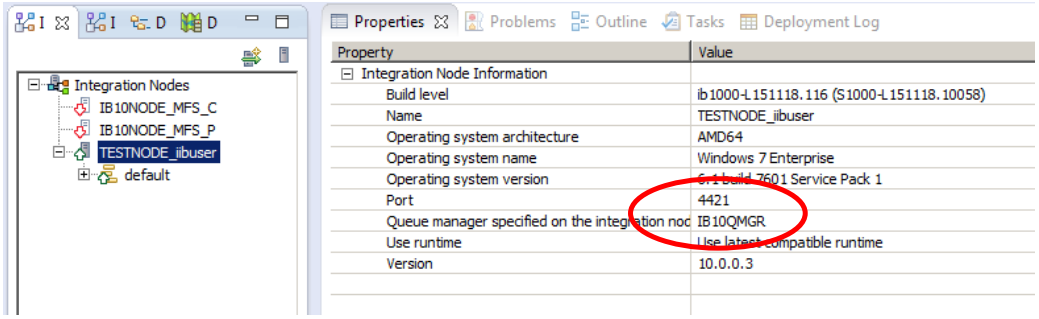
2.2 Configure the IIB node for Business Transaction Monitoring

2.2.1 Define an associated queue manager for the IIB node

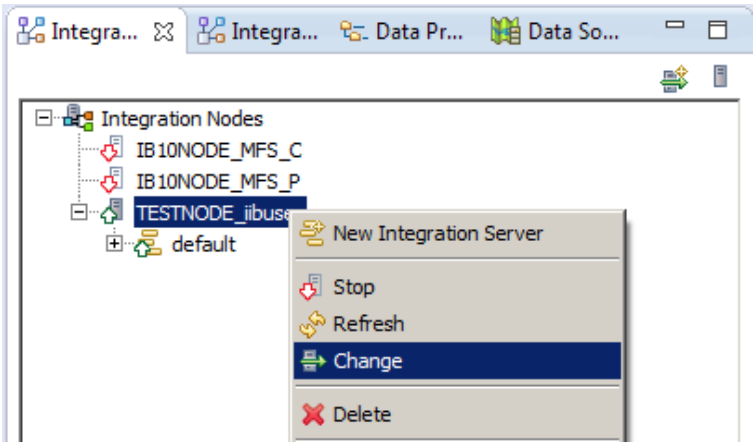
The Business Transaction Monitoring function requires the IIB node to have an associated queue manager. Make sure that the IIB node that you are using has a queue manager.

If you are using the TESTNODE_iibuser in the workshop environment, perform the following steps.

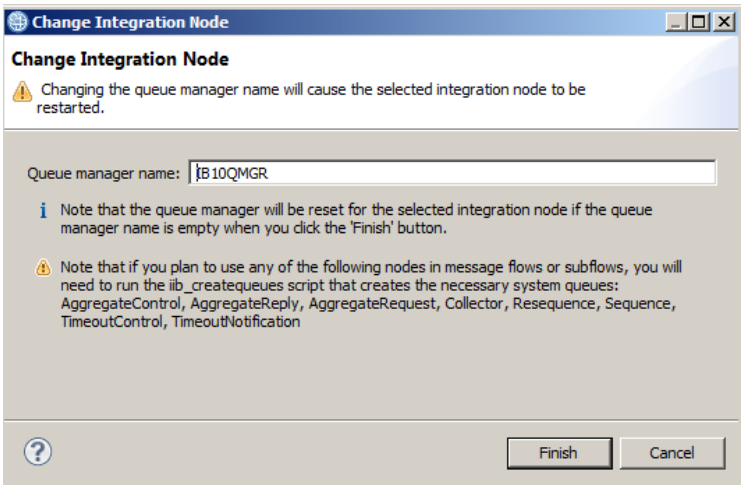
1. In the Toolkit IIB node view, in the Integration Nodes pane, highlight TESTNODE_iibuser. In the Properties of the node, you will see the property "Queue manager specified on the integration node". If this is already set to a queue manager (eg. IB10NODE), then you are all set.



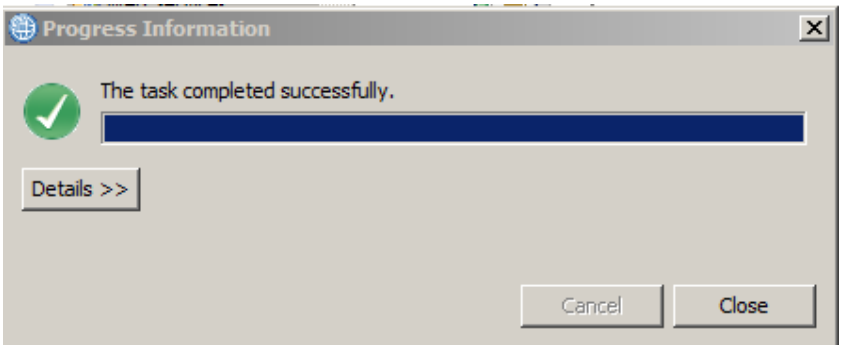
2. If a queue manager is not shown, right-click TESTNODE_iibuser and select Change.



3. Specify IB10QMGR as the queue manager name, and click Finish.



4. This will automatically stop and restart the IIB node. When complete, you will see the following message.



2.2.2 Configure the BTM components

Two further items of configuration need to be done to enable BTM.

1. Activate BTM for the IIB node.

   Execute the following command in an IIB Console:

   ```
   mqsichangeproperties TESTNODE_iibuser
         -o BrokerRegistry
         -n productFunctionality
         -v BUSINESS_TRANSACTION_MONITORING
   ```

2. Authorise access the BTM database, BTMDB, for the IIB node.

   Execute the following command:

   ```
   mqsisetdbparms TESTNODE_iibuser
         -n BTMDB
         -u iibadmin
         -p passw0rd
   ```

   Stop and restart the IIB node:

   ```
   mqsistop TESTNODE_iibuser

   mqsistart TESTNODE_iibuser
   ```

2.2.3 Define the MQ resources

Finally, the provided application requires several MQ queues, as well as some system queues for IIB. In a Windows DOS window (or IIB Console window), run the command:

```
c:\student10\BTM_Trades\commands\defineBTMqueues.cmd
```

3. Prepare the Application

3.1 Import the application

1. To avoid naming clashes with earlier labs, this lab will be developed using a new workspace.

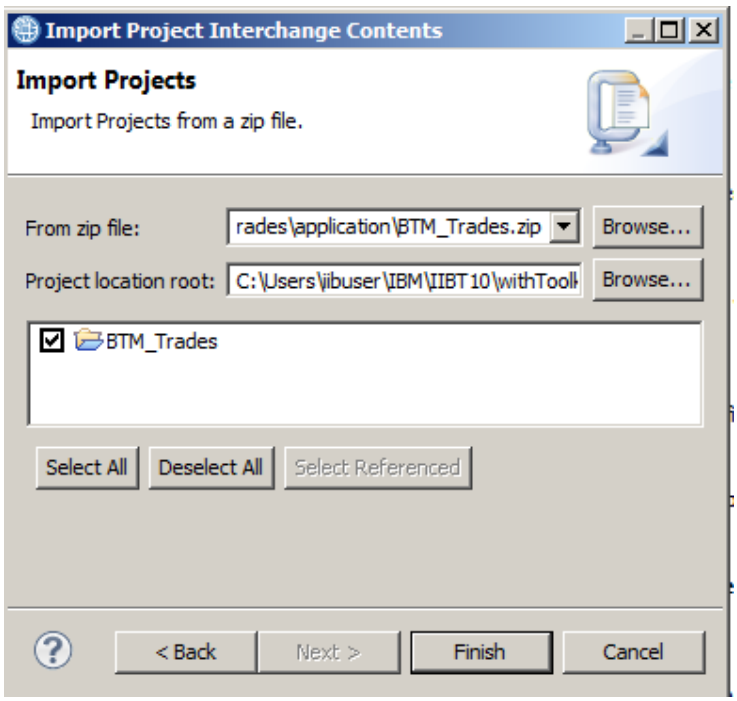
   If you already have a workspace open, click File, Switch Workspace. Give the new workspace the name

   `c:\users\iibuser\IBM\IIB 10\workspace_BTM`

2. Import the Project Interchange file

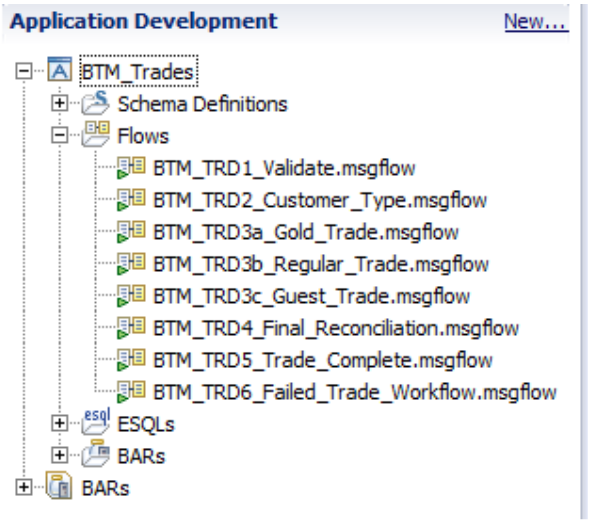
   `c:\student10 \ BTM_Trades \ application \ BTM_Trades.zip`

   This PI file contains one project. Ensure it is selected, and click Finish to import.



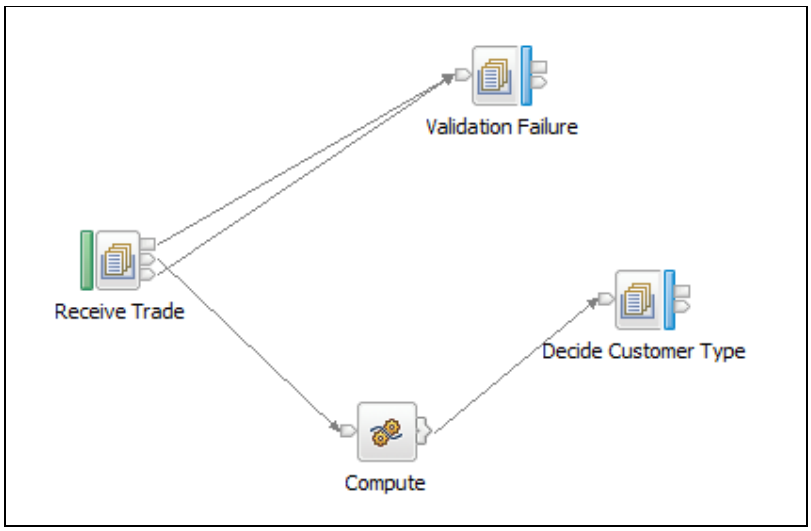
3.2 Investigate the application

1. The application contains a number of message flows. Each flow is quite simple, and is designed to pass the incoming message on to the next flow in the sequence of the business transaction.

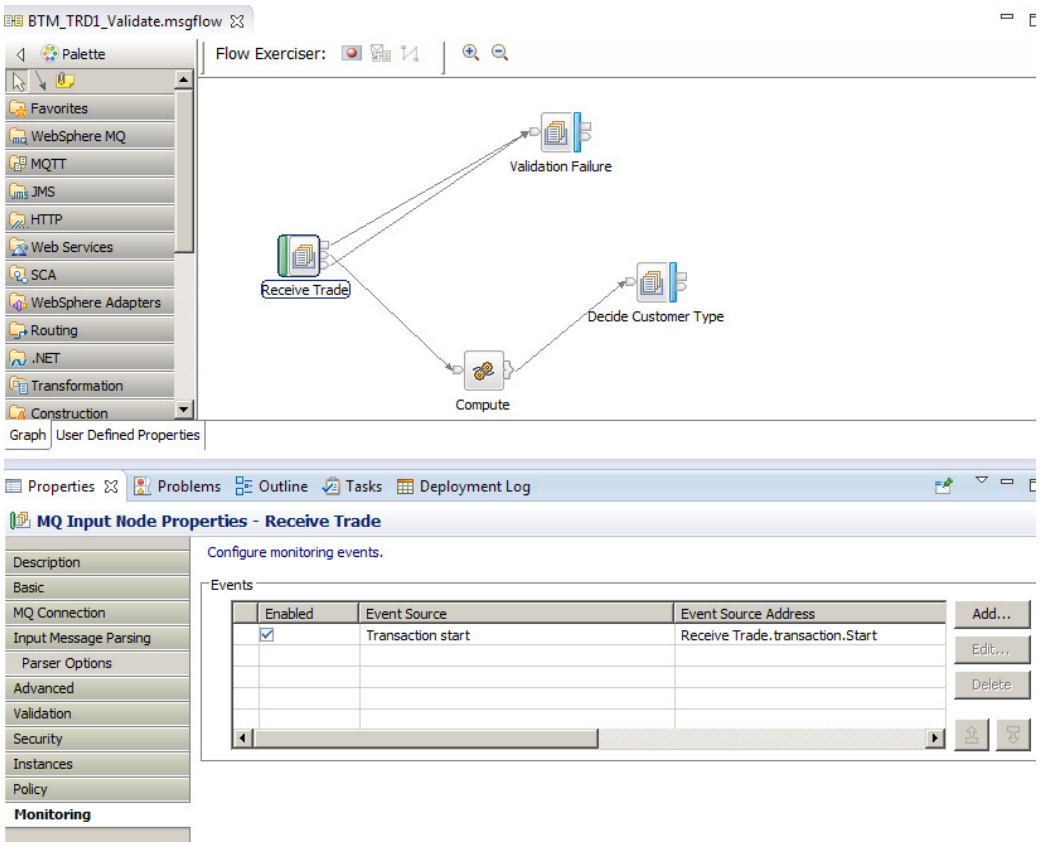


2. Most of the message flows have one or more monitoring events points associated with the nodes in the flow.

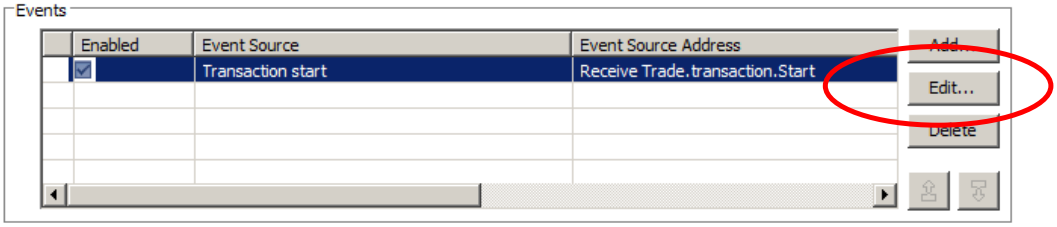
   Open the BTM_TRD1_Validate message flow.



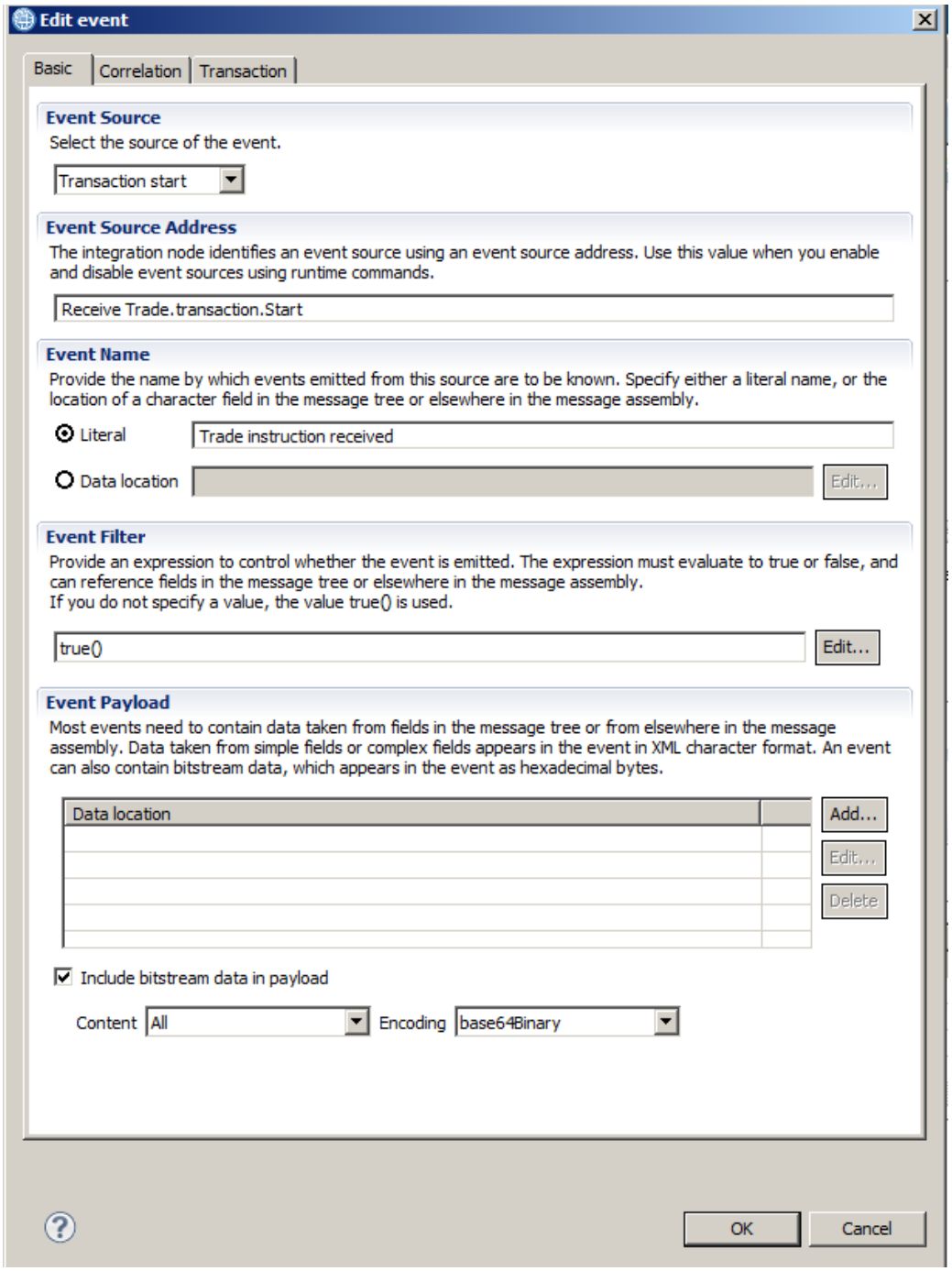
3. Highlight the "Receive Trade" node, and look at the Properties of the node. Select the Monitoring tab. You will see that a monitoring event point has been defined on this node.



4. Highlight the event, and then click the Edit button.



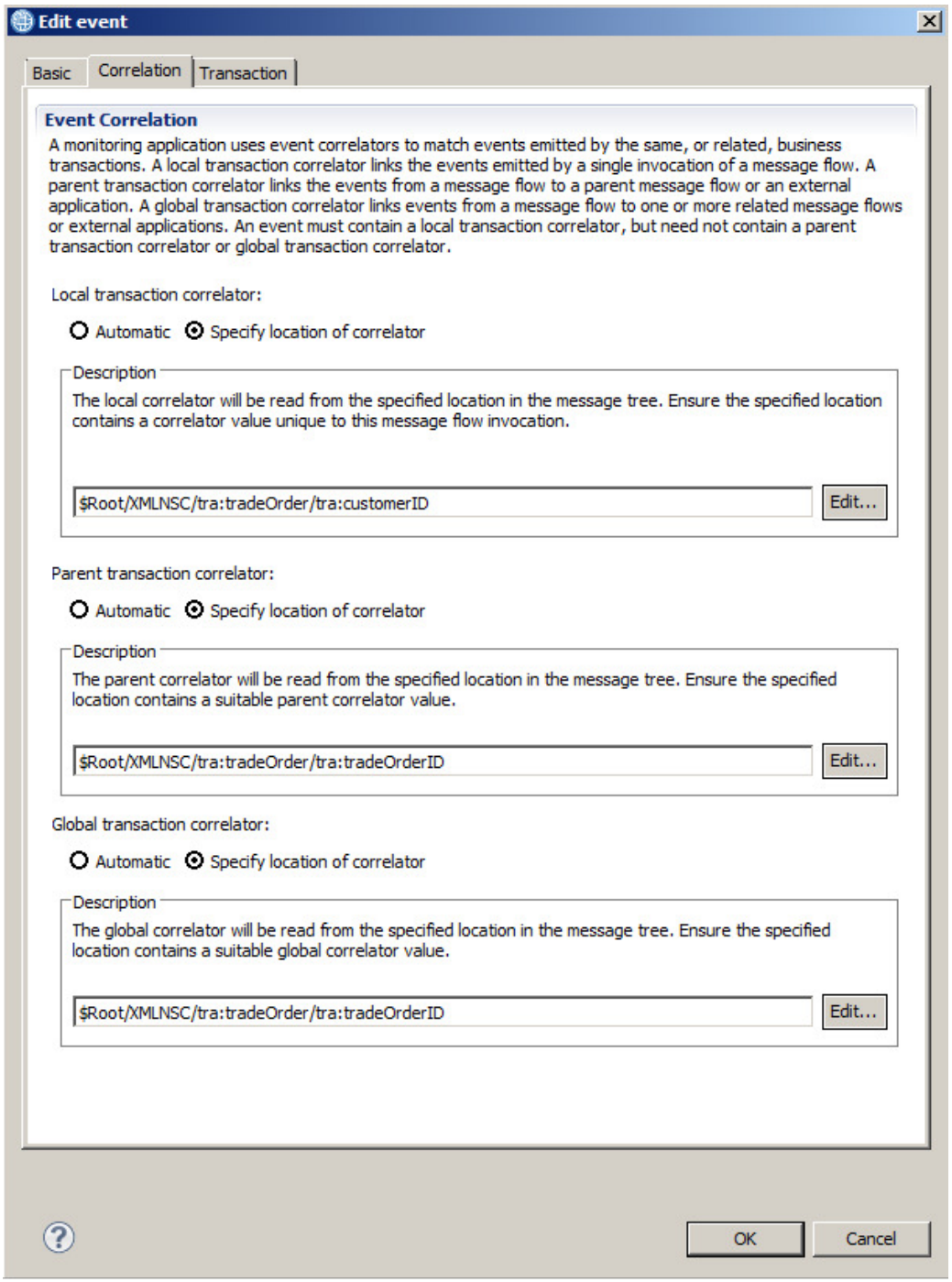
5. The first tab, Basic, will be displayed. This is where the basic details of the event are configured. This event has been set on the start of the transaction, and has had the name of the event set as a literal.



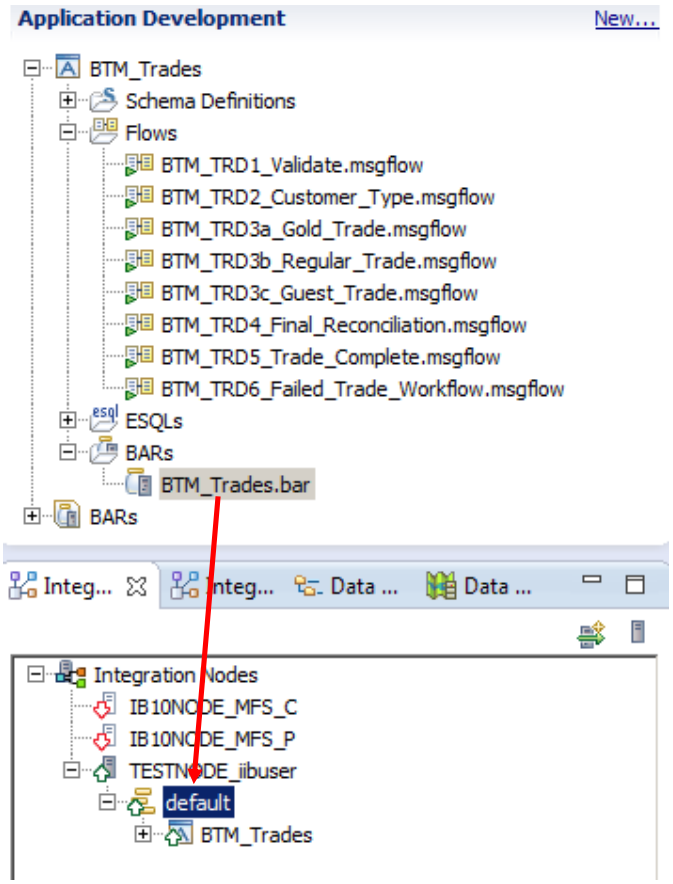
6. Click the Correlation tab. The most important correlator for Business Transaction Monitoring is the Global Transaction Correlator. This value enables the BTM component in IIB to connect the events from different message flows, in order to provide a status of the business transaction.

   In this case, the global transaction correlator has been set to an element contained within the message payload, the TradeOrderID element.

   You can examine other monitoring options. When complete, click Cancel.



7. Deploy the application to the IIB node (deploy the supplied barfile).

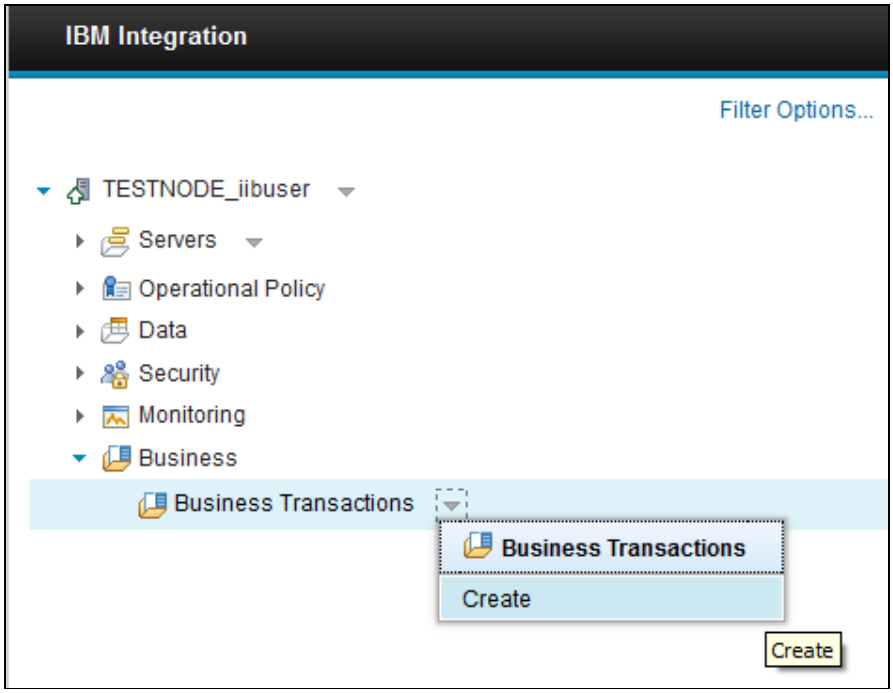


4. Configure the Business Transaction Definition

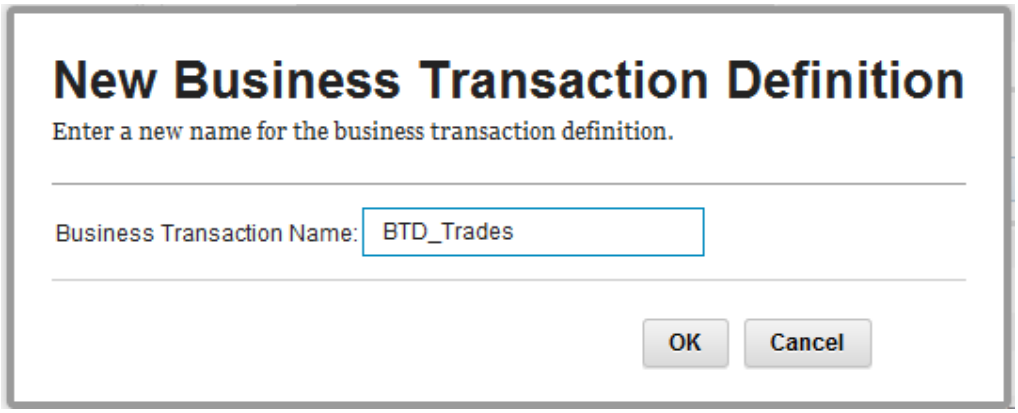
4.1 Define the BTD

1. Open a web browser and connect to the IIB node. (In the workshop VM, connect to betaworks-esb10 using the supplied shortcuts in Firefox. Depending on whether you have performed the Web Admin lab, you may need to use http(4414) or https(4421).

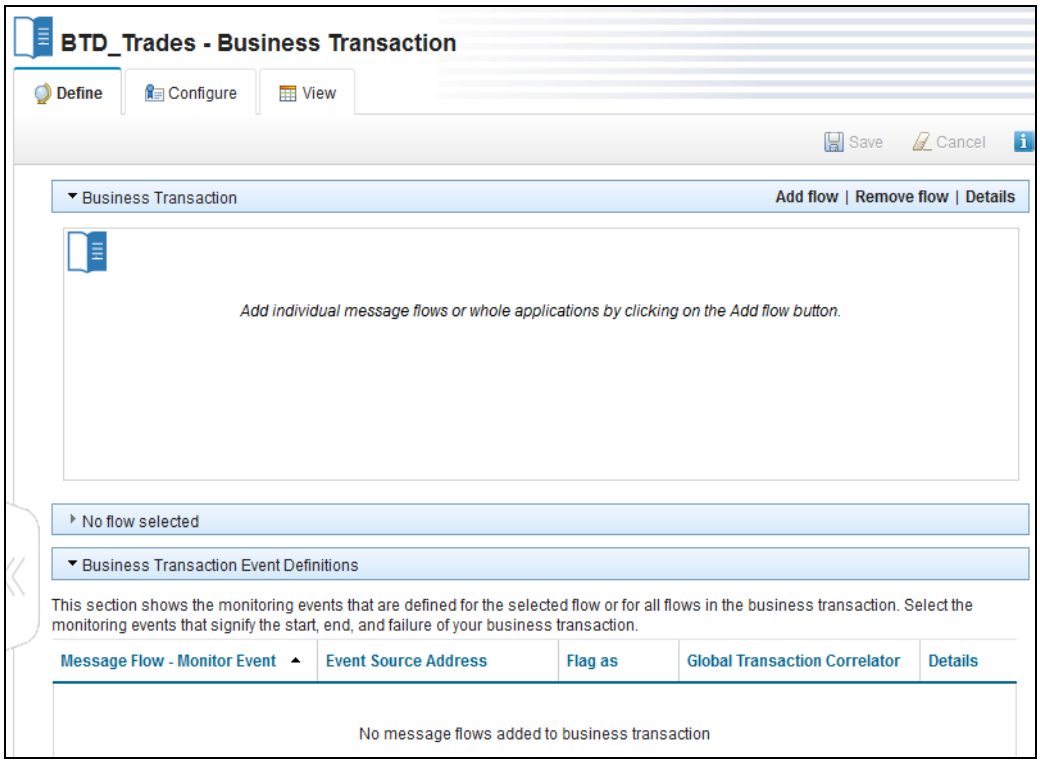
   Expand the Business folder, and click the context menu dropdown on the Business Transactions item. Click Create.



2. Provide a name, BTD_Trades, and click OK.



3. The BTD will be shown, but no message flows have been added yet. You will be on the Define tab.

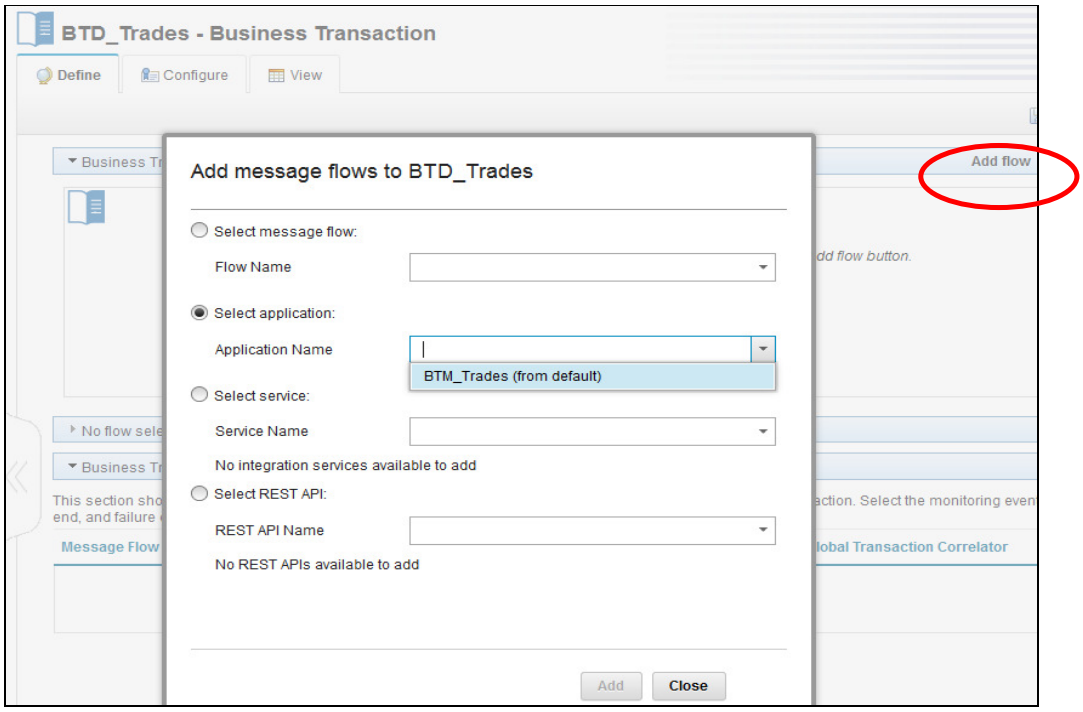


.

4. Click "Add flow".

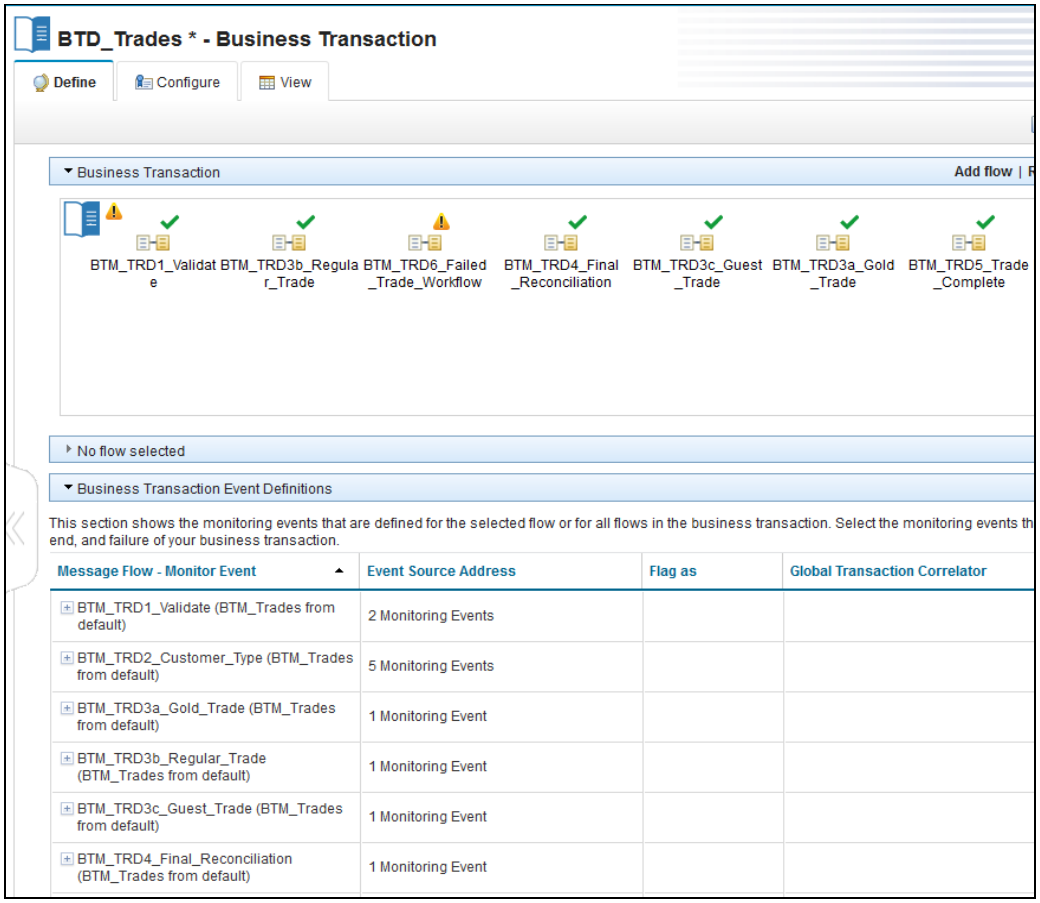
   Select an application, and from the drop-down, select BTM_Trades.

   Click Add.

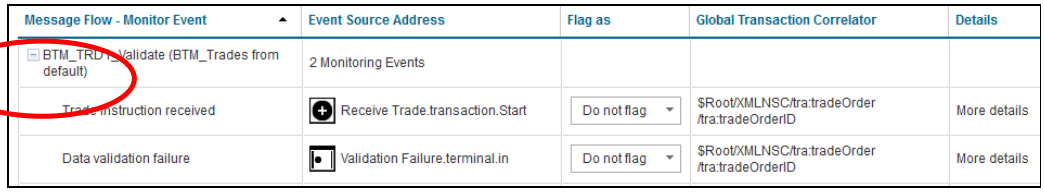


5. The message flows will be added to the BTD, and the monitoring points that have been defined on the message flows will be listed on the bottom of the window.

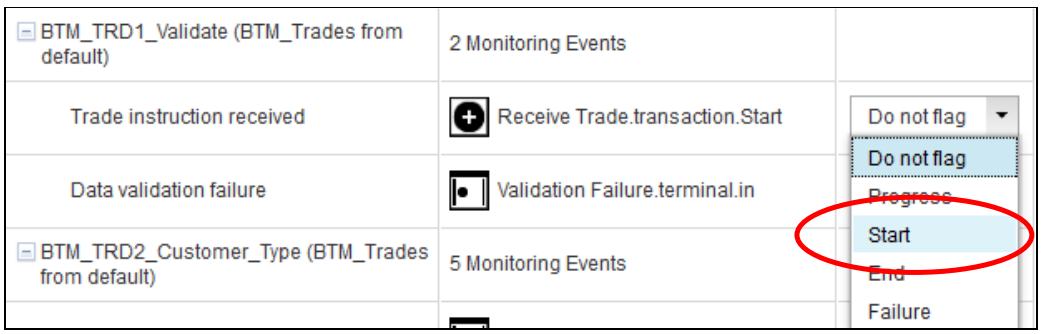
   The BTD define process has examined the deployed message flows, and has extracted details of the monitoring events points.



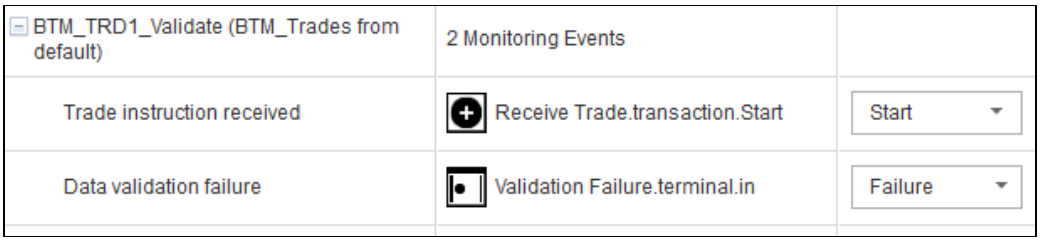
6. Expand the first message flow, BTM_TRD1_Validate. You will see that two monitoring events have been defined on this flow.



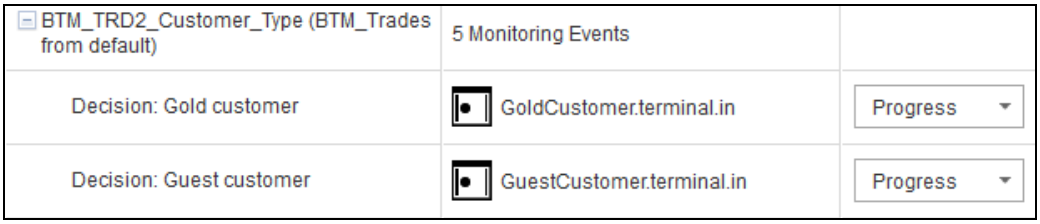
7. The first event for TRD1 will signify the start of the Business Transaction. In the "Flag As" column, click the drop-down, and select "Start" as the flag for this event.



8. For the "Data validation failure" event, select Failure.

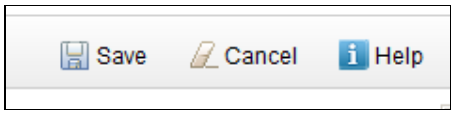


9. For all the events up to TRD5, set the flag to Progress.

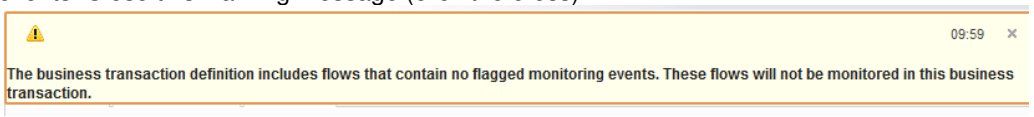


10. For the TRD5 message flow, set the event flag to End.

11. At the top of the window, click Save.



12. You will see a warning message indicating that not all flows contain flagged monitoring events. Close this warning message (click the cross).

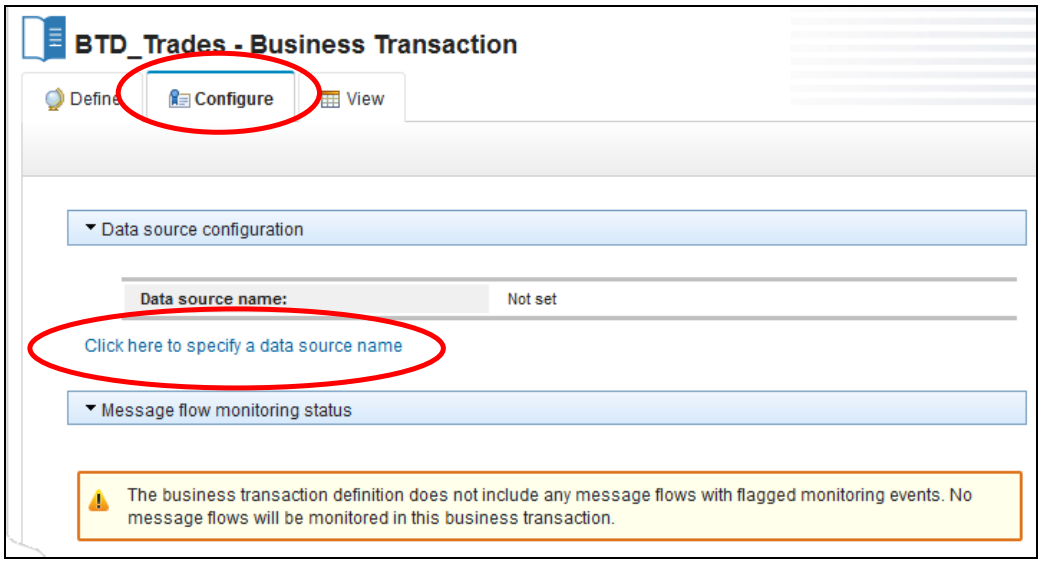


4.2 Configure the BTM database

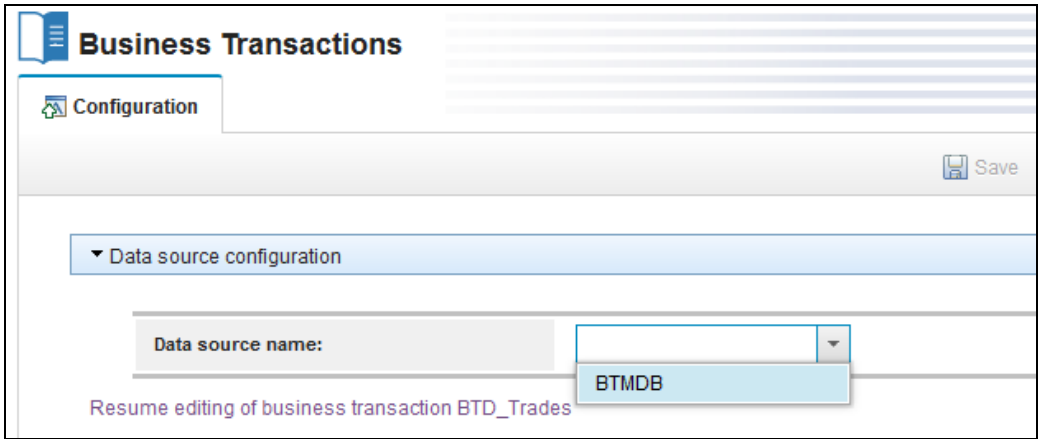
1. The BTM database needs to be specified to the IIB node. Click the Configure tab.

   You will see that the Data Source Name for the BTM database has not been set.

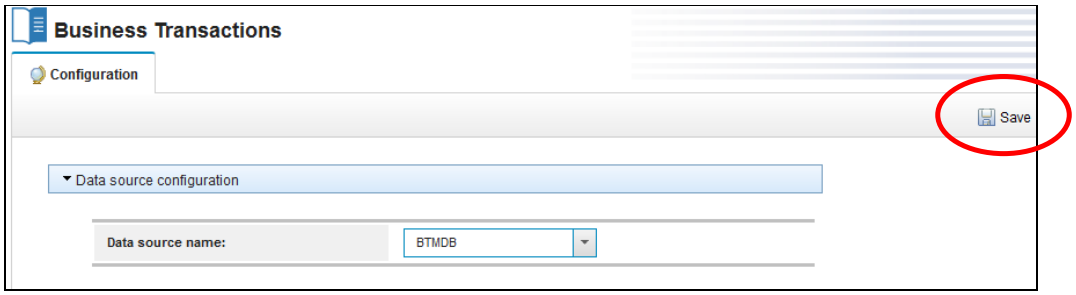
   Click to specify the data source name.



2. In the drop-down, select BTMDB. If BTMDB does not appear in the drop-down list, then something has gone wrong in the BTM enablement steps earlier in the lab.



3. Select BTMDB, and click Save.



5. Test the Business Transaction Definition

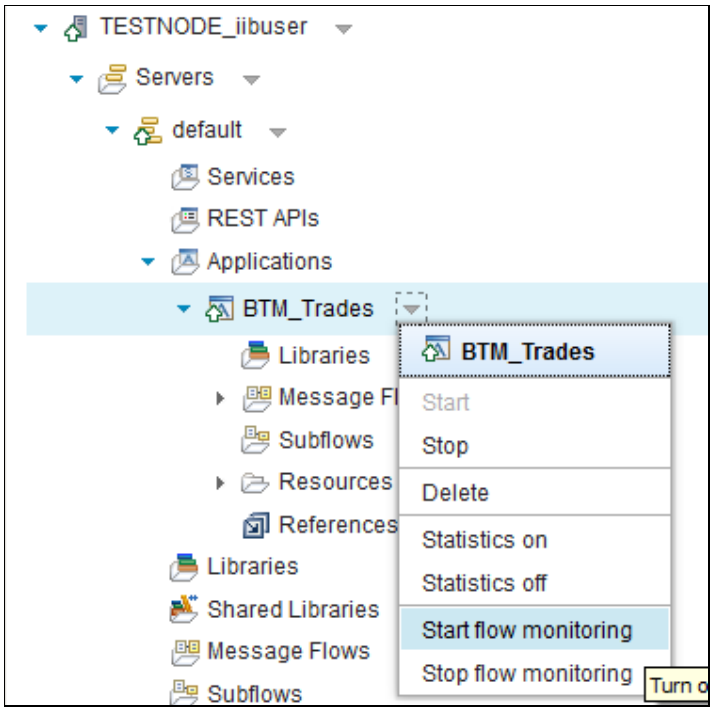
5.1 Activate Flow Monitoring for the Application

In order for any business event to emit monitoring data, flow monitoring must be enabled for each message flow that will form part of the business transaction.

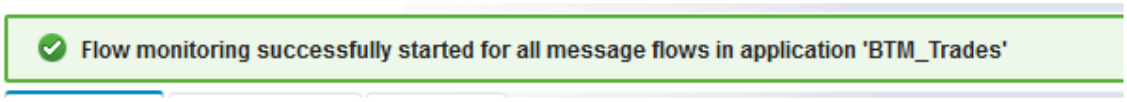
In this lab, this can be achieved by activating flow monitoring at the application level; this will activate monitoring for all message flows contained within the application.

In the Web UI navigator, expand the Applications folder, and on the BTM_Trades application, click the drop-down arrow.

Click "Start flow monitoring".



Flow monitoring will be activated.



5.2 Execute the Business Transaction

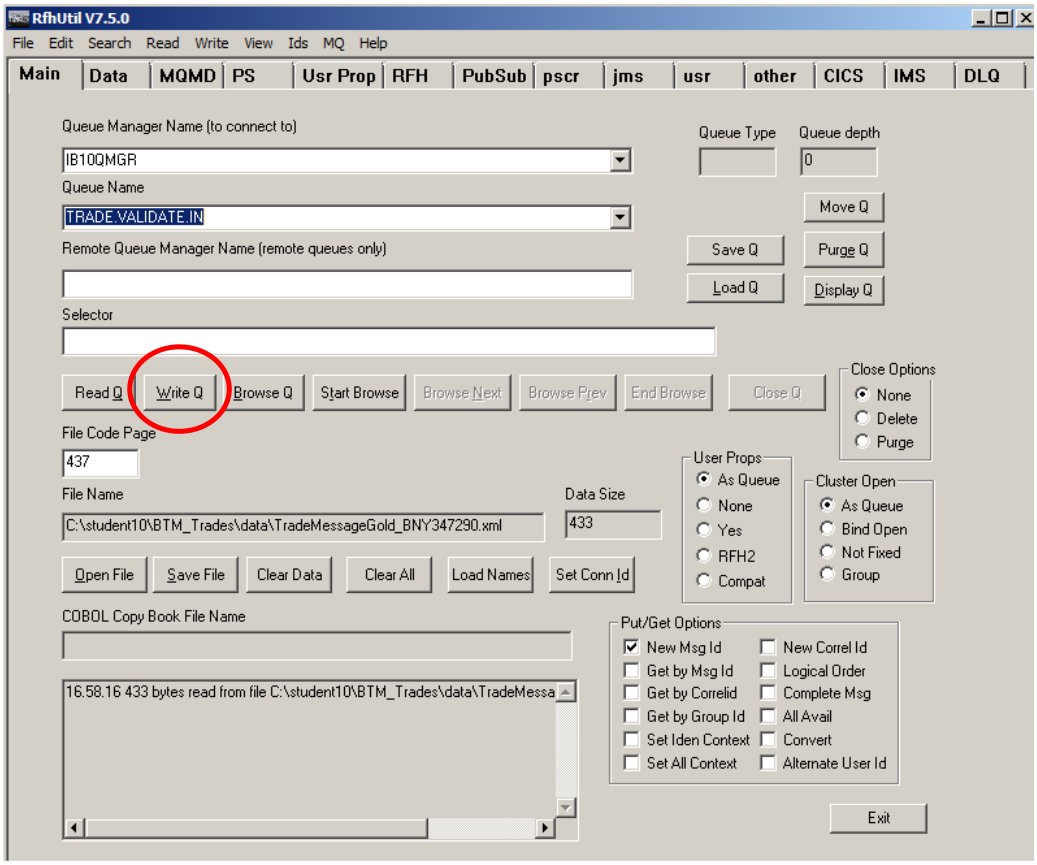
Note - please follow the tests described in this guide. If you send messages with the same TradeOrderID more than once, you will see the status of the associated business event become "Inconsistent". This is not an error, but an indication that there is a problem with a particular business transaction. For example, events for a particular business transaction have been received after the business transaction status has been set to "End".

You will now send a number of messages to the application. These will result in different outcomes in the BTD which you will examine.

1. Open an instance of RFHUtil from the Start menu, and set the following values:

   - Queue Manager Name = IB10QMGR
   - Queue Name = TRADE.VALIDATE.IN
   - File Name = c:\student10\BTM_Trades\data\TradeMessageGold_BNY347290.xml

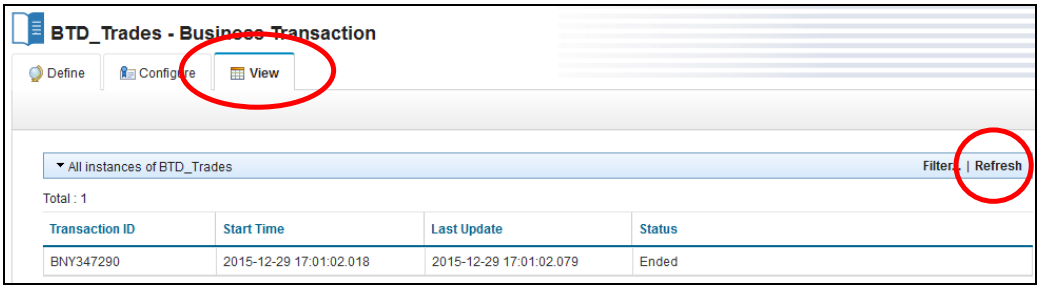
   Click the Write Q button to send this message to the first message flow.



2. In the Web UI, on the View tab, click Refresh.

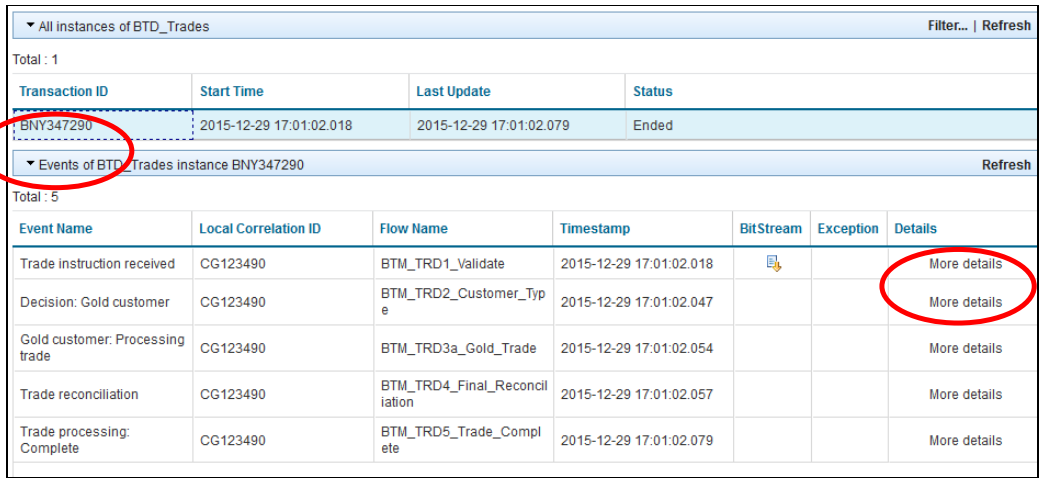
   You will see that an instance of the BTD_Trades business transaction has appeared, denoted by the ID BNY347290.

   Note that the Status is **Ended**.

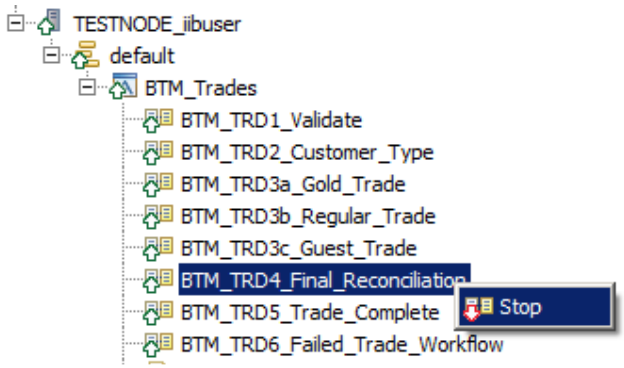


3. Click on the line showing the business transaction. The line will highlight in blue, and all the individual events that comprise the business transaction will be shown.

   Observe that the business transaction ID is represented by the Trade ID (the Global Transaction Correlator). For each event, you can click "More details" to see the details of the individual event.



4. Stop the message flow BTM_TRD4_Final_Reconciliation. In the Toolkit, right-click TRD4 and select Stop.



5. Now send several messages through to the message flow.

   In a DOS window (or IIB Console), change directory to c:\student10\BTM_Trades\test.

   Run the command :

   testBTM.cmd

   This will send a further 10 messages to the application, each of which has a different Trade ID.

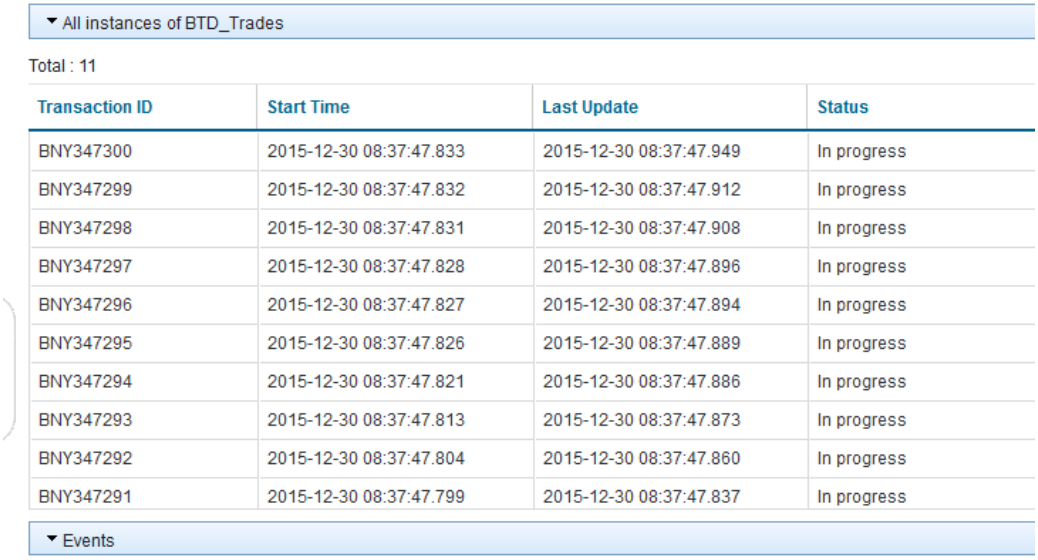
```
10 messages to be written to queue TRADE.VALIDATE.IN on queue
manager IB10QMGR
minimum queue depth 3 max 15 batchsize 2
initial sleep time 20 tune = 0
connecting to queue manager IB10QMGR
opening queue TRADE.VALIDATE.IN for output
First message written at Tue Dec 29 17:10:26 2015
MQ Timestamp of first message written at 17:10:26
number on queue after sleep - min 0, max 0
Last message written at Tue Dec 29 17:10:26 2015
MQ timestamp of last message written at 17:10:26

Total messages written 10 out of 10
Total elapsed time in seconds 0.006891
Total bytes written   4330
Total memory used 8180

closing the queue
closing the inquiry queue
disconnecting from the queue manager
MQPUT2 program ended
```

6. Back in the Web UI, click Refresh.

   You will see a number of instances of BTD_Trades. They will have a status of "In progress". This means that they have all been started (have executed TRD1), but have not yet reached the final message flow (TRD5) where the end of the business transaction is defined. This is because TRD4 is stopped.



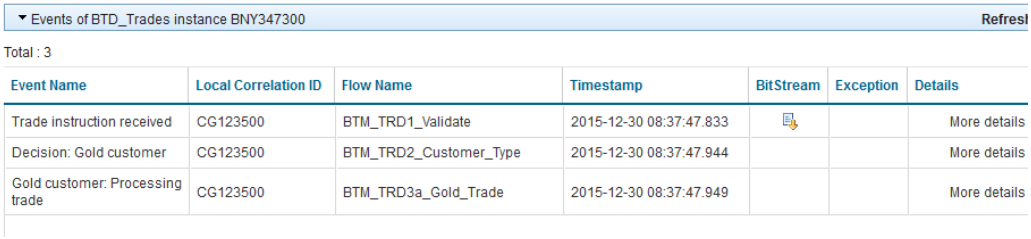
All instances of BTD_Trades

Total : 11

Transaction ID	Start Time	Last Update	Status
BNY347300	2015-12-30 08:37:47.833	2015-12-30 08:37:47.949	In progress
BNY347299	2015-12-30 08:37:47.832	2015-12-30 08:37:47.912	In progress
BNY347298	2015-12-30 08:37:47.831	2015-12-30 08:37:47.908	In progress
BNY347297	2015-12-30 08:37:47.828	2015-12-30 08:37:47.896	In progress
BNY347296	2015-12-30 08:37:47.827	2015-12-30 08:37:47.894	In progress
BNY347295	2015-12-30 08:37:47.826	2015-12-30 08:37:47.889	In progress
BNY347294	2015-12-30 08:37:47.821	2015-12-30 08:37:47.886	In progress
BNY347293	2015-12-30 08:37:47.813	2015-12-30 08:37:47.873	In progress
BNY347292	2015-12-30 08:37:47.804	2015-12-30 08:37:47.860	In progress
BNY347291	2015-12-30 08:37:47.799	2015-12-30 08:37:47.837	In progress

Events

7. You can click on any of the transaction instances to see the individual events that have been received for that instance.

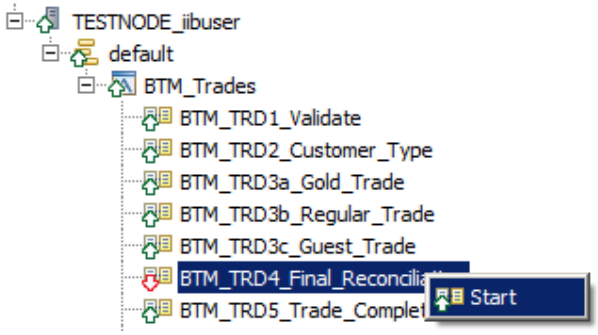


Events of BTD_Trades instance BNY347300 Refresh

Total : 3

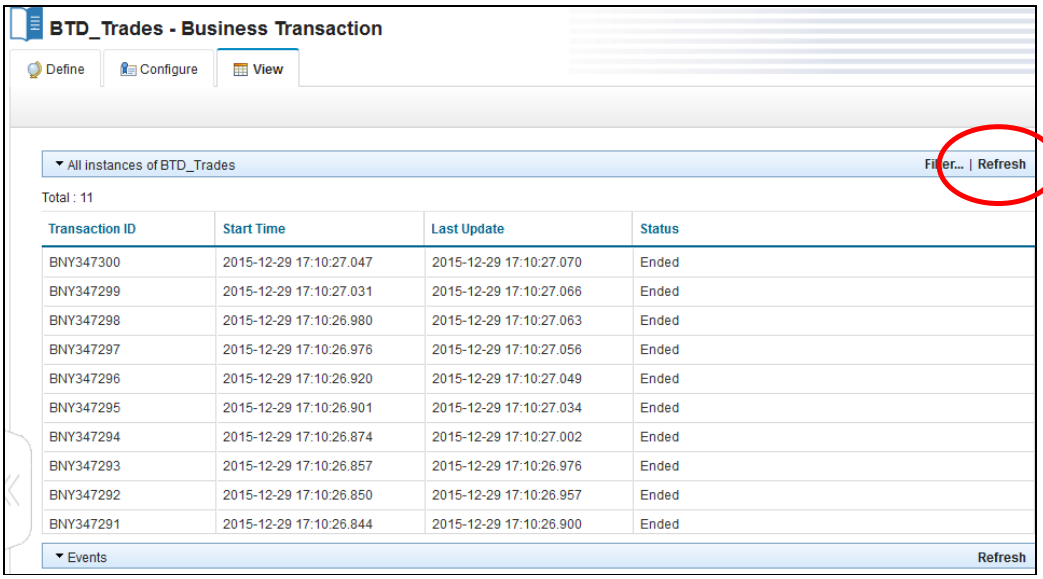
Event Name	Local Correlation ID	Flow Name	Timestamp	BitStream	Exception	Details
Trade instruction received	CG123500	BTM_TRD1_Validate	2015-12-30 08:37:47.833			More details
Decision: Gold customer	CG123500	BTM_TRD2_Customer_Type	2015-12-30 08:37:47.944			More details
Gold customer: Processing trade	CG123500	BTM_TRD3a_Gold_Trade	2015-12-30 08:37:47.949			More details

8. Now restart the TRD4 message flow.

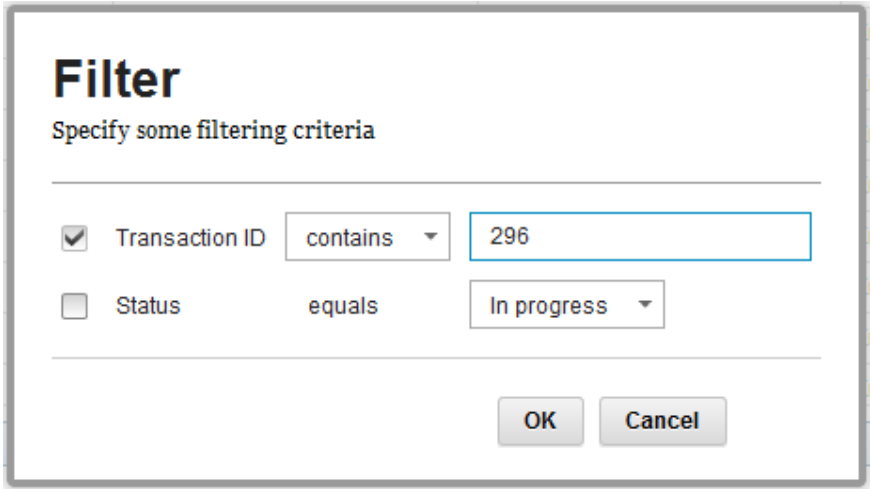


9. Back in the Web UI BTD_Trades view, click Refresh again.

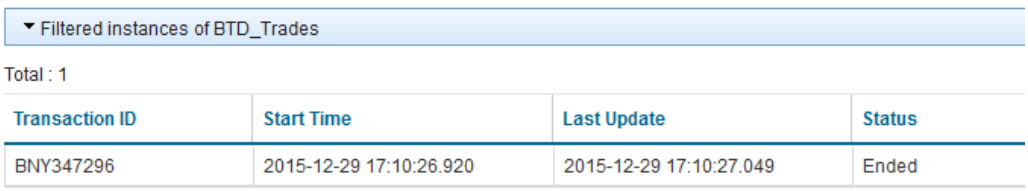
   You will see the transaction instances have been updated. All should have a status of Ended.



10. Experiment with the Filter options. For example, set the Filter to Transaction ID contains 296, and click OK.

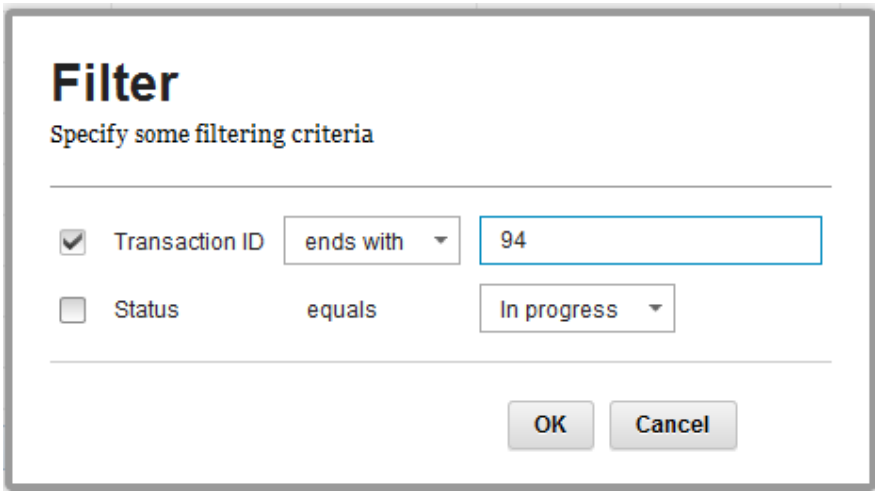


The display will be reduced to the matching transaction.



11. Clear the filter, then set the filter to "Transaction ID ends with 94", click OK.

    When finished, clear the Filter.

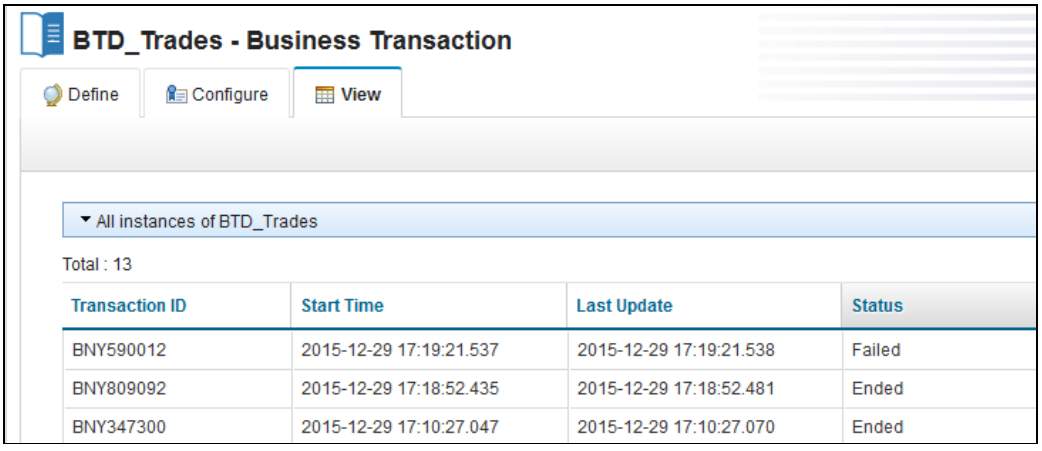


12. Send a message that is malformed. In RFHUtil, open the file TradeMessage_Malformed.xml.

    This message has a missing closing XML tag, and will fail validation on the input node in the TRD1_Validate message flow.

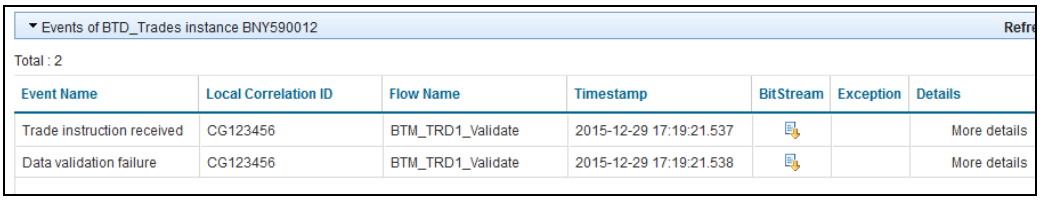
    In RFHUtil, click Write Q to send this message.

13. In the Web UI, click Refresh. You will see a new transaction has appeared at the top of the list, with the status Failed.

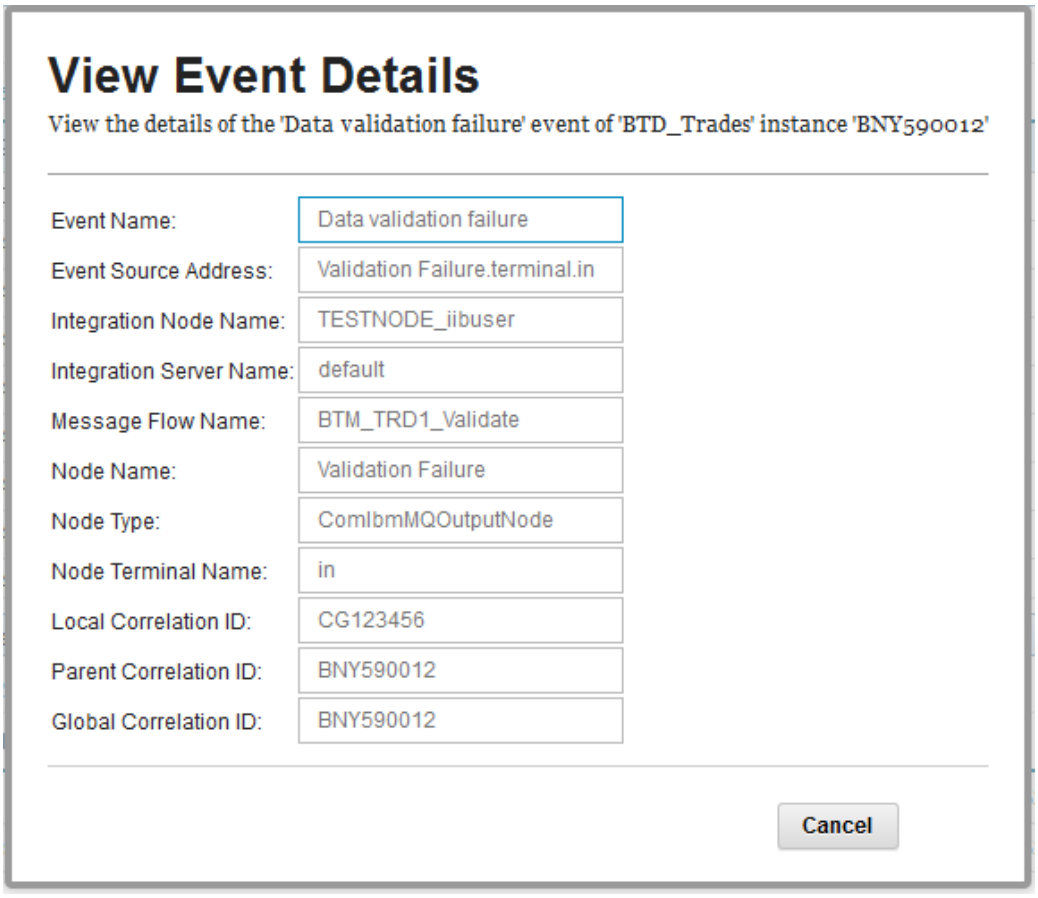


14. Highlight the business transaction, and you will see the individual events.

    You will see that the second event name is "Data validation failure".



15. Click "More details". You will see the full details of the event. Note that the Correlation IDs are shown correctly. This is because IIB was able to parse the incoming message at least as far as the field that is used for the Global Correlation ID (TradeOrderID). The XML error that caused the validation failure was after this particular element. In cases where IIB is not able to fully parse the message and obtain the value for the Global Correlation ID, it will not be possible to record this data, and a more generic failure will be recorded.



6. Add Security Roles for Web Users

So far in this lab, the IIB node has permitted all users to login. This means that users who are only interested in looking at BTM events have also had access to the IIB node, server and applications. You will now introduce administration security, which will provide more granular control of access to these functions.

This is discussed in more detail in the Admin Security lab.

1. First, activate administration security for the IIB node. In an IIB Console, execute the following commands:

```
mqsistop TESTNODE_iibuser

mqsichangeauthmode TESTNODE_iibuser -s active -m file

mqsistart TESTNODE_iibuser
```

2. Define role permissions for various classes of users. In the IIB Console, run the following commands:

```
cd c:\student10\BTM_Trades\webadmin

set_BTM_users_ACL_using_FileAuth.cmd
```

   This cmd file will issue a number of mqsi commands similar to these shown here:

   mqsichangefileauth IIBNODE -r iibAdmin2 -p read+
   mqsichangefileauth IIBNODE -r iibAdmin2 -e default -p read+,write+,execute+
   mqsichangefileauth IIBNODE -r iibAdmin2 -o DataCapture -p read-

   For example, these commands define a profile (role) called iibAdmin2 which permits full read/write/execute access to the IIB node, full access to the server (default), but no access to the BTM functions (the DataCapture object).

3. Define the Web UI users who will use these permissions.

   From the same directory, run the following command:

```
Create_BTM_users.cmd
```

   This cmd file will run a number of mqsi commands similar to this:

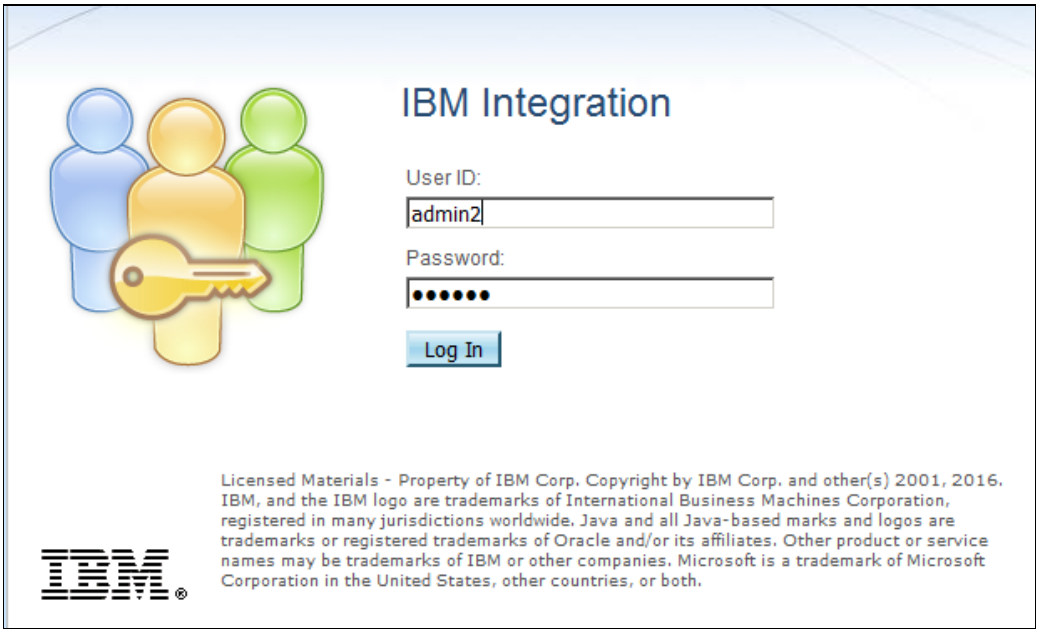
   mqsiwebuseradmin IIBNODE -c -u admin2 -a passw0rd -r iibAdmin2

   This example command will define a new user, admin2, with the associated role of iibAdmin2.

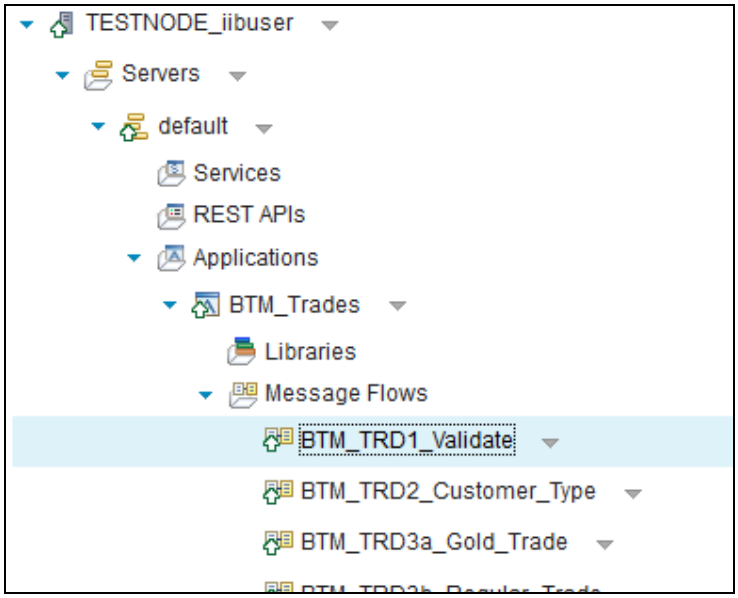
4. In the Web browser, first make sure you are fully logged out of the node.

   The, login with the user **admin2**, password = admin2.

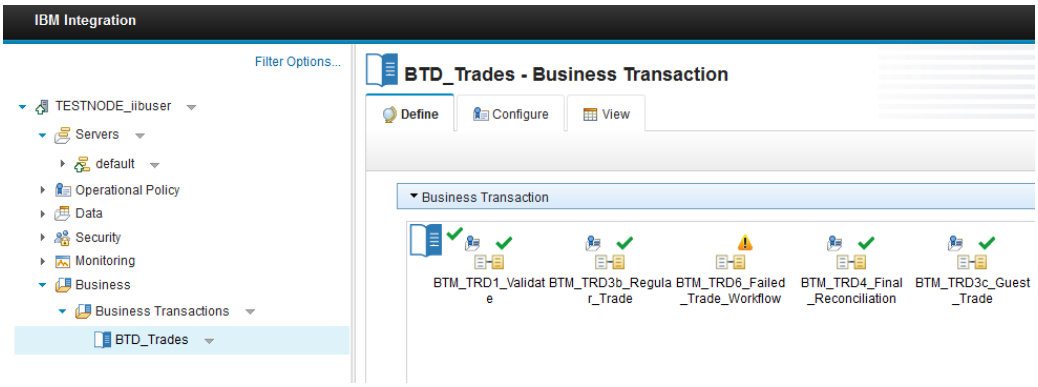
   This user has full (update) access to the IIB node, server and applications, but no access the any BTM events.



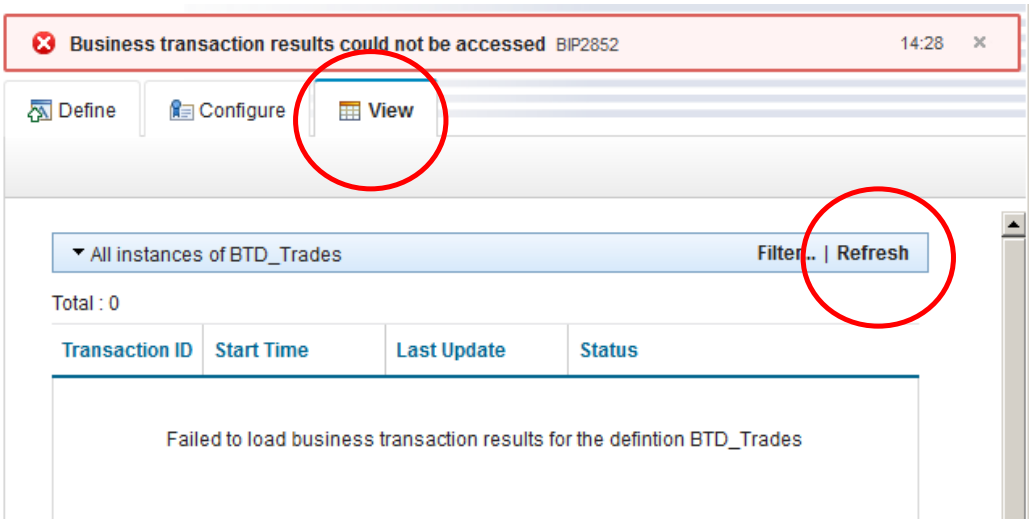
5. In the navigator, you can expand all items, and have full access to control resources.



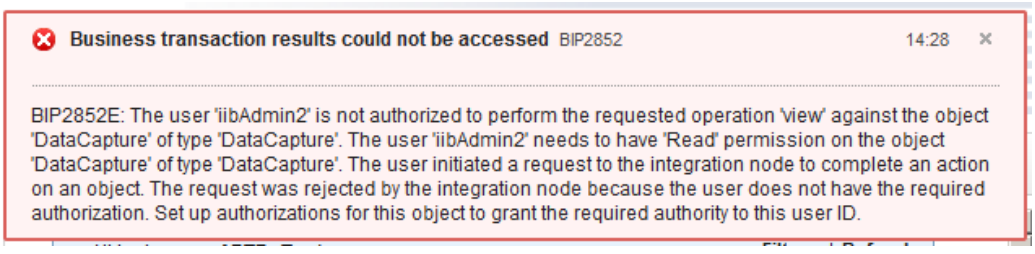
6. Expand the Business folder, and select the BTD_Trades definition. You will see that you are able to see the definition of the BTD, and indeed make changes to the BTD. This is because admin3 (iibAdmin3) has update access to the IIB node and the server, which controls the definition and saving of BTDs.



7. Click the View tab, and then click Refresh. You will see the message "Business transaction results could not be accessed".

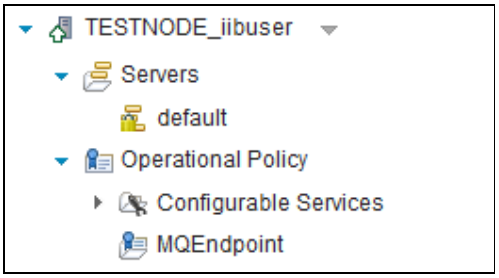


8. Clicking on the message will provide more details. Insufficient authority is available for users with role "iibAdmin2". iibAdmin2 does not have "read access" to the DataCapture object.



9. Logout admin2, and login with **btm1** (password = btm1).

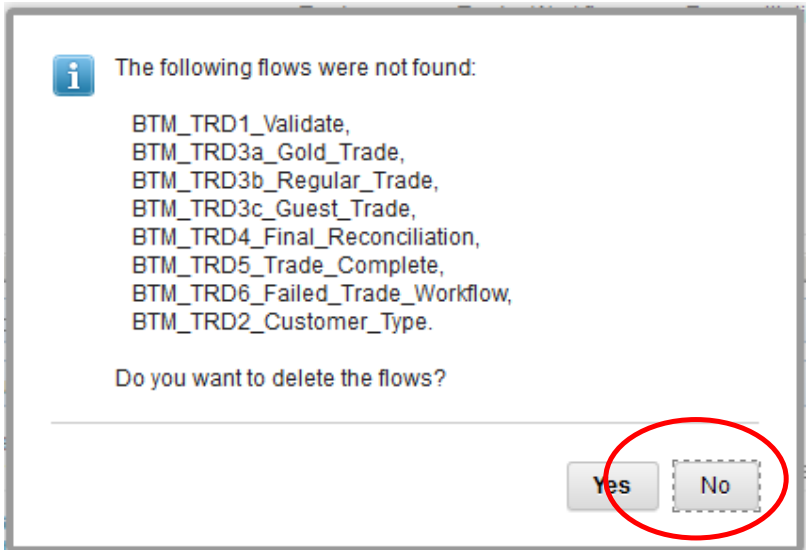
   In the navigator, this user cannot see any IIB resources.



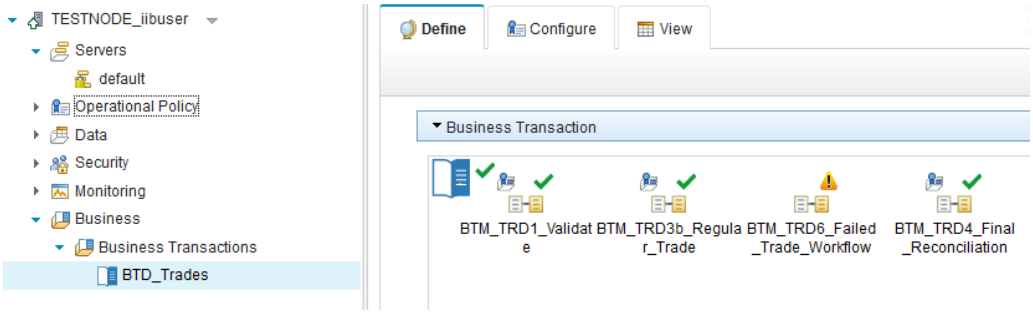
10. Expand the Business folder and select BTD_Trades.

    This user will not be able to create a new BTD, or make changes to the existing BTD.

    Note, you may see a message indicating that the flows that comprise the BTD are not available. Answer No when asked whether to delete these flows. This message appears because this user does not have access to view deployed resources.

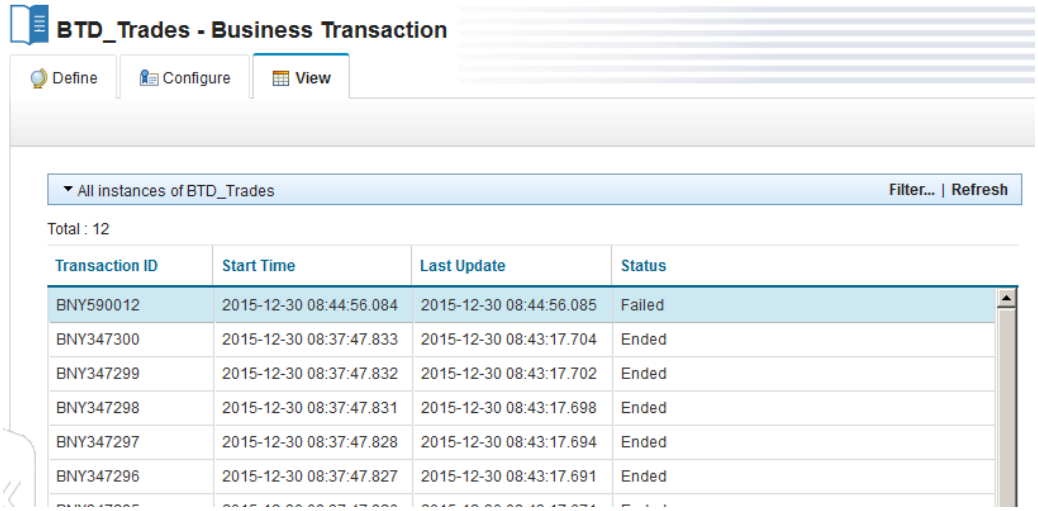


11.



12. Click the View tab, and then click the Refresh button. You will see all the transaction instances that were created earlier.

    You will be able to perform all the actions that were described earlier, such as filtering, and viewing the individual events.



END OF LAB GUIDE