# BTSHOL05: Working with Pipelines

Objectives

After completing this lab, you will be able to:

* Create a schema using the Flat File Schema Wizard.
* Create and configure a pipeline to use a flat-file disassembler component.
* Configure the receive pipeline of a BizTalk receive location.
* Configure pipeline for recoverable interchange processing.

Scenario

You work for a book supplier who needs to be able to accept batched flat file orders. You have been provided samples of a single order, a batched order that contains three orders, and a batched order which contains bad data. You will create a flat file schema for the order using the Flat-File Schema Wizard.

After you have created the schema you will create and test a custom pipeline which will be used to process the single order flat file message.

Estimated time to complete this lab: 45 minutes

Once the pipeline is configured to receive individual orders, you will configure it to receive and process batched orders. You will then configure it to allow recoverable interchange processing so a single bad order will not keep the rest of the orders in the batch from being processed.

User Name: **Administrator**

Password: **pass@word1**

Exercise 1

Create a Flat File Schema using the Flat File Schema Wizard

In this exercise, you will use the Flat File Schema Wizard to create a schema which represents a single order. You will specify the format of the records (positional or delimited) and then define the records, elements, and attributes of the message. This schema will be used in later exercises to process flat file orders.

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| Tasks | Detailed steps |
| 1. Investigate the records contained in the document for which you will be generating the schema. | 1. In Windows Explorer, navigate to and open **C:\Labs\Work\Lab 5\Messages\OrderFF.txt**. 2. Notice that the first line contains PO details, including the fact that this message is indeed a Purchase Order, the customer name, the PO number, and the PO date. 3. The second line consists of the address of the customer in a standard US format including the street, city, state and zip or postal code. 4. The third line is a comment. 5. The forth line is the detail of the order. It contains a recurring book record nested inside a books record. The book record contains the details pertaining to individual items. |
| 1. Open the BizTalk Server 2016 Solution. | 1. In Windows Explorer, browse to **C:\Labs\Lab 5\Start\,** and then double click **PipelineProcessing.sln** to open the solution. |
| 1. Add a flat file schema to the project. | 1. In Solution Explorer, right-click the **RecoverableInterchange** project, point to **Add**, and then click **New Item**. 2. In the **Add New Item** dialog box, click **Schema Files** in the Categories pane, and then click **Flat File Schema Wizard**. 3. In the **Name** box, type **FFOrder.xsd**, and then click **Add**. |
| 1. Define the schema structure using the Flat File Schema Wizard.   The Flat File Schema Wizard provides an intelligent user interface for building flat file schemas. Everything that can be done using the Flat File Schema Wizard can be done using the BizTalk Editor.  When a section of the message is specified as a Tag Identifier it will be removed from the message when it is processed. | 1. On the **Welcome to the BizTalk Flat File Schema Wizard** page of the **BizTalk Flat File Schema Wizard**, click **Next**. 2. On the **Flat File Schema Information** page, click **Browse**. 3. In the **Select a Flat File Document** dialog box, browse to and select **C:\Labs\Work\Lab 5\Messages\OrderFF.txt**, and then click **Open**. 4. On the **Flat File Schema Information** page, change the **Record name** to **Order**,and then click **Next**.      1. On the **Select Document Data** page, ensure the entire message is selected, and then click **Next**. 2. On the **Select Record Format** page, ensure that **By delimiter symbol** is selected and then click **Next**. 3. On the **Delimited Record** page, ensure that **Child delimiter** is set to **{CR}{LF}**, select the **Record has a tag identifier** check box, then type **PO** in the **Tag** box, and then click **Next**.      1. On the **Child Elements** page, change the properties for the **Child nodes** as listed in the table below, and then click **Next**.  |  |  | | --- | --- | | Element Name | Element Type | | PODetail | Record | | Address | Record | | Comment | Field Element | | Books | Record | |
| 1. Define the PODetail record.   The PODetail record is comma delimited.  Notice that the first record, except the tag identifier and the carriage return/line feed (¶«) is selected for you. | 1. On the **Schema View** page, ensure that **PODetail** is selected, and then click **Next**. 2. On the **Select Document Data** page, click **Next**. 3. On the **Select Record Format** page, ensure that **By delimiter symbol** is selected and then click **Next**. 4. On the **Delimited Record** page, in the **Child delimiter** list, choose the comma **(,)** symbol, and then click **Next**. 5. On the **Child Elements** page, change the **Child nodes** as listed in the table below, and then click **Next**.  |  |  |  | | --- | --- | --- | | Element Name | Element Type | Data Type | | OrderNumber | Field attribute | string | | CustomerName | Field attribute | string | | OrderDate | Field attribute | date | |
| 1. Define the Address record.   The Address node is a positional record.  The Flat File Schema Wizard provides a visual interface for determining the starting points for each node. Previously, you would need to count each character to know the where each node began. | 1. On the **Schema View** page, ensure that **Address** is selected, and then click **Next**. 2. On the **Select Document Data** page, click **Next**. 3. On the **Select Record Format** page, select **By relative positions**,and then click **Next**. 4. On the **Positional Record** page, click the position to the left of each of the elements. You should have an arrow on each of the following positions: **0** (default), **25**, **40**, **42**.      1. Click **Next**. 2. On the **Child Elements** page, change the **Child nodes** as listed in the table below, and then click **Next**.  |  |  | | --- | --- | | Element Name | Element Type | | Street | Field element | | City | Field element | | State | Field element | | Postal | Field element | |
| 1. Define the Books record.   The Book node will be repeated for any orders with more than one book. This means that it needs to be defined as a repeating record. | 1. On the **Schema View** page, ensure that **Books** is selected, and then click **Next**. 2. On the **Select Document Data** page, click **Next**. 3. On the **Select Record Format** page, ensure that **By delimiter symbol** is selected, and then click **Next**. 4. On the **Delimited Record** page, set the **Child delimiter** to the comma **(,)** symbol, then select the **Record has a tag identifier** check box, then type **Books** in the **Tag** box, and then click **Next**. 5. In the error dialog box, click **OK**.   *The Flat File Schema Wizard parses the message to verify that the tag identifier is valid. Because the tag identifier is case-sensitive, ‘Books’ is not found within the record, and an error is displayed.*   1. Change the **Tag** box to **BOOKS**, and then click **Next**.      1. On the **Child Elements** page, change the **Child nodes** as listed in the table below, and then click **Next**.  |  |  | | --- | --- | | Element Name | Element Type | | Book | Repeating Record | | Books\_Child2 | Ignore | |
| 1. Define the elements for the Book record. | 1. On the **Schema View** page, ensure that **Book** is selected, and then click **Next**. 2. On the **Select Document Data** page, click **Next**. 3. On the **Select Record Format** page, ensure that **By delimiter symbol** is selected and then click **Next**. 4. On the **Delimited Record** page, set the **Child delimiter** to the pipe **( | )** symbol, then select the **Record has a tag identifier** check box, then type **BOOK** in the **Tag** box, and then click **Next**.        1. On the **Child Elements** page, change the **Child nodes** as listed in the table below, and then click **Next**.  |  |  | | --- | --- | | Element Name | Element Type | | ISBN | Field element | | Title | Field element | | Qty | Field element | | Price | Field element |  1. Click **Finish**. |
| 1. Validate the message instance.   Validating the schema generates an XML translation of the message instance. | 1. In Solution Explorer, right-click **FFOrder.xsd,** and then click **Validate Instance**.   *The Flat File Schema Wizard has configured the sample document used in the creation of the schema as the Input Instance Filename property on the schema file.*   1. In the **Output** window, CTRL + click the **Validation generated XML output** link. (If an Internet Explorer dialog appears, click OK to close the dialog)   *Notice that the data from FFOrder.txt has been translated from the flat file format to XML.* |

Exercise 2  
Create a Receive Pipeline to Disassemble a Message Interchange

In this exercise, you will create a new pipeline with a Flat file disassembler component. You will configure the disassembler to process messages that match the type of the schema you created in the previous exercise. You will then build and deploy the project.

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| Tasks | Detailed steps |
| 1. Create the pipeline used to process incoming flat file messages. | 1. Right-click the **RecoverableInterchange** project, point to **Add**, and then click **New Item**. 2. In the **Add New Item** dialog box, click **Pipeline Files**, and then click **Receive Pipeline**. 3. In the **Name** text box, type **ReceiveCustOrders.btp**, and then click **Add**. |
| 1. Add a flat file disassembler to the pipeline.   The flat file disassembler component uses the schema you defined to translate incoming messages to XML. | 1. In the Pipeline Designer, drag and drop a **Flat file disassembler** pipeline component from the Toolbox to the **Disassemble** stage of the pipeline. 2. In the Properties window for the Flat file disassembler component, set the **Document schema** property to **RecoverableInterchange.FFOrder**.   *This is the schema created by the Flat File Schema Wizard in the previous exercise.* |
| 1. Build and deploy the RecoverableInterchange project. | 1. Right-click the **RecoverableInterchange** project and click **Build**. 2. Right-click the **RecoverableInterchange** project and click **Deploy**. |

Exercise 3  
Enable and Test the Pipeline

In this exercise, you will configure the receive location to process incoming messages through the ReceiveCustOrders pipeline that you just built. After you’ve configured the receive location, you will start the application, and process the test message. The message will be translated from the flat file format to XML.

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| Tasks | Detailed steps |
| 1. Configure the receive location to use the ReceiveCustOrders pipeline. | 1. On the **Start** menu, click **BizTalk Server Administration**. 2. In BizTalk Server 2016 Administration Console, expand **BizTalk Server 2016 Administration > BizTalk Group > Applications > Lab5**. 3. Right-click **Receive Ports**, then point to **New**, and then click **One-way Receive Port**. 4. In the **Receive Port Properties** dialog box, configure the port with the following properties and click OK to close the dialog.  |  |  | | --- | --- | | Parameter | Value | | Name | RcvOrder |  1. Right-click **Receive Locations**, point to **New**, and then click **One-way Receive Location**. 2. In the **Select a Receive Port** dialog box, select **RcvOrder**, and the click **OK**. 3. Use the following properties for the receive location (to access **Receive Folder** and **File Mask**, click **Configure**):  |  |  | | --- | --- | | Parameter | Value | | Name | RcvFFOrder | | Transport Type | FILE | | Receive Folder | C:\Labs\Work\Lab 5\Messages\In (\*tip\* - use the **Browse** button to ensure the correct path) | | File Mask | \*.txt | | Receive Handler | BizTalkServerApplication | | Receive Pipeline | ReceiveCustOrders |  1. Click **OK** to save changes. 2. Right-click **Send Ports** under the Lab5 application, then point to **New**, and then click **Static One-way Send Port**. 3. Create a static one-way port by using the following information (to access **Destination Folder** and **File Name**, click **Configure**):  |  |  | | --- | --- | | Parameter | Value | | Name | SendOrder | | Transport Type | FILE | | Destination Folder | C:\Labs\Work\Lab 5\Messages\OUT (\*tip\* - use the **Browse** button to ensure the correct path) | | File Name | %MessageID%.xml | | Send Pipeline | PassThruTransmit | | Filter | BTS.ReceivePortName == RcvOrder |  1. Click **OK** to save changes. |
| 1. Start the application. | 1. Right-click the **Lab5** application, and then click **Start**. 2. In the **Start ‘Lab5’ Application** dialog box, click **Start**.   *Starting the application starts and/or enables all ports, locations, and orchestration within the applications.* |
| 1. Test the processing of the flat file message.   When processed through the pipeline the flat file message is transformed to XML. | 1. In Windows Explorer, navigate to **C:\Labs\Work\Lab 5\Messages**. 2. Copy **OrderFF.txt** to the **IN** folder.   *Do NOT move the message to the IN folder. The message is unrecoverable once BizTalk has processed it*   1. When the message is removed from the **IN** folder, browse to the **C:\Labs\Work\Lab 5\Messages\OUT** folder. 2. Open the {**GUID}.xml** message.   *Notice that the message has been transformed to an XML format.*   1. Close and delete the **{GUID}.xml** message. |

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Exercise 4

Configure and Test the Pipeline for Interchange Processing

In this exercise, you will add a header schema to the Flat file disassembler component of the pipeline to enable the processing of batched messages.

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| Tasks | Detailed steps |
| 1. View the batch message to be disassembled. | 1. Navigate to **C:\Labs\Work\Lab 5\Messages**, and then open **BatchFF.txt**.   *Notice that the first line contains batch details, including the fact that this message is indeed a BATCH, the company name, and a batch number. You should be able to identify three individual messages (based on the FF schema generated in Exercise 1) as the remainder of the message.*   1. Close Notepad. |
| 1. Modify the Flat file disassembler component in the pipeline to enable the processing of batched messages.   The header schema identifies information about the batched message.  Note that you are changing the configuration of the pipeline component for this specific receive location only. | 1. In the BizTalk Server 2016 Administration Console, under **Lab5**, click **Receive Locations**, and then double-click **RcvFFOrder** in the right pane. 2. In the RcvFFOrder – Receive Location Properties window, click the **Ellipsis (…)** button to the right of the Receive Pipeline list. 3. Set the **HeaderSpecName** property to **RecoverableInterchange.Header**, and then click **OK**. (Note that you cannot select OK until you move the cursor outside of the property box)   *The Header schema has been provided for you. It contains batch specific information. A header schema is required to process batched messages.*   1. In the RcvFFOrder – Receive Location Properties window, click **OK**. |
| 1. Test the processing of a flat file batch.   When processed through the pipeline the batched message is split into three separate XML messages. | 1. Copy **C:\Labs\Work\Lab 5\Messages\BatchFF.txt** to the **C:\Labs\Work\Lab 5\Messages\IN** folder.   *Do NOT move the message to the IN folder. The message is unrecoverable once BizTalk has processed it. If you do accidentally move the message another message can be found in C:\Labs\Work\Lab5\Sample Messages.*   1. Browse to the **C:\Labs\Work\Lab 5\Messages\OUT** folder and open the three **{GUID}.xml** messages.   *There are now three messages - one for each order.*   1. Close and delete all the messages in the **OUT** folder. |

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Exercise 5  
Configure and Test the Pipeline for Recoverable Interchange Processing

In this exercise, you will try to process a batched message which contains bad data. You will see that without recoverable interchange processing a batched message will fail as a whole. You will then configure the pipeline to allow recoverable interchange processing and submit the message again.

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| Tasks | Detailed steps |
| 1. Submit a batched message that contains invalid data.   The BADDATA contained in a single message of the batch will cause a failure of all the messages. | 1. In Windows Explorer, browse to **C:\Labs\Work\Lab 5\Messages**. 2. Open **BadBatchFF.txt**.   *Notice that the sixth line of the message (within the second of the batched messages) contains some “BADDATA”.*   1. Close BadBatchFF.txt. 2. Copy **BadBatchFF.txt** to the **IN** folder. 3. Browse to the **OUT** folder and verify that no new messages appear. |
| 1. Diagnose the problem. | 1. In the BizTalk Server 2016 Administration Console, expand the **Event Viewer (local)** node and the **Windows Logs** node, and click the **Application** node. 2. Double-click the error with the Event ID of **5719**.   *In the Description section notice the line: “Reason: The remaining stream has unrecognizable data” This is caused by the bad data in the message.*   1. Close the **Event Properties** window. |
| 1. Configure the pipeline to allow recoverable interchange processing.   The recoverable interchange option allows the processing of valid messages within an interchange even if one or more of the messages are invalid. This means if a message batch contains 100 messages and 1 is invalid, the 99 good messages will be processed. | 1. In BizTalk Server 2016 Administration Console, under the **Lab5** application, click **Receive Locations**. 2. In the right pane, double-click **RcvFFOrder**. 3. In the RcvFFOrder – Receive Location Properties window, click the **Ellipsis (…)** button next to the receive pipeline drop down list. 4. In the **Configure Pipeline** dialog box, change the **RecoverableInterchangeProcessing** property to **True**.      1. Click **OK**. 2. In the RcvFFOrder – Receive Location Properties window, click **OK**. |
| 1. Process the batched message that contains bad data. | 1. In Windows Explorer, browse to **C:\Labs\Work\Lab 5\Messages**. 2. Copy **BadBatchFF.txt** to the **IN** folder. 3. Browse to the **OUT** folder.   *The two valid messages were processed correctly while the one bad message was suspended. You can verify this by running the Suspended Service Instances query from the group hub page of the administration console.*   1. Close all open windows. |
| 1. Delete the application   *Do* ***NOT*** *perform this step if you are going to perform the optional exercise below.* | 1. In BizTalk Server 2016 Administration Console, right click on the Lab5 application and select **Stop**. 2. Select the **Full Stop – Terminate Instances** radio button 3. Click **Stop**. 4. After the stopping progress is complete, right-click on the **Lab5** application again and select **Delete**. 5. Expand **Platform Settings > Host Instances** in the tree view, and select **BizTalkServerApplication** in the right-hand pane. Right-click and select **Restart**. |

Optional 1  
Working with XML Envelope Schemas

In this exercise, you will look at creating XML Envelope schemas and processing them in a pipeline.

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| Tasks | Detailed steps |
| 1. Create an Envelope Schema. | 1. In the PipelineProcessing solution and the RecoverableInterchange project, create a new schema that looks like this:  A root node of OrderEnvelope, with a BatchDescription Record, BatchTitle and BatchNo attributes, and a Orders Record with an Any element. 2. Select the <Schema> node and in the properties window, find the Envelope property. Set it to Yes. 3. Select the OrderEnvelope root node, and find the Body XPath property. 4. Point the Body XPath property to the Orders node. 5. Build and deploy the schema. |
| 1. Create a xml instance | 1. Using the OrderEnvelope schema generate an envelope XML Instance. 2. Using the FFOrder schemas generate a XML Instance.   In the Orders node of the OrderEnvelopeSchema, paste two copies of the Order node generated from the FFOrder.  *The resulting XML document should look like this.* |
| 1. Deploy, Configure and Test the Envelope Schema | 1. Create a Receive Port and location that uses the XMLReceive pipeline. 2. Create a Send Port that subscribes to the Receive Port.  *If you are unsure how to create Receive and Send ports and configure the Send Ports Filter, then refer back to previous labs where you completed that task.* 3. Enable and Start the ports. 4. Using the instance you previously generated, drop it in the location you configured for the receive port. 5. Check the output location for Order documents. You should get as many as you put Order nodes inside the Orders node. |

Optional 2  
Run and investigate the FixMsg custom component sample

In this exercise, you will deploy, run and examine a SDK sample for a Custom Pipeline Component.

Go to the link <http://msdn.microsoft.com/en-us/library/aa561772.aspx> where you will find the BizTalk Server SDK CustomComponent sample. It’s source code is in the location C:\Program Files (x86)\Microsoft BizTalk Server 2016\SDK\Samples\Pipelines\CustomComponent.

Besides spending time on building and deploying the sample, also open the solution in the FixMsg folder (FixMsg.sln) and look around it a bit to identify the interfaces used and the methods they contain.

Take an additional look at the Execute method which is the method where all the “real logic” of the component is performed.

Remember, what the component does is adds a custom string (as configured on the pipeline component) to the start and end of each message. This functionality is encapsulated by the FixMsgStream, but you do not have to look closely at that implementation.