



# BEA WebLogic Integration™

## Tutorial: Building Your First Data Transformation

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# 1 Tutorial: Building Your First Data Transformation

Data transformation is the mapping and conversion of data from one format to another. For example, XML data can be transformed from XML data valid to one XML Schema to another XML document valid to a different XML Schema. Other examples include the data transformation from non-XML data to XML data. This tutorial introduces the basics of building a data transformation by describing how to create and test a XML-to-XML data transformation using WebLogic Workshop.

In WebLogic Integration business processes, a data transformation transforms data using queries (written in the XQuery language). This tutorial describes the steps for building a query in the XQuery language—a language defined by the World Wide Web Consortium (W3C) that provides a vendor independent language for the query and retrieval of XML data.

To learn about the XQuery language, see the [XQuery 1.0: An XML Query Language Specification - W3C Working Draft 16 August 2002](#) at the web site of the W3C. The WebLogic XQuery engine invoked by a business process conforms to the August 16, 2002 draft of the XQuery Specification.

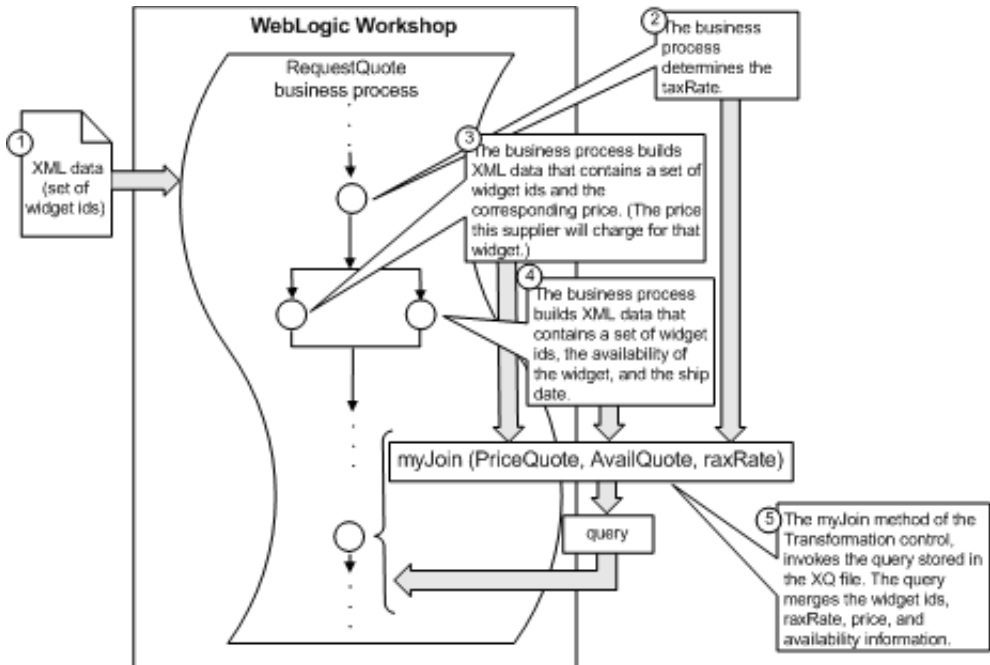
To learn more about XML and XML Schemas, see [Java and XML Basics](#).

The data transformation created in this tutorial is invoked in the RequestQuote business process. This business process is created to meet the business needs of an enterprise. The enterprise starts the business process as a result of receiving a Request for Quote from clients, checks the enterprise's inventory and pricing systems to

# 1 Tutorial: Building Your First Data Transformation

determine whether the order can be filled, and sends a quote for the requested items to the client. To learn more about creating business processes and the RequestQuote business process, see [Tutorial: Building Your First Business Process](#).

The following figure shows the flow of data in the RequestQuote business process of the Tutorial Process application.



The purpose of the RequestQuote business process is to provide price and availability information for a set of widgets. The flow of the data through the RequestQuote business process is represented by the following steps:

1. The business process receives the set of widget IDs.
2. The business process gets the price of each of the requested widgets from a source and places the resulting XML data into the `priceQuote` business process variable. (This XML data is valid to the XML Schema in the `PriceQuote.xsd` file.)

3. The business process gets information about availability for the widgets from another source and places the resulting XML data into the `availQuote` business process variable. (This XML data is valid to the XML Schema in the `AvailQuote.xsd` file.)
4. The business process determines the tax rate for the shipment and puts the result in the `taxRate` float business process variable.
5. The business process invokes the **Combine Price and Avail Quotes** node. The **Combine Price and Avail Quotes** node calls the `myJoin` Transformation method of the Transformation control. This Transformation control is stored in `MyTutorialJoin.dtf` file. The business process passes the values of the `priceQuote`, `availQuote`, and `taxRate` business process variables to the `myJoin` method. The `myJoin` method invokes the query written in the XQuery language and stored in the `myJoin.xq` file. The query merges all the price, availability, and tax rate information into a single set of XML data and returns the result as the return value of the `myJoin` method. The data returned from this `myJoin` method is valid to the XML Schema in the `Quote.xsd` file. After the `myJoin` method is invoked, the **Combine Price and Avail Quotes** node assigns the resulting XML data to the `Quote` business process variable.

## Tutorial Goals

The tutorial provides steps to create and test a transformation using the graphical environment provided in WebLogic Workshop. Specifically, in this tutorial you will create the following:

- The **MyTutorialJoin** Transformation Control stored in the `MyTutorialJoin.dtf` file.
- The `myJoin` Transformation method in the **MyTutorialJoin** Transformation Control.
- The query invoked by the `myJoin` Transformation method. This query is stored in the XQ file called `myJoin.xq`.

# Steps in This Tutorial

Follow the steps in this tutorial to create and test a data transformation. Specifically, the steps include:

[Chapter 2, “Step 1: Getting Started”](#)

Describes how to load the prepackaged Tutorial Process Application.

[Chapter 3, “Step 2: Building the Transformation”](#)

Provides a step-by-step procedure to create and select input and output types for a Transformation control.

[Chapter 4, “Step 3: Mapping Elements and Attributes”](#)

Provides a step-by-step procedure to create mappings between input and output elements and attributes in a Transformation control.

[Chapter 5, “Step 4: Mapping a Repeating Element \(Join\)”](#)

Provides a step-by-step procedure to add a join between repeating elements to the Transformation control.



# 2 Step 1: Getting Started

The Business Process and Data Transformation Tutorials both use a prepackaged Tutorial Process application. The prepackaged **Tutorial: Process Application** contains all the business process, XML, XML Schema, DTF, and XQ files, required to run the tutorial business processes and transformations.

The RequestQuote workflow in the Tutorial Process application invokes a transformation stored in the `TutorialJoin.dtf` and `join.xq` files. The steps in this Tutorial tell you how to create the same transformation that is prepackaged in the `TutorialJoin.dtf` and `join.xq` files of the **Tutorial: Process Application**. (You can use the transformation in the `TutorialJoin.dtf` and `join.xq` files as a reference.) You name the Transformation control file that you build in this tutorial: `MyTutorialJoin.dtf` and the XQ file that contains the query: `myJoin.xq`.

After completing the steps in this Tutorial, you will change the RequestQuote business process to invoke the transformation you created in this tutorial. In addition, you will run the RequestQuote business process which will invoke the transformation, as described in [Step 12: Run the Request Quote Business Process](#) of the Business Process Tutorial.

**Note:** If you followed the steps described in the Business Process Tutorial, you have created an application and can skip the [“To Load The Tutorial Process Application” on page 2-2](#) task. (The application, however, must be open. To open the application, from the WebLogic Workshop menu bar, select **File→Open→Application**. The **Open Workshop Application** is displayed. Browse for the existing **Tutorial\_Process\_Application** and click **Open**.)

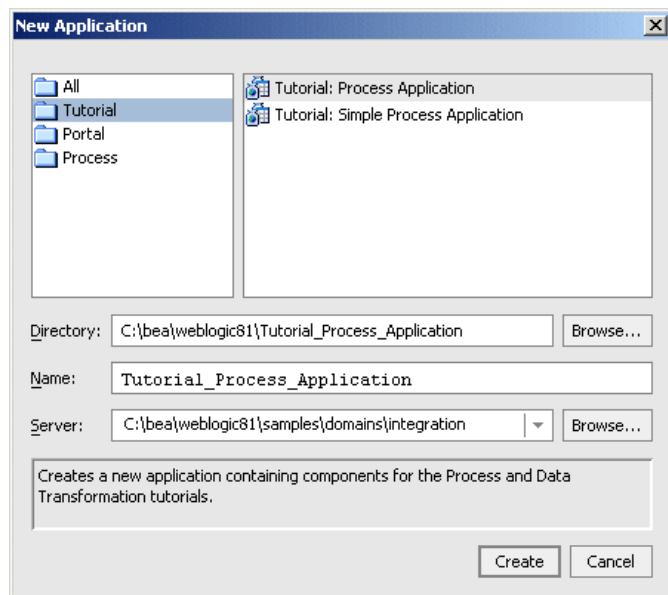
The tasks in this step include:

- [To Load The Tutorial Process Application](#)
- [To Explore the Contents of the Application](#)

### To Load The Tutorial Process Application

In this task, you load the prepackaged **Tutorial: Process Application**.

1. From the BEA WebLogic Workshop menu bar, choose **File→New→Application**.  
The **New Application** dialog box is displayed.
2. In the left pane, select the **Tutorial** folder, as shown in the following figure.
3. In the right pane, select **Tutorial: Process Application**, as shown in the following figure.



4. In the **Name** field, enter `Tutorial_Process_Application`.
5. Click the arrow beside the **Server** field to display a list of servers. Then choose the integration server. For example, if you installed WebLogic Platform in the `c:\bea` directory on Windows, the path to the integration server is:  
`c:\bea\weblogic81\samples\domains\integration`
6. Click **Create**.

---

Your Tutorial Process application is created and displayed in the **Application** tab. (If the **Application** tab is not visible in WebLogic Workshop, from menu bar choose **View→Application**.)

## To Explore the Contents of the Application

1. In the **Application** tab, expand the **Schemas** folder. (If the **Application** tab is not visible, from the WebLogic Workshop menu bar, choose **View→Application**.)

The XML Schema files for this application are displayed.

2. In the **Application** tab, expand the **Tutorial\_Process\_ApplicationWeb** folder.

The directories and files that make up the Tutorial project are displayed.

3. In the **Application** tab, expand the **Tutorial\_Process\_ApplicationWeb/requestquote** folder.

The DTF, XQ, and JPD files used in the tutorial are displayed. These files are part of the Tutorial project.

The **Application** tab represents the files and resources available in your business process application. It includes the following components:

**Tutorial\_Process\_Application**—The application folder.

**Schemas**—Contains the XML Schemas used in the business process.

**Tutorial\_Process\_ApplicationWeb**—The project folder. Every business process application contains one or more projects. (Projects represent WebLogic Server web applications. That is, when you create a project, you are creating a web application. The name of your project will be included in the URL your clients use to access your application.)

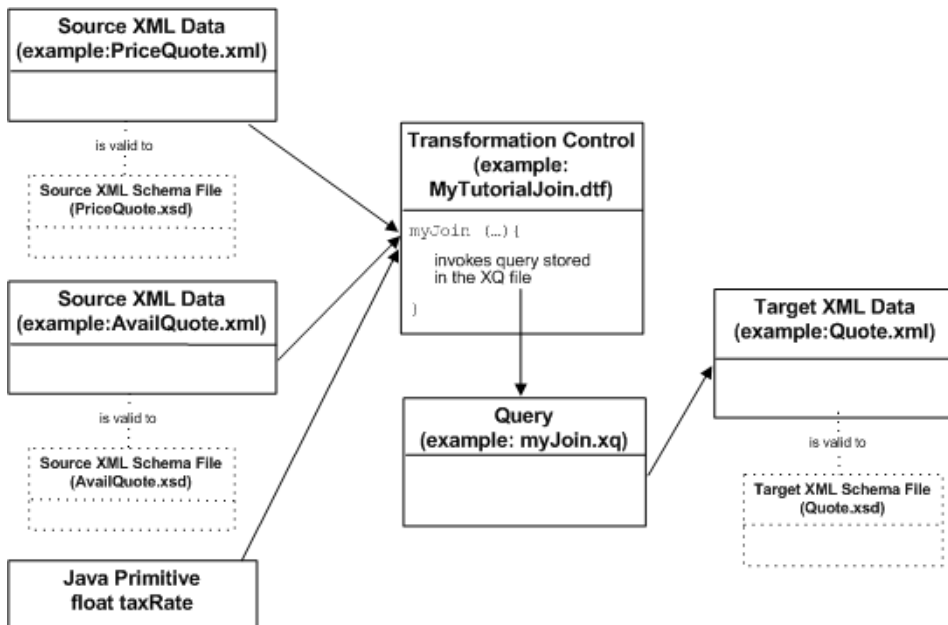
**requestquote**—Contains your project files:

- **services** folder contains Web services with which your business process interacts.
- **testxml** folder contains XML files which you can use to test the completed business process.
- **RequestQuote.jpd**—The completed business process. The Business Process Tutorial walks you through rebuilding this business process. In this tutorial, the prebuilt RequestQuote business process is used to exercise the transformation stored in the `TutorialJoin.dtf` file.

- DTF files (**Transformations.dtf**, **PriceAvailTransformations.dtf**, **RequestQuoteTransformations.dtf**, **TutorialJoin.dtf**)—Contains the Transformation controls used in `RequestQuote.jspd`.
- XQ files—Contains queries (written in the XQuery language) called by the DTF files used in `RequestQuote.jspd`. A Data Transformation control can have one or more methods, each of which is associated to a query in an XQ file.
- **FileQuote.jcx**—A File control used by your Request for Quote business process to write a file to the file system.

# 3 Step 2: Building the Transformation

In this step, you create a transformation that contains the mapping of different input types to a single output type. Specifically, this tutorial provides the steps for transforming a Java primitive and two sets of XML data (valid to two different schemas) to a single set of XML data valid to a third schema, as shown in the following figure.



### 3 Step 2: Building the Transformation

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The RequestQuote business process takes as input a set of widget IDs and returns the price and availability of these widget IDs.

The inputs to the `myJoin` Transformation method include the following:

- XML data valid to the `PriceQuote.xsd` file. The RequestQuote business process of the Tutorial Process application builds a piece of XML data that is valid to the `PriceQuote.xsd` XML Schema and stores it in a business process variable called `priceQuote`. This piece of XML data contains a set of widget IDs and their price.
- XML data valid to the `AvailQuote.xsd` file. The RequestQuote business process of the Tutorial Process application builds a piece of XML data that is valid to the `AvailQuote.xsd` XML Schema and stores it in a business process variable called `availQuote`. This piece of XML data contains a set of widget IDs, a boolean that represents if the widget is available, and the ship date.
- A Java primitive of type float called `taxRate`.

The `myJoin` Transformation method takes these inputs and invokes a query which merges the price, availability, and tax rate information into one piece of XML data valid to the XML Schema in the `Quote.xsd` file.

The tasks in this step include:

- [To Create MyTutorialJoin.dtf](#)
- [To Add a Transformation method to MyTutorialJoin](#)
- [To Select the Input Types](#)
- [To Select the Output Type](#)

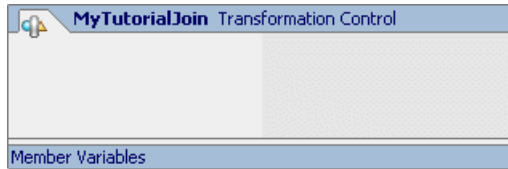
#### To Create MyTutorialJoin.dtf

In this task, you create a Transformation control which is stored in a DTF file called `MyTutorialJoin.dtf`. In addition, you create a Transformation method in the Transformation control. During run time, the business process will call this method to invoke the transformation.

1. In the **Application** tab, right-click the `requestquote` folder and from the drop-down menu, select **New→Transformation File**.
2. The **New File** dialog box is displayed.

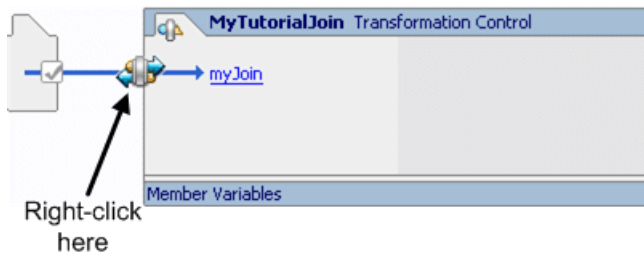
3. In the **File name** field, enter `MyTutorialJoin.dtf`.
4. In the **New File** dialog box, click **Create**.

In the **Design View**, a graphical representation of the **MyTutorialJoin** Transformation control appears, as shown in the following figure.



### To Add a Transformation method to MyTutorialJoin

1. In the **Design View**, right-click in the box representing the **MyTutorialJoin** Transformation control. (The box shown in the preceding figure.)
2. From the drop-down menu, select **Add Transformation method**.  
A Transformation method is created in the **MyTutorialJoin** Transformation control.
3. Enter `myJoin` as the method name.
4. Right-click the arrow representing the **myJoin** method, as shown in the following figure.

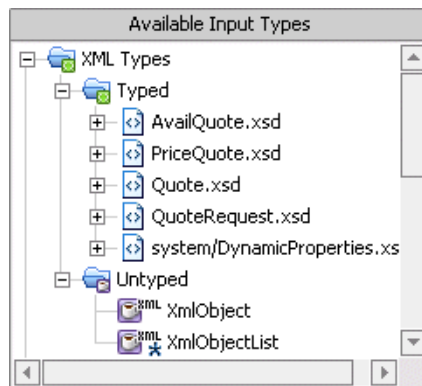


5. From the drop-down menu, select **Configure XQuery Transformation Method**.  
The **Configure XQuery Transformation Method - myJoin** dialog box is displayed.

### To Select the Input Types

In this task, you select the Input Types in the **Transform Method Parameters** pane of the **Configure XQuery Transformation Method - myJoin** dialog box. Input types are the source data types for the transformation—the data types that are transformed to the output data type.

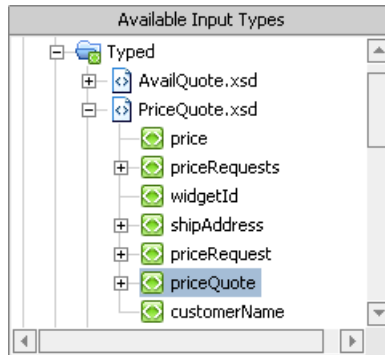
1. In the **Available Input Types** pane of the **Configure XQuery Transformation Method - myJoin** dialog box, the `PriceQuote.xsd`, `AvailQuote.xsd`, `Quote.xsd`, and `QuoteRequest.xsd` files are displayed, as shown in following figure.



**Note:** If these files are not listed, you probably have not loaded the **Tutorial: Process Application**. For instructions on loading this application, see [“To Load The Tutorial Process Application” on page 2-2](#).

2. In the **Available Input Types** pane, expand **PriceQuote.xsd** folder and select the **priceQuote** element, as shown in the following figure.





3. Click **Add**.

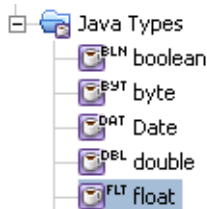
The elements and attributes that make up the **priceQuote** element are displayed in the **Selected Input Types** pane.

4. In the **Available Input Types** pane, expand **AvailQuote.xsd** folder and select the **availQuote** element.

5. Click **Add**.

The elements and attributes that make up the **availQuote** element are displayed in the **Selected Input Types** pane.

6. In the **Java Types** folder of the **Available Input Types** pane, select the **float** node, as shown in the following figure.



7. Click **Add**.

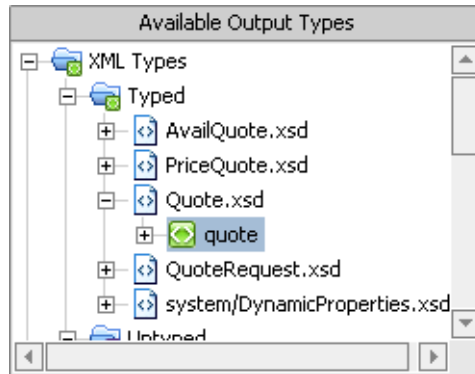
## To Select the Output Type

In this task, you select an Output Type in the **Transform Method Return** pane of the **Configure XQuery Transformation Method -myJoin** dialog box.

### 3 Step 2: Building the Transformation

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1. In the **Available Output Types** pane of the **Configure XQuery Transformation Method - myJoin** dialog box, the `PriceQuote.xsd`, `AvailQuote.xsd`, `Quote.xsd`, and `QuoteRequest.xsd` files are listed.
2. In the **Available Output Types** pane, expand **Quote.xsd** folder and select the **quote** element, as shown in the following figure.



3. Click **Select**.

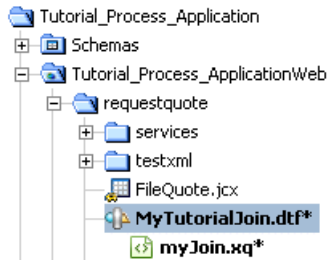
The elements and attributes that make up the **quote** element are displayed in the **Selected Output Types** pane.

4. Click **Create Transformation**.

The file: `myJoin.xq` is created and displayed in the **Design View**.

The `myJoin` Transformation method is added to the **MyJoinTutorial** Transformation control. The `myJoin` method contains the three input parameters selected in the previous steps.

In the **Application** tab, representations of the **MyTutorialJoin.dtf** and **myJoin.xq** files are displayed as shown in the following figure.



**Note:** In the **Application** tab, the **myJoin.xq** appears indented under the **MyTutorialJoin.dtf**. These files are associated and contain references to each other. To learn more, see [The Association Between XQ and DTF Files](#).

5. Save the `MyTutorialJoin.dtf` file. Right-click the **MyTutorialJoin.dtf** file and in the drop-down menu select **Save**.
6. Save the `myJoin.xq` file. In **Application** tab, right-click the **myJoin.xq** file and in the drop-down menu select **Save**.

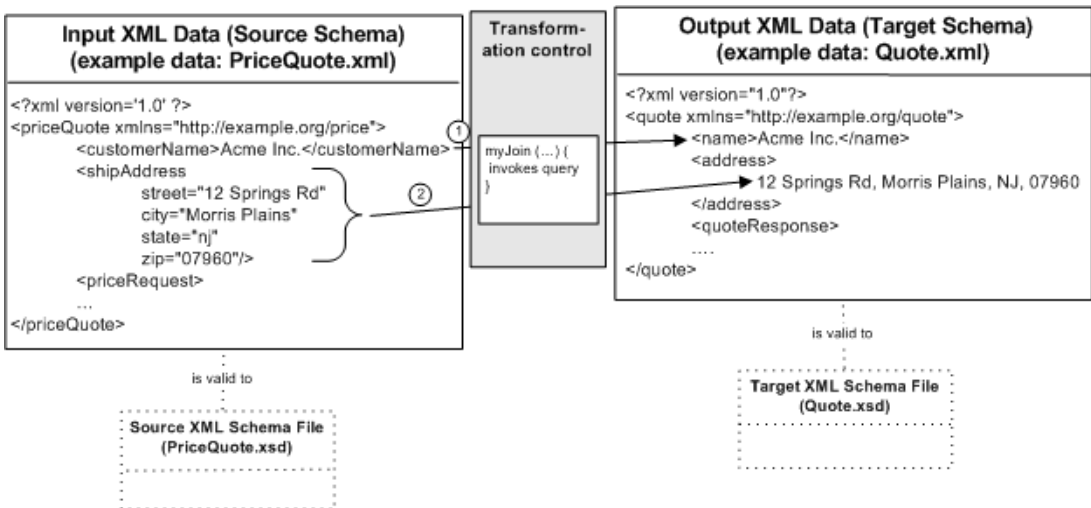
### 3 *Step 2: Building the Transformation*

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# 4 Step 3: Mapping Elements and Attributes

In this step, you map input (Source Schema) nodes to output (Target Schema) nodes. The following figure shows the mapping of example XML data.

Figure 4-1 Mapping Example



## 4 *Step 3: Mapping Elements and Attributes*

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In the preceding figure, the input XML data has a different format than the output XML data. When building a query invoked by a Transformation method, you map the input nodes to output nodes as represented by the arrows. During run time, the transformation uses the mappings to convert the data from the input format to the output format. For example, the arrow labeled 1 represents the transformation of the `priceQuote/customerName` element to the `quote/name` element.

The mapping of the address data, is a more complex transformation, as represented by the arrow labeled 2 in the preceding figure. To transform the address information, all the attributes of the `shipAddress` element (`street`, `city`, `state`, and `zip`) must be converted to a single string XML element called `address`.

The input XML data is valid to a different XML Schema than the output XML data. As shown in the preceding figure, the example input XML document called `PriceQuote.xml` is valid to the XML Schema in the `PriceQuote.xsd` file. Additionally, the example input XML document called `Quote.xml` is valid to the XML Schema in the `Quote.xsd` file.

The `PriceQuote.xml`, `AvailQuote.xml`, `QuoteRequest.xml`, `QuoteRequest_a.xml`, and `Quote.xml` files are located in the `Tutorial_Process_ApplicationWeb/requestquote/testxml` directory of the application.

**Note:** The preceding figure shows just one input data type (`priceQuote`). This is just one of the three inputs to the `myJoin` method as described in [“Step 2: Building the Transformation” on page 3-1](#). In this step, the mappings between the XML Schema in the `PriceQuote.xsd` file to the XML Schema in the `Quote.xsd` file are discussed. In the [“Step 4: Mapping a Repeating Element \(Join\)” on page 5-1](#), mappings between the other input types (`AvailQuote.xsd` and `taxRate`) are discussed.

**Note:** The `PriceQuote.xml`, `AvailQuote.xml`, `QuoteRequest_a.xml`, `QuoteRequest.xml`, and `Quote.xml` files are provided as examples and are not used by the business process during run time. During run time, the business process constructs the input XML data, and passes it to the transformation as described in [“Tutorial: Building Your First Data Transformation” on page 1-1](#).

Complete the following tasks to create, alter, and test mappings between the input and output data:

- [To Map a Node From a Source Schema to a Target Schema](#)
- [To Map Attributes of an Element to Single Element](#)

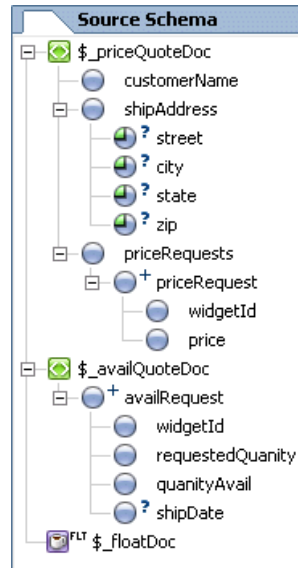
- 
- To View and Save the Generated Simple Query
  - To Test the Simple Query
  - To Edit, Retest, and Save the Simple Query
  - To Add an XQuery Function Call to the Query

### To Map a Node From a Source Schema to a Target Schema

In this step, you map the XML string element called **customerName** from the source schema (`PriceQuote.xsd`) to the XML string element called **name** in target schema (`Quote.xsd`).

1. View `myJoin.xq` in the **Design View**:
  - a. If the **Application** tab is not visible in WebLogic Workshop, from the menu bar choose **View→Application**.
  - b. In the **Application** tab, double-click  
`Tutorial_Process_Application\Tutorial_Process_ApplicationWeb\requestquote\MyTutorialJoin.dtf\myJoin.xq` and select the **Design View** tab.

The **Design View** displays the a graphical representation of the selected source schemas in the **Source Schema** pane, as shown in the following figure.



**Note:** If the `$_priceQuoteDoc`, `$_quoteQuoteDoc`, and `$_floatDoc` nodes are not displayed in your **Source Schema** pane, follow the instructions in [“To Select the Input Types” on page 3-4](#).

The nodes displayed in the **Source Schema** pane correspond to input parameters of the `myJoin` method of the **MyJoinTutorial** Transformation control. The signature of the `myJoin` method from the `MyJoinTutorial.dtf` file is shown in the following Java code segment:

```
/**
 * @dtf:transform xquery-ref="myJoin.xq"
 */
public abstract org.example.quote.QuoteDocument
myJoin(org.example.price.PriceQuoteDocument _priceQuoteDoc,
org.example.avail.AvailQuoteDocument _availQuoteDoc, float
_floatDoc);
```

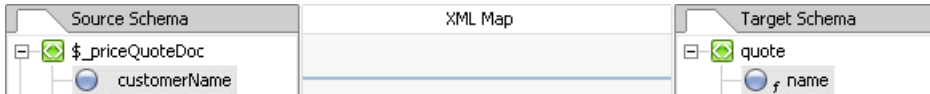
For example, the `$_priceQuoteDoc` node displayed in the **Source Schema** pane, corresponds to the `org.example.price.PriceQuoteDocument _priceQuoteDoc` parameter in the `myJoin` method.

**Note:** You can view the full source code listing of the **MyJoinTutorial** Transformation control by double-clicking **MyJoinTutorial.dtf** in the **Application** tab.



2. From the **Source Schema** pane drag the **\$\_priceQuoteDoc/customerName** node to the **quote/name** node in the **Target Schema** pane.

A solid line appears between the two elements. This solid line represents a data link between the two nodes—a link that converts the value of the source node directly to the value of the target node. This link is shown in the following figure.



This link corresponds to the mapping represented with an arrow (labeled with the number 1) in Figure 4-1.

## To Map Attributes of an Element to Single Element

In this step, you will map multiple attributes of one element to another single element.

The XML **\$\_priceQuoteDoc/shipAddress** element contains the following attributes:

- street
- city
- state
- zip

All these attributes will be mapped to the single XML **quote/address** element of type string. This mapping is represented by the arrow labeled 2 in [Figure 4-1](#).

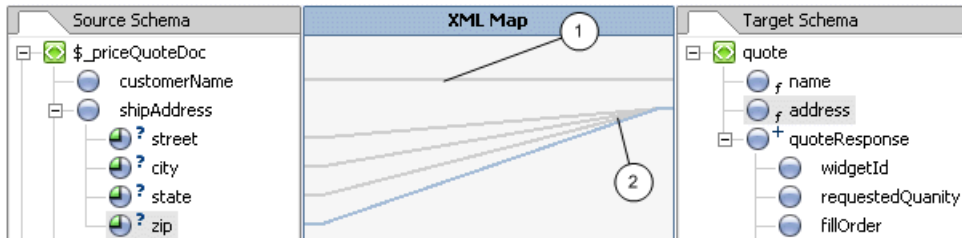
1. From the **Source Schema** pane drag the **street** attribute of **\$\_priceQuoteDoc/shipAddress** node to the **quote/address** node in the **Target Schema** pane.
2. From the **Source Schema** pane drag the **city** attribute of **\$\_priceQuoteDoc/shipAddress** node to the **quote/address** node in the **Target Schema** pane.
3. From the **Source Schema** pane drag the **state** attribute of **\$\_priceQuoteDoc/shipAddress** node to the **quote/address** node in the **Target Schema** pane.

## 4 Step 3: Mapping Elements and Attributes

4. From the **Source Schema** pane drag the **zip** attribute of **\$\_priceQuoteDoc/shipAddress** node to the **quote/address** node in the **Target Schema** pane.

Four new links are displayed, as shown in the following figure:

**Figure 4-2 Create Links**



The links labeled with numbers in the preceding figure, correspond to the mappings represented as arrows (labeled with numbers) in [Figure 4-1](#).

### To View and Save the Generated Simple Query

A query (in the XQuery language) is generated when you create mapping links from Source Schema elements and attributes to Target Schema elements and attributes.

1. Select the **Source View** tab of the `myJoin.xq` file.

The generated query is displayed as shown in the following figure:



**Note:** The lines of the query labeled with numbers in the preceding figure, correspond to the mappings represented as arrows in [Figure 4-1](#) and the corresponding links in [Figure 4-2](#), both of which are also labeled with numbers.

- 
2. Save all the files in this application. From the **WebLogic Workshop** menu bar, choose **File→Save All**. You can also save all the files by entering Ctrl+S.

**Note:** Pressing **Ctrl+S** saves all the files in the application, not just the current one.

## To Test the Simple Query

This section describes the steps necessary to test the query generated in the preceding section. In this section, you will enter input XML data, run that data against the query, and view the resulting output XML data.

1. Select the **Test View** tab of `myJoin.xq` file.
2. Import `PriceQuote.xml` as input data for the transformation:
  - a. From the drop-down menu in the **Source Data** pane, select `$_priceQuoteDoc`.
  - b. Click **Import...**

The **Open File to Test** dialog box is displayed.

- c. Double-click the **requestquote** folder.
- d. Double-click the **testxml** folder.
- e. Double-click the `PriceQuote.xml` file.

A graphical representation of the `PriceQuote.xml` file appears in the **Source Data** pane.

3. In the **Result Data** pane, click **Test**.

If not currently running, the WebLogic Server for the current application will be started.

**Note:** In order for a query to run, the WebLogic Server for the current application must be running.

The input XML data in one format is transformed by the query to XML in the output format and graphically displayed in the **Result Data** pane, as shown in the following figure.



---

```
<address>{concat($_priceQuoteDoc/ns0:shipAddress/@street,"",  
$_priceQuoteDoc/ns0:shipAddress/@city,"",  
$_priceQuoteDoc/ns0:shipAddress/@state,"",  
$_priceQuoteDoc/ns0:shipAddress/@zip)}</address>
```

3. Select the **Test View** tab of `myJoin.xq` file and in the **Result Data** pane click **Test**.

In the **Result Data** pane, the XML output is displayed.

The street, city, state, and zip code fields of the `address` element will be delineated by a commas, as shown in the following listing:

```
<address>12 Springs Rd,Morris Plains,nj,07960</address>
```

4. Save all the files in this application. From the **WebLogic Workshop** menu bar, choose **File**→**Save All**.

## To Add an XQuery Function Call to the Query

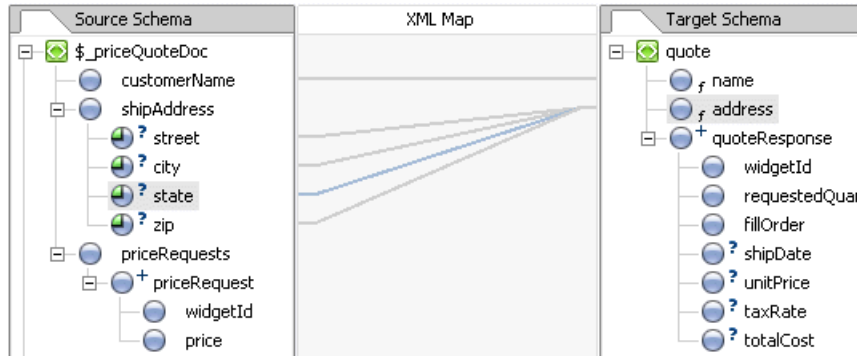
This section provides steps for converting the `state` field to uppercase by calling a standard W3C XQuery function from the query.

1. Select the **Design View** tab of `myJoin.xq` file.
2. In the **XML Map** pane, select one of the links between the `state` attribute of the `shipAddress` element and the `quote/address` element.

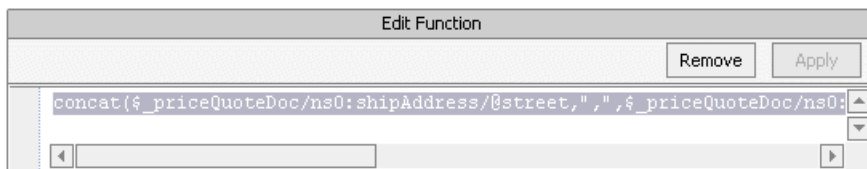
For example, select the link between the `state` attribute of the `shipAddress` element and the `quote/address` element.

In the **XML Map** pane, the link between the `state` attribute of the `shipAddress` element and the `quote/address` element becomes blue as shown in the following figure:

## 4 Step 3: Mapping Elements and Attributes



3. Select the **Functions** tab in the bottom left-hand part of the screen.  
The **Functions** tab is displayed, as shown in the following figure.

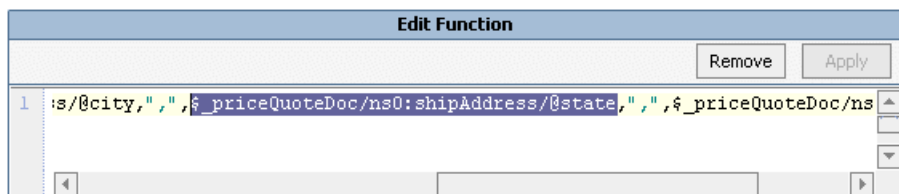


4. In the **Select Function** pane, expand the **String Functions** folder.
5. In the **Edit Function** pane, select the following text:

`$_priceQuoteDoc/ns0:shipAddress/@state`

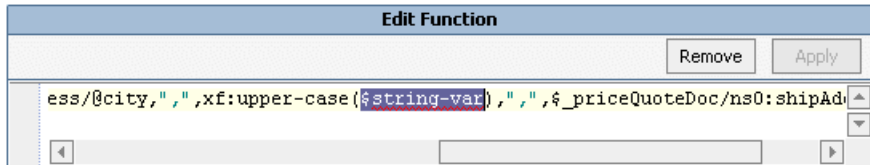
**Warning:** Do not select any commas.

In the **Edit Function** pane the following is displayed as shown in the following figure.



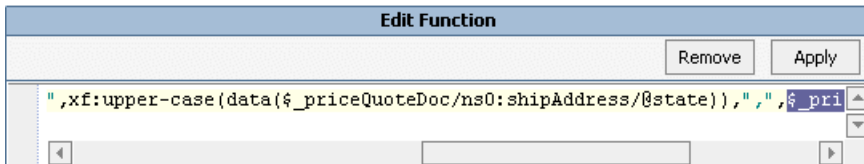
6. In the **Select Function** pane, select the **upper-case** function, and drag it into the **Edit Function** pane.

The following is displayed in the **Edit Function** pane, as shown in the following figure:



7. Leave `$string-var` selected in the **Edit Function** pane as shown in the preceding figure. In the **Select Parameter** drop-down list, select `$_priceQuoteDoc`.
8. In the **Select Parameters** pane, select **state** and drag it into the **Edit Function** pane.

The following is displayed in the **Edit Function** pane, as shown in the following figure:



9. Click **Apply**.
10. Select the **Test View** tab.
11. Click **Test**.

In the **Result Data** pane, the state is displayed in upper-case characters, as shown in the following listing:

```
<address>12 Springs Rd,Morris Plains,NJ,07960</address>
```

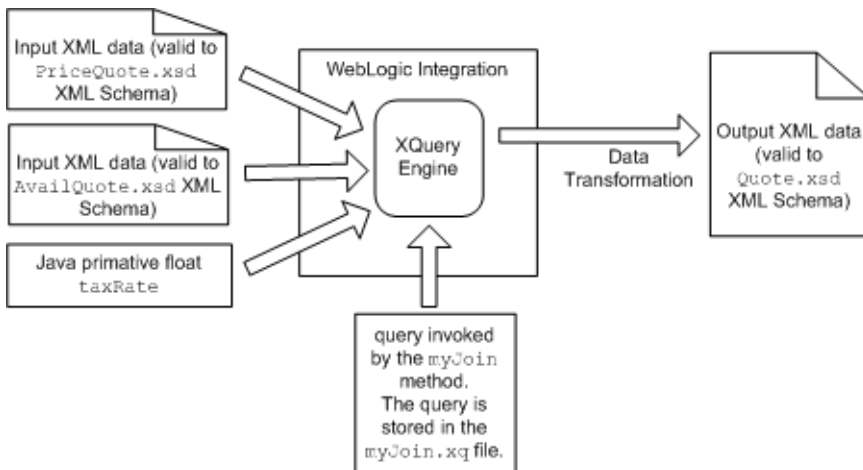
12. Save all the files in this application. From the **WebLogic Workshop** menu bar, choose **File**→**Save All**.





# 5 Step 4: Mapping a Repeating Element (Join)

In this step, you will add additional mappings to the existing query. In the previous sections, you mapped data from the Input Type defined by the `PriceQuote.xsd` XML Schema to the Output Type defined by the `Quote.xsd` XML Schema. In this section, you will map data from the Input Types defined by the `AvailQuote.xsd` XML Schema and the Java float primitive: `taxRate` to the Output Type defined by the `Quote.xsd` XML Schema, as shown in the following figure.



Mappings created in this section will create a join between repeating elements in the Input and Output XML Schemas. Complete the following tasks to create, test, and alter the join:

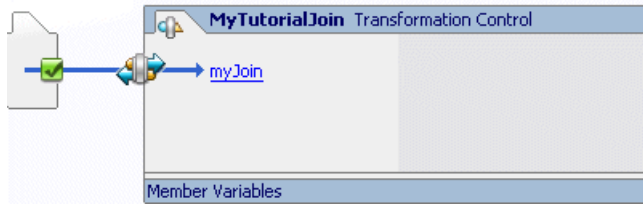
- [Create a User Defined Java Method to Invoke From the Join Query](#)
- [To Join Two Sets of Repeating Elements](#)
- [Add Links to Populate the quoteResponse Element](#)
- [Call the calculateTotalPrice User Method From the Query](#)
- [To View the Generated Query](#)
- [To Test the Query](#)
- [Create an Instance of the MyTutorialJoin Control](#)
- [Edit the Node That Invokes the Transformation](#)
- [To Run the Business Process](#)

### Create a User Defined Java Method to Invoke From the Join Query

In this task, you will create a User Defined Java method in the **MyTutorialJoin** Transformation control which calculates the total price of the widgets requested including tax. In [“Call the calculateTotalPrice User Method From the Query”](#) on page 5-9, you will change the query to invoke this method.

1. View `MyTutorialJoin.dtf` in the **Design View**:
  - a. If the **Application** tab is not visible in WebLogic Workshop, from the menu bar choose **View→Application**.
  - b. In the **Application** tab, double-click `Tutorial_Process_Application\Tutorial_Process_ApplicationWeb\requestquote\MyTutorialJoin.dtf` and select the **Design View** tab.

The graphical representation of the **MyTutorialJoin** Transformation control is displayed, as shown in the following figure:



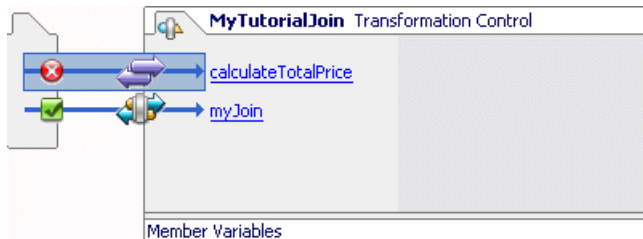
2. Right-click in the box representing the **MyTutorialJoin** Transformation control. (The box shown in the preceding figure.)

3. From the drop-down menu, select **Add User Method**.

A User method is created in the **MyTutorialJoin** Transformation control.

4. Enter `calculateTotalPrice` as the method name.

The methods that make up the **MyTutorialJoin** Transformation control are displayed, as shown in the following figure:



5. Right-click the arrow representing the **calculateTotalPrice** method.
6. From the drop-down menu, select **Edit in source view**.
7. In the **Design View** of the MyTutorialJoin Transformation control, replace the generated `calculateTotalPrice` Java method.

Replace the following generated `calculateTotalPrice` Java method:

```
public void calculateTotalPrice()
{
}
```

With the following `calculateTotalPrice` Java method:

```
public float calculateTotalPrice(float taxRate, int quantity,
float price, boolean fillOrder)
{
```

## 5 Step 4: Mapping a Repeating Element (Join)

---

```
float totalTax, costNoTax, totalCost;
if (fillOrder)
{
    // Calculate the total tax
    totalTax = taxRate * quantity * price;
    // Calculate the total cost without tax
    costNoTax = quantity * price;
    // Add the tax and the cost to get the total cost
    totalCost = totalTax + costNoTax;
}
else
{
    totalCost = 0;
}
return totalCost;
}
```

**Warning:** Make sure you change the return type of the `calculateTotalPrice` function from `void` to `float`.

8. Save all the files in this application. From the **WebLogic Workshop** menu bar, choose **File**→**Save All**.

### To Join Two Sets of Repeating Elements

1. View `myJoin.xq` in the **Design View**:
  - a. If the **Application** tab is not visible in WebLogic Workshop, from the menu bar choose **View**→**Application**.
  - b. In the **Application** tab, double-click `Tutorial_Process_Application\Tutorial_Process_ApplicationWeb\requestquote\MyTutorialJoin.dtf\myJoin.xq` and select the **Design View** tab.
2. Collapse the **shipAddress** node.
3. Select the `$_priceQuoteDoc\priceRequests\priceRequest` node and drag it to the `quote\quoteResponse` node.

These nodes are both repeating nodes. A repeating node means more than one instances of this node can be specified. The + symbol to the right of the node indicates these nodes are repeating nodes.

**Warning:** You must select the **priceRequest** node and not the **priceRequests** node.

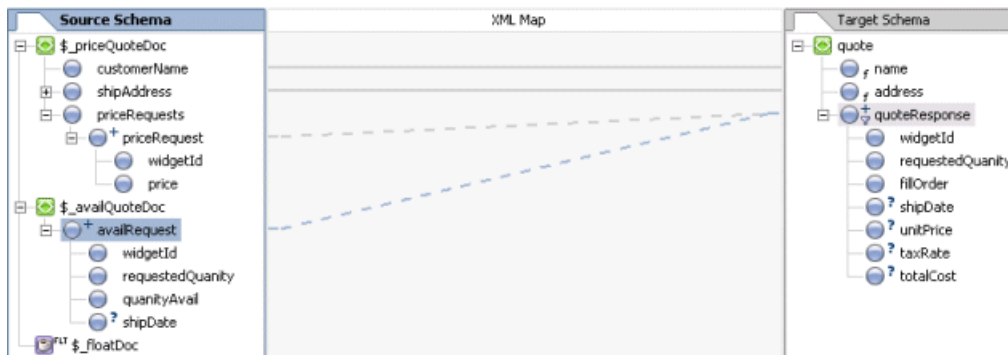
A dashed line linking the two repeating nodes is displayed, as shown in the following figure.

The dashed line represents a structural link—a link between two parent structures that does not map data directly.

To learn more about XML repeating nodes, see [“Understanding XML Repeating Nodes” on page 6-5](#).

4. Select the **\$\_availQuoteDoc\availRequest** node and drag it to the **quote\quoteResponse** node.

A dashed line linking the two repeating elements is displayed, as shown in the following figure:



5. Select the **Source View** tab to view the changes to the query.

Expand the **declare namespace...** node.

The following query is displayed in the **Source View**:

```
-- requestquote/MyTutorialJoin.dtf#myJoin --

declare namespace ns0 = "http://www.example.org/price"
declare namespace ns1 = "http://www.example.org/avail"
declare namespace ns2 = "http://www.example.org/quote"

<ns2:quote>
  <name>{ data($_priceQuoteDoc/ns0:customerName) }</name>
  <address>{
    concat($_priceQuoteDoc/ns0:shipAddress/@street, ", ", $_priceQuote
Doc/ns0:shipAddress/@city, ", ",
xf:upper-case($_priceQuoteDoc/ns0:shipAddress/@state), ", ", $_pri
ceQuoteDoc/ns0:shipAddress/@zip) }</address>
```

```
    {
      for $availRequest1 in $_availQuoteDoc/ns1:availRequest,
      $priceRequest1 in
      $_priceQuoteDoc/ns0:priceRequests/ns0:priceRequest
      return
        <quoteResponse/>
    }
  </ns2:quote>
```

In the preceding query, there are no data links between the children of the structure nodes, so the `quoteResponse` element is empty. (The string: `<quoteResponse/>` is an empty node.)

The structural links between the repeating nodes generates the `for` loop which is shown in bold in the preceding query listing. This XQuery `for` loop iterates through the set of `priceRequest` and `availRequest` repeating elements. For example, if the input XML data to this query contains three instances of the `priceRequest` element and three instances of the `availRequest` element, the `for` loop would execute a total of nine times with the following combinations:

- The first instance of the `availRequest` element with the first instance of `priceRequest` element.
- The first instance of the `availRequest` element with the second instance of `priceRequest` element.
- The first instance of the `availRequest` element with the third instance of `priceRequest` element.
- The second instance of the `availRequest` element with the first instance of `priceRequest` element.
- The second instance of the `availRequest` element with the second instance of `priceRequest` element.
- The second instance of the `availRequest` element with the third instance of `priceRequest` element.
- The third instance of the `availRequest` element with the first instance of `priceRequest` element.
- The third instance of the `availRequest` element with the second instance of `priceRequest` element.
- The third instance of the `availRequest` element with the third instance of `priceRequest` element.

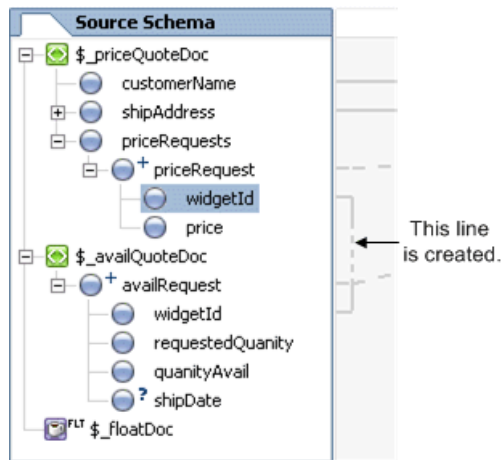
---

For some transformations, you may want the query to generate all the possible combinations but for others, you may want to constrain the combinations as described in the following steps.

6. Select the **Design View** tab.
7. Select the **\$\_priceQuoteDoc/priceRequests/priceRequest/widgetId** node and drag it to the **\$\_availQuote/availRequest/widgetId** node.

**Note:** Both of these elements are in the **Source Schema** pane.

A line between the two **widgetId** nodes is displayed, as shown in the following figure:



8. Select the **Source View** tab to view the changes to the query.

The following query is displayed in the **Source View**:

```
-- requestquote/MyTutorialJoin.dtf#myJoin --

declare namespace ns0 = "http://www.example.org/price"
declare namespace ns1 = "http://www.example.org/avail"
declare namespace ns2 = "http://www.example.org/quote"

<ns2:quote>
  <name>{ data($_priceQuoteDoc/ns0:customerName) }</name>
  <address>{
concat($_priceQuoteDoc/ns0:shipAddress/@street, ", ", $_priceQuote
Doc/ns0:shipAddress/@city, ", ",
xf:upper-case($_priceQuoteDoc/ns0:shipAddress/@state), ", ", $_pri
```

## 5 Step 4: Mapping a Repeating Element (Join)

---

```
ceQuoteDoc/ns0:shipAddress/@zip) }</address>
{
  for $availRequest1 in $_availQuoteDoc/ns1:availRequest,
    $priceRequest1 in
$_priceQuoteDoc/ns0:priceRequests/ns0:priceRequest
    where data($priceRequest1/ns0:widgetId) =
data($availRequest1/ns1:widgetId)
    return
      <quoteResponse/>
}
</ns2:quote>
```

The link between the **widgetId** nodes generates the **where** clause in the **for** loop, as shown in bold in the preceding query listing. This **where** clause specifies that if the expression in the **where** clause is true, the **for** loop will output the contents of the **return**. For this example, if the **widgetId** of the **availRequest** element is equal to the **widgetId** of the **priceQuest** element, the following XML data is returned:

```
<quoteResponse/>
```

An empty **quoteReponse** element isn't very useful. In the following task: [“Add Links to Populate the quoteResponse Element” on page 5-8](#), you will add data links that will populate the **quoteResponse** element.

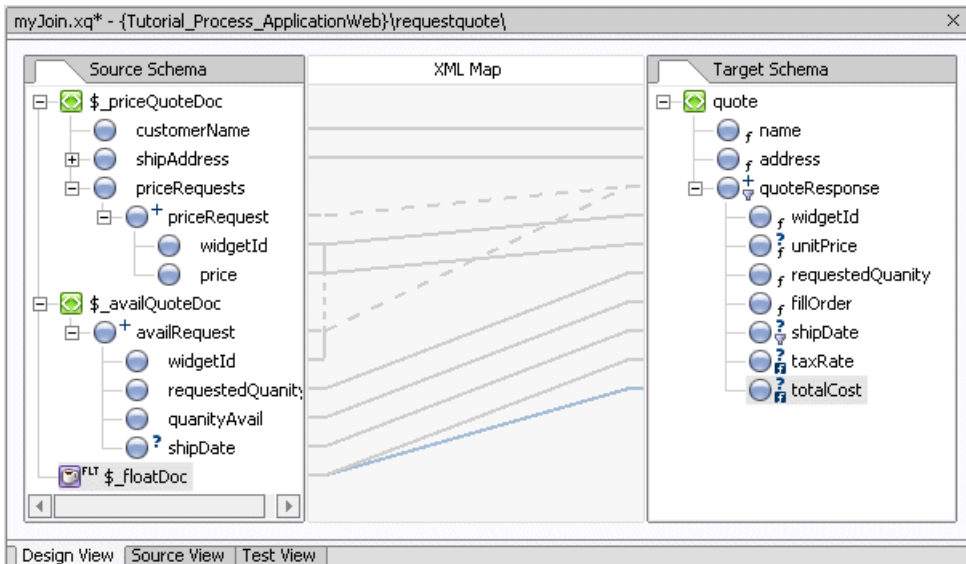
### Add Links to Populate the quoteResponse Element

1. Select the **Design View** tab.
2. From the **Source Schema** pane, drag the **\$\_priceQuoteDoc/priceRequests/priceRequest/widgetId** node to the **quote/quoteResponse/widgetId** node in the **Target Schema** pane.
3. From the **Source Schema** pane, drag the **\$\_priceQuoteDoc/priceRequests/priceRequest/price** node to the **quote/quoteResponse/unitPrice** node in the **Target Schema** pane.
4. From the **Source Schema** pane, drag the **\$\_availQuoteDoc/availRequest/requestedQuantity** node to the **quote/quoteResponse/requestedQuantity** node in the **Target Schema** pane.
5. From the **Source Schema** pane, drag the **\$\_availQuoteDoc/availRequest/quantityAvail** node to the **quote/quoteResponse/fillOrder** node in the **Target Schema** pane.



6. From the **Source Schema** pane, drag the **\$\_availQuoteDoc/availRequest/shipDate** node to the **quote/quoteResponse/shipDate** node in the **Target Schema** pane.
7. From the **Source Schema** pane, drag the **\$\_floatDoc** Java primitive to the **quote/quoteResponse/taxRate** node in the **Target Schema** pane.
8. From the **Source Schema** pane, drag the **\$\_floatDoc** Java primitive to the **quote/quoteResponse/totalCost** node in the **Target Schema** pane.

In the **Design View** the following links are displayed as shown in the following figure:



9. Save all the files in this application. From the WebLogic Workshop menu bar, choose **File→Save All**.

### Call the `calculateTotalPrice` User Method From the Query

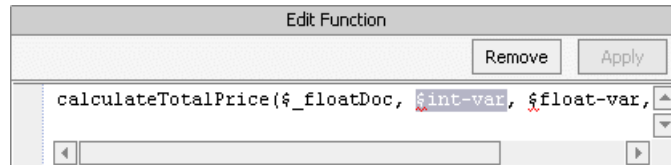
1. Select the **Design View** tab.
2. In the **XML Map** pane, select the link between the **\$\_floatDoc** Java primitive and the **quote/quoteResponse/totalCost** node.

In the **XML Map** pane, the link between these two nodes becomes blue.

## 5 Step 4: Mapping a Repeating Element (Join)

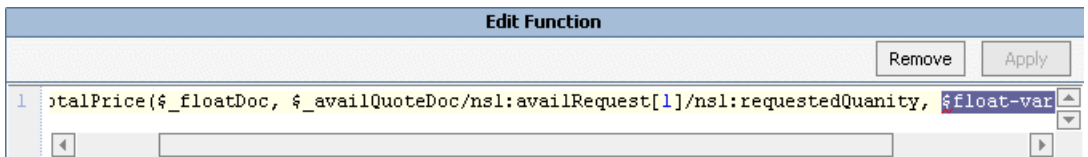
3. Select the **Functions** tab in the bottom left-hand part of the screen.
4. In the **Select Function** pane, from the drop-down menu select **User Functions**.
5. In the **XQuery Functions** pane, select the **calculateTotalPrice** function, and drag it into the **Edit Function** pane.
6. Leave `$float-var` selected in the **Edit Function** pane and in the **Select Parameter** drop-down list select `$_floatDoc`.
7. In the **Select Parameters** pane, select `$_floatDoc` and drag it into the **Edit Function** pane.

In the **Edit Function** pane, the default parameter: `$float_var` is replaced with the `$_floatDoc` parameter, as shown in the following figure:



8. Leave `$int-var` selected in the **Edit Function** pane and in the **Select Parameter** drop-down list select `$_availQuoteDoc`.
9. In the **Select Parameters** pane, select `$_availQuoteDoc/availRequest/requestedQuantity` and drag it into the **Edit Function** pane.

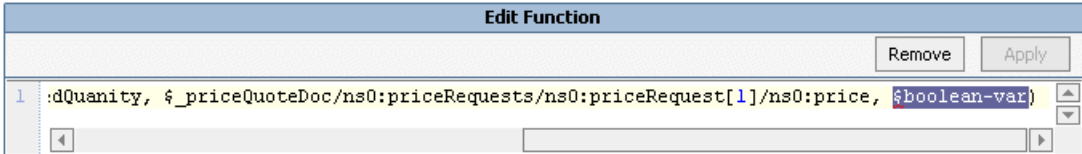
In the **Edit Function** pane, the default parameter: `$int_var` is replaced with the `$_availQuoteDoc/availRequest/requestedQuantity` parameter, as shown in the following figure:



10. Leave `$float-var` selected in the **Edit Function** pane and in the **Select Parameter** drop-down list select `$_priceQuoteDoc`.

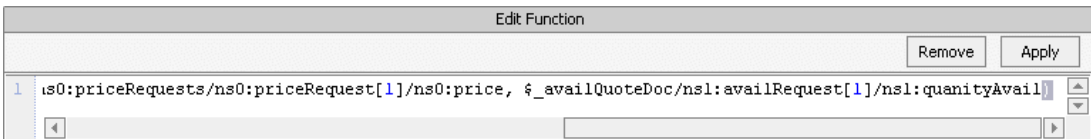
11. In the **Select Parameters** pane, select **\$\_priceQuoteDoc/priceRequests/priceRequest/price** and drag it into the **Edit Function** pane.

In the **Edit Function** pane, the default parameter: **\$float\_var** is replaced with the **\$\_priceQuoteDoc/priceRequests/priceRequest/price** parameter, as shown in the following figure:



12. In the **Select Parameters** pane, select **\$\_availQuoteDoc/availRequest/quantityAvail** and drag it into the **Edit Function** pane.

In the **Edit Function** pane, the default parameter: **\$boolean\_var** is replaced with the **\$\_availQuoteDoc/availRequest/quantityAvail** parameter, as shown in the following figure:



13. Click **Apply**.
14. Save all the files in this application. From the WebLogic Workshop menu bar, choose **File→Save All**.

## To View the Generated Query

Select the **Source View** tab to view the changes to the query.

The following query is displayed in **Source View**:

```
{-- requestquote/MyTutorialJoin.dtf#myJoin --}

declare namespace ns0 = "http://www.example.org/price"
declare namespace ns1 = "http://www.example.org/avail"
declare namespace ns2 = "http://www.example.org/quote"
```

## 5 Step 4: Mapping a Repeating Element (Join)

```
<ns2:quote>
  <name>{ data($_priceQuoteDoc/ns0:customerName) }</name>
  <address>{
    concat($_priceQuoteDoc/ns0:shipAddress/@street, ", ", $_priceQuoteDoc/ns0:shipAddress/@city, ", ",
    xf:upper-case(data($_priceQuoteDoc/ns0:shipAddress/@state)), ", ", $_priceQuoteDoc/ns0:shipAddress/@zip) }</address>
  {
    for $availRequest1 in $_availQuoteDoc/ns1:availRequest,
      $priceRequest1 in $_priceQuoteDoc/ns0:priceRequests/ns0:priceRequest
      where data($availRequest1/ns1:widgetId) =
data($priceRequest1/ns0:widgetId)
      return
        <quoteResponse>
          <widgetId>{ data($priceRequest1/ns0:widgetId) }</widgetId>
          <unitPrice>{ data($priceRequest1/ns0:price) }</unitPrice>
          <requestedQuantity>{ data($availRequest1/ns1:requestedQuantity)
}</requestedQuantity>
          <fillOrder>{ data($availRequest1/ns1:quantityAvail) }</fillOrder>
          {
            for $shipDate1 in $availRequest1/ns1:shipDate
              return
                <shipDate>{ data($shipDate1) }</shipDate>
          }
          <taxRate>{ $_floatDoc }</taxRate>
          <totalCost>{ calculateTotalPrice($_floatDoc,
$availRequest1/ns1:requestedQuantity,
$priceRequest1/ns0:price, $availRequest1/ns1:quantityAvail) }</totalCost>
        </quoteResponse>
      }
}
</ns2:quote>
```

The links added the preceding task generate the additional XQuery source listed between the `<quoteResponse>` and `</quoteResponse>` tags highlighted in bold in the preceding query listing.

### To Test the Query

1. Select the **Test View** tab.
2. There are three import parameters to the `myJoin` Transformation method: `$_priceQuoteDoc`, `$_availQuoteDoc`, and `$_floatDoc`. In the task: [“To Test the Simple Query” on page 4-7](#), you imported `PriceQuote.xml` as input for the `$_priceQuoteDoc` parameter. In this step, you import `AvailQuote.xml` for the input parameter: `$_availQuoteDoc`:
  - a. From the drop-down menu in the **Source Data** pane, select `$_availQuoteDoc`.

- 
- b. Click **Import...** .

The **Open XML File to Test** dialog box is displayed.

- c. Double-click the **requestquote** folder.
- d. Double-click the **testxml** folder.
- e. Double-click the `AvailQuote.xml` file.

A graphical representation of the `AvailQuote.xml` file appears in the **Source Data** pane.

3. From the drop-down menu in the **Source Data** pane, select `$_floatDoc` .
4. In the **Node Value** field of the `$_floatDoc` node, double-click on the existing value, enter: `0.08`, and press the Enter key twice.
5. In the **Result Data** pane click **Test**.

The query is run with the test XML data. A graphical representation of the resulting XML data is shown in the **Result Data** pane. This query joins the two sets of input repeating elements (`availRequest` and `priceRequest`) to a single repeating element (`quoteResponse`).

6. To view resulting data as XML, in the **Result Data** pane select the **XML Source View** tab.
7. To check that the resulting XML data from the query is valid against the associated XML Schema, in the **Result Data** pane click **Validate**. In this example, the resulting XML data is checked against the XML Schema in the `Quote.xsd` file. To learn more, see [Validating](#).
8. Save all the files in this application. From the WebLogic Workshop menu bar, choose **File**→**Save All**.

## Create an Instance of the MyTutorialJoin Control

In this task, you create an instance of the `MyTutorialJoin.dtf` control.

1. View the RequestQuote business process in the **Design View**:
  - a. If the **Application** tab is not visible in WebLogic Workshop, from the menu bar choose **View**→**Application**.

## 5 Step 4: Mapping a Repeating Element (Join)

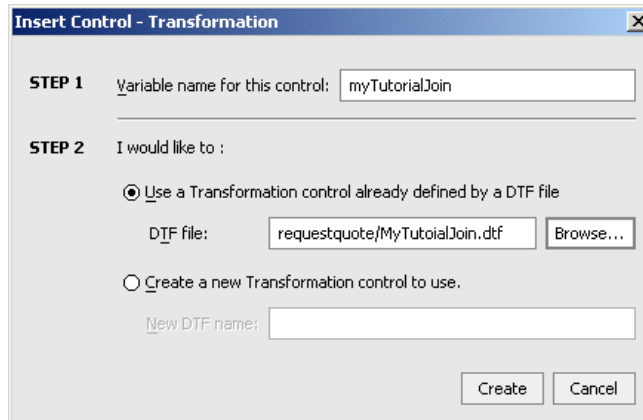
---

- b. In the **Application** tab, double-click `Tutorial_Process_Application\Tutorial_Process_ApplicationWeb\requestquote\RequestQuote.jspd` and select the **Design View** tab.
2. Click **Add** on the **Controls** tab and choose **Integration Controls**→**Transformation** from the drop-down menu. (If the **Controls** pane is not visible in WebLogic Workshop, from the menu bar choose **View**→**Windows**→**Data Palette**.)

The **Insert Control** dialog box is displayed.

3. In the **Insert Control** dialog box, complete the following steps:
  - a. In **Step 1**, enter **myTutorialJoin** as the variable name for the control.
  - b. In **Step 2**, ensure that the following option is selected: **Use a Transformation control already defined by a DTF file**.
  - c. Click **Browse** beside the **DTF file** field, expand the **requestquote** folder, select **MyTutorialJoin.dtf** and click **Select** to close the file browser.

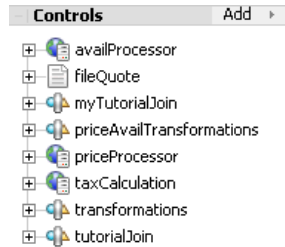
The following is displayed in the **Insert Control** dialog box:



4. Click **Create** to close the **Insert Control** dialog box.

An instance of a Transformation control, named **myTutorialJoin**, is created in your project and displayed in the **Controls** pane.

You can view the Transformation controls and their methods in the **Controls** tab, which at this point, should resemble the following figure:



## Edit the Node That Invokes the Transformation

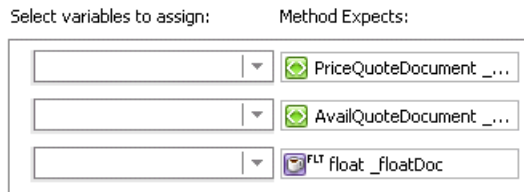
In this task, you edit the **Combine Price and Avail Quotes** node in the RequestQuote business process and change the Transformation control that gets invoked by this node from an instance of the `TutorialJoin.dtf` control to an instance of the `MyTutorialJoin.dtf` control. Additionally, you change the design of the **Combine Price and Avail Quotes** node to call the `myJoin()` method on the **MyTutorialJoin** control. The `myJoin()` method combines the data returned to your business process from different systems and creating a single XML response document (quote), which is subsequently returned to the business process's client.

1. In the RequestQuote business process, double-click the **Combine Price and Avail Quotes** node to open its node builder.

The node builder opens on the **General Settings** tab.

2. From the drop-down menu in the **Control** field and select **myTutorialJoin**.
3. Select `myJoin()` from the **Method** panel and click **Apply**.
4. Click **Send Data** to open the second tab in the node builder.

The **Method Expects** field is populated with the data type expected by the `myJoin()` method on the **MyTutorialJoin** control, as shown in the following figure.



## 5 Step 4: Mapping a Repeating Element (Join)

5. Under **Select variables to assign**, select the variables such that their data types match the data type expected in the input parameters to the `myJoin()` method.
  - a. For the case in which the method expects **PriceQuoteDocument**, choose **priceQuote (PriceQuoteDocument)**.

**priceQuote** holds the price quote data, which is returned from the PriceProcessor service in the **For Each** loop in your business process.
  - b. For the case in which the method expects **AvailQuoteDocument**, choose **availQuote (AvailQuoteDocument)**.







**availQuote** holds the availability quote data, which is returned from the AvailProcessor service in the **For Each** loop in your business process.
  - c. For the case in which the method expects **float**, choose **taxRate (float)**.

**taxRate** holds the rate of sales tax applied to the quote, based on the shipping address, which is returned to your business process from the taxCalculation service.

☒ Variable Assignment   ☐ Mapping and Transformation

---

Select variables to assign:      Method Expects:

 priceQuote (Price...   ▾	 PriceQuoteDocument
 availQuote (Avail...   ▾	 AvailQuoteDocument
 FLT taxRate (float)   ▾	 FLT float



6. Click **Apply**. Then click **Receive Data** to open the third tab in the node builder.

On the **Receive Data** tab, the **Method Returns** field is populated with the data type returned by the `myJoin()` method: **QuoteDocument**.
7. Click the arrow in **Select variable to assign**, then choose **Quote**.

☒ Variable Assignment   ☐ Transformation

---

Select variables to assign:      Method Expects:

 Quote (QuoteDoc...   ▾	 QuoteDocument
--	---

8. Click **Apply**, then **Close** to save your specifications and close the node builder.



- 
9. Save all the files in this application, including the RequestQuote business process. From the WebLogic Workshop menu bar, choose **File**→**Save All**.

### **To Run the Business Process**

In this tutorial, you entered the XML data that is run against the query. During run time, the business process builds the XML data and passes it to the Transformation control and the associated query that was built in this tutorial. To run the business process and invoke the query, follow the instructions in [Step 12: Run the RequestQuote Business Process](#) in the *Tutorial: Building Your First Business Process*.



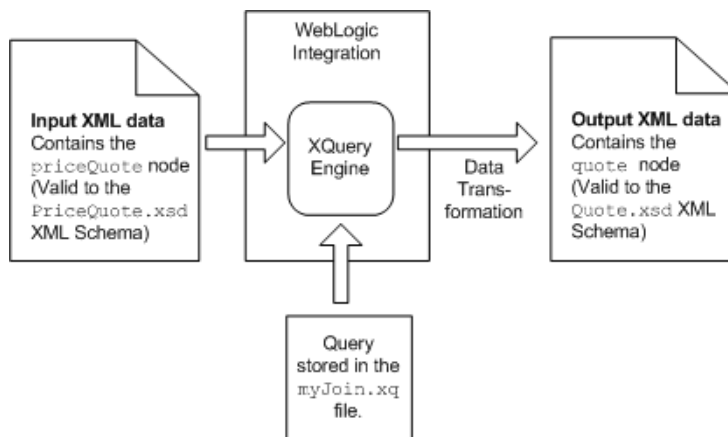
# 6 Understanding the Concepts

This section is optional and provides detailed conceptual information about the following topics:

- [Understanding the Transformation](#)
- [Understanding XML Repeating Nodes](#)

## Understanding the Transformation

The transformation occurring in the query built in “[Step 3: Mapping Elements and Attributes](#)” on [page 4-1](#) is shown in the following figure:



The query generated in “To Map Attributes of an Element to Single Element” on page 4-5 is shown in the following listing:

```

{-- requestquote/MyTutorialJoin.dtf#myJoin --}
declare namespace ns0 = "http://www.example.org/price"
declare namespace ns1 = "http://www.example.org/avail"
declare namespace ns2 = "http://www.example.org/quote"
<ns2:quote>
  <name>{ data($_priceQuoteDoc/ns0:customerName) }</name>
  <address>{
concat($_priceQuoteDoc/ns0:shipAddress/@street,$_priceQuoteDoc/ns0:shipAddress/
@city,
$_priceQuoteDoc/ns0:shipAddress/@state,$_priceQuoteDoc/ns0:shipAddress/@zip)
}</address>
</ns2:quote>

```

The first three lines of this query are namespace declarations. These namespace declarations are part of the query prolog. For each namespace in the input and output XML Schema, the mapper generates a namespace declaration. For example, the mapper generates the namespace declaration: ns0 for the namespace URI (<http://www.example.org/price>) defined in the XML Schema of the `PriceQuote.xsd` file. Namespaces are used to uniquely distinguish elements in XML Schema from elements in another XML Schema.

The following steps describe the transformation that occurs when the input XML data is run against the preceding query:

1. The fifth line of the query is shown in the following listing:

---

```
<ns2:quote>
```

This fifth line of the query becomes the first line of the XML output, as shown in the following listing:

```
<quot:quote xmlns:quot="http://www.example.org/quote">
```

During the transformation, the namespace prefix for the `quote` element changes. In the query, the namespace prefix associated with `http://www.example.org/quote` namespace URI is `ns2`. However, in the resulting XML data, the namespace prefix generated for the `http://www.example.org/quote` namespace URI is `quot`. This namespace declaration is highlighted in bold in the preceding listing.

2. The sixth line of the query is shown in the following listing:

```
<name>{data($_priceQuoteDoc/ns0:customerName)}</name>
```

This sixth line of the query transforms the `customerName` element of the `priceQuote` element to the `name` element of the `quote` element.

The following steps describe the transformation that occurs on this line of XQuery code:

- a. The `<name>` and `</name>` tags transform directly to XML output.
- b. Characters between curly braces `{ }` are interpreted in a special way by the XQuery engine. That is, characters surrounded by curly braces are not transformed directly into XML. Specifically, in this example, the curly braces surrounding the data method specify that the `data` function of the XQuery language should be executed.

The `data` function returns the value of the passed in XML node. For this example, the argument to the `data` function is the following XPath expression: `$_priceQuoteDoc/ns0:customerName`. The `$_priceQuoteDoc` variable contains the contents of the `priceQuote` element including its subelements. This XPath expression returns the `customerName` node of the `priceQuote` element. (The `/` XPath operator delimitates parent nodes from child nodes.)

The XQuery `data` function takes `customerName` node and returns the value of the node, the string: `Acme Inc`. This string is placed between the `<name>` and `</name>` tags resulting in the following line of output XML data, as shown in the following listing:

```
<name>Acme Inc</name>
```

3. The seventh line in the query is shown in the following listing:

```
<address>{
concat ($_priceQuoteDoc/ns0:shipAddress/@street,$_priceQuoteDoc/
ns0:shipAddress/@city,
$_priceQuoteDoc/ns0:shipAddress/@state,$_priceQuoteDoc/ns0:ship
Address/@zip) }</address>
```

The following steps describe the transformation that occurs on this line of XQuery code.

- The `<address>` and `</address>` tags transform directly to XML output.
- Characters between curly braces `{ }` are interpreted in a special way by the XQuery engine. That is, characters surrounded by curly braces are not transformed directly into XML. Specifically, in this example, the curly braces surrounding the data method specify that the `data` function of the XQuery language should be executed.
- The `concat` function takes the values of all its arguments, concatenates these values together, and returns them as a string. For this example, the `concat` function takes the values of the all the XPath expressions and concatenates them together in one address string. Additionally, all the arguments in this `concat` function are XPath expressions that return the value of specified attribute, as shown in the following table.

The Following XPath Expression	Returns	The String
<code>\$_priceQuoteDoc/ns0:shipAddress/@ns0:street</code>	The value of the street attribute of the shipAddress element.	12 Springs Rd
<code>\$_priceQuoteDoc/ns0:shipAddress/@ns0:city</code>	The value of the city attribute of the shipAddress element.	Morris Plains
<code>\$_priceQuoteDoc/ns0:shipAddress/@ns0:state</code>	The value of the state attribute of the shipAddress element.	nj
<code>\$_priceQuoteDoc/ns0:shipAddress/@ns0:zip</code>	The value of the zip attribute of the shipAddress element.	07960

---

The return string of the `concat` function is placed between the `<address>` and `</address>` tags resulting in the following line of XML data, as shown in the following listing:

```
<address>12 Springs RdMorris Plainsnj07960</address>
```

4. The last line of the query is shown in the following listing:

```
</ns2:quote>
```

This last line of the query becomes the last line of the XML output, as shown in the following listing:

```
</quot:quote>
```

The resulting `address` element has no delimiter between the street, city, state, and zip code fields, making the address difficult to read and parse. For instructions on adding delimiters to this query, return to [“To Edit, Retest, and Save the Simple Query” on page 4-8](#) in the main section of this tutorial.

## Understanding XML Repeating Nodes

A repeating node means more than one instances of this node can be specified. For example, in the following XML data there are three instances of the **priceRequest** node, as shown in the following listing:

```
<?xml version="1.0"?>
<priceQuote xmlns="http://www.example.org/price">
  <customerName>Acme Inc</customerName>
  <shipAddress street="12 Springs Rd" city="Morris Plains" state="nj"
zip="07960"/>
  <priceRequests>
    <priceRequest>
      <widgetId>12</widgetId>
      <price>1.00</price>
    </priceRequest>
    <priceRequest>
      <widgetId>134</widgetId>
      <price>34.10</price>
    </priceRequest>
    <priceRequest>
      <widgetId>211</widgetId>
      <price>10.00</price>
    </priceRequest>
  </priceRequests>
</priceQuote>
```

```
        </priceRequest>
    </priceRequests>
</priceQuote>
```

A segment of the XML Schema for the preceding XML data is shown in the following listing:

```
<?xml version="1.0"?>
<xsd:schema . . . >
. . .
    <xsd:element name="widgetId" type="xsd:integer"/>
    <xsd:element name="price" type="xsd:float"/>
    <xsd:element name="priceRequest">
        <xsd:complexType>
            <xsd:sequence>
                <xsd:element ref="pri:widgetId"/>
                <xsd:element ref="pri:price"/>
            </xsd:sequence>
        </xsd:complexType>
    </xsd:element>
    <xsd:element name="priceRequests">
        <xsd:complexType>
            <xsd:sequence>
                <xsd:element ref="pri:priceRequest" minOccurs="1" maxOccurs="10"/>>
            </xsd:sequence>
        </xsd:complexType>
    </xsd:element>
. . .
    <xsd:element name="priceQuote">
        <xsd:complexType>
            <xsd:sequence>
                <xsd:element ref="pri:customerName" minOccurs="1" maxOccurs="1"/>
                <xsd:element ref="pri:shipAddress" minOccurs="1" maxOccurs="1"/>
                <xsd:element ref="pri:priceRequests"/>
            </xsd:sequence>
        </xsd:complexType>
    </xsd:element>
</xsd:schema>
```

The `minOccurs="1"` and `maxOccurs="10"` settings in the definition of the `priceRequest` element (highlighted in bold in the preceding listing) specifies there can be one to ten instances of the `priceRequest` element. This defines `priceQuote` as a repeating element.

### To View the Full listing of the XML Schema, Open the PriceQuote.xsd file

1. In the **Application** tab, expand **Schemas** folder. (If the **Application** tab is not visible in WebLogic Workshop, from the menu bar choose **View→Application.**)



- 
2. Double-click the **PriceQuote.xsd** icon.

The `PriceQuote.xsd` file is displayed.

3. Return to the **Design View** of the `myJoin.xq` file:

- a. In the **Application** tab, double-click

`Tutorial_Process_Application\Tutorial_Process_ApplicationWeb  
\requestquote\MyTutorialJoin.dtf\myJoin.xq`

- b. Select the **Design View** tab.

