IBM Integration Bus

# Message Modeling with DFDL

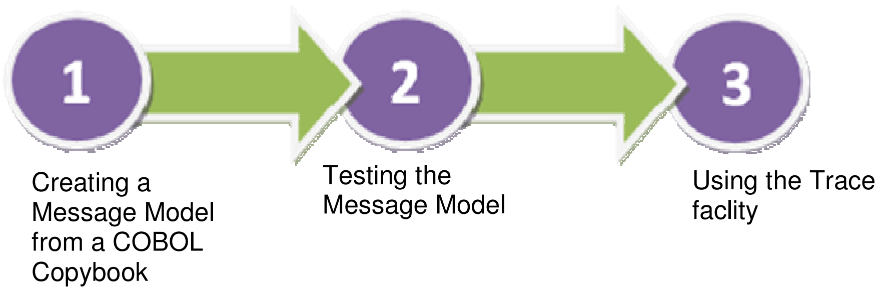
Lab 2
Modeling fixed-length data using a COBOL copybook

June, 2013

Hands-on lab built at product code level Version 9.0.0.0

# 1. Introduction

In this lab, you will create a Message Model from a COBOL Copybook. Then you will test parse it against a valid data file and a malformed data file. In this last part you will be able to take a look at the trace facility.


1
2
3
Creating a Message Model from a COBOL Copybook
Testing the Message Model
Using the Trace faclity

This lab should be done after Lab 1, Message Modelling with CSV files.

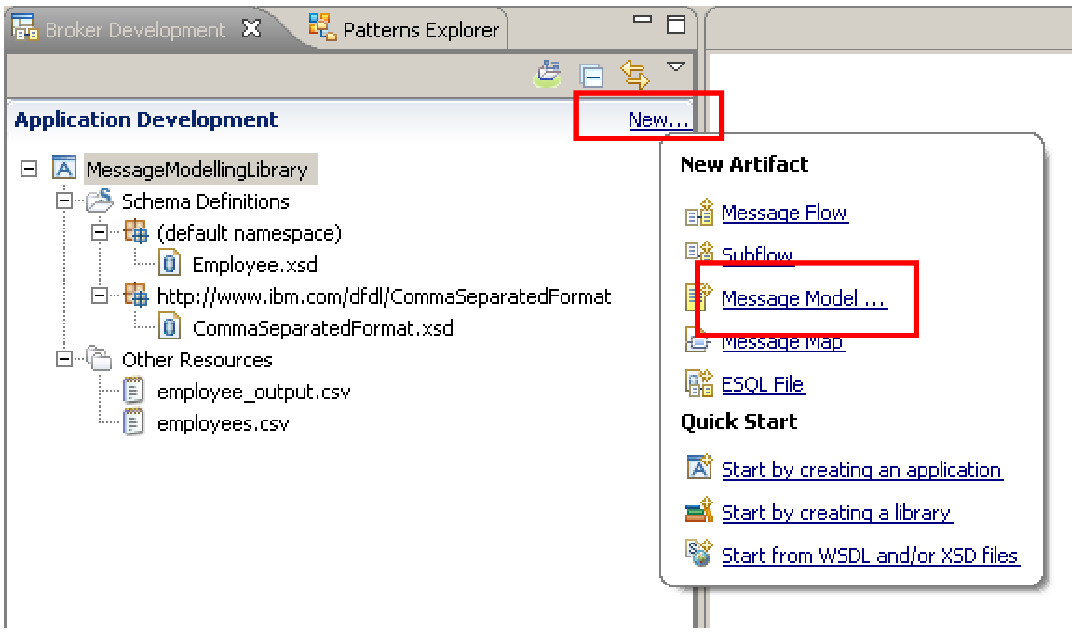
# 2. Creating a Message Model from a COBOL Copybook

This lab shows you how to create a Message Model based on a the fixed length COBOL Copybook format. To do that, you will use the message model wizard taking a .cpy file as input.

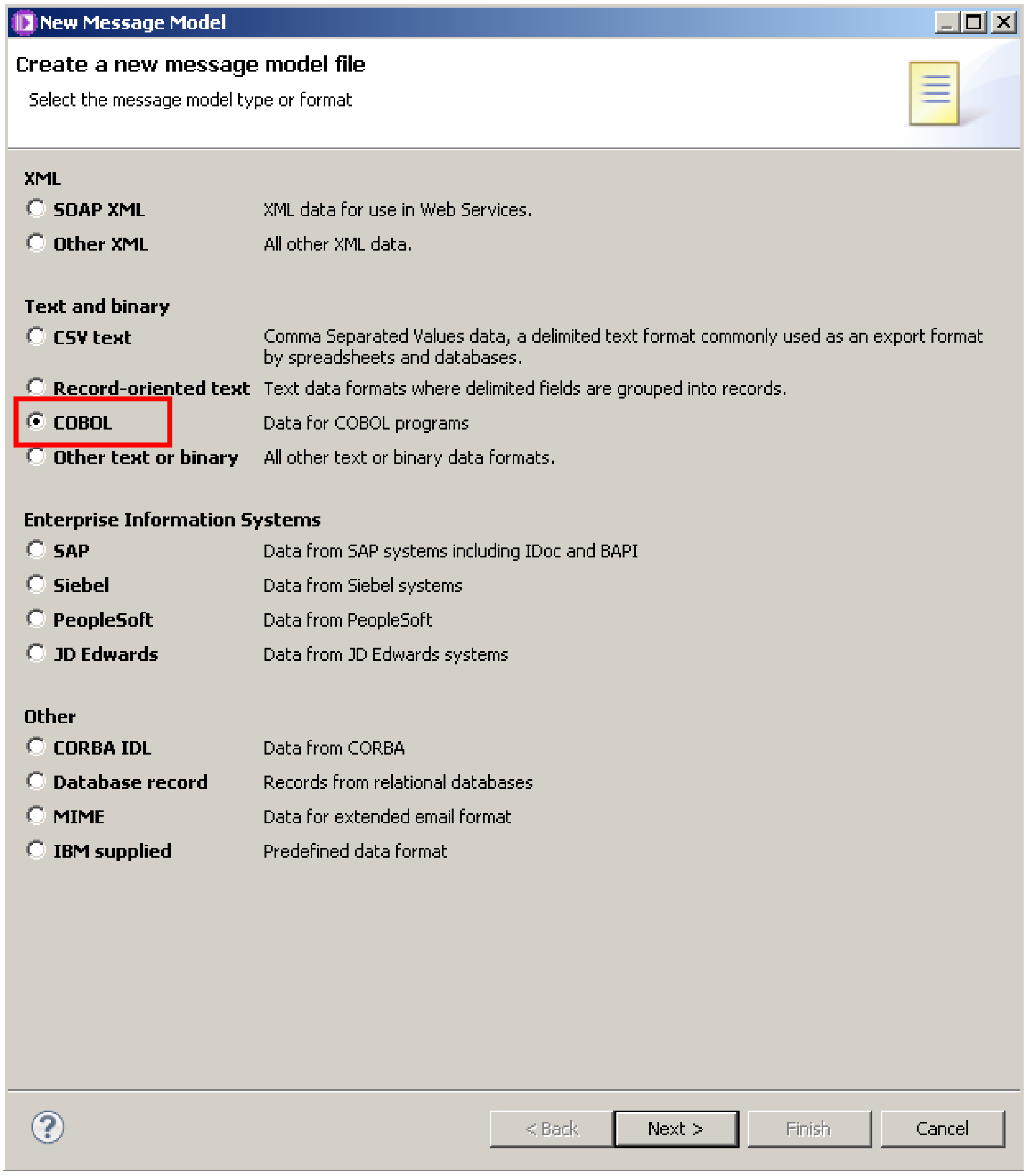
1. The first lab in this series created a CSV Message Model, so you should already have a Library created for this purpose. This lab uses the library called MessageModellingLibrary.

   (If you didn't do that lab, create a new library now called MessageModellingLibrary).

   In this library, click "New…", and select Message Model.



2. In the Message Model wizard, select COBOL and click Next.



**Create a new message model file**

Select the message model type or format

**XML**

| | |
|---|---|
| ○ SOAP XML | XML data for use in Web Services. |
| ○ Other XML | All other XML data. |

**Text and binary**

| | |
|---|---|
| ○ CSV text | Comma Separated Values data, a delimited text format commonly used as an export format by spreadsheets and databases. |
| ○ Record-oriented text | Text data formats where delimited fields are grouped into records. |
| ● COBOL | Data for COBOL programs |
| ○ Other text or binary | All other text or binary data formats. |

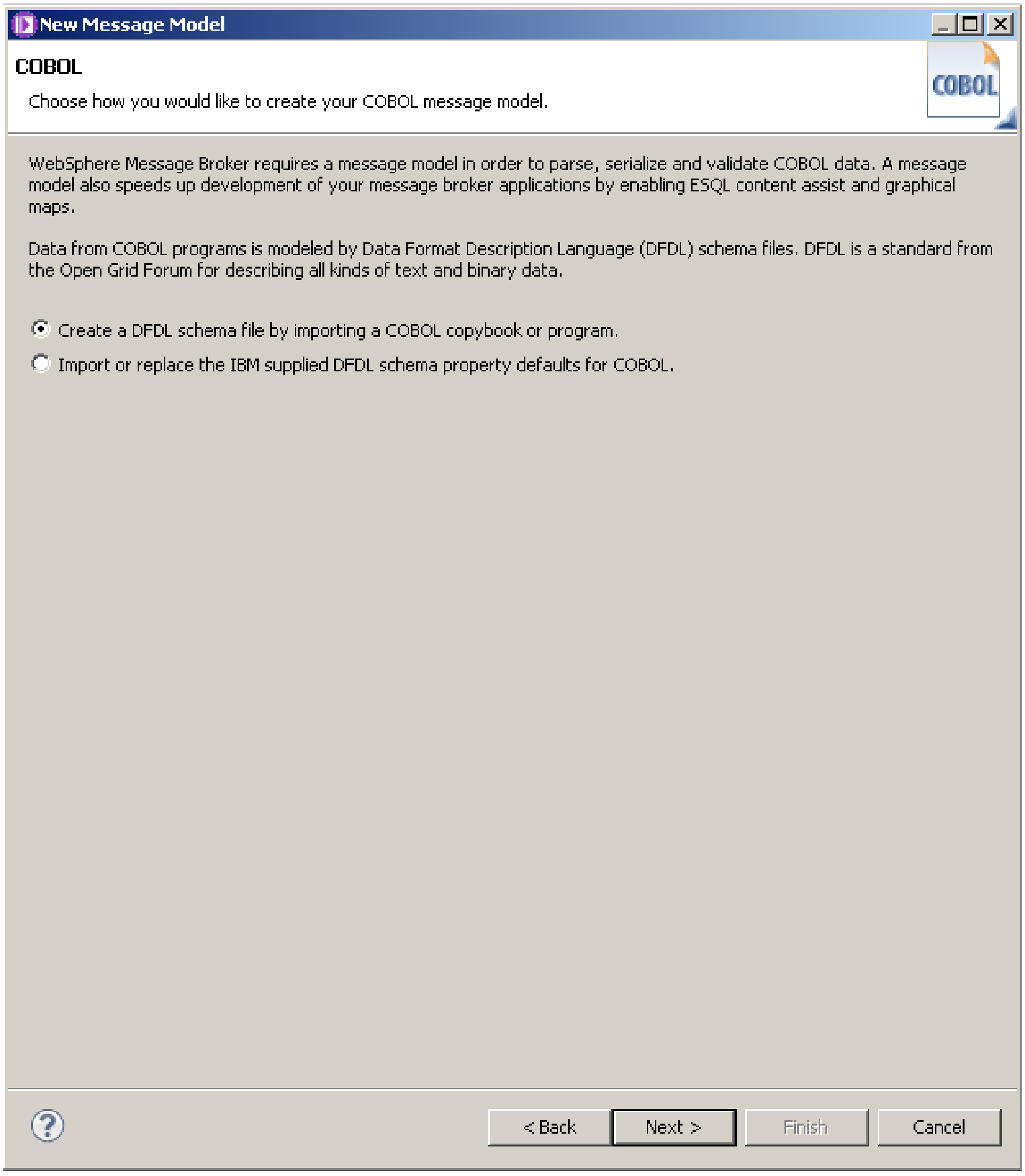
**Enterprise Information Systems**

| | |
|---|---|
| ○ SAP | Data from SAP systems including IDoc and BAPI |
| ○ Siebel | Data from Siebel systems |
| ○ PeopleSoft | Data from PeopleSoft |
| ○ JD Edwards | Data from JD Edwards systems |

**Other**

| | |
|---|---|
| ○ CORBA IDL | Data from CORBA |
| ○ Database record | Records from relational databases |
| ○ MIME | Data for extended email format |
| ○ IBM supplied | Predefined data format |

3. Leave the default option selected, and click Next.



**COBOL**

Choose how you would like to create your COBOL message model.

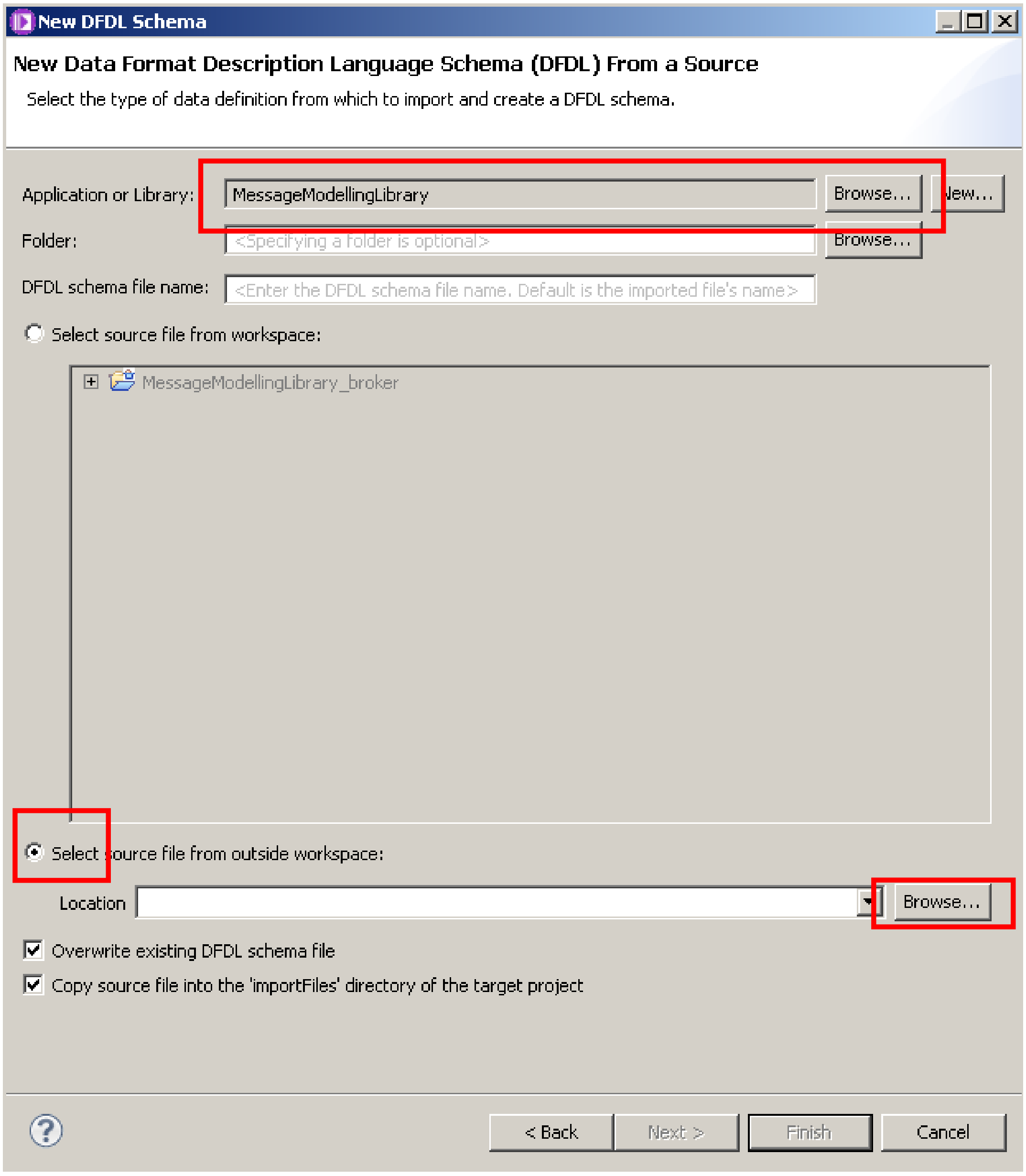
WebSphere Message Broker requires a message model in order to parse, serialize and validate COBOL data. A message model also speeds up development of your message broker applications by enabling ESQL content assist and graphical maps.

Data from COBOL programs is modeled by Data Format Description Language (DFDL) schema files. DFDL is a standard from the Open Grid Forum for describing all kinds of text and binary data.

- [✓] Create a DFDL schema file by importing a COBOL copybook or program.
- [ ] Import or replace the IBM supplied DFDL schema property defaults for COBOL.

4. Set the “Application or Library” to MessageModellingLibrary, by using the Browse button.

   Select "Select source file from outside workspace". Click the Browse button.



New DFDL Schema

New Data Format Description Language Schema (DFDL) From a Source

Select the type of data definition from which to import and create a DFDL schema.

Application or Library: MessageModellingLibrary

Folder: <Specifying a folder is optional>

DFDL schema file name: <Enter the DFDL schema file name. Default is the imported file's name>

( ) Select source file from workspace:

MessageModellingLibrary_broker

(●) Select source file from outside workspace:

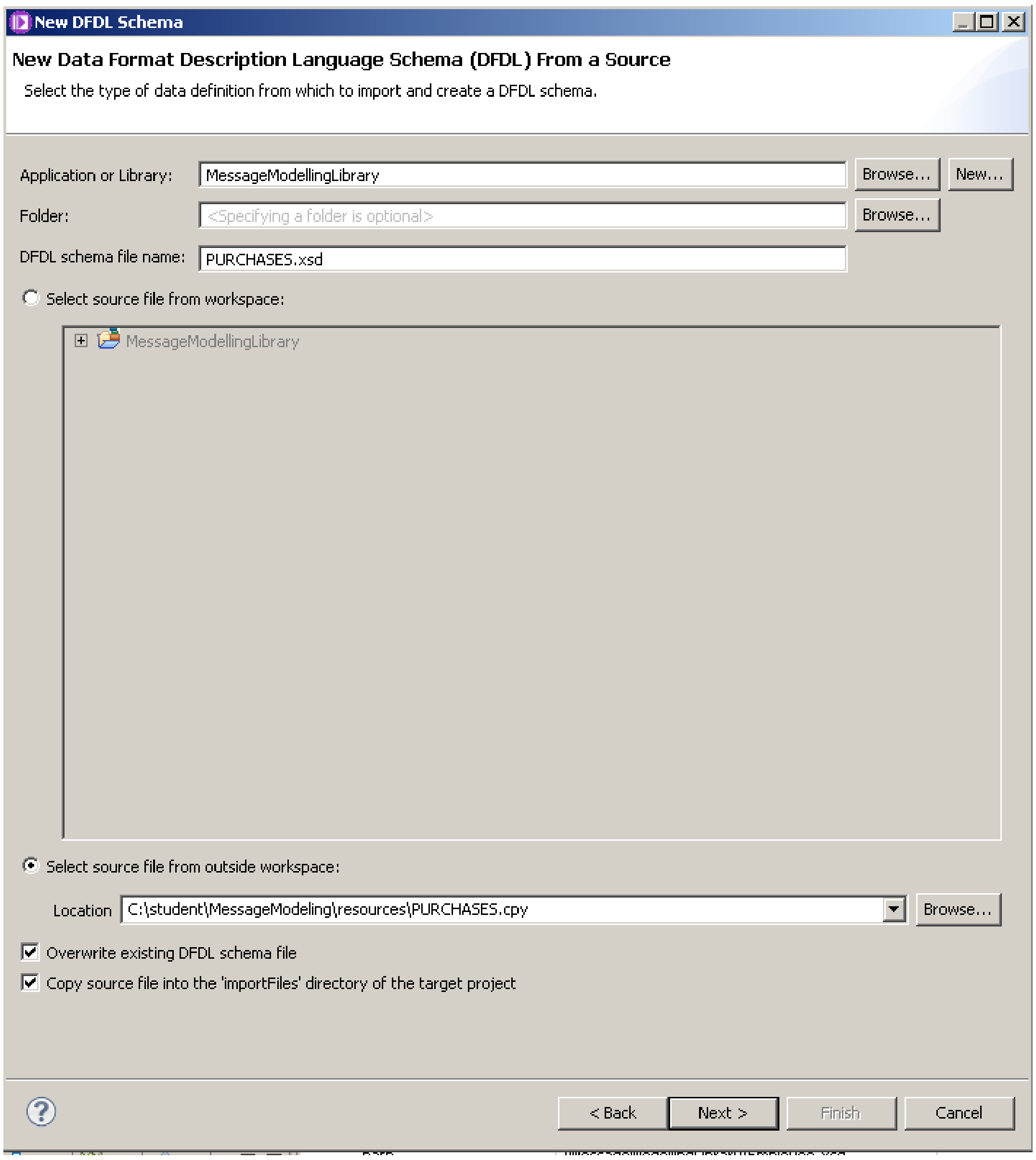
Location

[✓] Overwrite existing DFDL schema file

[✓] Copy source file into the 'importFiles' directory of the target project

5. Browse in C:\student\MessageModeling\resources\ and select the file "PURCHASES.cpy".

   Click Next.



New Data Format Description Language Schema (DFDL) From a Source

Select the type of data definition from which to import and create a DFDL schema.

Application or Library: MessageModellingLibrary

Folder: <Specifying a folder is optional>

DFDL schema file name: PURCHASES.xsd

( ) Select source file from workspace:

MessageModellingLibrary

(•) Select source file from outside workspace:

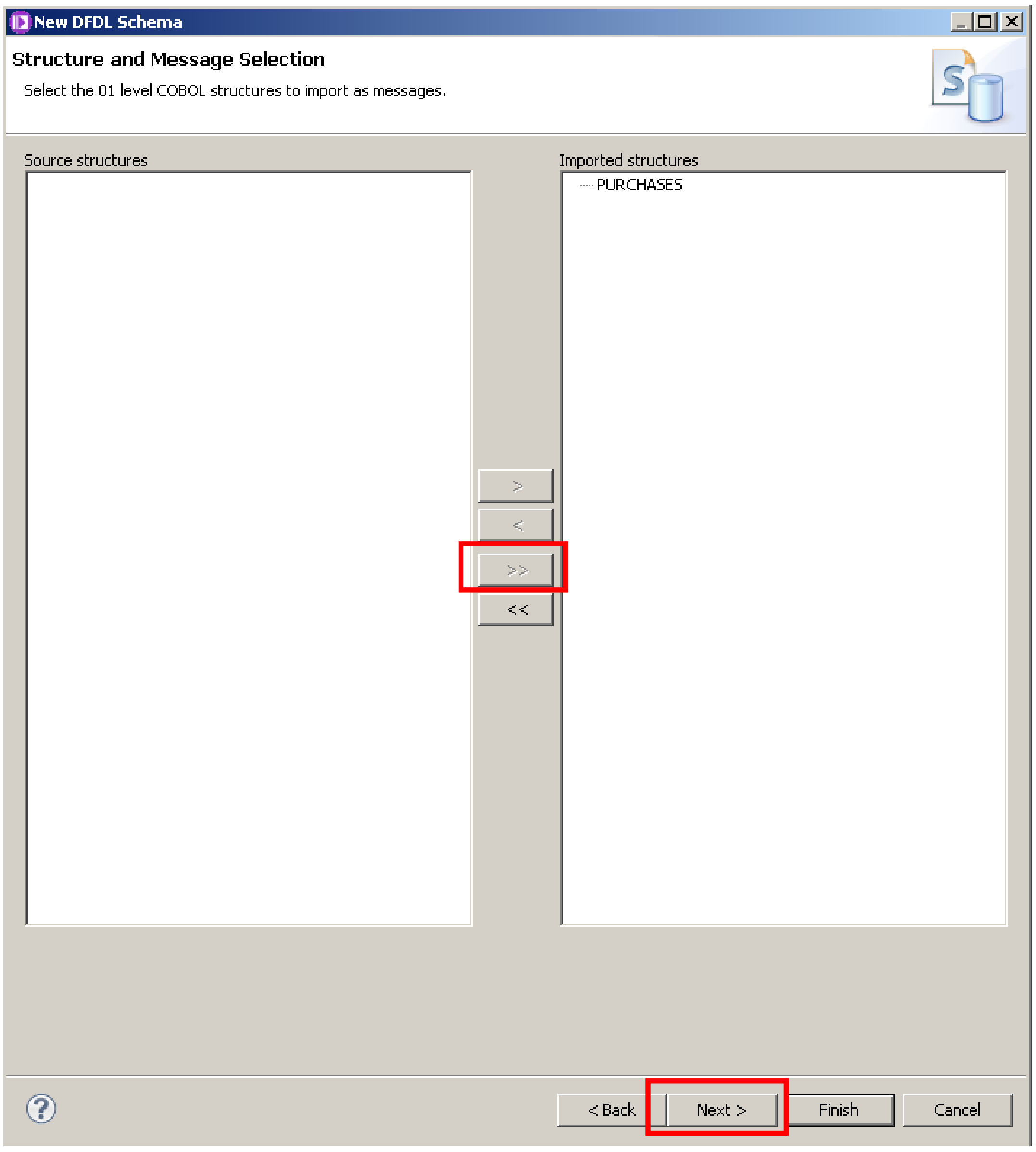
Location C:\student\MessageModeling\resources\PURCHASES.cpy

[✓] Overwrite existing DFDL schema file

[✓] Copy source file into the 'importFiles' directory of the target project

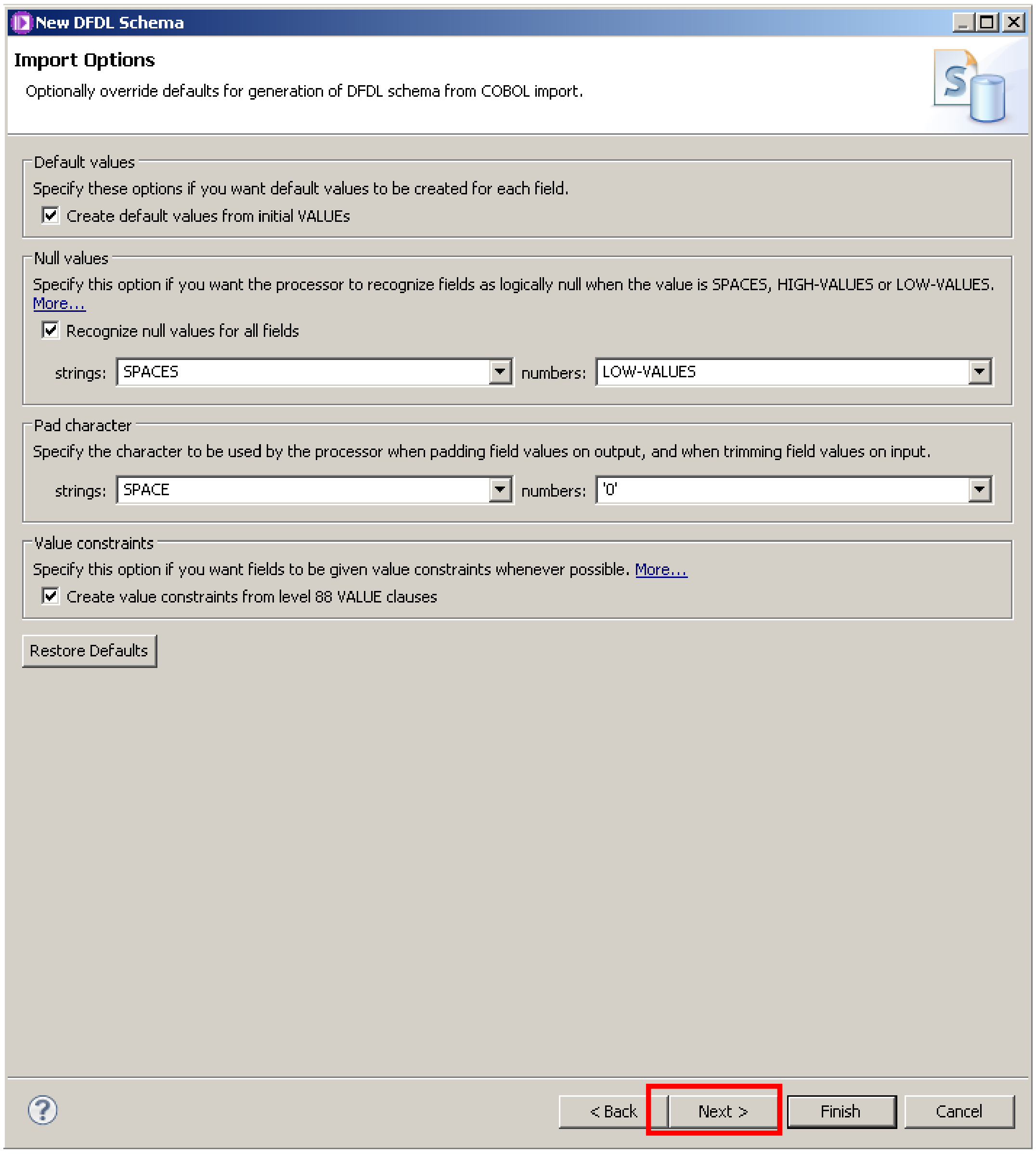
6. Click on the ">>" button to select all found objects (just one in this case) and click Next.

   Do not click Finish.


New DFDL Schema
Structure and Message Selection
Select the 01 level COBOL structures to import as messages.
Source structures
Imported structures
PURCHASES
>
<
>>
<<
< Back
Next >
Finish
Cancel

7. Leave most of the default values, but select "Recognize null values for all fields".

   Click Next.



New DFDL Schema

**Import Options**

Optionally override defaults for generation of DFDL schema from COBOL import.

Default values

Specify these options if you want default values to be created for each field.

☑ Create default values from initial VALUEs

Null values

Specify this option if you want the processor to recognize fields as logically null when the value is SPACES, HIGH-VALUES or LOW-VALUES. More...

☑ Recognize null values for all fields

strings: SPACES numbers: LOW-VALUES

Pad character

Specify the character to be used by the processor when padding field values on output, and when trimming field values on input.

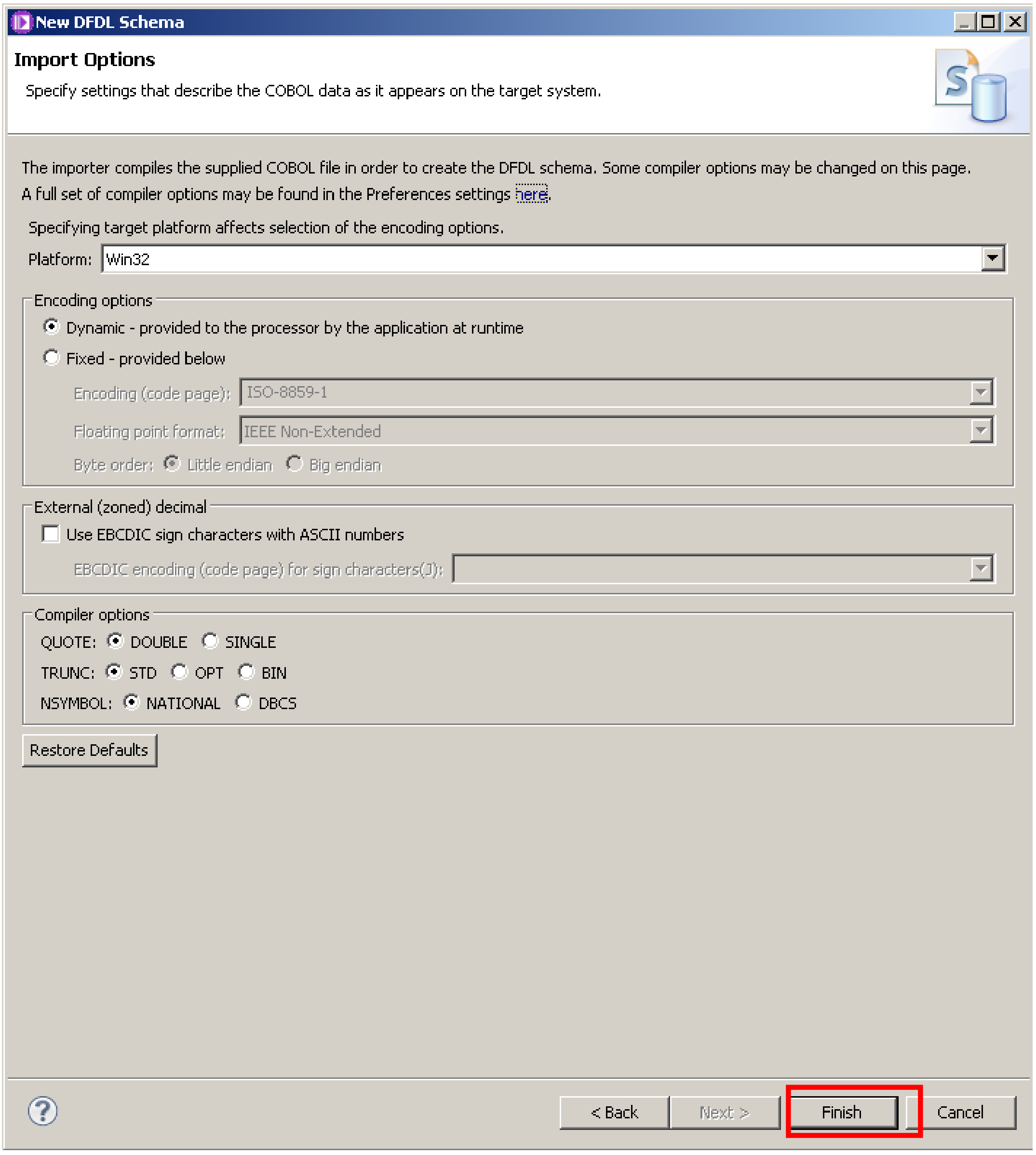
strings: SPACE numbers: '0'

Value constraints

Specify this option if you want fields to be given value constraints whenever possible. More...

☑ Create value constraints from level 88 VALUE clauses

8. Leave all the defaults values, and click Finish.



New DFDL Schema

**Import Options**

Specify settings that describe the COBOL data as it appears on the target system.

The importer compiles the supplied COBOL file in order to create the DFDL schema. Some compiler options may be changed on this page.
A full set of compiler options may be found in the Preferences settings here.

Specifying target platform affects selection of the encoding options.

Platform: Win32

Encoding options

[✓ Dynamic - provided to the processor by the application at runtime]

Fixed - provided below

Encoding (code page): ISO-8859-1

Floating point format: IEEE Non-Extended

Byte order: [✓ Little endian] Big endian

External (zoned) decimal

☐ Use EBCDIC sign characters with ASCII numbers

EBCDIC encoding (code page) for sign characters(J):

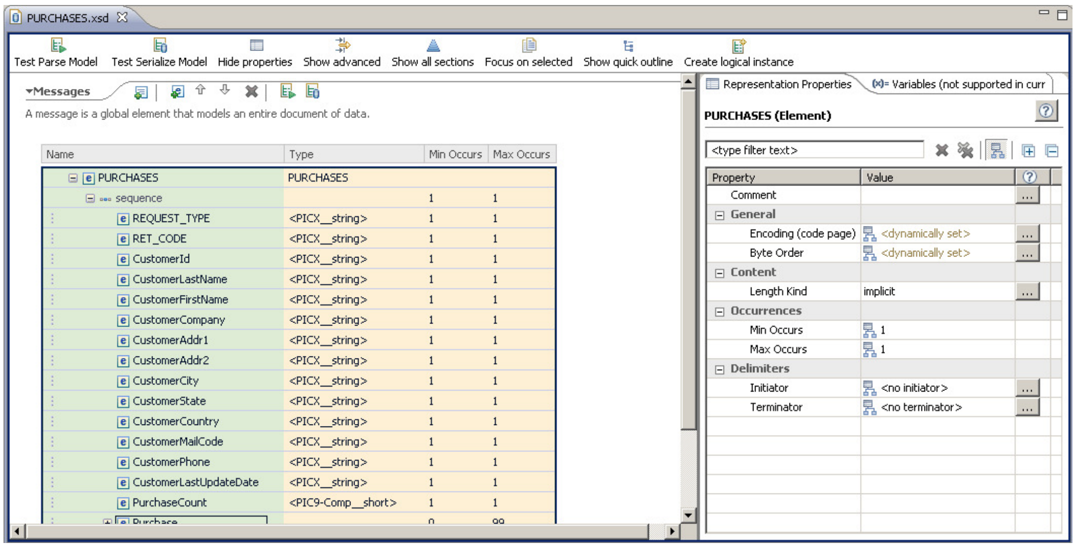
Compiler options

QUOTE: [✓ DOUBLE] SINGLE

TRUNC: [✓ STD] OPT BIN

NSYMBOL: [✓ NATIONAL] DBCS

9. The DFDL editor opens with the newly created DFDL message model called PURCHASES.xsd.



A message is a global element that models an entire document of data.

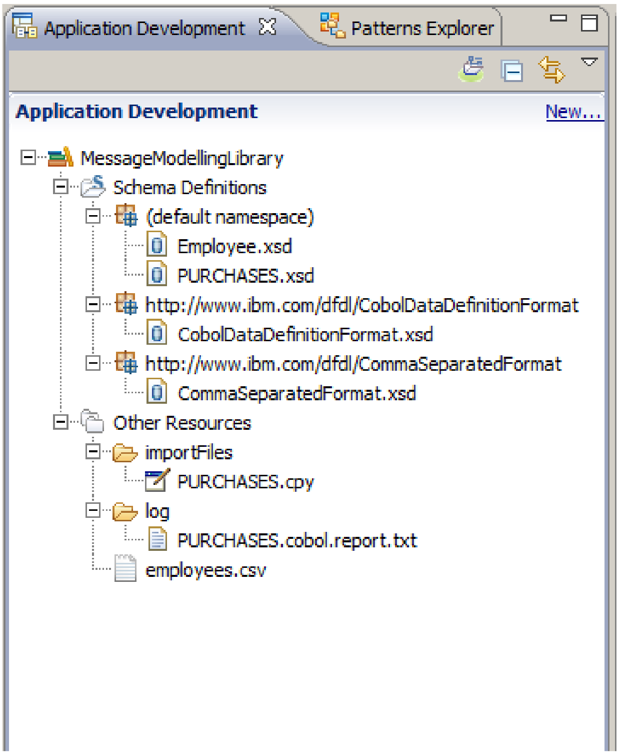
| Name | Type | Min Occurs | Max Occurs |
|---|---|---|---|
| PURCHASES | PURCHASES | | |
| sequence | | 1 | 1 |
| REQUEST_TYPE | <PICX__string> | 1 | 1 |
| RET_CODE | <PICX__string> | 1 | 1 |
| CustomerId | <PICX__string> | 1 | 1 |
| CustomerLastName | <PICX__string> | 1 | 1 |
| CustomerFirstName | <PICX__string> | 1 | 1 |
| CustomerCompany | <PICX__string> | 1 | 1 |
| CustomerAddr1 | <PICX__string> | 1 | 1 |
| CustomerAddr2 | <PICX__string> | 1 | 1 |
| CustomerCity | <PICX__string> | 1 | 1 |
| CustomerState | <PICX__string> | 1 | 1 |
| CustomerCountry | <PICX__string> | 1 | 1 |
| CustomerMailCode | <PICX__string> | 1 | 1 |
| CustomerPhone | <PICX__string> | 1 | 1 |
| CustomerLastUpdateDate | <PICX__string> | 1 | 1 |
| PurchaseCount | <PIC9-Comp__short> | 1 | 1 |
| Purchase | | 0 | 99 |

PURCHASES (Element)

<type filter text>

| Property | Value |
|---|---|
| Comment | |
| General | |
| Encoding (code page) | <dynamically set> |
| Byte Order | <dynamically set> |
| Content | |
| Length Kind | implicit |
| Occurrences | |
| Min Occurs | 1 |
| Max Occurs | 1 |
| Delimiters | |
| Initiator | <no initiator> |
| Terminator | <no terminator> |

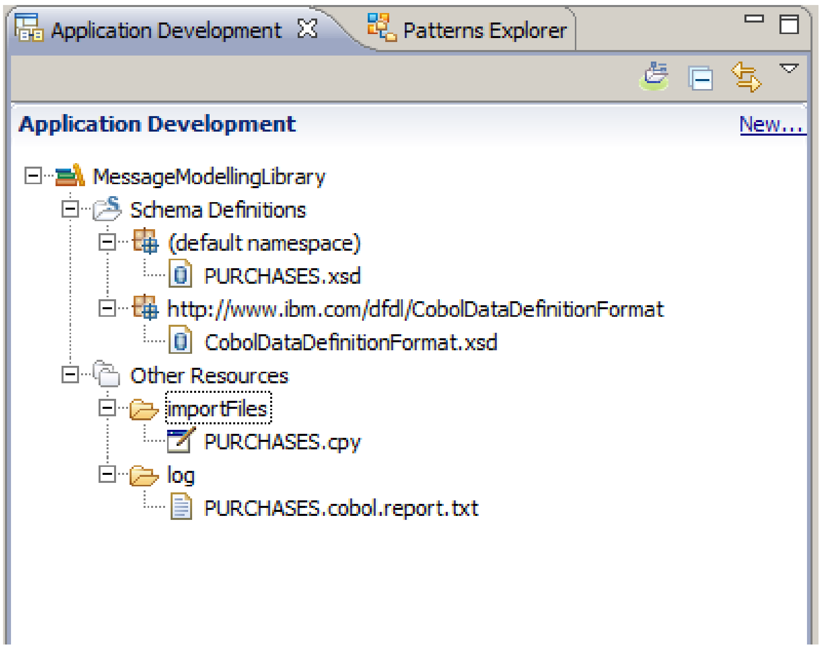
10. Notice the wizard automatically added a file called "CobolDataDefinitionFormat.xsd" under the Schema Definitions in MessageModellingLibrary. This file is referenced by PURCHASES.xsd as a schema import, and it contains COBOL-specific defaults for all the DFDL properties, and some pre-defined simple types.



```
MessageModellingLibrary
    Schema Definitions
        (default namespace)
            Employee.xsd
            PURCHASES.xsd
        http://www.ibm.com/dfdl/CobolDataDefinitionFormat
            CobolDataDefinitionFormat.xsd
        http://www.ibm.com/dfdl/CommaSeparatedFormat
            CommaSeparatedFormat.xsd
    Other Resources
        importFiles
            PURCHASES.cpy
        log
            PURCHASES.cobol.report.txt
        employees.csv
```

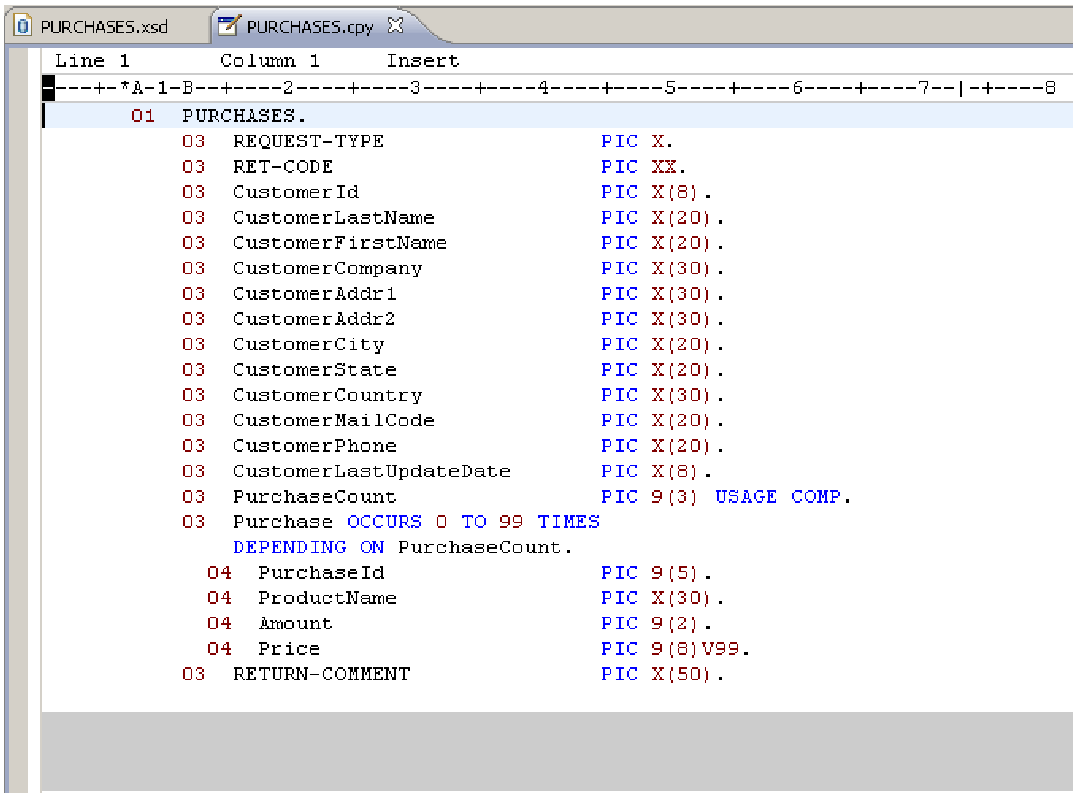
11. Expand the "Other Resources" folder under the MessageModelingLibrary library.

    Expand the "importFiles/student/MessageModeling/resources" folder and you will find the PURCHASES.cpy file that the wizard has automatically imported. (You will also see resources that you created in earlier DFDL labs).



```
MessageModellingLibrary
  Schema Definitions
    (default namespace)
      PURCHASES.xsd
    http://www.ibm.com/dfdl/CobolDataDefinitionFormat
      CobolDataDefinitionFormat.xsd
  Other Resources
    importFiles
      PURCHASES.cpy
    log
      PURCHASES.cobol.report.txt
```

12. Double-click on PURCHASES.cpy to open it in the editor.

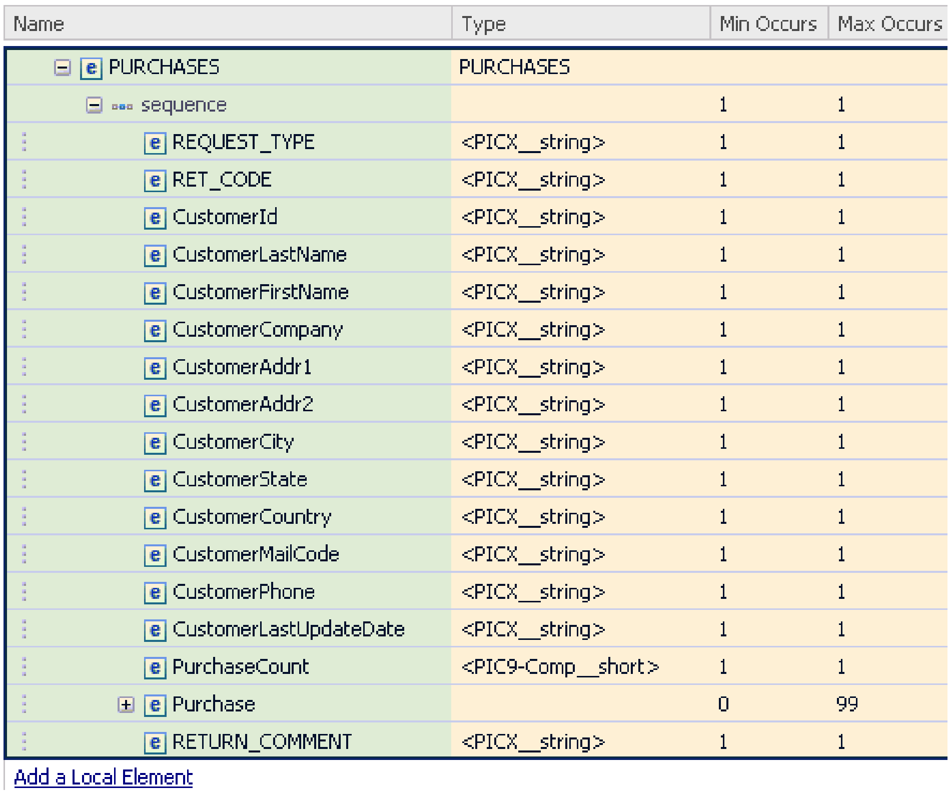


```
 Line 1        Column 1      Insert
----+-*A-1-B--+----2----+----3----+----4----+----5----+----6----+----7--|-+----8
       01  PURCHASES.
           03  REQUEST-TYPE                PIC X.
           03  RET-CODE                    PIC XX.
           03  CustomerId                  PIC X(8).
           03  CustomerLastName            PIC X(20).
           03  CustomerFirstName           PIC X(20).
           03  CustomerCompany             PIC X(30).
           03  CustomerAddr1               PIC X(30).
           03  CustomerAddr2               PIC X(30).
           03  CustomerCity                PIC X(20).
           03  CustomerState               PIC X(20).
           03  CustomerCountry             PIC X(30).
           03  CustomerMailCode            PIC X(20).
           03  CustomerPhone               PIC X(20).
           03  CustomerLastUpdateDate      PIC X(8).
           03  PurchaseCount               PIC 9(3) USAGE COMP.
           03  Purchase OCCURS 0 TO 99 TIMES
               DEPENDING ON PurchaseCount.
             04  PurchaseId                PIC 9(5).
             04  ProductName               PIC X(30).
             04  Amount                    PIC 9(2).
             04  Price                     PIC 9(8)V99.
           03  RETURN-COMMENT              PIC X(50).
```

This is a simple copybook with:

- 14 string fields
- PurchaseCount: binary field with the number of the Purchase structure occurrences
- Purchase: Repeating structure
  - PurchaseId, Amount: numeric fields.
  - Price: numeric field with 2 decimal places.

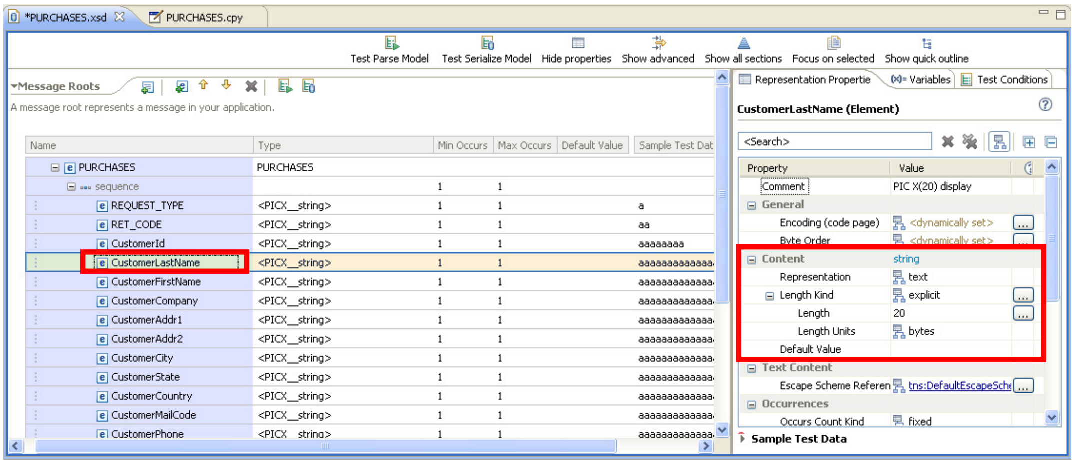
13. Switch to the DFDL editor. For the PURCHASES.xsd This shows the string fields, defined as "PICX_string" by the import wizard:



| Name | Type | Min Occurs | Max Occurs |
|---|---|---|---|
| PURCHASES | PURCHASES | | |
| sequence | | 1 | 1 |
| REQUEST_TYPE | <PICX__string> | 1 | 1 |
| RET_CODE | <PICX__string> | 1 | 1 |
| CustomerId | <PICX__string> | 1 | 1 |
| CustomerLastName | <PICX__string> | 1 | 1 |
| CustomerFirstName | <PICX__string> | 1 | 1 |
| CustomerCompany | <PICX__string> | 1 | 1 |
| CustomerAddr1 | <PICX__string> | 1 | 1 |
| CustomerAddr2 | <PICX__string> | 1 | 1 |
| CustomerCity | <PICX__string> | 1 | 1 |
| CustomerState | <PICX__string> | 1 | 1 |
| CustomerCountry | <PICX__string> | 1 | 1 |
| CustomerMailCode | <PICX__string> | 1 | 1 |
| CustomerPhone | <PICX__string> | 1 | 1 |
| CustomerLastUpdateDate | <PICX__string> | 1 | 1 |
| PurchaseCount | <PIC9-Comp__short> | 1 | 1 |
| Purchase | | 0 | 99 |
| RETURN_COMMENT | <PICX__string> | 1 | 1 |

Add a Local Element

14. In the DFDL Editor click on the "CustomerLastName" field to see its properties:



A message root represents a message in your application.

| Name | Type | Min Occurs | Max Occurs | Default Value | Sample Test Dat |
|---|---|---|---|---|---|
| PURCHASES | PURCHASES | | | | |
| sequence | | 1 | 1 | | |
| REQUEST_TYPE | <PICX__string> | 1 | 1 | | a |
| RET_CODE | <PICX__string> | 1 | 1 | | aa |
| CustomerId | <PICX__string> | 1 | 1 | | aaaaaaa |
| CustomerLastName | <PICX__string> | 1 | 1 | | aaaaaaaaaaaa |
| CustomerFirstName | <PICX__string> | 1 | 1 | | aaaaaaaaaaaa |
| CustomerCompany | <PICX__string> | 1 | 1 | | aaaaaaaaaaaa |
| CustomerAddr1 | <PICX__string> | 1 | 1 | | aaaaaaaaaaaa |
| CustomerAddr2 | <PICX__string> | 1 | 1 | | aaaaaaaaaaaa |
| CustomerCity | <PICX__string> | 1 | 1 | | aaaaaaaaaaaa |
| CustomerState | <PICX__string> | 1 | 1 | | aaaaaaaaaaaa |
| CustomerCountry | <PICX__string> | 1 | 1 | | aaaaaaaaaaaa |
| CustomerMailCode | <PICX__string> | 1 | 1 | | aaaaaaaaaaaa |
| CustomerPhone | <PICX__string> | 1 | 1 | | aaaaaaaaaaaa |

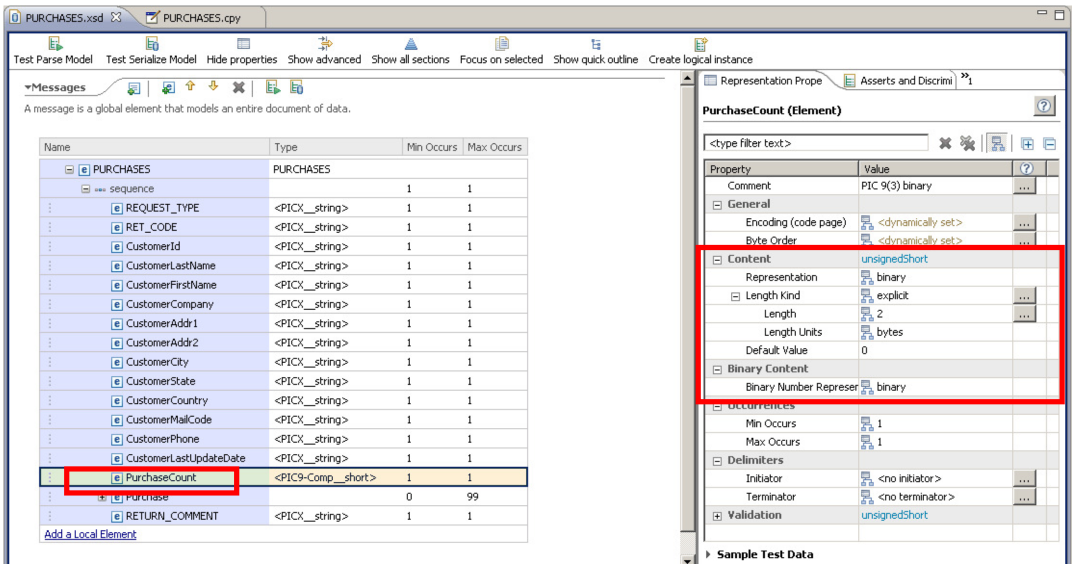
CustomerLastName (Element)

<Search>

| Property | Value |
|---|---|
| Comment | PIC X(20) display |
| General | |
| Encoding (code page) | <dynamically set> |
| Byte Order | <dynamically set> |
| Content | string |
| Representation | text |
| Length Kind | explicit |
| Length | 20 |
| Length Units | bytes |
| Default Value | |
| Text Content | |
| Escape Scheme Referen | tns:DefaultEscapeSche |
| Occurrences | |
| Occurs Count Kind | fixed |

In the properties view, look for the "Content" section. Note that the field was modeled as "text" representation, with a fixed (explicit) Length of 20 bytes, because the cpy file defined it as a "PIC X(20)"

15. In the DFDL Editor, click on the PurchaseCount field to see its properties:



A message is a global element that models an entire document of data.

| Name | Type | Min Occurs | Max Occurs |
|---|---|---|---|
| PURCHASES | PURCHASES | | |
| sequence | | 1 | 1 |
| REQUEST_TYPE | <PICX__string> | 1 | 1 |
| RET_CODE | <PICX__string> | 1 | 1 |
| CustomerId | <PICX__string> | 1 | 1 |
| CustomerLastName | <PICX__string> | 1 | 1 |
| CustomerFirstName | <PICX__string> | 1 | 1 |
| CustomerCompany | <PICX__string> | 1 | 1 |
| CustomerAddr1 | <PICX__string> | 1 | 1 |
| CustomerAddr2 | <PICX__string> | 1 | 1 |
| CustomerCity | <PICX__string> | 1 | 1 |
| CustomerState | <PICX__string> | 1 | 1 |
| CustomerCountry | <PICX__string> | 1 | 1 |
| CustomerMailCode | <PICX__string> | 1 | 1 |
| CustomerPhone | <PICX__string> | 1 | 1 |
| CustomerLastUpdateDate | <PICX__string> | 1 | 1 |
| PurchaseCount | <PIC9-Comp__short> | 1 | 1 |
| Purchase | | 0 | 99 |
| RETURN_COMMENT | <PICX__string> | 1 | 1 |

PurchaseCount (Element)

<type filter text>

| Property | Value |
|---|---|
| Comment | PIC 9(3) binary |
| General | |
| Encoding (code page) | <dynamically set> |
| Byte Order | <dynamically set> |
| Content | unsignedShort |
| Representation | binary |
| Length Kind | explicit |
| Length | 2 |
| Length Units | bytes |
| Default Value | 0 |
| Binary Content | |
| Binary Number Represer | binary |
| Occurrences | |
| Min Occurs | 1 |
| Max Occurs | 1 |
| Delimiters | |
| Initiator | <no initiator> |
| Terminator | <no terminator> |
| Validation | unsignedShort |

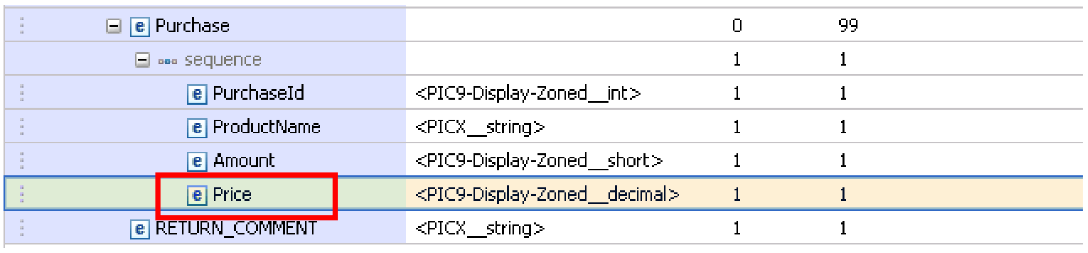
This field, which was defined as binary in the copybook file ("PIC 9(3) USAGE COMP"), was created as "PIC9_Comp_short" by the Import wizard.

You can see the details of this field in the properties view, where its length is set to "2", its Length Units to "bytes" and its representation to "binary".

Also, in the "Binary Content" section, its Binary Number Representation is set to binary. This property can take 3 different values:

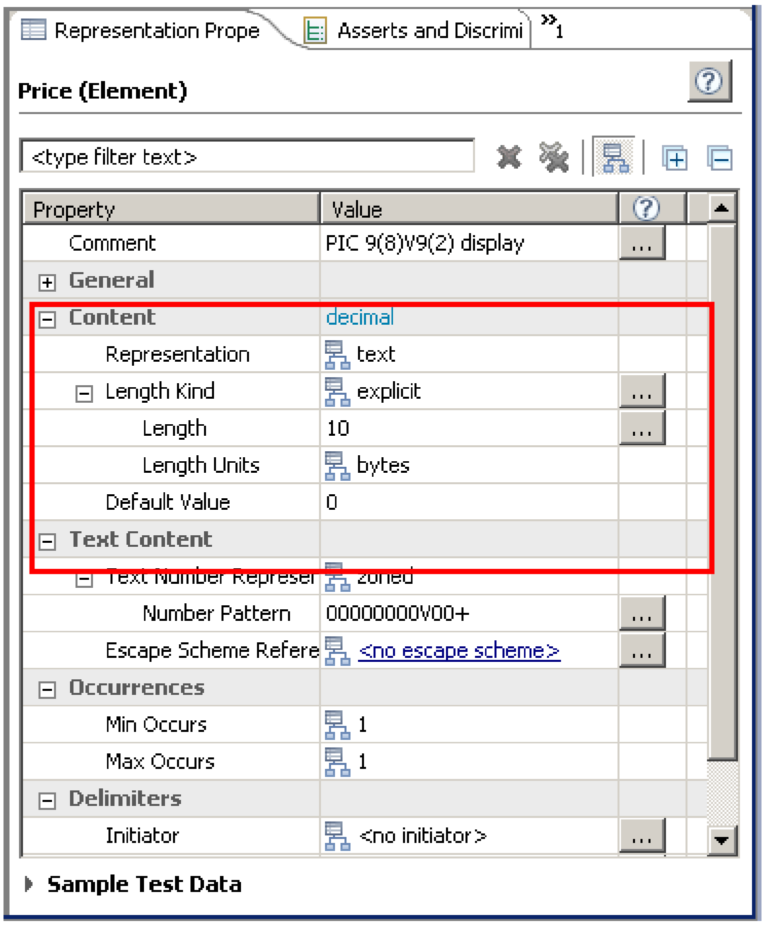
- packed: represented as a packed decimal. Each byte contains 2 decimal digits except for the least significant byte, which contains a sign in the least significant nibble
- bcd: represented as a binary coded decimal with 2 digits per byte.
- binary: represented as 2' complement for signed types and unsigned binary for unsigned types.
- ibm4690Packed:  used by the IBM 4690 retail store devices

16. Now click on the Price field, in the Purchase structure.



| | | | |
|---|---|---|---|
| Purchase | | 0 | 99 |
| sequence | | 1 | 1 |
| PurchaseId | <PIC9-Display-Zoned__int> | 1 | 1 |
| ProductName | <PICX__string> | 1 | 1 |
| Amount | <PIC9-Display-Zoned__short> | 1 | 1 |
| Price | <PIC9-Display-Zoned__decimal> | 1 | 1 |
| RETURN_COMMENT | <PICX__string> | 1 | 1 |

17. In the properties view, look at the "Content" section.



Representation Prope | Asserts and Discrimi | »1

**Price (Element)**

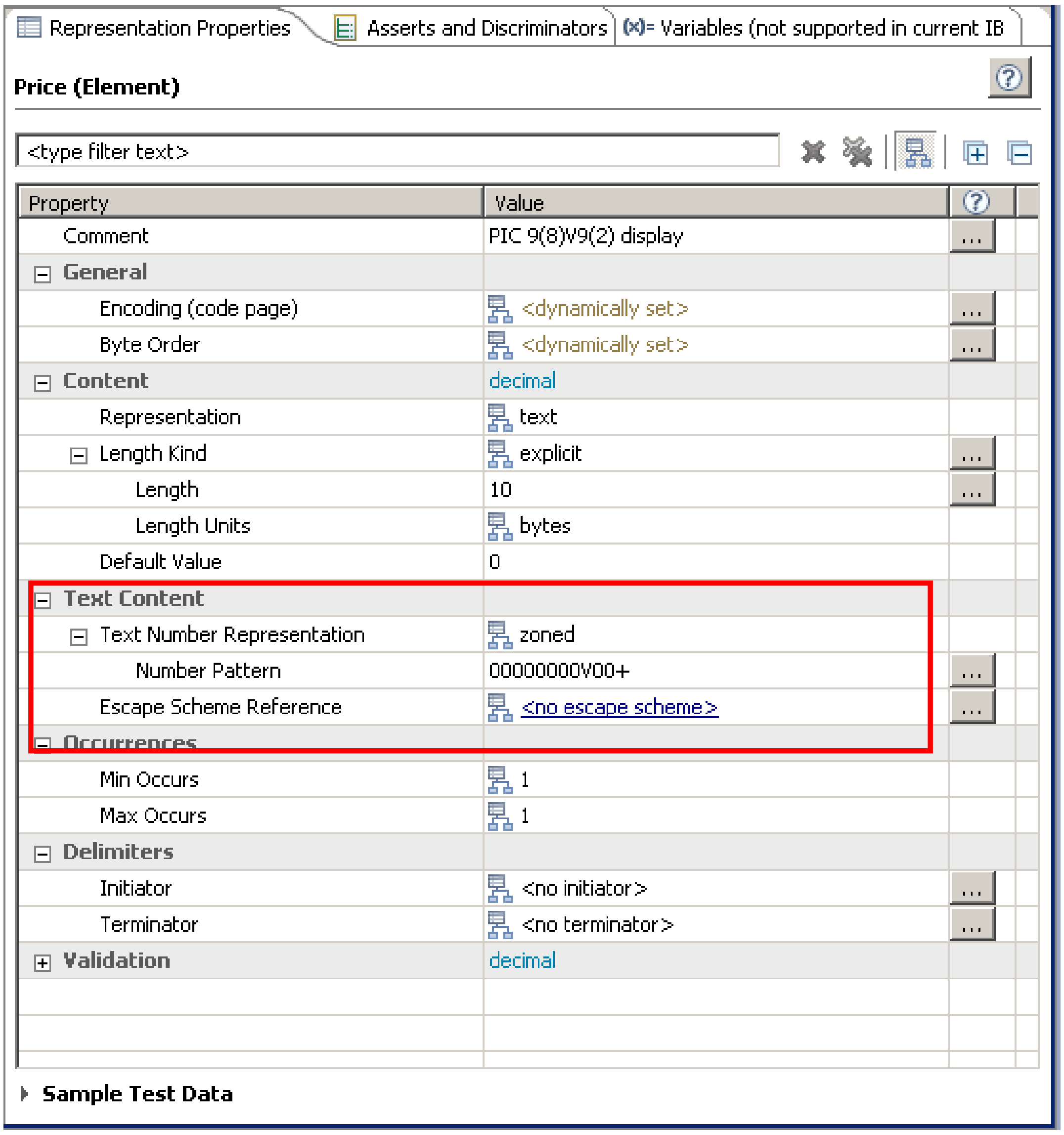
<type filter text>

| Property | Value |
|---|---|
| Comment | PIC 9(8)V9(2) display |
| General | |
| Content | decimal |
| Representation | text |
| Length Kind | explicit |
| Length | 10 |
| Length Units | bytes |
| Default Value | 0 |
| Text Content | |
| Text Number Represen | zoned |
| Number Pattern | 00000000V00+ |
| Escape Scheme Refere | <no escape scheme> |
| Occurrences | |
| Min Occurs | 1 |
| Max Occurs | 1 |
| Delimiters | |
| Initiator | <no initiator> |

**Sample Test Data**

Note that it is defined as a decimal field, with text representation and a length of 10 bytes (8 integers and 2 decimal places).

18. Look at the "Text Content" section of the properties view.



Representation Properties | Asserts and Discriminators | (x)= Variables (not supported in current IB

**Price (Element)**

<type filter text>

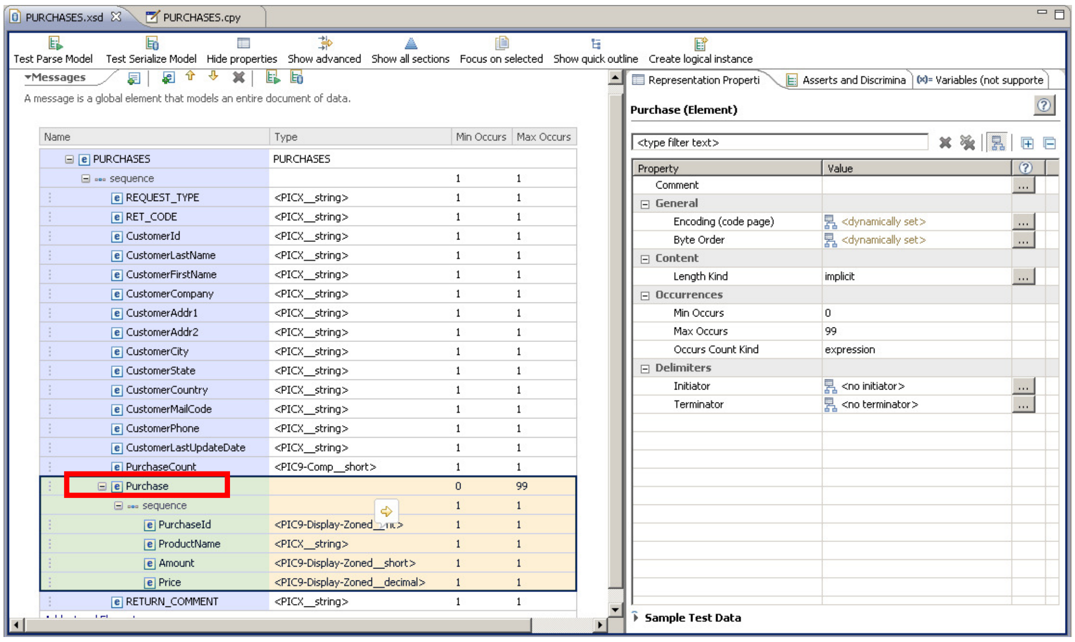
| Property | Value |
|---|---|
| Comment | PIC 9(8)V9(2) display |
| **General** | |
| Encoding (code page) | <dynamically set> |
| Byte Order | <dynamically set> |
| **Content** | decimal |
| Representation | text |
| Length Kind | explicit |
| Length | 10 |
| Length Units | bytes |
| Default Value | 0 |
| **Text Content** | |
| Text Number Representation | zoned |
| Number Pattern | 00000000V00+ |
| Escape Scheme Reference | <no escape scheme> |
| **Occurrences** | |
| Min Occurs | 1 |
| Max Occurs | 1 |
| **Delimiters** | |
| Initiator | <no initiator> |
| Terminator | <no terminator> |
| **Validation** | decimal |

**Sample Test Data**

Note that the "text number representation" is defined as "zoned", with a pattern of 8 integer numbers and 2 decimal places.

The letter “V” in the Number Pattern is an implied decimal point (common in COBOL copybooks).

19. Click on the "Purchase" element to open its properties.



A message is a global element that models an entire document of data.

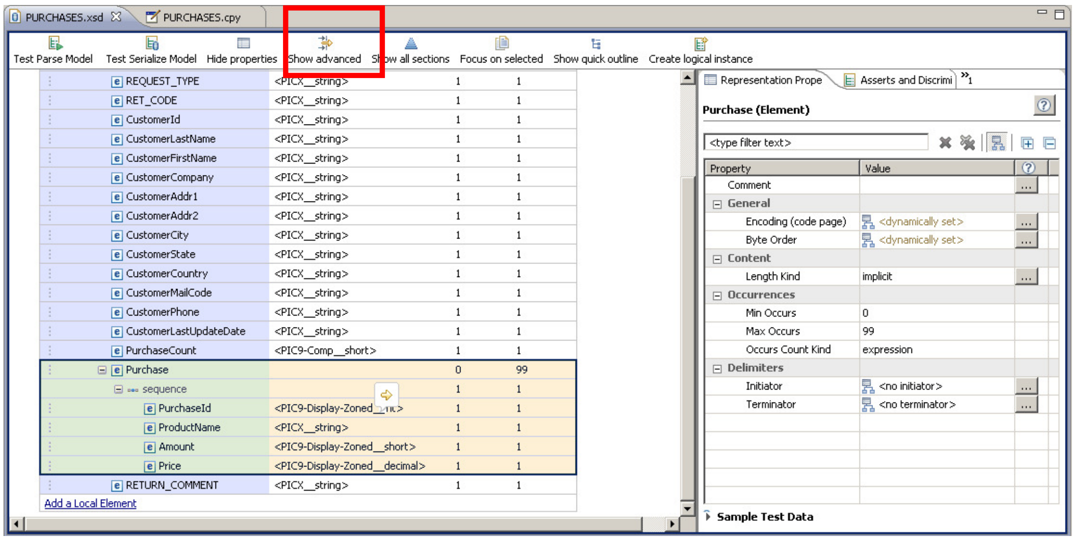
| Name | Type | Min Occurs | Max Occurs |
|---|---|---|---|
| PURCHASES | PURCHASES | | |
| sequence | | 1 | 1 |
| REQUEST_TYPE | <PICX__string> | 1 | 1 |
| RET_CODE | <PICX__string> | 1 | 1 |
| CustomerId | <PICX__string> | 1 | 1 |
| CustomerLastName | <PICX__string> | 1 | 1 |
| CustomerFirstName | <PICX__string> | 1 | 1 |
| CustomerCompany | <PICX__string> | 1 | 1 |
| CustomerAddr1 | <PICX__string> | 1 | 1 |
| CustomerAddr2 | <PICX__string> | 1 | 1 |
| CustomerCity | <PICX__string> | 1 | 1 |
| CustomerState | <PICX__string> | 1 | 1 |
| CustomerCountry | <PICX__string> | 1 | 1 |
| CustomerMailCode | <PICX__string> | 1 | 1 |
| CustomerPhone | <PICX__string> | 1 | 1 |
| CustomerLastUpdateDate | <PICX__string> | 1 | 1 |
| PurchaseCount | <PIC9-Comp__short> | 1 | 1 |
| Purchase | | 0 | 99 |
| sequence | | 1 | 1 |
| PurchaseId | <PIC9-Display-Zoned__int> | 1 | 1 |
| ProductName | <PICX__string> | 1 | 1 |
| Amount | <PIC9-Display-Zoned__short> | 1 | 1 |
| Price | <PIC9-Display-Zoned__decimal> | 1 | 1 |
| RETURN_COMMENT | <PICX__string> | 1 | 1 |

**Purchase (Element)**

<type filter text>

| Property | Value |
|---|---|
| Comment | |
| General | |
| Encoding (code page) | <dynamically set> |
| Byte Order | <dynamically set> |
| Content | |
| Length Kind | implicit |
| Occurrences | |
| Min Occurs | 0 |
| Max Occurs | 99 |
| Occurs Count Kind | expression |
| Delimiters | |
| Initiator | <no initiator> |
| Terminator | <no terminator> |

20. Click on the "Show advanced" icon, to show the advanced properties.



| | | | |
|---|---|---|---|
| REQUEST_TYPE | <PICX__string> | 1 | 1 |
| RET_CODE | <PICX__string> | 1 | 1 |
| CustomerId | <PICX__string> | 1 | 1 |
| CustomerLastName | <PICX__string> | 1 | 1 |
| CustomerFirstName | <PICX__string> | 1 | 1 |
| CustomerCompany | <PICX__string> | 1 | 1 |
| CustomerAddr1 | <PICX__string> | 1 | 1 |
| CustomerAddr2 | <PICX__string> | 1 | 1 |
| CustomerCity | <PICX__string> | 1 | 1 |
| CustomerState | <PICX__string> | 1 | 1 |
| CustomerCountry | <PICX__string> | 1 | 1 |
| CustomerMailCode | <PICX__string> | 1 | 1 |
| CustomerPhone | <PICX__string> | 1 | 1 |
| CustomerLastUpdateDate | <PICX__string> | 1 | 1 |
| PurchaseCount | <PIC9-Comp__short> | 1 | 1 |
| Purchase | | 0 | 99 |
| sequence | | 1 | 1 |
| PurchaseId | <PIC9-Display-Zoned__int> | 1 | 1 |
| ProductName | <PICX__string> | 1 | 1 |
| Amount | <PIC9-Display-Zoned__short> | 1 | 1 |
| Price | <PIC9-Display-Zoned__decimal> | 1 | 1 |
| RETURN_COMMENT | <PICX__string> | 1 | 1 |

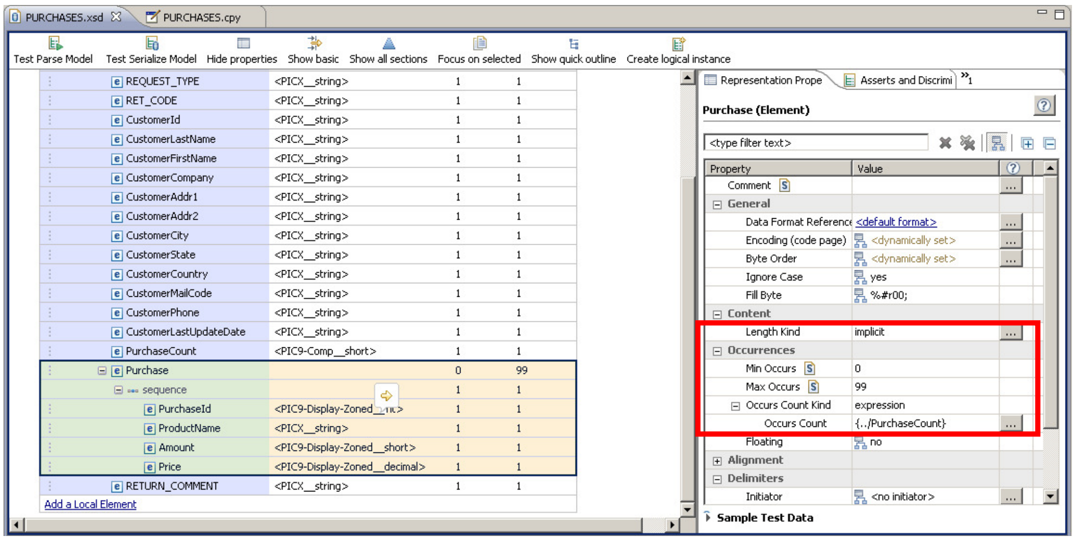
Add a Local Element

**Purchase (Element)**

<type filter text>

| Property | Value |
|---|---|
| Comment | |
| General | |
| Encoding (code page) | <dynamically set> |
| Byte Order | <dynamically set> |
| Content | |
| Length Kind | implicit |
| Occurrences | |
| Min Occurs | 0 |
| Max Occurs | 99 |
| Occurs Count Kind | expression |
| Delimiters | |
| Initiator | <no initiator> |
| Terminator | <no terminator> |

21. Look for the "Occurrences" section inside the properties view, and expand the "Occurs Count Kind" property.



| | | | |
|---|---|---|---|
| REQUEST_TYPE | <PICX__string> | 1 | 1 |
| RET_CODE | <PICX__string> | 1 | 1 |
| CustomerId | <PICX__string> | 1 | 1 |
| CustomerLastName | <PICX__string> | 1 | 1 |
| CustomerFirstName | <PICX__string> | 1 | 1 |
| CustomerCompany | <PICX__string> | 1 | 1 |
| CustomerAddr1 | <PICX__string> | 1 | 1 |
| CustomerAddr2 | <PICX__string> | 1 | 1 |
| CustomerCity | <PICX__string> | 1 | 1 |
| CustomerState | <PICX__string> | 1 | 1 |
| CustomerCountry | <PICX__string> | 1 | 1 |
| CustomerMailCode | <PICX__string> | 1 | 1 |
| CustomerPhone | <PICX__string> | 1 | 1 |
| CustomerLastUpdateDate | <PICX__string> | 1 | 1 |
| PurchaseCount | <PIC9-Comp__short> | 1 | 1 |
| Purchase | | 0 | 99 |
| sequence | | 1 | 1 |
| PurchaseId | <PIC9-Display-Zoned__int> | 1 | 1 |
| ProductName | <PICX__string> | 1 | 1 |
| Amount | <PIC9-Display-Zoned__short> | 1 | 1 |
| Price | <PIC9-Display-Zoned__decimal> | 1 | 1 |
| RETURN_COMMENT | <PICX__string> | 1 | 1 |

Add a Local Element

Purchase (Element)

<type filter text>

| Property | Value |
|---|---|
| Comment | |
| General | |
| Data Format Reference | <default format> |
| Encoding (code page) | <dynamically set> |
| Byte Order | <dynamically set> |
| Ignore Case | yes |
| Fill Byte | %#r00; |
| Content | |
| Length Kind | implicit |
| Occurrences | |
| Min Occurs | 0 |
| Max Occurs | 99 |
| Occurs Count Kind | expression |
| Occurs Count | {../PurchaseCount} |
| Floating | no |
| Alignment | |
| Delimiters | |
| Initiator | <no initiator> |

This property, as defined by the DFDL specification, can take different values:

- fixed: uses the "maxOccurs" property.
- expression: uses the value defined by the expression in "occursCount" property.
- parsed: the number of occurrences is determined by normal speculative parsing.

In this case, the "OccursCountKind" property is set to "expression", and "occursCount" is set to point to the "PurchaseCount" element. This means that the number of occurrences of the "Purchase" repeating structure will be defined by the PurchaseCount element.

This was defined by the Import wizard to reflect the cpy file, which stated:

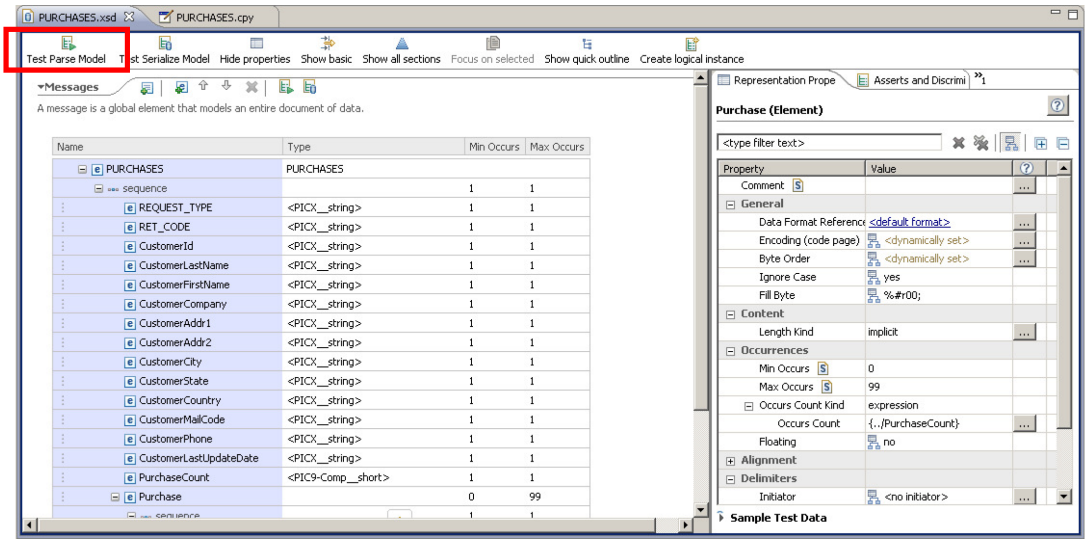
```
Purchase OCCURS 0 TO 99 TIMES DEPENDING ON PurchaseCount.
```

Notice also that the MinOccurs property is set to "0" and the MaxOccurs property is set to "99", as the cpy file stated.

22. Save your message model (PURCHASES.xsd) by pressing Ctrl+S, or File->Save.

# 3. Testing the Message Model

1. Now you will test that the message model correctly models the COBOL data. Click the "Test Parse Model" icon.



A message is a global element that models an entire document of data.

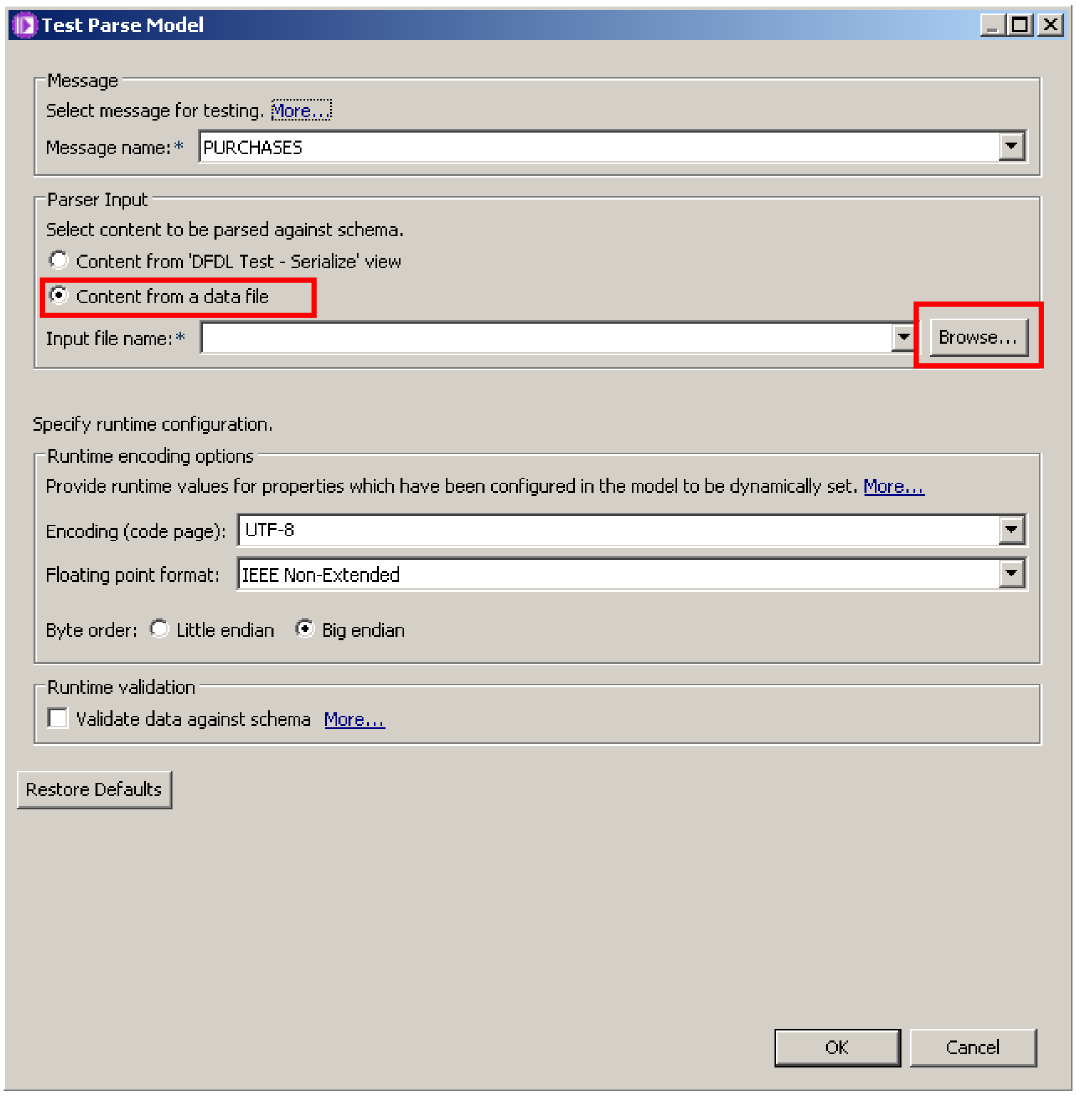
| Name | Type | Min Occurs | Max Occurs |
|---|---|---|---|
| PURCHASES | PURCHASES | | |
| sequence | | 1 | 1 |
| REQUEST_TYPE | <PICX__string> | 1 | 1 |
| RET_CODE | <PICX__string> | 1 | 1 |
| CustomerId | <PICX__string> | 1 | 1 |
| CustomerLastName | <PICX__string> | 1 | 1 |
| CustomerFirstName | <PICX__string> | 1 | 1 |
| CustomerCompany | <PICX__string> | 1 | 1 |
| CustomerAddr1 | <PICX__string> | 1 | 1 |
| CustomerAddr2 | <PICX__string> | 1 | 1 |
| CustomerCity | <PICX__string> | 1 | 1 |
| CustomerState | <PICX__string> | 1 | 1 |
| CustomerCountry | <PICX__string> | 1 | 1 |
| CustomerMailCode | <PICX__string> | 1 | 1 |
| CustomerPhone | <PICX__string> | 1 | 1 |
| CustomerLastUpdateDate | <PICX__string> | 1 | 1 |
| PurchaseCount | <PIC9-Comp__short> | 1 | 1 |
| Purchase | | 0 | 99 |
| sequence | | 1 | 1 |

**Purchase (Element)**

<type filter text>

| Property | Value |
|---|---|
| Comment | |
| **General** | |
| Data Format Referenc | <default format> |
| Encoding (code page) | <dynamically set> |
| Byte Order | <dynamically set> |
| Ignore Case | yes |
| Fill Byte | %#r00; |
| **Content** | |
| Length Kind | implicit |
| **Occurrences** | |
| Min Occurs | 0 |
| Max Occurs | 99 |
| Occurs Count Kind | expression |
| Occurs Count | {../PurchaseCount} |
| Floating | no |
| **Alignment** | |
| **Delimiters** | |
| Initiator | <no initiator> |

2. In the Parser Input section, select "Content from a data file" and click the Browse button.



Test Parse Model

Message
Select message for testing. More...
Message name: * PURCHASES

Parser Input
Select content to be parsed against schema.
Content from 'DFDL Test - Serialize' view
[✓ Content from a data file]
Input file name: *
Browse...

Specify runtime configuration.

Runtime encoding options
Provide runtime values for properties which have been configured in the model to be dynamically set. More...
Encoding (code page): UTF-8
Floating point format: IEEE Non-Extended
Byte order: Little endian [✓ Big endian]

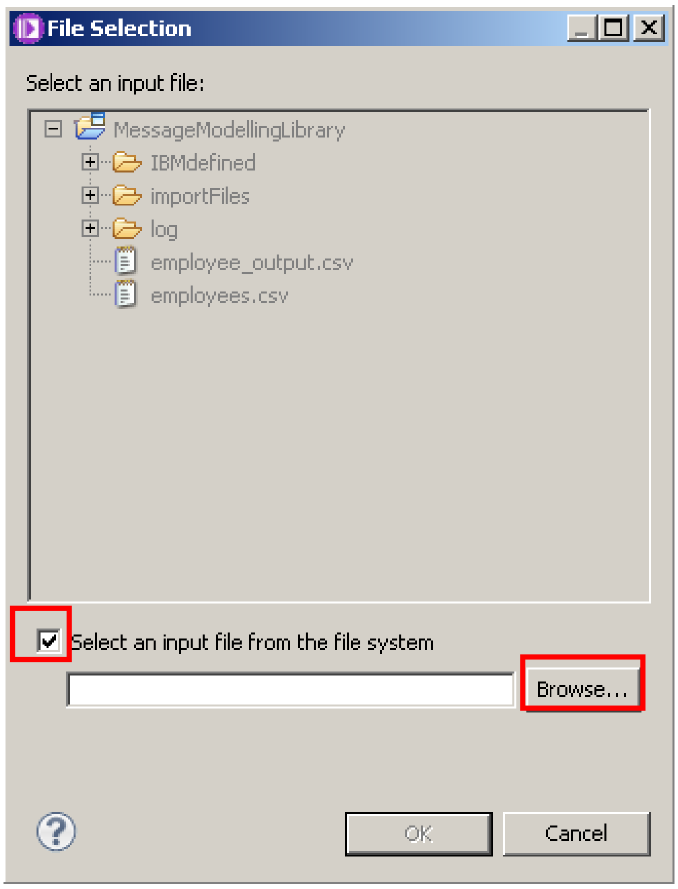
Runtime validation
Validate data against schema More...

Restore Defaults

OK Cancel

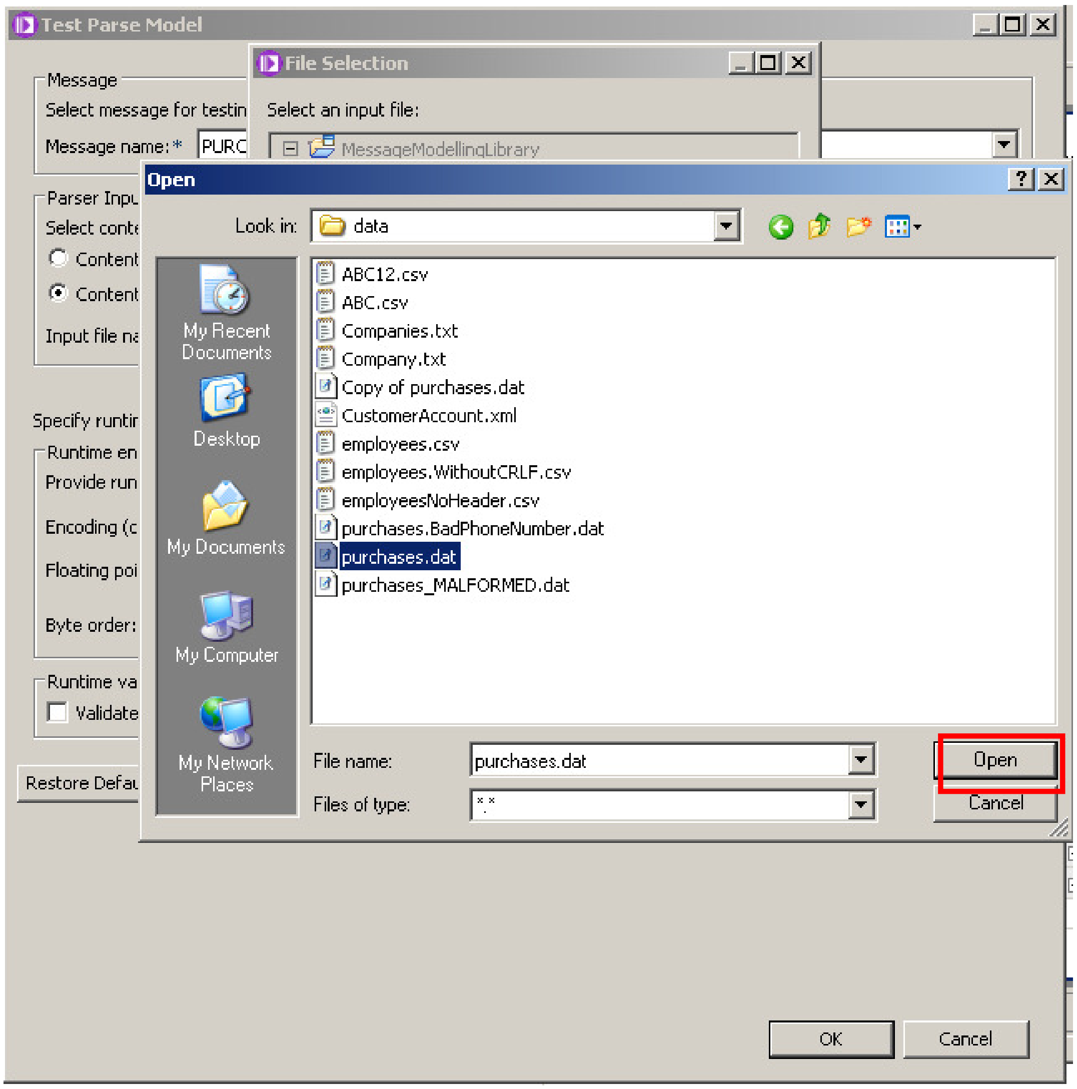
3. In the File Selection dialog, select the "Select an input file from the file system" option.

   Click on the Browse button.



4. Navigate to "C:\student\MessageModeling\data\" and select the "purchases.dat" file.

   Click the Open button.



Test Parse Model

File Selection

Select an input file:

Open

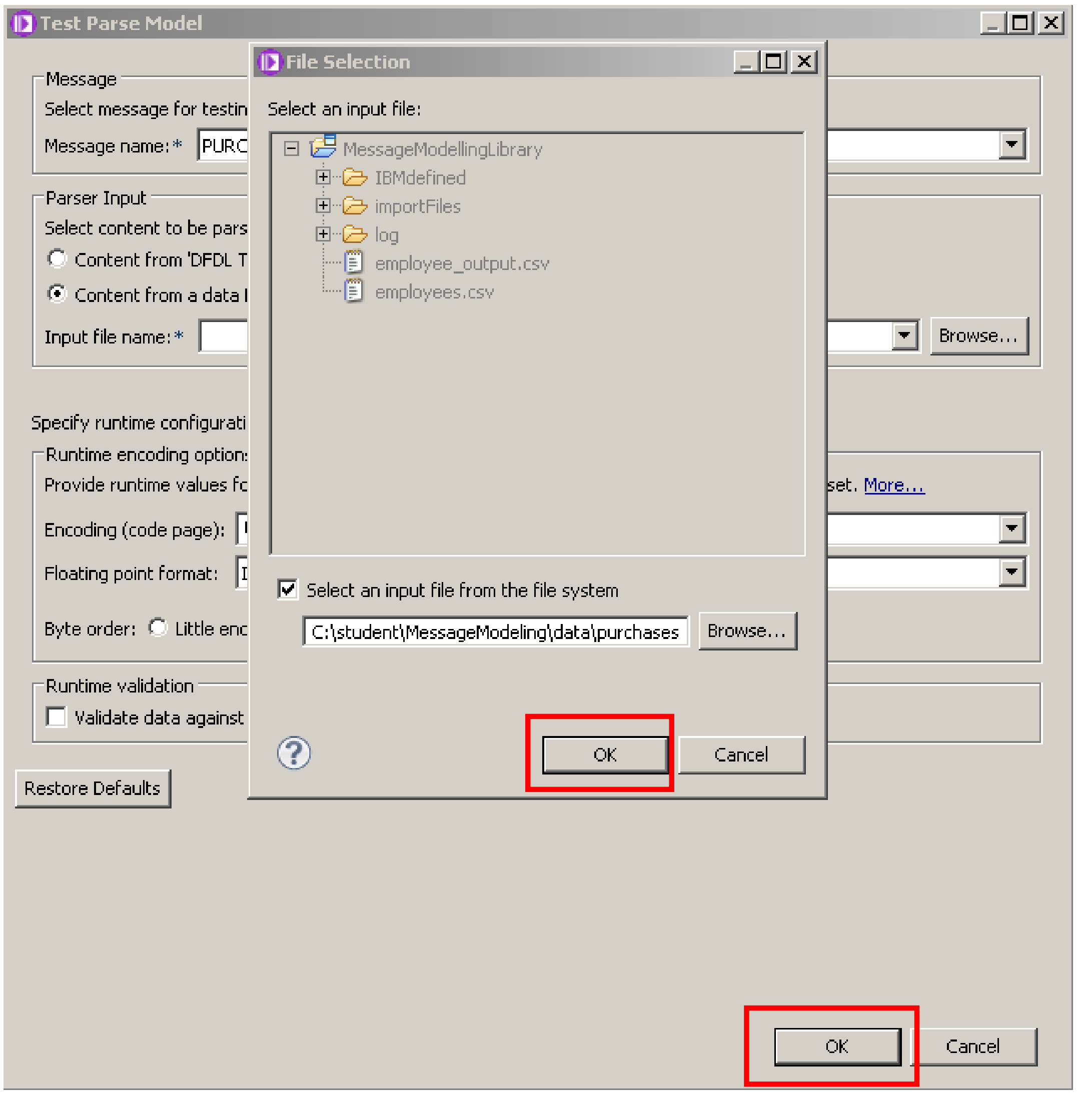
Look in: data

ABC12.csv
ABC.csv
Companies.txt
Company.txt
Copy of purchases.dat
CustomerAccount.xml
employees.csv
employees.WithoutCRLF.csv
employeesNoHeader.csv
purchases.BadPhoneNumber.dat
purchases.dat
purchases_MALFORMED.dat

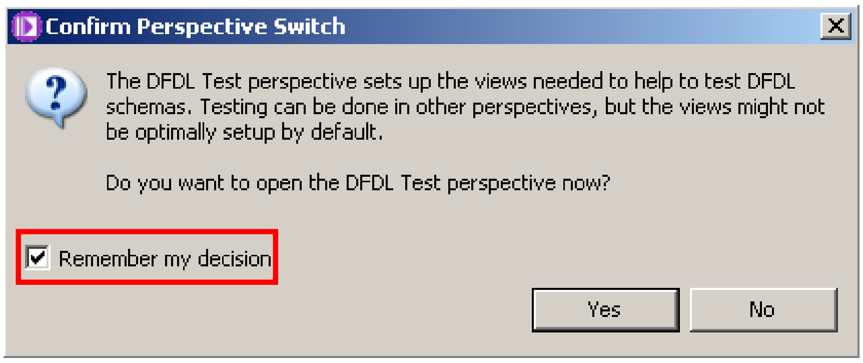
File name: purchases.dat

Files of type: *.*

5. Click OK on both windows.



6. Click on the checkbox "Remember my decision", and click Yes.



Confirm Perspective Switch

The DFDL Test perspective sets up the views needed to help to test DFDL schemas. Testing can be done in other perspectives, but the views might not be optimally setup by default.

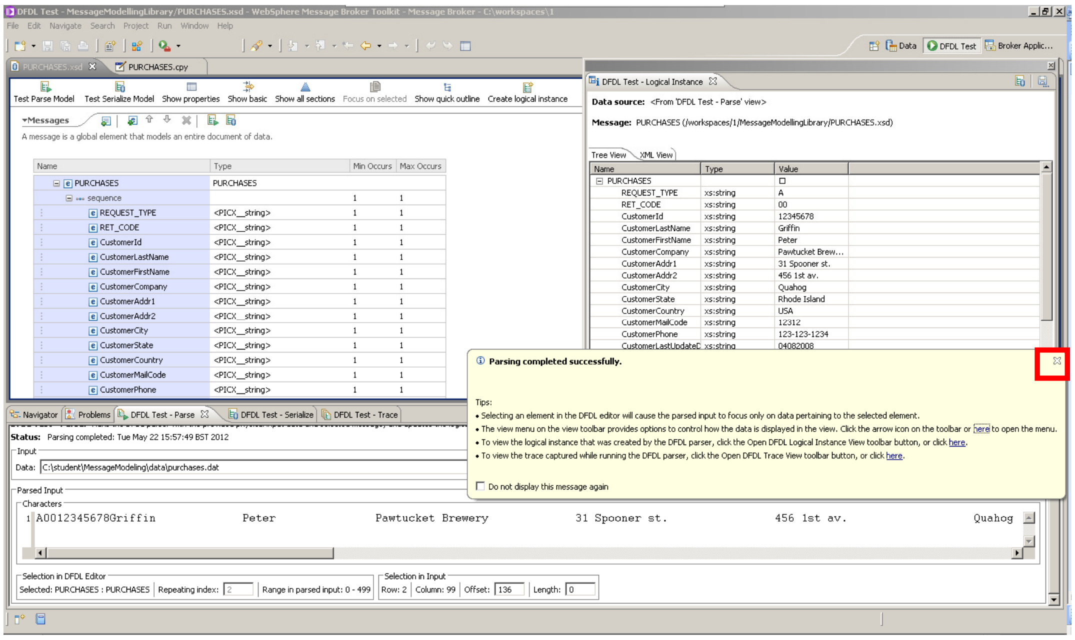
Do you want to open the DFDL Test perspective now?

☑ Remember my decision

7. The DFDL Test perspective will open, with the Test Parse view in focus.

   A message balloon will appear, indicating the parsing was successful.

   Close it by clicking on the "x", or by clicking anywhere else in the workbench.



DFDL Test - MessageModellingLibrary/PURCHASES.xsd - WebSphere Message Broker Toolkit - Message Broker - C:\workspaces\1

A message is a global element that models an entire document of data.

| Name | Type | Min Occurs | Max Occurs |
|---|---|---|---|
| PURCHASES | PURCHASES | | |
| sequence | | 1 | 1 |
| REQUEST_TYPE | <PICX__string> | 1 | 1 |
| RET_CODE | <PICX__string> | 1 | 1 |
| CustomerId | <PICX__string> | 1 | 1 |
| CustomerLastName | <PICX__string> | 1 | 1 |
| CustomerFirstName | <PICX__string> | 1 | 1 |
| CustomerCompany | <PICX__string> | 1 | 1 |
| CustomerAddr1 | <PICX__string> | 1 | 1 |
| CustomerAddr2 | <PICX__string> | 1 | 1 |
| CustomerCity | <PICX__string> | 1 | 1 |
| CustomerState | <PICX__string> | 1 | 1 |
| CustomerCountry | <PICX__string> | 1 | 1 |
| CustomerMailCode | <PICX__string> | 1 | 1 |
| CustomerPhone | <PICX__string> | 1 | 1 |

DFDL Test - Logical Instance

**Data source:** <From 'DFDL Test - Parse' view>

**Message:** PURCHASES (/workspaces/1/MessageModellingLibrary/PURCHASES.xsd)

| Name | Type | Value |
|---|---|---|
| PURCHASES | | ☐ |
| REQUEST_TYPE | xs:string | A |
| RET_CODE | xs:string | 00 |
| CustomerId | xs:string | 12345678 |
| CustomerLastName | xs:string | Griffin |
| CustomerFirstName | xs:string | Peter |
| CustomerCompany | xs:string | Pawtucket Brew... |
| CustomerAddr1 | xs:string | 31 Spooner st. |
| CustomerAddr2 | xs:string | 456 1st av. |
| CustomerCity | xs:string | Quahog |
| CustomerState | xs:string | Rhode Island |
| CustomerCountry | xs:string | USA |
| CustomerMailCode | xs:string | 12312 |
| CustomerPhone | xs:string | 123-123-1234 |
| CustomerLastUpdateD | xs:string | 04082008 |

**Parsing completed successfully.**

Tips:
- Selecting an element in the DFDL editor will cause the parsed input to focus only on data pertaining to the selected element.
- The view menu on the view toolbar provides options to control how the data is displayed in the view. Click the arrow icon on the toolbar or here to open the menu.
- To view the logical instance that was created by the DFDL parser, click the Open DFDL Logical Instance View toolbar button, or click here.
- To view the trace captured while running the DFDL parser, click the Open DFDL Trace View toolbar button, or click here.

☐ Do not display this message again

**Status:** Parsing completed: Tue May 22 15:57:49 BST 2012

Input
Data: C:\student\MessageModeling\data\purchases.dat

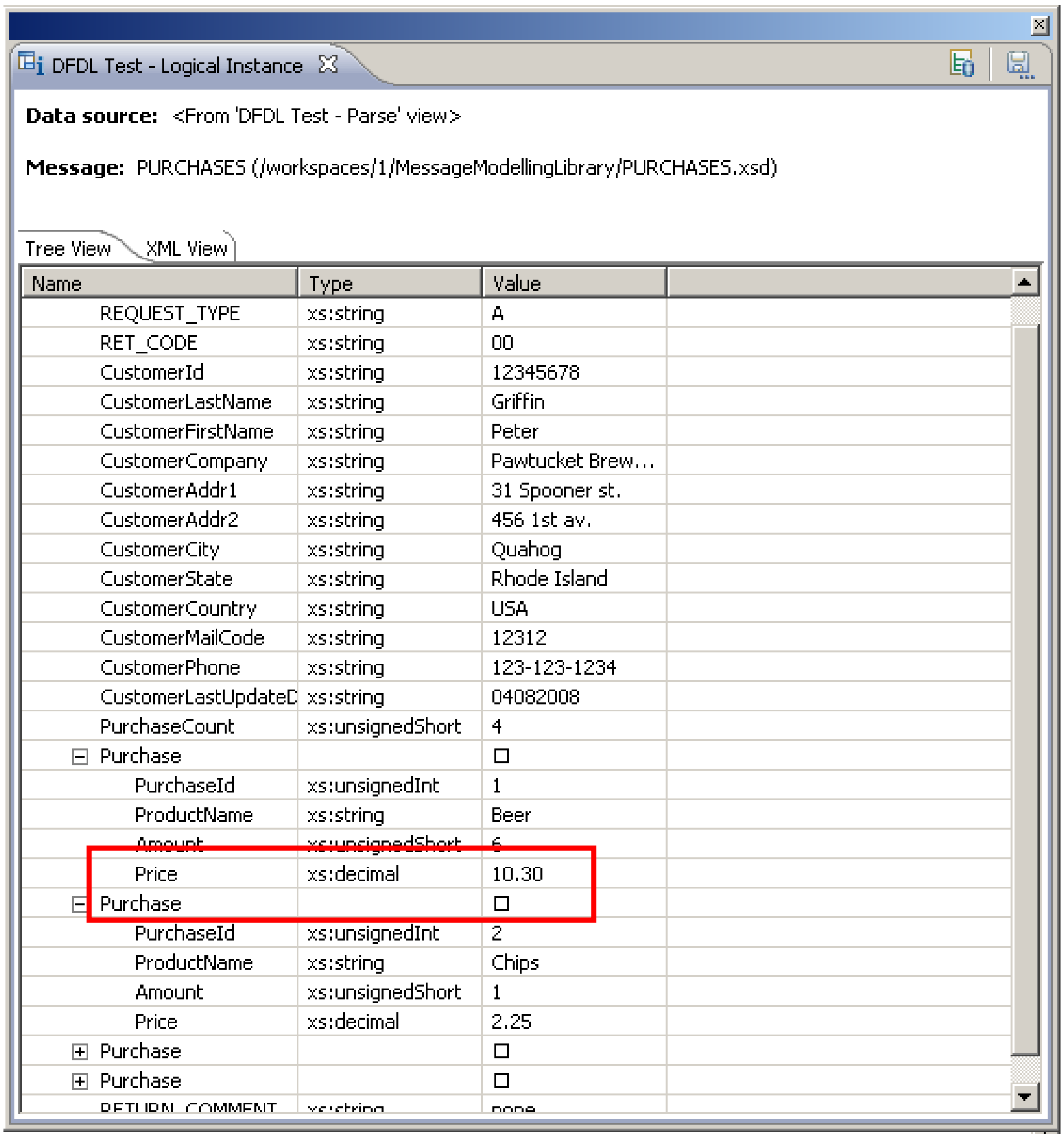
Parsed Input
Characters

```
1 A0012345678Griffin           Peter             Pawtucket Brewery          31 Spooner st.             456 1st av.                    Quahog
```

Selection in DFDL Editor
Selected: PURCHASES : PURCHASES | Repeating index: 2 | Range in parsed input: 0 - 499

Selection in Input
Row: 2 | Column: 99 | Offset: 136 | Length: 0

8. Inspect the "Test - Logical Instance" view. Navigate through the message tree parsed from the input file.



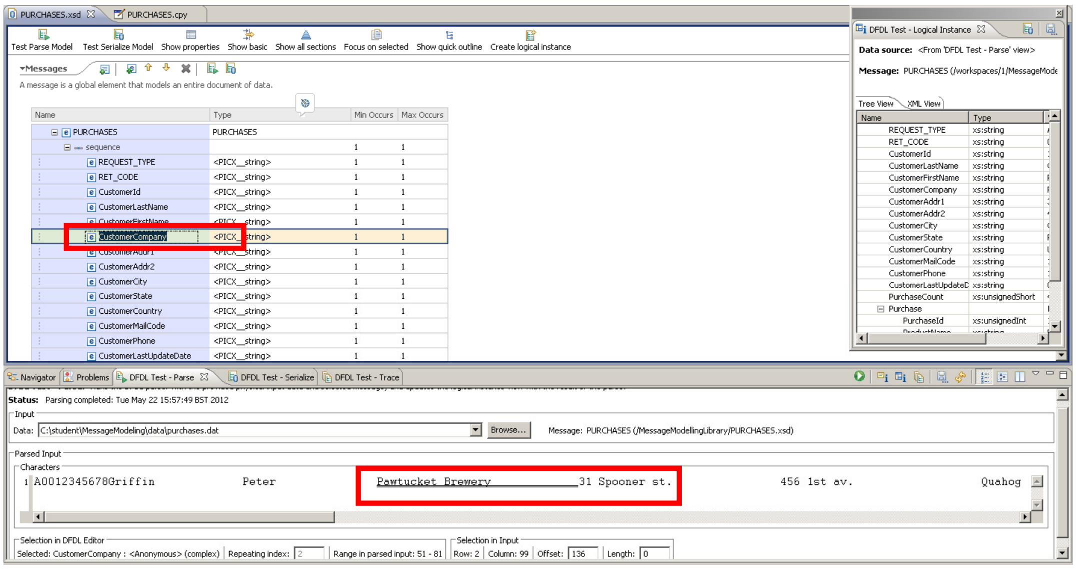
**Data source:** <From 'DFDL Test - Parse' view>

**Message:** PURCHASES (/workspaces/1/MessageModellingLibrary/PURCHASES.xsd)

| Name | Type | Value |
|---|---|---|
| REQUEST_TYPE | xs:string | A |
| RET_CODE | xs:string | 00 |
| CustomerId | xs:string | 12345678 |
| CustomerLastName | xs:string | Griffin |
| CustomerFirstName | xs:string | Peter |
| CustomerCompany | xs:string | Pawtucket Brew... |
| CustomerAddr1 | xs:string | 31 Spooner st. |
| CustomerAddr2 | xs:string | 456 1st av. |
| CustomerCity | xs:string | Quahog |
| CustomerState | xs:string | Rhode Island |
| CustomerCountry | xs:string | USA |
| CustomerMailCode | xs:string | 12312 |
| CustomerPhone | xs:string | 123-123-1234 |
| CustomerLastUpdateD | xs:string | 04082008 |
| PurchaseCount | xs:unsignedShort | 4 |
| ⊟ Purchase | | ☐ |
| PurchaseId | xs:unsignedInt | 1 |
| ProductName | xs:string | Beer |
| Amount | xs:unsignedShort | 6 |
| Price | xs:decimal | 10.30 |
| ⊟ Purchase | | ☐ |
| PurchaseId | xs:unsignedInt | 2 |
| ProductName | xs:string | Chips |
| Amount | xs:unsignedShort | 1 |
| Price | xs:decimal | 2.25 |
| ⊞ Purchase | | ☐ |
| ⊞ Purchase | | ☐ |
| RETURN_COMMENT | xs:string | none |

Note that the parser shows "10.30" (2 decimal places) because the COBOL field was defined as PIC 9(8)V99.

9. In the DFDL Editor, click on any element on the Message Model and you will see the relevant data underlined in the input text below:



PURCHASES.xsd | PURCHASES.cpy

Messages

A message is a global element that models an entire document of data.

| Name | Type | Min Occurs | Max Occurs |
|---|---|---|---|
| PURCHASES | PURCHASES | | |
| sequence | | 1 | 1 |
| REQUEST_TYPE | <PICX__string> | 1 | 1 |
| RET_CODE | <PICX__string> | 1 | 1 |
| CustomerId | <PICX__string> | 1 | 1 |
| CustomerLastName | <PICX__string> | 1 | 1 |
| CustomerFirstName | <PICX__string> | 1 | 1 |
| CustomerCompany | <PICX__string> | 1 | 1 |
| CustomerAddr1 | <PICX__string> | 1 | 1 |
| CustomerAddr2 | <PICX__string> | 1 | 1 |
| CustomerCity | <PICX__string> | 1 | 1 |
| CustomerState | <PICX__string> | 1 | 1 |
| CustomerCountry | <PICX__string> | 1 | 1 |
| CustomerMailCode | <PICX__string> | 1 | 1 |
| CustomerPhone | <PICX__string> | 1 | 1 |
| CustomerLastUpdateDate | <PICX__string> | 1 | 1 |

DFDL Test - Logical Instance

**Data source:** <From 'DFDL Test - Parse' view>

**Message:** PURCHASES (/workspaces/1/MessageMode

| Name | Type |
|---|---|
| REQUEST_TYPE | xs:string |
| RET_CODE | xs:string |
| CustomerId | xs:string |
| CustomerLastName | xs:string |
| CustomerFirstName | xs:string |
| CustomerCompany | xs:string |
| CustomerAddr1 | xs:string |
| CustomerAddr2 | xs:string |
| CustomerCity | xs:string |
| CustomerState | xs:string |
| CustomerCountry | xs:string |
| CustomerMailCode | xs:string |
| CustomerPhone | xs:string |
| CustomerLastUpdateD | xs:string |
| PurchaseCount | xs:unsignedShort |
| Purchase | |
| PurchaseId | xs:unsignedInt |

**Status:** Parsing completed: Tue May 22 15:57:49 BST 2012

Input
Data: C:\student\MessageModeling\data\purchases.dat
Message: PURCHASES (/MessageModellingLibrary/PURCHASES.xsd)

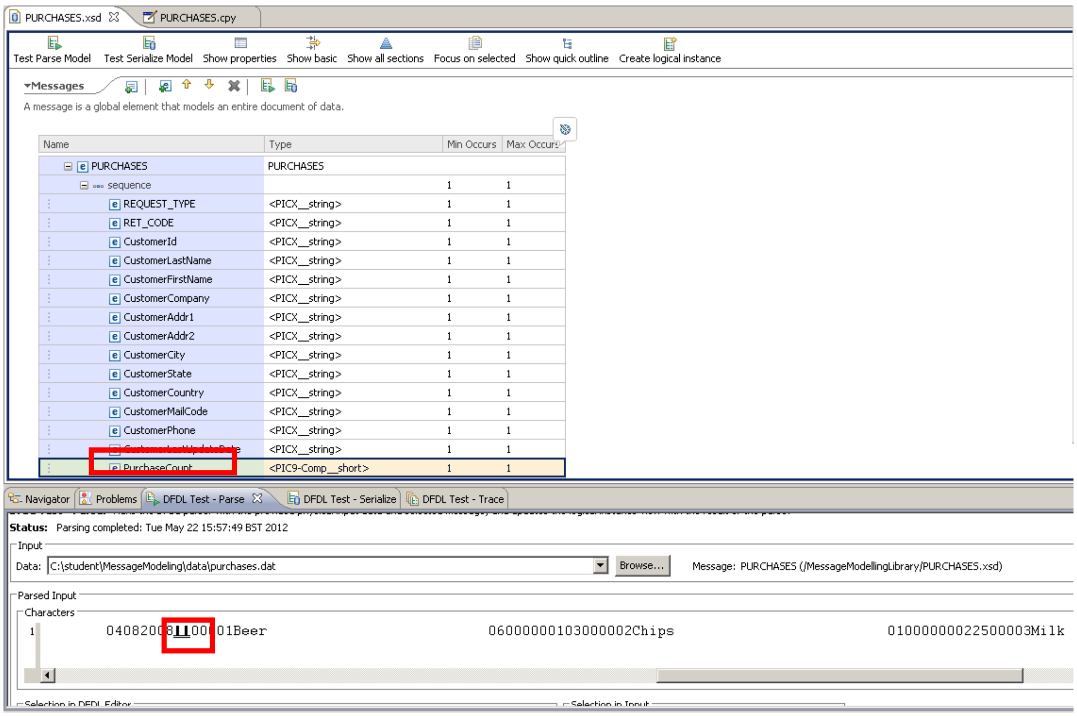
Parsed Input
Characters

```
1 A0012345678Griffin           Peter          Pawtucket Brewery         31 Spooner st.               456 1st av.                Quahog
```

Selection in DFDL Editor
Selected: CustomerCompany : <Anonymous> (complex) | Repeating index: 2 | Range in parsed input: 51 - 81

Selection in Input
Row: 2 | Column: 99 | Offset: 136 | Length: 0

10. Now click on the PurchaseCount element.



PURCHASES.xsd | PURCHASES.cpy

Test Parse Model | Test Serialize Model | Show properties | Show basic | Show all sections | Focus on selected | Show quick outline | Create logical instance

Messages

A message is a global element that models an entire document of data.

| Name | Type | Min Occurs | Max Occurs |
|---|---|---|---|
| PURCHASES | PURCHASES | | |
| sequence | | 1 | 1 |
| REQUEST_TYPE | <PICX__string> | 1 | 1 |
| RET_CODE | <PICX__string> | 1 | 1 |
| CustomerId | <PICX__string> | 1 | 1 |
| CustomerLastName | <PICX__string> | 1 | 1 |
| CustomerFirstName | <PICX__string> | 1 | 1 |
| CustomerCompany | <PICX__string> | 1 | 1 |
| CustomerAddr1 | <PICX__string> | 1 | 1 |
| CustomerAddr2 | <PICX__string> | 1 | 1 |
| CustomerCity | <PICX__string> | 1 | 1 |
| CustomerState | <PICX__string> | 1 | 1 |
| CustomerCountry | <PICX__string> | 1 | 1 |
| CustomerMailCode | <PICX__string> | 1 | 1 |
| CustomerPhone | <PICX__string> | 1 | 1 |
| CustomerLastUpdateDate | <PICX__string> | 1 | 1 |
| PurchaseCount | <PIC9-Comp__short> | 1 | 1 |

Navigator | Problems | DFDL Test - Parse | DFDL Test - Serialize | DFDL Test - Trace

Status: Parsing completed: Tue May 22 15:57:49 BST 2012

Input

Data: C:\student\MessageModeling\data\purchases.dat  Browse...  Message: PURCHASES (/MessageModellingLibrary/PURCHASES.xsd)

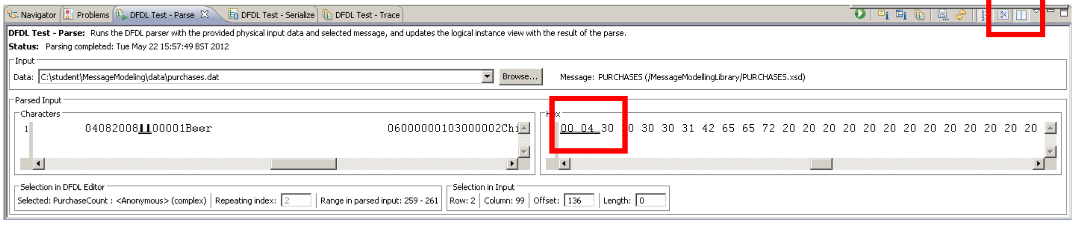
Parsed Input

Characters

```
1        04082008▌▌00001Beer                060000000103000002Chips                01000000022500003Milk
```

Since it's a binary field, the highlighted value isn't readable with this editor.

11. Now click on the "Show hex" button (top right of the lower pane, as highlighted below).



Navigator | Problems | DFDL Test - Parse | DFDL Test - Serialize | DFDL Test - Trace

DFDL Test - Parse: Runs the DFDL parser with the provided physical input data and selected message, and updates the logical instance view with the result of the parse.

Status: Parsing completed: Tue May 22 15:57:49 BST 2012

Input

Data: C:\student\MessageModeling\data\purchases.dat  Browse...  Message: PURCHASES (/MessageModellingLibrary/PURCHASES.xsd)

Parsed Input

Characters

```
1        04082008▌▌00001Beer                060000000103000002Chi
```

Hex

```
00 04 30 30 30 30 31 42 65 65 72 20 20 20 20 20 20 20 20 20 20 20 20 20
```

Selection in DFDL Editor

Selected: PurchaseCount : <Anonymous> (complex) | Repeating index: 2 | Range in parsed input: 259 - 261

Selection in Input

Row: 2 | Column: 99 | Offset: 136 | Length: 0

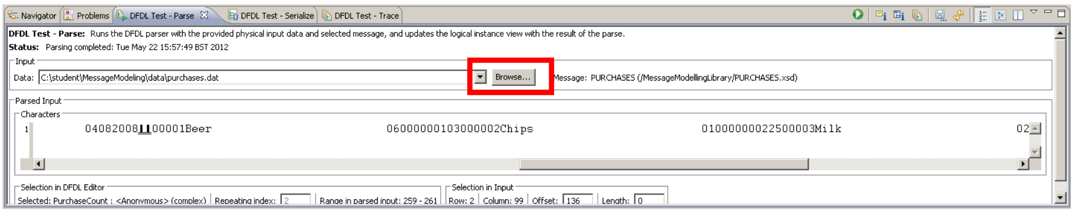
Notice that the binary field is now readable, and has a value of "00 04" which corresponds to the 4 occurrences of the "purchase" element.

Click the "Show Hex" to revert to normal display.

# 4. Using the Trace facility

1. Next you are going to test the message model using a malformed message.

   In the DFDL Test perspective, "DFDL Test - parse" view, click on the Browse button.



**DFDL Test - Parse:** Runs the DFDL parser with the provided physical input data and selected message, and updates the logical instance view with the result of the parse.
**Status:** Parsing completed: Tue May 22 15:57:49 BST 2012

Input
Data: C:\student\MessageModeling\data\purchases.dat
Message: PURCHASES (/MessageModellingLibrary/PURCHASES.xsd)

Parsed Input
Characters

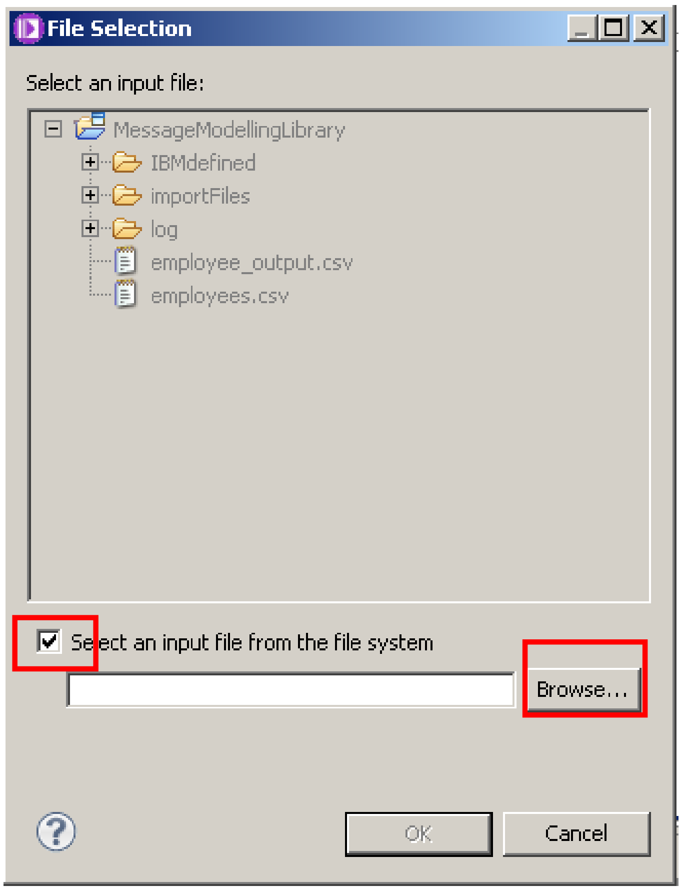
```
1        04082008  00001Beer                    06000000103000002Chips                    01000000022500003Milk          02
```

Selection in DFDL Editor
Selected: PurchaseCount : <Anonymous> (complex) | Repeating index: 2 | Range in parsed input: 259 - 261

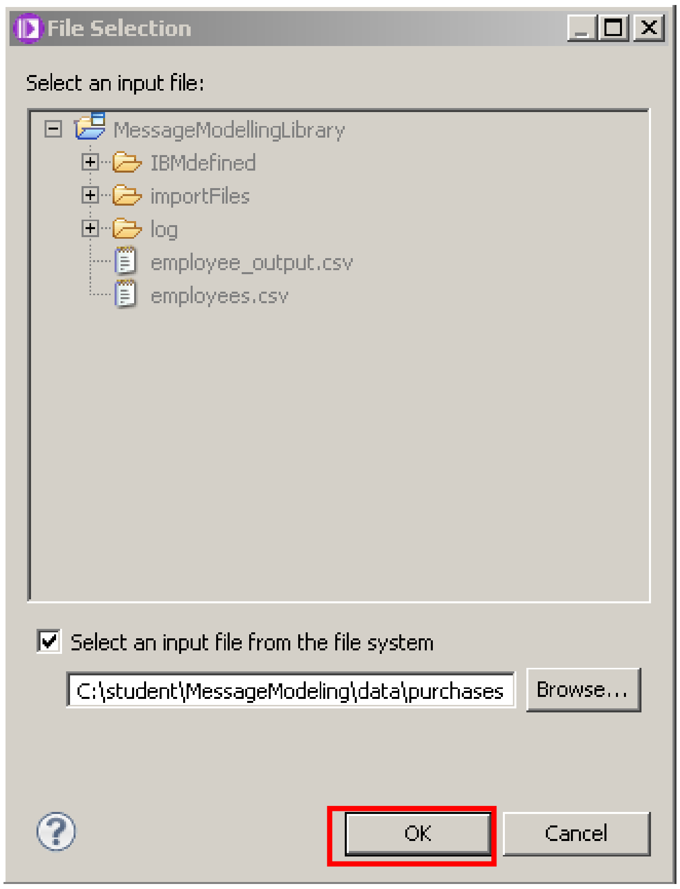
Selection in Input
Row: 2 | Column: 99 | Offset: 136 | Length: 0

2. In the File Selection dialog, select the "Select an input file from the file system" option.

   Click on the Browse button.



3. Navigate to the "C:\student\MessageModeling\data" directory and select the "purchases_MALFORMED.dat" file.

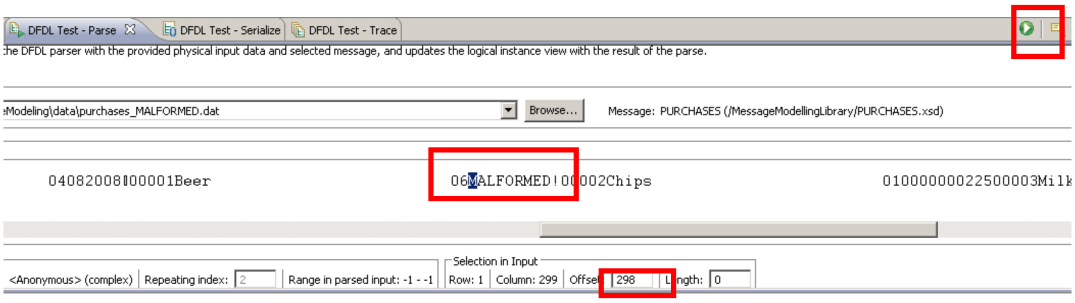


Click OK.

4. In the "Offset" textbox, enter "298", and scroll right to find the highlighted character (byte 298 will be highlighted in blue).

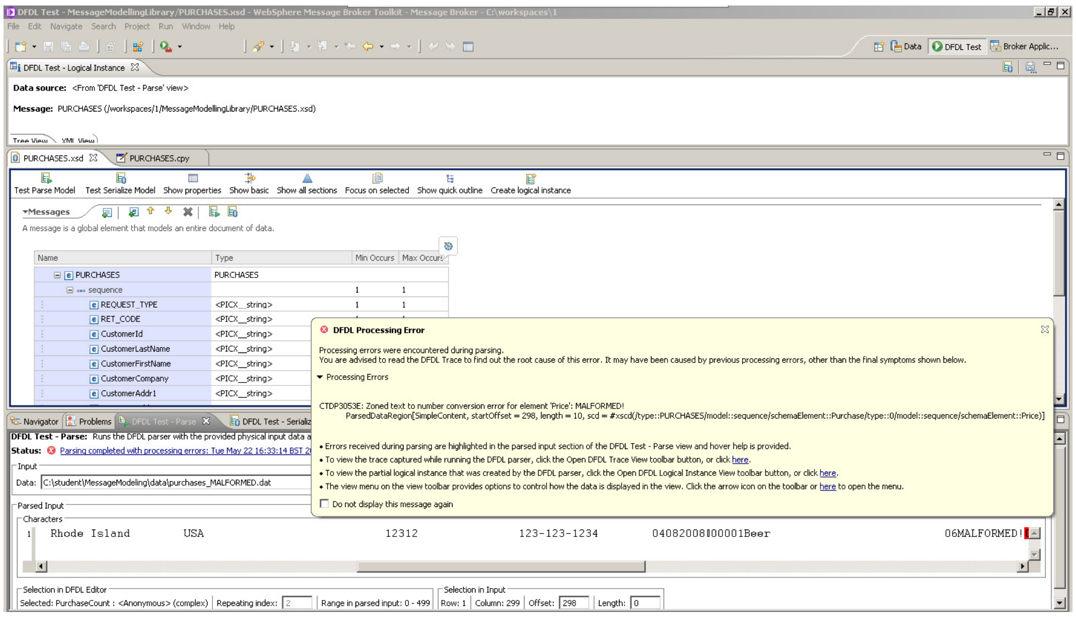
   Note that at this position ("Price" field's position) there is a string "MALFORMED!" instead of the expected decimal number.

   Now click on the "Run parser" button to test the message model (green arrow as highlighted below).



```
the DFDL parser with the provided physical input data and selected message, and updates the logical instance view with the result of the parse.
Modeling\data\purchases_MALFORMED.dat     Browse...     Message: PURCHASES (/MessageModellingLibrary/PURCHASES.xsd)
04082008100001Beer          06MALFORMED!00002Chips          01000000022500003Milk
<Anonymous> (complex) | Repeating index: 2 | Range in parsed input: -1 - -1 | Selection in Input: Row: 1 | Column: 299 | Offset: 298 | Length: 0
```

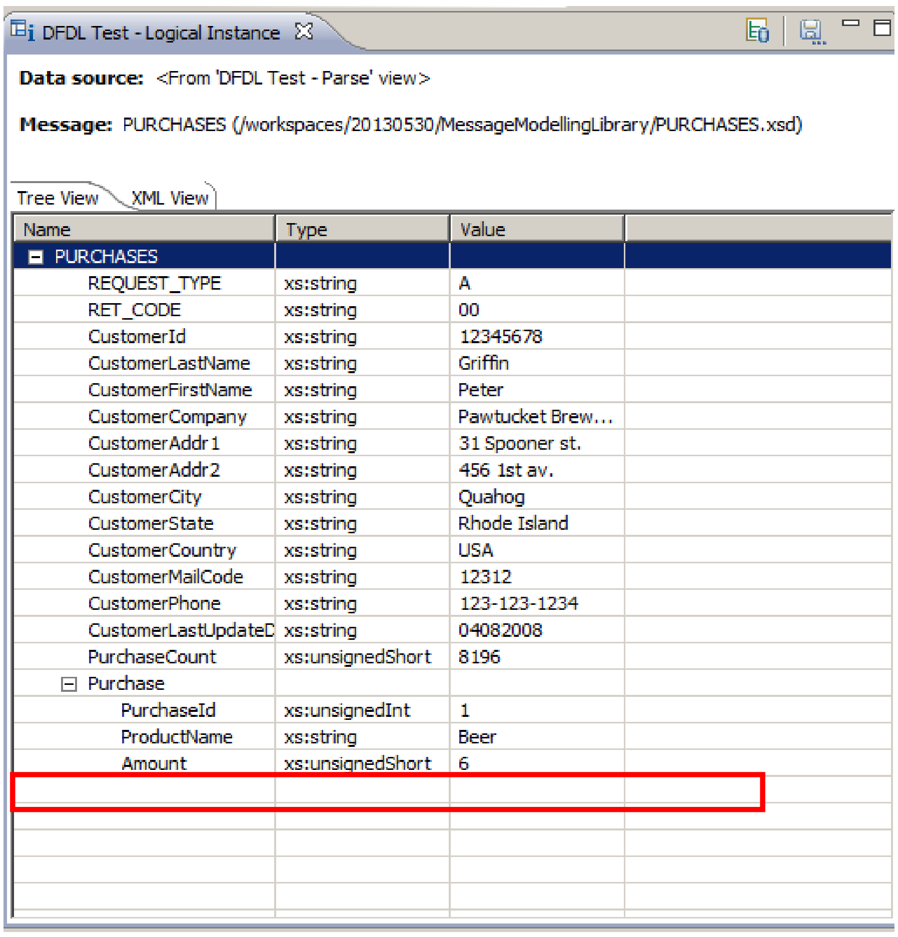
5. An error message will appear with the cause of the failed parsing.



```
DFDL Test - Parse: Runs the DFDL parser with the provided physical input data a
Status: Parsing completed with processing errors: Tue May 22 16:33:14 BST 2
Data: C:\student\MessageModeling\data\purchases_MALFORMED.dat

DFDL Processing Error

Processing errors were encountered during parsing.
You are advised to read the DFDL Trace to find out the root cause of this error. It may have been caused by previous processing errors, other than the final symptoms shown below.

Processing Errors

CTDP3053E: Zoned text to number conversion error for element 'Price': MALFORMED!
    ParsedDataRegion[SimpleContent, startOffset = 298, length = 10, scd = #xscd(/type::PURCHASES/model::sequence/schemaElement::Purchase/type::0/model::sequence/schemaElement::Price)]

• Errors received during parsing are highlighted in the parsed input section of the DFDL Test - Parse view and hover help is provided.
• To view the trace captured while running the DFDL parser, click the Open DFDL Trace View toolbar button, or click here.
• To view the partial logical instance that was created by the DFDL parser, click the Open DFDL Logical Instance View toolbar button, or click here.
• The view menu on the view toolbar provides options to control how the data is displayed in the view. Click the arrow icon on the toolbar or here to open the menu.

Do not display this message again

1  Rhode Island     USA          12312        123-123-1234       04082008100001Beer          06MALFORMED!

Selected: PurchaseCount : <Anonymous> (complex) | Repeating index: 2 | Range in parsed input: 0 - 499 | Row: 1 | Column: 299 | Offset: 298 | Length: 0
```

6. Inspect the "DFDL Test - Logical Instance", you will see that the parsed tree is not complete.

   Go to the Purchase element, expand it, and check that it was correctly parsed until the "Amount" element. The following field "Price" is empty.



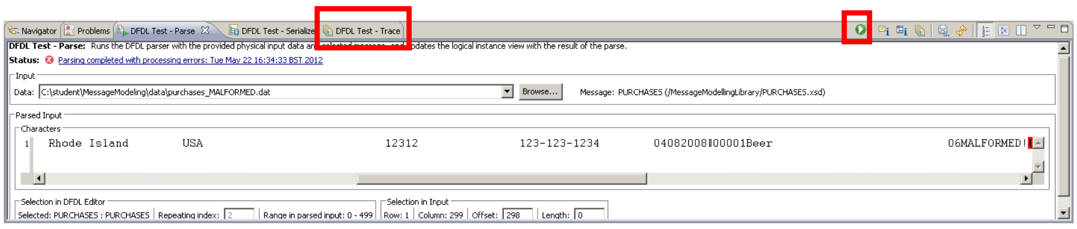
**Data source:** <From 'DFDL Test - Parse' view>

**Message:** PURCHASES (/workspaces/20130530/MessageModellingLibrary/PURCHASES.xsd)

| Name | Type | Value |
|---|---|---|
| PURCHASES | | |
| REQUEST_TYPE | xs:string | A |
| RET_CODE | xs:string | 00 |
| CustomerId | xs:string | 12345678 |
| CustomerLastName | xs:string | Griffin |
| CustomerFirstName | xs:string | Peter |
| CustomerCompany | xs:string | Pawtucket Brew... |
| CustomerAddr1 | xs:string | 31 Spooner st. |
| CustomerAddr2 | xs:string | 456 1st av. |
| CustomerCity | xs:string | Quahog |
| CustomerState | xs:string | Rhode Island |
| CustomerCountry | xs:string | USA |
| CustomerMailCode | xs:string | 12312 |
| CustomerPhone | xs:string | 123-123-1234 |
| CustomerLastUpdateD | xs:string | 04082008 |
| PurchaseCount | xs:unsignedShort | 8196 |
| Purchase | | |
| PurchaseId | xs:unsignedInt | 1 |
| ProductName | xs:string | Beer |
| Amount | xs:unsignedShort | 6 |

7. Now you will use the "DFDL Test - Trace" view, to better understand what the problem was.

   Click on the "DFDL Test - Trace" view.



**DFDL Test - Parse:** Runs the DFDL parser with the provided physical input data an[d] selected message, and updates the logical instance view with the result of the parse.

**Status:** Parsing completed with processing errors: Tue May 22 16:34:33 BST 2012

Input

Data: C:\student\MessageModeling\data\purchases_MALFORMED.dat

Message: PURCHASES (/MessageModellingLibrary/PURCHASES.xsd)

Parsed Input

Characters

```
1   Rhode Island        USA                    12312            123-123-1234        04082008▮00001Beer                        06MALFORMED!
```

Selection in DFDL Editor

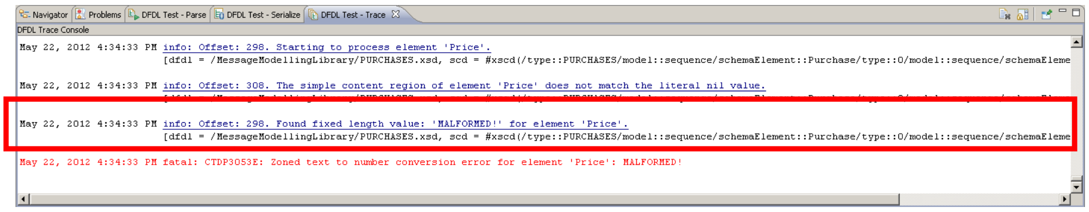
Selected: PURCHASES : PURCHASES | Repeating index: 2 | Range in parsed input: 0 - 499

Selection in Input

Row: 1 | Column: 299 | Offset: 298 | Length: 0

8. In the "DFDL Test - Trace" view, you will find an execution log of the parsing activities.

   At the end of the trace, there is a red colored line with the found error.



```
May 22, 2012 4:34:33 PM info: Offset: 298. Starting to process element 'Price'.
                        [dfdl = /MessageModellingLibrary/PURCHASES.xsd, scd = #xscd(/type::PURCHASES/model::sequence/schemaElement::Purchase/type::0/model::sequence/schemaEleme

May 22, 2012 4:34:33 PM info: Offset: 308. The simple content region of element 'Price' does not match the literal nil value.

May 22, 2012 4:34:33 PM info: Offset: 298. Found fixed length value: 'MALFORMED!' for element 'Price'.
                        [dfdl = /MessageModellingLibrary/PURCHASES.xsd, scd = #xscd(/type::PURCHASES/model::sequence/schemaElement::Purchase/type::0/model::sequence/schemaEleme

May 22, 2012 4:34:33 PM fatal: CTDP3053E: Zoned text to number conversion error for element 'Price': MALFORMED!
```

9. Look at the 2 lines before the error:

```
06-03-2011 10:18:41     info: Offset: 298 Starting to process element "/PURCHASES[1]/Purchase[1]/Price[1]".
                        [dfdl = /MessageModelingLibrary_broker/PURCHASES.xsd, scd = #xscd(/type::PURCHASES/model::

06-03-2011 10:18:41     info: Offset: 298 Found fixed length value: "MALFORMED!" for element "Price".
                        [dfdl = /MessageModelingLibrary_broker/PURCHASES.xsd, scd = #xscd(/type::PURCHASES/model::

06-03-2011 10:18:41     fatal: CTDP3053E: Zoned text to number conversion error for element "Price": "MALFORMED!"
```

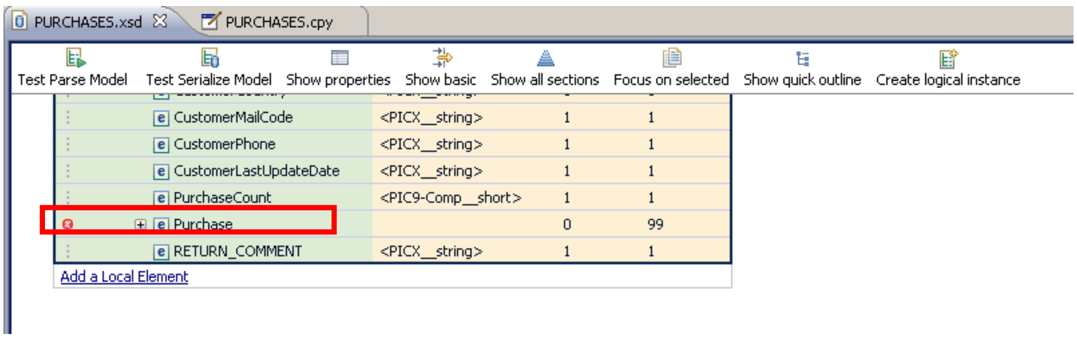
   The first line states that it is starting to process the Price element.

   Then in the second, it has found a string "MALFORMED!" as the value of the element.

   Then the parser tries to convert the string to a decimal number, and an error appears.

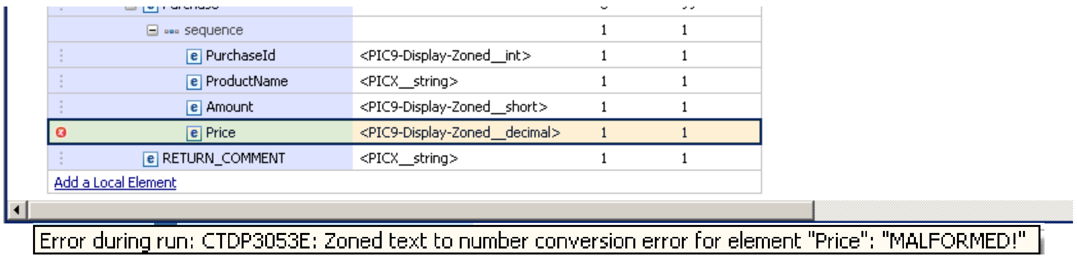
10. Back in the DFDL Editor, scroll to the "Price" element.

    Note that it has an error icon next to its name.



| | | | |
|---|---|---|---|
| CustomerMailCode | <PICX__string> | 1 | 1 |
| CustomerPhone | <PICX__string> | 1 | 1 |
| CustomerLastUpdateDate | <PICX__string> | 1 | 1 |
| PurchaseCount | <PIC9-Comp__short> | 1 | 1 |
| Purchase | | 0 | 99 |
| RETURN_COMMENT | <PICX__string> | 1 | 1 |

11. Place the cursor on the error icon and a message will appear, showing the same error cause you saw in the trace view.



| | | | |
|---|---|---|---|
| sequence | | 1 | 1 |
| PurchaseId | <PIC9-Display-Zoned__int> | 1 | 1 |
| ProductName | <PICX__string> | 1 | 1 |
| Amount | <PIC9-Display-Zoned__short> | 1 | 1 |
| Price | <PIC9-Display-Zoned__decimal> | 1 | 1 |
| RETURN_COMMENT | <PICX__string> | 1 | 1 |
| Add a Local Element | | | |

```
Error during run: CTDP3053E: Zoned text to number conversion error for element "Price": "MALFORMED!"
```

This concludes the COBOL Message Modeling lab.