TIBCO® Data Virtualization

Tutorial Guide

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Two-Second Advantage®

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Preface

Documentation for this and other TIBCO products is available on the TIBCO Documentation site. This site is updated more frequently than any documentation that might be included with the product. To ensure that you are accessing the latest available help topics, please visit:

- https://docs.tibco.com

Product-Specific Documentation

The following documents form the TIBCO® Data Virtualization(TDV) documentation set:

- *TIBCO TDV and Business Directory Release Notes* Read the release notes for a list of new and changed features. This document also contains lists of known issues and closed issues for this release.
- TDV Installation and Upgrade Guide
- TDV Administration Guide
- TDV Reference Guide
- TDV User Guide
- TDV Security Features Guide
- TDV Business Directory Guide
- TDV Application Programming Interface Guide
- TDV Tutorial Guide
- TDV Extensibility Guide
- TDV Getting Started Guide
- TDV Client Interfaces Guide
- TDV Adapter Guide
- TDV Discovery Guide
- TDV Active Cluster Guide
- TDV Monitor Guide
- TDV Northbay Example

How to Access TIBCO Documentation

Documentation for TIBCO products is available on the TIBCO Product Documentation website mainly in the HTML and PDF formats.

The TIBCO Product Documentation website is updated frequently and is more current than any other documentation included with the product. To access the latest documentation, visit https://docs.tibco.com.

Documentation for TIBCO Data Virtualization is available on https://docs.tibco.com/products/tibco-data-virtualization-server.

How to Contact TIBCO Support

You can contact TIBCO Support in the following ways:

- For an overview of TIBCO Support, visit https://www.tibco.com/services/support.
- For accessing the Support Knowledge Base and getting personalized content about products you are interested in, visit the TIBCO Support portal at https://support.tibco.com.
- For creating a Support case, you must have a valid maintenance or support contract with TIBCO. You also need a user name and password to log in to https://support.tibco.com. If you do not have a user name, you can request one by clicking **Register** on the website.

How to Join TIBCO Community

TIBCO Community is the official channel for TIBCO customers, partners, and employee subject matter experts to share and access their collective experience. TIBCO Community offers access to Q&A forums, product wikis, and best practices. It also offers access to extensions, adapters, solution accelerators, and tools that extend and enable customers to gain full value from TIBCO products. In addition, users can submit and vote on feature requests from within the TIBCO Ideas Portal. For a free registration, go to https://community.tibco.com.

REST Tutorial

TDV supports REST (REpresentational State Transfer) for designing Web services. This tutorial focuses on the following standards used to implement a REST architectural style:

- HTTP
- URL

This tutorial includes the following topics:

- Understanding REST and the Tutorial Workflows, page 9
- Creating Studio Resources for Use in this Tutorial, page 12
- Linking and Mapping Procedures to Specific REST Service URLs, page 21
- Adding a Custom Parameter in an HTTP Header for a REST Request to a Published Method, page 32

Understanding REST and the Tutorial Workflows

Before working through specific examples using code and the Studio UI, it can be valuable to become familiar with some REST concepts. A REST service typically has the following characteristics:

- Client-Server—REST uses a pull-based style; in other words, the consuming components pull information about representations.
- Stateless—Each request from client to server contains all the information necessary to understand the request, and cannot take advantage of any stored context on the server.
- Standard Interface—All resources are accessed using an interface such as the HTTP verbs of GET, POST, PUT, and DELETE.
- Named Resources—Each resource is named using a URL.

This section includes these topics:

- Basic REST Workflow, page 10
- Overview of the ACT Example and Summary of Tasks, page 10

Basic REST Workflow

This section describes a typical REST development workflow.

The basic workflow associated with REST services

1. Identify all of the conceptual entities that you want to expose as services.
2. Create a URL to each resource.
3. Categorize your resources according to their HTTP verb (or method). HTTP verbs include:

Verb	Typical use
GET	Read operations
POST	Insert and update operations
PUT	Insert and update operations
DELETE	Delete operations

   Resources accessed using GET should return a representation of the resource, but not modify it.

4. Specify the format of the response data.

Overview of the ACT Example and Summary of Tasks

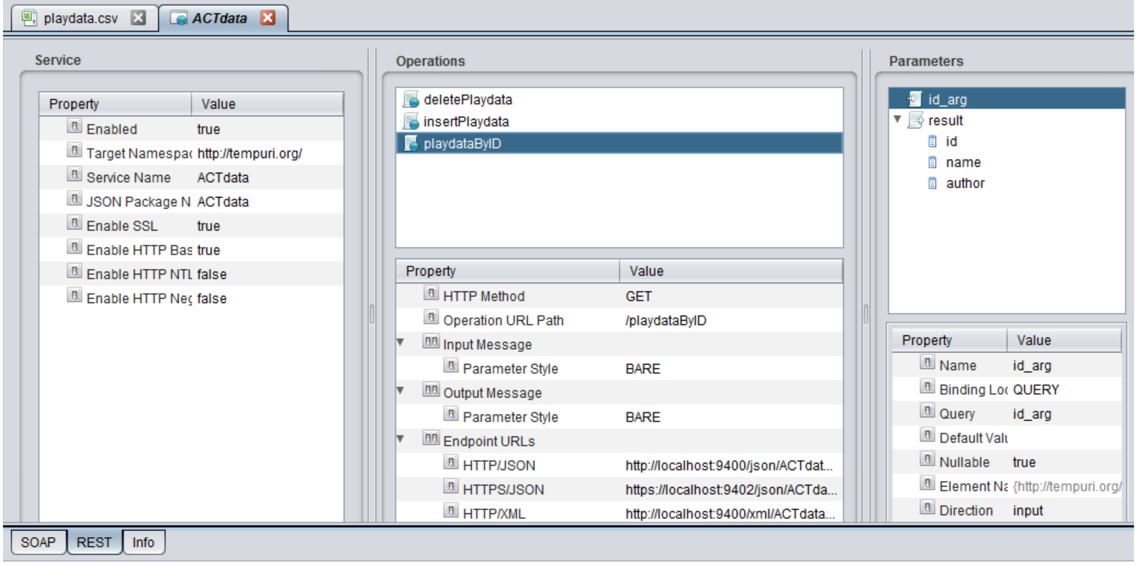
In this use case, you create a REST-based client application that helps the members of an actors' guild called ACT manage and schedule their plays for the year. As part of this on-line system, members need to:

- Search for plays by their ID number (GET).
- Update author information (PUT).
- Create new plays (POST).
- Delete plays.

This tutorial guide helps you:

- Create play data in a CSV (comma-separated values) file
- Create the TDV SQL procedures that read, update, insert and delete data
- Understand how to create a REST client

TDV Studio deploys REST services to the TDV Web Service.



Service

Property	Value
Enabled	true
Target Namespac	http://tempuri.org/
Service Name	ACTdata
JSON Package N	ACTdata
Enable SSL	true
Enable HTTP Bas	true
Enable HTTP NTL	false
Enable HTTP Ne(	false

Operations

- deletePlaydata
- insertPlaydata
- playdataByID

Property	Value
HTTP Method	GET
Operation URL Path	/playdataByID
Input Message	
Parameter Style	BARE
Output Message	
Parameter Style	BARE
Endpoint URLs	
HTTP/JSON	http://localhost:9400/json/ACTdat...
HTTPS/JSON	https://localhost:9402/json/ACTda...
HTTP/XML	http://localhost:9400/xml/ACTdata...

Parameters

- id_arg
- result
  - id
  - name
  - author

Property	Value
Name	id_arg
Binding Lo(	QUERY
Query	id_arg
Default Valı	
Nullable	true
Element Nε	{http://tempuri.org/
Direction	input

This tutorial pays special attention to the mapping of procedures to HTTP methods, and the construction of the necessary paths and arguments that make up the REST API for the sample application.

Note: This application is only an example of how you can set up a REST framework. The REST infrastructure in TDV is flexible and does not enforce any specific mapping or operation URL PATH structure.

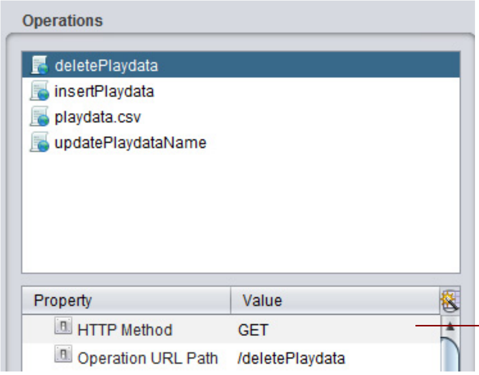
The base URL for REST services in TDV always includes the following derived components.

Protocol	Hostname	port	dataformat	WebContainerNameSpace
HTTP	localhost	9400	XML	ACTdata
HTTPS	localhost	9402	JSON	ACTdata

The basic required Studio tasks to set up REST

1. Create procedures in Studio for the REST client actions.
2. Publish the procedures and supporting resources to the Web service.

3. Create links between HTTP verbs within Studio and the Web service.



Select a procedure from this area.

Link the procedure with a verb.

Each of the following verbs is associated with one or more of the procedures defined in Studio. After defining the procedures, you can publish them to the Web service and bind them to a verb. This tutorial focuses on the following procedure and verb associations.

HTTP Verb	SQLScript Procedure
GET	playdataByID
POST	insertPlaydata
DELETE	deletePlaydata

4. Map the REST client application to the URL from the Studio Web service.

Creating Studio Resources for Use in this Tutorial

These simple objects should take less than 30 minutes to create. (If you choose to use data that is already available on your system, you need to figure out what code and Studio resources to change for this to work.)

This section includes the following topics:

- Creating Data Sources, page 13
- Introspecting the Data Source, page 13
- Creating the Vplaydata View, page 15
- Creating the Procedures, page 16
- Publishing the Procedures to a REST Service, page 19

Creating Data Sources

For this example, you can replicate the data that ACT has by creating a simple Excel file with the following data and structure.

To create the data source used by the ACT example

1. Open Excel or a similar application.
2. Create the following rows of data, including the heading row with ID, name, and author:

ID	name	author
1	Hairspray	John Waters
2	St. Joan	George Bernard Shaw
3	King Lear	William Shakespeare
4	Skin of Our Teeth	Thornton Wilder
5	The Bald Soprano	Eugene Ionesco
6	A Streetcar Named Desire	Tennessee Williams
7	The Importance of Being Earnest	Oscar Wilde
8	Glengarry Glen Ross	David Mamet
9	The Threepenny Opera	Bertolt Brecht

3. Save the file as playdata.csv.

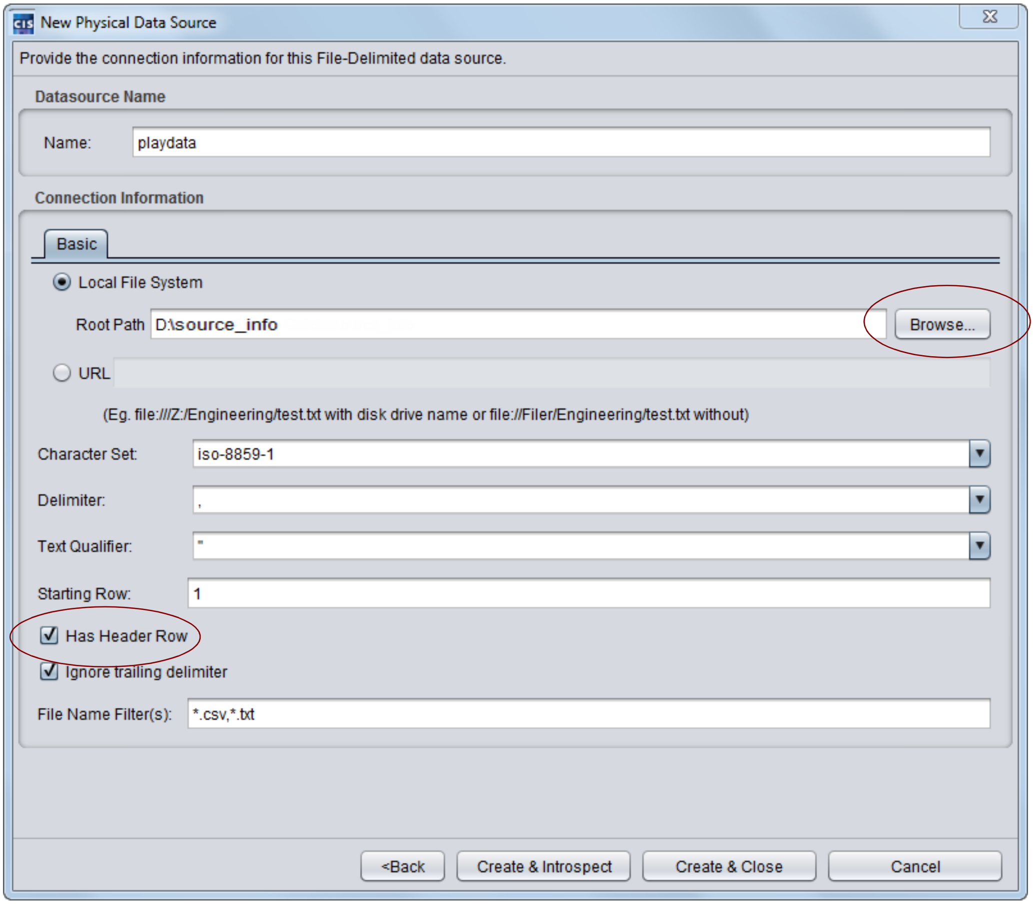
Introspecting the Data Source

This task creates a data source connection to the playdata.csv so that TDV users can access and manipulate the data.

To add the playdata.csv file to Studio

1. Open Studio.
2. Create a data sources folder under the Shared node.
3. Create a fil-based folder under the data sources node.

4. Right-click filed based and select New Data Source.
5. Select the File Delimited data source adapter.
6. Click Next.
7. Assign the name “playdata” to the data source.



New Physical Data Source

Provide the connection information for this File-Delimited data source.

Datasource Name

Name: playdata

Connection Information

Basic

● Local File System

Root Path D:\source_info

○ URL

(Eg. file:///Z:/Engineering/test.txt with disk drive name or file://Filer/Engineering/test.txt without)

Character Set: iso-8859-1

Delimiter: ,

Text Qualifier: "

Starting Row: 1

☑ Has Header Row

☑ Ignore trailing delimiter

File Name Filter(s): *.csv,*.txt

8. Use the Browse button to navigate to the directory where you created the playdata.csv file.
9. Check the Has Header Row check box.
10. Click Create & Introspect.
11. Select the playdata.csv resource and click Next.

    In the summary of changes, make sure that playdata.csv is listed.
12. Click Finish.

13. Click OK.

14. Verify that the data source was added to your Studio tree and that you can view its contents within Studio.

Creating the Vplaydata View

The procedures you create later will all use this view—a simple mapping from one view to one table. (The absence of transformations or joins within the exposed view means you can add to and update it.)

Note: It is typical to wrap even simple tables in a Studio view to decouple the services and clients from the physical connection.

To create the Vplaydata view

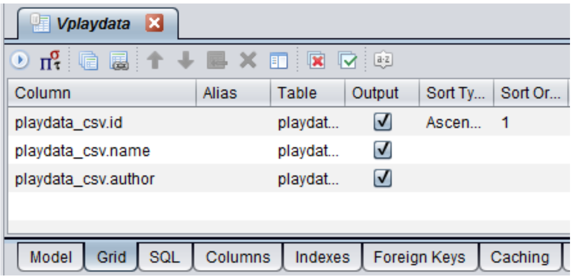
1. From the Studio resource tree, create the **playdata** folder under the Shared folder.

2. Right-click the playdata folder and select New View.

3. Give the view the name "Vplaydata" and click OK.

4. In the View editor for Vplaydata, drag the playdata.csv object onto the Model tab.

5. Select the Grid tab and set the following values.

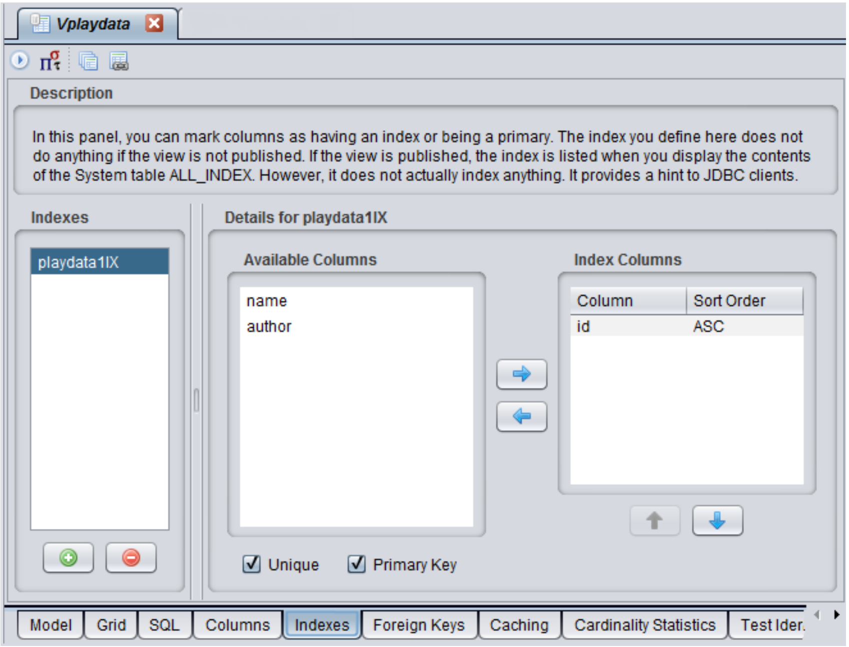


Column	Alias	Table	Output	Sort Ty...	Sort Or...
playdata_csv.id		playdat...	☑	Ascen...	1
playdata_csv.name		playdat...	☑		
playdata_csv.author		playdat...	☑		

6. Validate that the SQL tab contains the following.

```
SELECT
   playdata_csv.id,
   playdata_csv.name,
   playdata_csv.author
FROM
   /shared/datasources/filebased/playdata/"playdata.csv" playdata_csv
```

7. Select the Indexes tab and set the values to match the following.



In this panel, you can mark columns as having an index or being a primary. The index you define here does not do anything if the view is not published. If the view is published, the index is listed when you display the contents of the System table ALL_INDEX. However, it does not actually index anything. It provides a hint to JDBC clients.

Indexes: playdata1IX

Available Columns: name, author

Column	Sort Order
id	ASC

☑ Unique ☑ Primary Key

8. Save the definitions.

Creating the Procedures

Now you create procedures within TDV to search, add to, and delete the play data.

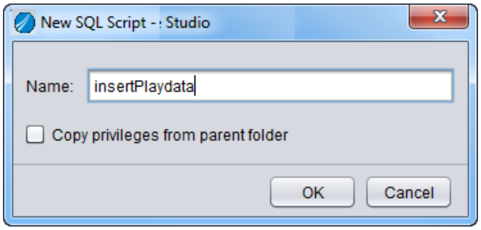
Procedure	Used To
playdataByID	GET data
insertPlaydata	PUT data
deletePlaydata	DELETE data

Create the procedures needed to GET, PUT, and DELETE data

1. Open Studio.

2. For each of the three scripts, right-click to select New SQL Script from the Studio tree.

3. Name the scripts as follows:
   — playdataByID
   — insertPlaydata
   — deletePlaydata



Name: insertPlaydata

□ Copy privileges from parent folder

4. Copy the appropriate script contents into the editor.

For the script	Copy the following into the editor

deletePlaydata	PROCEDURE deletePlaydata(
	IN pk VARCHAR(250),
	OUT response VARCHAR(250)
	)
	BEGIN
	INDEPENDENT TRANSACTION
	  delete from /shared/playdata/Vplaydata
	  where ID = pk;
	  set response='row '|| pk || ' deleted';
	  COMMIT;
	END

<table>
<tr><th>For the script</th><th>Copy the following into the editor</th></tr>
<tr><td>insertPlaydata</td><td>PROCEDURE insertPlaydata(
IN id_val VARCHAR(250),
IN name_val VARCHAR(250),
IN author_val VARCHAR(250),
OUT response VARCHAR(250)
)
BEGIN
INDEPENDENT TRANSACTION
DECLARE r ROW (ID VARCHAR(250));
DECLARE c CURSOR(ID VARCHAR(250));
set response='row '|| id_val || ' already EXISTS!';

OPEN c FOR
SELECT cs.ID FROM /shared/playdata/Vplaydata cs
WHERE cs.ID=id_val;
FETCH c INTO r;
IF NOT c.FOUND
THEN
INSERT INTO /shared/playdata/Vplaydata (ID,name,author)
VALUES (id_val, name_val,author_val);
    set response='row '|| id_val || ' inserted';
END IF;
COMMIT;
END</td></tr>
</table>

<table>
<tr><th>For the script</th><th>Copy the following into the editor</th></tr>
<tr><td>playdataByID</td><td>

```
PROCEDURE playdataByID(
  IN id_arg INTEGER,
  OUT result CURSOR (
    ID INTEGER,
    name VARCHAR(32768),
    author VARCHAR(32768)
    )
  )
  BEGIN
DECLARE isnull varchar(12);
set isnull=nvl2(id_arg,''||id_arg,'true');
IF  isnull <> 'true'
THEN
    OPEN result FOR
      SELECT
        id_arg ID,
        Vplaydata.name,
        Vplaydata.author
      FROM
        /shared/playdata/Vplaydata Vplaydata
      WHERE
        id_arg = Vplaydata.ID;

ELSEIF isnull='true'
THEN
    OPEN result FOR
      SELECT
CAST(Vplaydata.ID as INTEGER) ID,
        Vplaydata.name,
        Vplaydata.author
      FROM
        /shared/playdata/Vplaydata Vplaydata;
END IF;
END
```

</td></tr>
</table>

5. Save each procedure.

Publishing the Procedures to a REST Service

You publish TDV views and procedures as Web or database services to make them available to consuming applications—in this case, a REST client application.

To publish the procedures to a REST service

1. Select the Web Services node under Data Services in the Studio resource tree.
2. Right-click to select New Composite Web Service.
3. For Data Service Name, enter a name for your Web service. For this example we use ACTdata.

4. Click OK.
5. Publish the following scripts to the Web service:

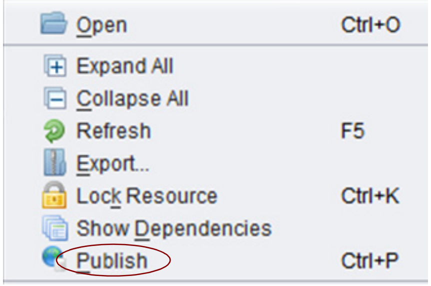
— playdataByID

— insertPlaydata

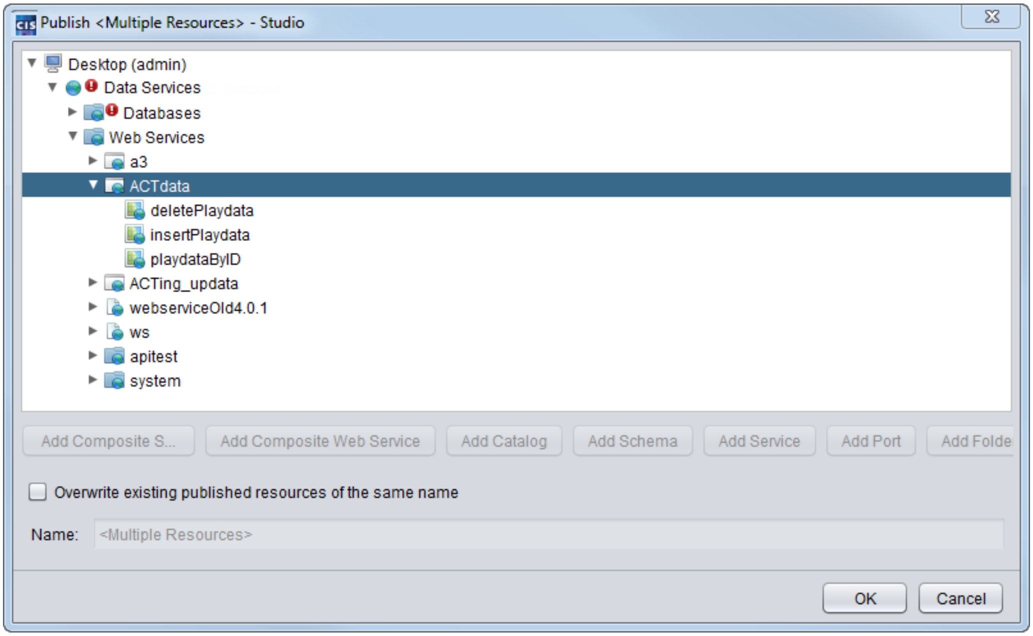
— deletePlaydata

a. Select all three of the scripts from the resource tree, and right-click.

b. Select Publish.



c. Select the Web service to which you want the resource to be published.



□ Overwrite existing published resources of the same name

Name: <Multiple Resources>

d. Click OK.

Linking and Mapping Procedures to Specific REST Service URLs

This section explains how to link each procedure to a specific HTTP verb and then how to map each URL for the procedure to your REST service client application.

HTTP defines verbs (or methods) to specify an action to perform on the data. You can link the logic that you have defined using other procedures within TDV to a specific HTTP verb. These verbs are trusted actions that HTTP allows to pass over the network.

SQL Script Procedure	HTTP Verb	Description of Action
playdataByID	GET	Requests the specified data. GET retrieves data and does nothing else.
insertPlaydata	POST	Submits data to be processed. The data is included in the body of the request.
deletePlaydata	DELETE	Deletes the specified data.

This section includes the following topics:

- Linking the playdataByID Procedure to an HTTP Verb, page 21
- Mapping the Studio REST playdataByID URLs to Specific REST Services, page 23
- Linking the insertPlaydata Procedure to an HTTP Verb, page 25
- Mapping the Studio REST insertPlaydata URLs to Specific REST Services, page 27
- Linking the deletePlaydata Procedures to an HTTP Verb, page 29
- Mapping the Studio REST deletePlaydata URLs to Specific REST Services, page 30

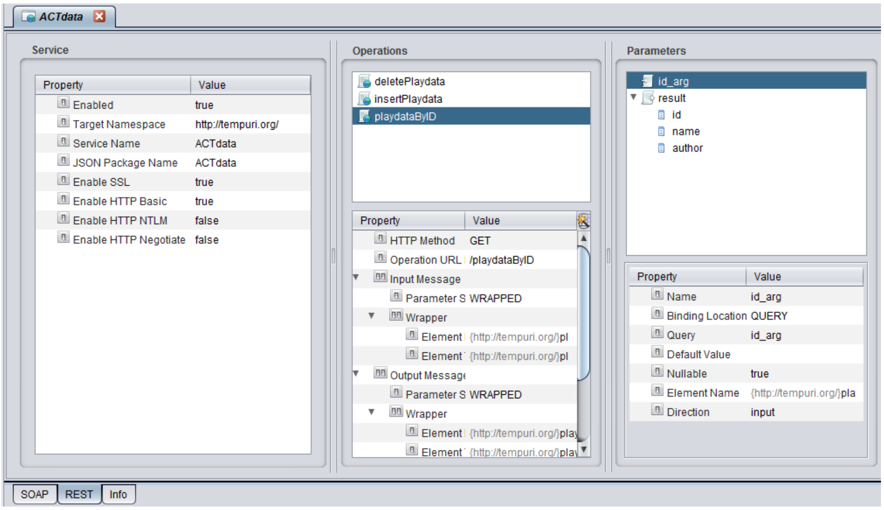
Linking the playdataByID Procedure to an HTTP Verb

In this task you link the playdataByID to the GET verb.

To link the playdataByID procedure to the GET verb

1. Open the ACTdata Web service.

2. Select the REST tab.



Service

Property	Value
Enabled	true
Target Namespace	http://tempuri.org/
Service Name	ACTdata
JSON Package Name	ACTdata
Enable SSL	true
Enable HTTP Basic	true
Enable HTTP NTLM	false
Enable HTTP Negotiate	false

Operations

deletePlaydata
insertPlaydata
playdataByID

Property	Value
HTTP Method	GET
Operation URL	/playdataByID
Input Message	
Parameter S	WRAPPED
Wrapper	
Element	{http://tempuri.org/}pl
Element	{http://tempuri.org/}pl
Output Messag	
Parameter S	WRAPPED
Wrapper	
Element	{http://tempuri.org/}play
Element	{http://tempuri.org/}play

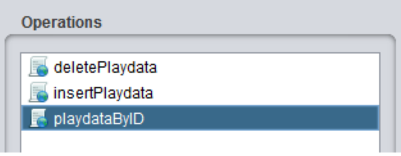
Parameters

id_arg
result
id
name
author

Property	Value
Name	id_arg
Binding Location	QUERY
Query	id_arg
Default Value	
Nullable	true
Element Name	{http://tempuri.org/}pla
Direction	input

3. From the upper part of the Operations section, select the playdataByID procedure.

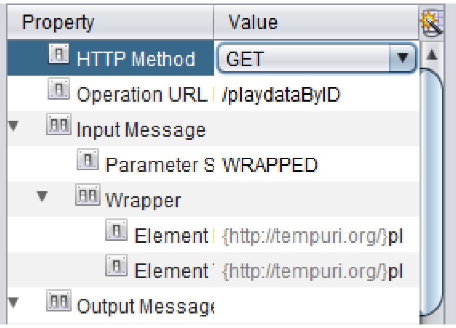
   Note: You might need to close and reopen this window for it to appear in the list.



Operations

deletePlaydata
insertPlaydata
playdataByID

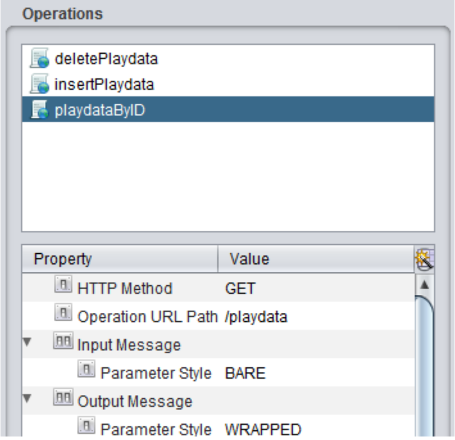
4. In the lower part of the Operations section, click in the Value field next to HTTP Method, and select the GET verb.



Property	Value
HTTP Method	GET
Operation URL	/playdataByID
Input Message	
Parameter S	WRAPPED
Wrapper	
Element	{http://tempuri.org/}pl
Element	{http://tempuri.org/}pl
Output Messag	

5. Edit the Operation URL Path so that it reads /playdata.

6. Change the input parameter style to BARE.



Operations

- deletePlaydata
- insertPlaydata
- playdataByID

Property	Value
HTTP Method	GET
Operation URL Path	/playdata
Input Message	
Parameter Style	BARE
Output Message	
Parameter Style	WRAPPED

7. Save your changes.

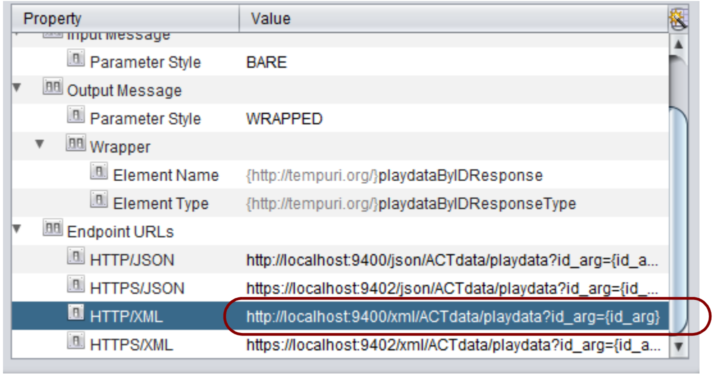
Mapping the Studio REST playdataByID URLs to Specific REST Services

Map a specific path for each REST service, paying particular attention to what is passed into each one and how. The following steps illustrate one method for connecting your client application with the REST service that you have created using Studio.

To map playdataByID

1. Open the ACTdata Web service.
2. Select the REST tab.
3. In the Operations portion of the screen, select the playdataByID procedure.

4. In the lower portion of the Operations area, double-click to select the value of the HTTP/XML endpoint.



Property	Value
Input Message	
Parameter Style	BARE
Output Message	
Parameter Style	WRAPPED
Wrapper	
Element Name	{http://tempuri.org/}playdataByIDResponse
Element Type	{http://tempuri.org/}playdataByIDResponseType
Endpoint URLs	
HTTP/JSON	http://localhost:9400/json/ACTdata/playdata?id_arg={id_a...
HTTPS/JSON	https://localhost:9402/json/ACTdata/playdata?id_arg={id_...
HTTP/XML	http://localhost:9400/xml/ACTdata/playdata?id_arg={id_arg}
HTTPS/XML	https://localhost:9402/xml/ACTdata/playdata?id_arg={id_a...

5. Copy that endpoint URL into your REST client application development tool.

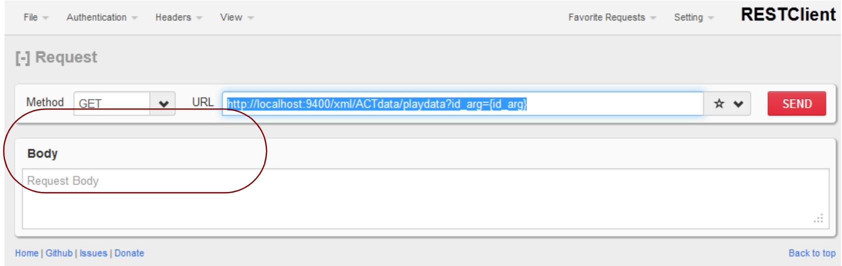
   For example using the Firefox RESTClient, you can test the playdataByID operation.

   a. Make sure that the Method is set to GET.

   b. Replace "{id_arg}" with 3.

For an even cleaner URL path, try replacing “id_arg={id_arg}” with 3.

c. Click SEND.

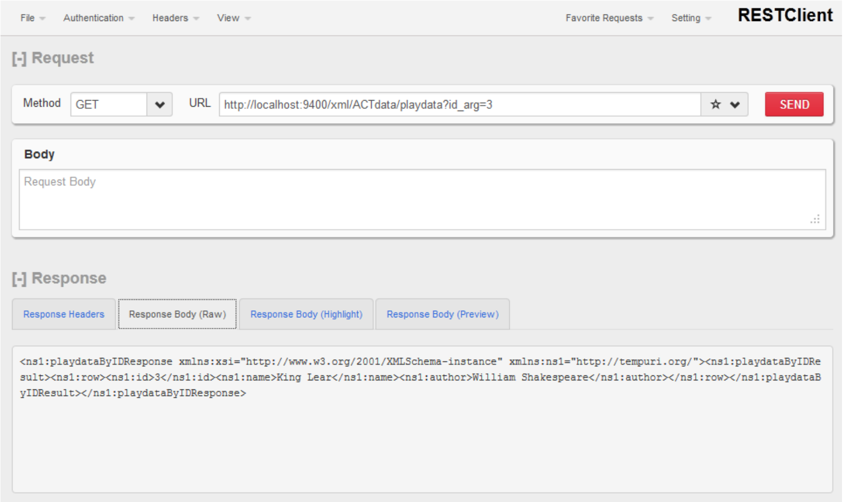


Method: GET

URL: http://localhost:9400/xml/ACTdata/playdata?id_arg={id_arg}

d. Type the Studio username and password for the user with access to the REST service.

e. Select the Response Body (Raw) tab.



Method: GET

URL: http://localhost:9400/xml/ACTdata/playdata?id_arg=3

```
<ns1:playdataByIDResponse xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:ns1="http://tempuri.org/"><ns1:playdataByIDRe
sult><ns1:row><ns1:id>3</ns1:id><ns1:name>King Lear</ns1:name><ns1:author>William Shakespeare</ns1:author></ns1:row></ns1:playdataB
yIDResult></ns1:playdataByIDResponse>
```

6. Finish development of your REST client.

   The exact steps that need to be done and the order in which they need to be done depends on what tool you have chosen.

Linking the insertPlaydata Procedure to an HTTP Verb

This task links the insertPlaydata procedure to the POST HTTP verb. POST submits data to process and includes data in the body of the request.

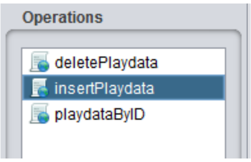
To link the insertPlaydata procedures to the POST verb

1. Open the ACTdata Web service.

2. Select the REST tab.

3. From the upper part of the Operations section, select the insertPlaydata procedure.

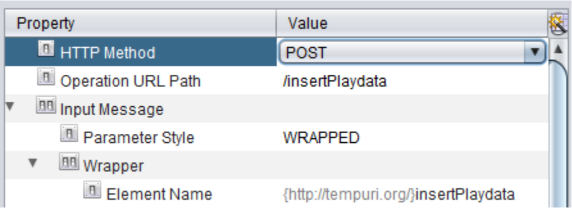
   Note: You might need to close and reopen this window for it to appear in the list.



Operations

- deletePlaydata
- insertPlaydata
- playdataByID

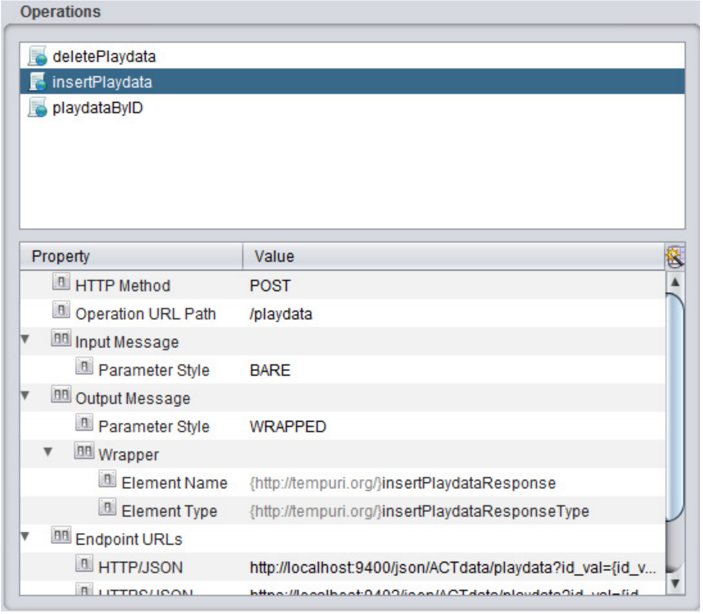
4. In the lower part of the Operations section, select the verb associated with the procedure.



Property	Value
HTTP Method	POST
Operation URL Path	/insertPlaydata
Input Message	
Parameter Style	WRAPPED
Wrapper	
Element Name	{http://tempuri.org/}insertPlaydata

5. Edit the Operation URL so that it reads /playdata.

6. Change the input parameter style to BARE.



Operations

- deletePlaydata
- insertPlaydata
- playdataByID

Property	Value
HTTP Method	POST
Operation URL Path	/playdata
▼ Input Message	
Parameter Style	BARE
▼ Output Message	
Parameter Style	WRAPPED
▼ Wrapper	
Element Name	{http://tempuri.org/}insertPlaydataResponse
Element Type	{http://tempuri.org/}insertPlaydataResponseType
▼ Endpoint URLs	
HTTP/JSON	http://localhost:9400/json/ACTdata/playdata?id_val={id_v...
HTTPS/JSON	https://localhost:9402/json/ACTdata/playdata?id_val={id

7. Save your changes.

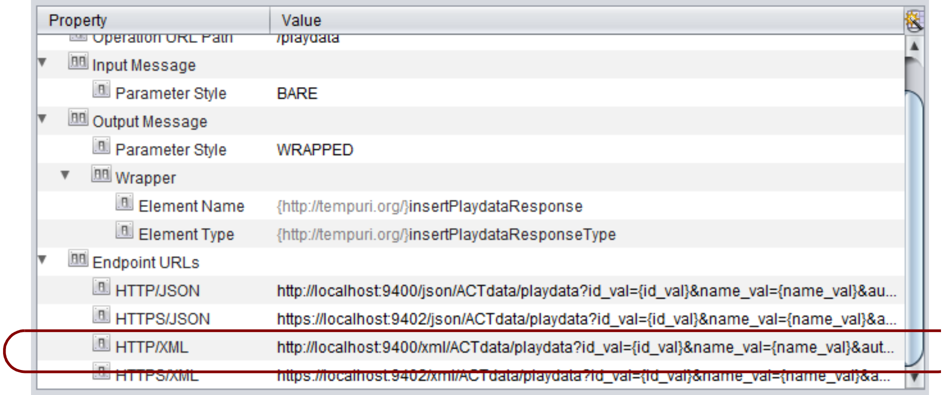
Mapping the Studio REST insertPlaydata URLs to Specific REST Services

Map a specific path for each REST service, paying special attention to what is passed into each one and how. For simplicity, this portion of the tutorial uses a Firefox browser plug-in to test that data can be updated using insertPlaydata.

To map insertPlaydata

1. Open the Studio Web service editor.
2. Select the REST tab.
3. In the Operations portion of the screen, select the insertPlaydata procedure.

4. In the lower portion of the Operations area, double click to select the value of the HTTP/XML endpoint.



Property	Value
Operation URL Path	/playdata
▼ Input Message	
Parameter Style	BARE
▼ Output Message	
Parameter Style	WRAPPED
▼ Wrapper	
Element Name	{http://tempuri.org/}insertPlaydataResponse
Element Type	{http://tempuri.org/}insertPlaydataResponseType
▼ Endpoint URLs	
HTTP/JSON	http://localhost:9400/json/ACTdata/playdata?id_val={id_val}&name_val={name_val}&au...
HTTPS/JSON	https://localhost:9402/json/ACTdata/playdata?id_val={id_val}&name_val={name_val}&a...
HTTP/XML	http://localhost:9400/xml/ACTdata/playdata?id_val={id_val}&name_val={name_val}&aut...
HTTPS/XML	https://localhost:9402/xml/ACTdata/playdata?id_val={id_val}&name_val={name_val}&a...

5. Copy that endpoint URL into your REST client application development tool.

   For testing purposes, you can try the ACTdata Web service insertPlaydata operation using a plug-in from your browser.

   a. Paste the REST URL string into the browser RESTClient.

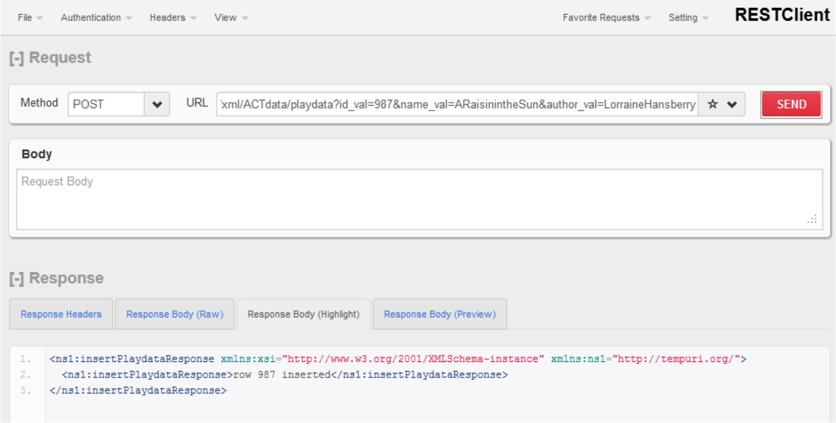
   b. Make sure that the Method is set to POST.

   c. Locate parameter values that are noted by curly brackets. This example replaces the values and submits the string as follows:

http://localhost:9400/xml/ACTdata/playdata?id_val=987&name_val=ARaisinintheSun&author_val=LorraineHansberry

   d. Click SEND.

   e. Type the Studio user name and password for the user who has access to the REST service.



Method: POST

URL: xml/ACTdata/playdata?id_val=987&name_val=ARaisinintheSun&author_val=LorraineHansberry

```
<ns1:insertPlaydataResponse xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:ns1="http://tempuri.org/">
  <ns1:insertPlaydataResponse>row 987 inserted</ns1:insertPlaydataResponse>
</ns1:insertPlaydataResponse>
```

6. Finish development of your REST client.

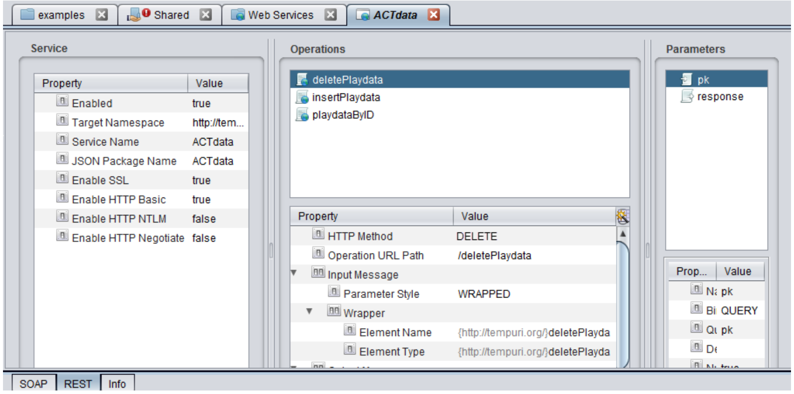
   The exact steps depend on what tool you have chosen.

Linking the deletePlaydata Procedures to an HTTP Verb

This task describes how to link the deletePlaydata procedure to the DELETE HTTP verb to control the removal of data.

To link the deletePlaydata procedures to the DELETE verb

1. Open the ACTdata Web service to which you published your PLAYDATA procedures.
2. Select the REST tab.



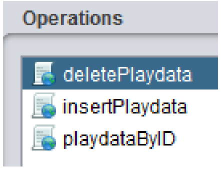
Property	Value
Enabled	true
Target Namespace	http://tem...
Service Name	ACTdata
JSON Package Name	ACTdata
Enable SSL	true
Enable HTTP Basic	true
Enable HTTP NTLM	false
Enable HTTP Negotiate	false

Property	Value
HTTP Method	DELETE
Operation URL Path	/deletePlaydata
Input Message	
Parameter Style	WRAPPED
Wrapper	
Element Name	{http://tempuri.org/}deletePlayda
Element Type	{http://tempuri.org/}deletePlayda

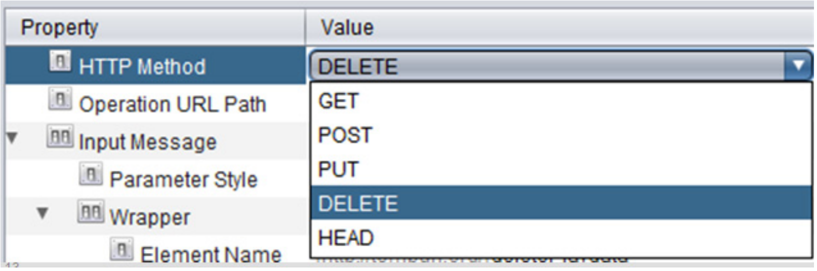
Prop...	Value
Na	pk
Bi	QUERY
Qu	pk
De	
N	true

3. From the upper part of the Operations section, select the deletePlaydata procedure.

   Note: You might need to close and reopen this window for it to appear in the list.



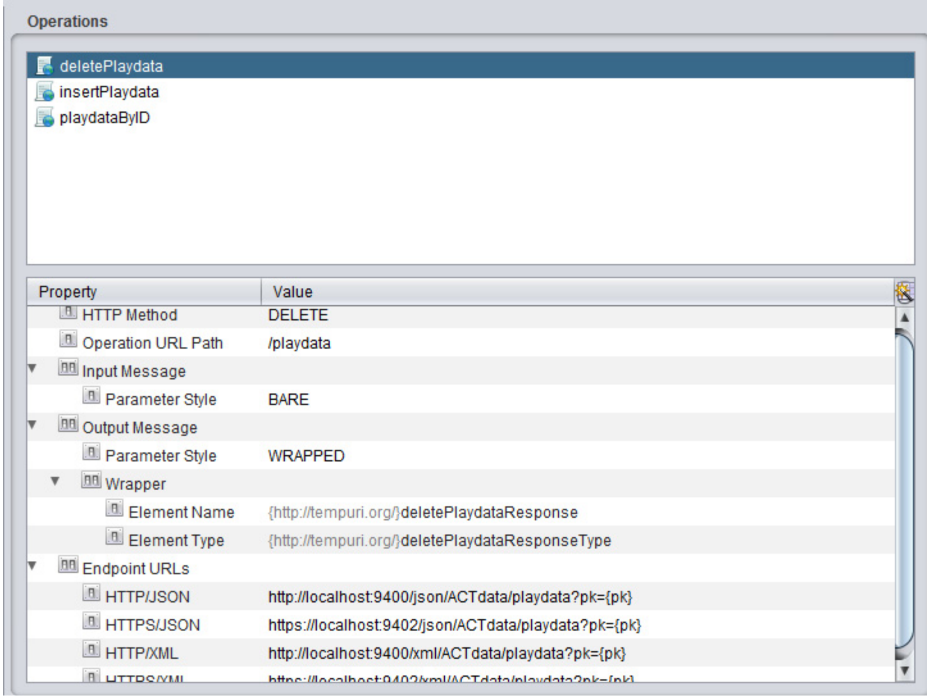
4. In the lower part of the Operations section, select the DELETE verb.



Property	Value
HTTP Method	DELETE
Operation URL Path	
Input Message	
Parameter Style	
Wrapper	
Element Name	

5. Edit the Operation URL so that it reads /playdata.

6. Change the input parameter style to BARE.



Operations

- deletePlaydata
- insertPlaydata
- playdataByID

Property	Value
HTTP Method	DELETE
Operation URL Path	/playdata
Input Message	
Parameter Style	BARE
Output Message	
Parameter Style	WRAPPED
Wrapper	
Element Name	{http://tempuri.org/}deletePlaydataResponse
Element Type	{http://tempuri.org/}deletePlaydataResponseType
Endpoint URLs	
HTTP/JSON	http://localhost:9400/json/ACTdata/playdata?pk={pk}
HTTPS/JSON	https://localhost:9402/json/ACTdata/playdata?pk={pk}
HTTP/XML	http://localhost:9400/xml/ACTdata/playdata?pk={pk}
HTTPS/XML	https://localhost:9402/xml/ACTdata/playdata?pk={pk}

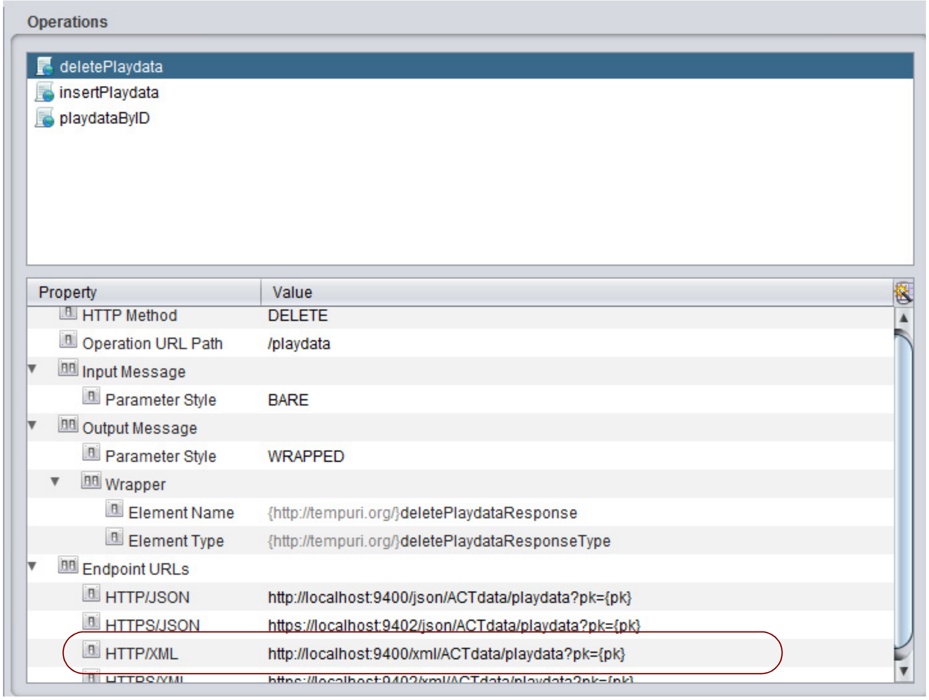
7. Save your changes.

Mapping the Studio REST deletePlaydata URLs to Specific REST Services

Map a specific path for each REST service, being careful about what is passed into each one and how. The following steps show you one possible way to interface your client application with the REST service that you have created.

To map deletePlaydata

1. Open the Studio Web service editor.
2. Select the REST tab.
3. In the Operations portion of the screen, select the deletePlaydata procedure.
4. In the lower portion of the Operations area, double click to select the value of the HTTP/XML endpoint.



Operations

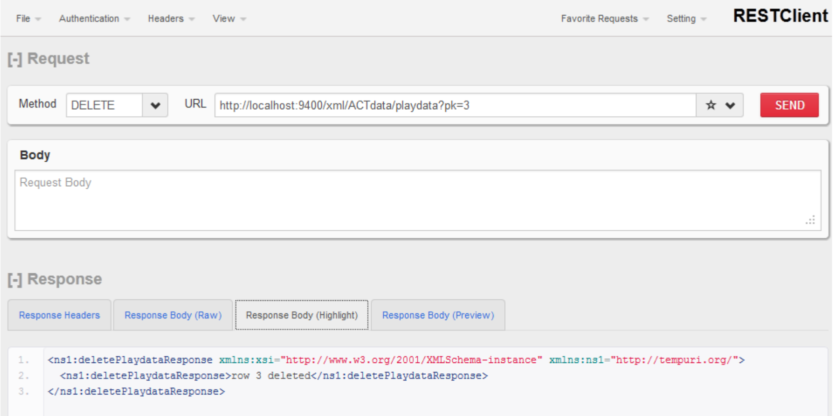
- deletePlaydata
- insertPlaydata
- playdataByID

Property	Value
HTTP Method	DELETE
Operation URL Path	/playdata
▼ Input Message	
Parameter Style	BARE
▼ Output Message	
Parameter Style	WRAPPED
▼ Wrapper	
Element Name	{http://tempuri.org/}deletePlaydataResponse
Element Type	{http://tempuri.org/}deletePlaydataResponseType
▼ Endpoint URLs	
HTTP/JSON	http://localhost:9400/json/ACTdata/playdata?pk={pk}
HTTPS/JSON	https://localhost:9402/json/ACTdata/playdata?pk={pk}
HTTP/XML	http://localhost:9400/xml/ACTdata/playdata?pk={pk}
HTTPS/XML	https://localhost:9402/xml/ACTdata/playdata?pk={pk}

5. Copy that endpoint URL into your REST client application development tool.

For testing purposes, you can try the ACTdata Web service insertPlaydata operation using a plug-in from your browser.

- — Paste the REST URL string into the browser RESTClient.
- — Make sure that the Method is set to DELETE.
- — Replace {pk} with 3.
- — Click SEND.
- — Type the Studio user name and password for the user with access to the REST service.



Method DELETE

URL http://localhost:9400/xml/ACTdata/playdata?pk=3

```
<ns1:deletePlaydataResponse xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:ns1="http://tempuri.org/">
  <ns1:deletePlaydataResponse>row 3 deleted</ns1:deletePlaydataResponse>
</ns1:deletePlaydataResponse>
```

6. Finish development of your REST client.

   The exact steps depend on the tool you have chosen.

Adding a Custom Parameter in an HTTP Header for a REST Request to a Published Method

For better security, you can add a custom parameter in an HTTP header for a REST request. This requires the ability to read the header of an incoming REST request in a TDV script. To read the parameter, you can wrap table or view in a script, or use a hook to read the values.

The following example uses a procedure to return the header property. It uses the TDV GetClientProperty API to get HTTP header properties per request from client.

To add the ability to read HTTP header fields

1. Create a procedure to return the header field. For example:

```
PROCEDURE readHeader(in param date, out OrderID integer, out OrderDate TIMESTAMP, out contentType
VARCHAR(255))
    BEGIN
      CALL /lib/util/GetClientProperty('Contenttype123', contentType);
      SELECT
        Orders.OrderID,
        Orders.OrderDate
      INTO OrderID, OrderDate
      FROM /shared/HttpHeader/ds_orders/tutorial/orders Orders
      WHERE Orders.OrderDate = param;
    END
```

2. Publish the procedure to the Web Service.
3. Create a REST data source with HTTP/JSON Endpoint URLs. For example, the value of the Base URL is:

```
http://DVBU-VDI-008:9400/json/HttpHeader004/readHeader?
```

4. Scroll down the Basic tab to the Operations section.
5. Add a GET operation to the REST resource.
6. Add Header/Body Parameters. The Param Name must be same as the HTTP Header name, which is the first parameter of GetClientProperty. HTTP header names are case-insensitive.
7. Type Contenttype123 for the Parameter name.
8. Specify HTTP Header for the Location.
9. Save the data source.
10. Open the operation.
11. Execute the GET operation.
12. Input the parameters.
13. Review the results.
14. Save and close.
15. Use your client applications to access the REST service get operation that you have defined. Verify that the results are what you expect.

Creating a Basic Transform Tutorial

This topic steps you through the creation of a simple transformation that uses the sample data that is shipped with TDV. The steps to create and use this transform include:

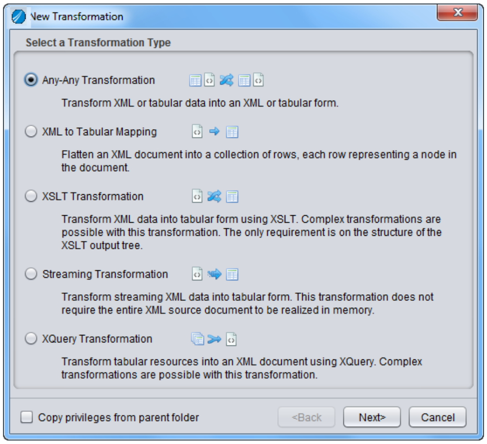
- Creating the Any-Any Transform, page 35
- Adding a Query to the supplyChainV Transform, page 36
- Linking Outputs for Your Transform, page 38
- Executing and Testing Your Transform, page 39

Creating the Any-Any Transform

Transforms, like procedures, are resources that once saved are available from the Studio resource tree.

To create the Any-Any transformation

1. Select a folder in the Studio resource tree.
2. Right-click and select **New Transformation**, or select File > New > Transformation.



New Transformation

Select a Transformation Type

● Any-Any Transformation

Transform XML or tabular data into an XML or tabular form.

○ XML to Tabular Mapping

Flatten an XML document into a collection of rows, each row representing a node in the document.

○ XSLT Transformation

Transform XML data into tabular form using XSLT. Complex transformations are possible with this transformation. The only requirement is on the structure of the XSLT output tree.

○ Streaming Transformation

Transform streaming XML data into tabular form. This transformation does not require the entire XML source document to be realized in memory.

○ XQuery Transformation

Transform tabular resources into an XML document using XQuery. Complex transformations are possible with this transformation.

□ Copy privileges from parent folder

3. Select **Any-Any Transformation**.
4. Click **Next**.

5. Type supplyChainV.
6. Click **Finish**.

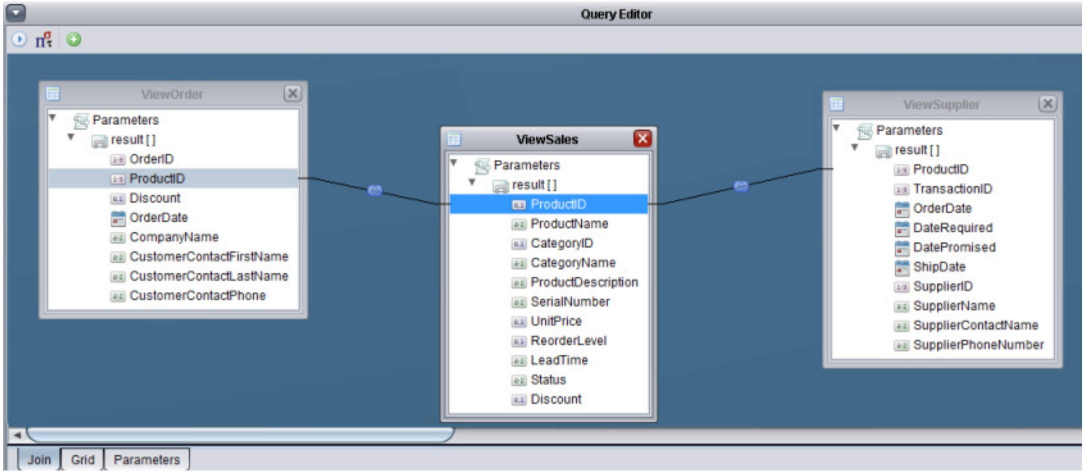
   When you click **Finish**, the transformation is added to the resource tree, and the Transformation editor opens in the right pane.

Adding a Query to the supplyChainV Transform

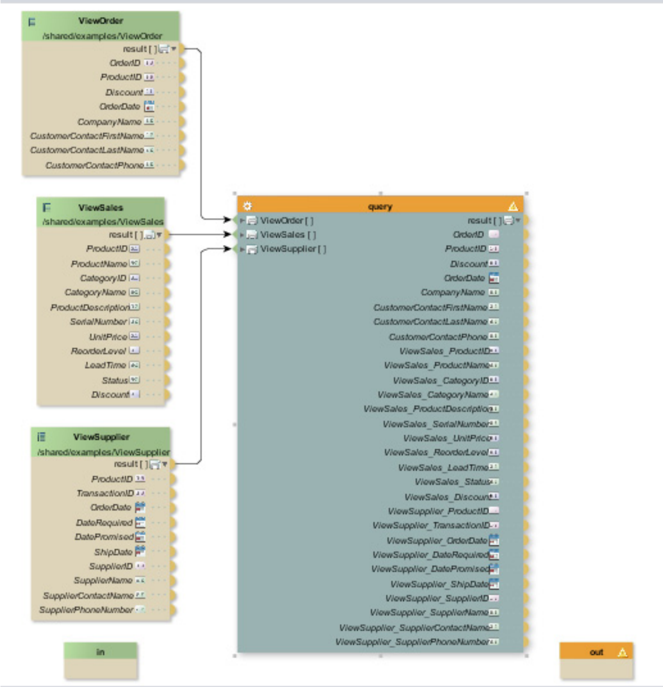
The query recreates the CompositeView resource, and is an easy way to explore how to add queries to your transform.

To create the supplyChainV transformation

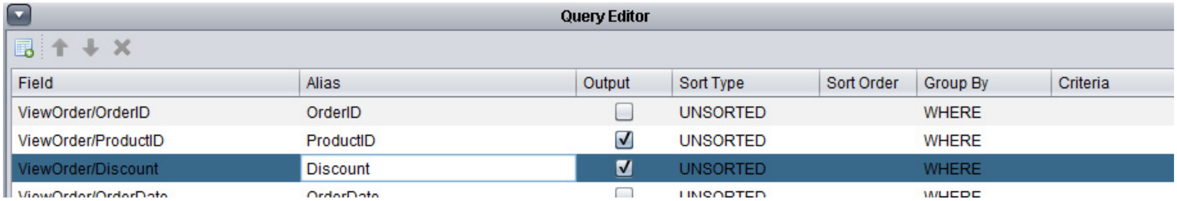
1. Click and drag Query from the Transformation Editor palette.
2. Double-click the query operation that was added to the Model tab
3. From the Studio resource tree, expand Shared > Examples.
4. Click and drag the following views onto the Query Editor:
   - — ViewOrder
   - — ViewSales
   - — ViewSupplier
5. Locate the ProductID column in each of the views.
6. Select and connect each of the ProductID columns. For example, your Query Editor should look like the following:



7. Close the Query Editor. Your changes are saved.
8. Your transform Model tab should now look like the following:



9. Save your transform.
10. Right-click the query operation that was added to the Model tab and select Edit.
11. Select the Grid tab.
12. Manipulate the fields so that they look like the following:



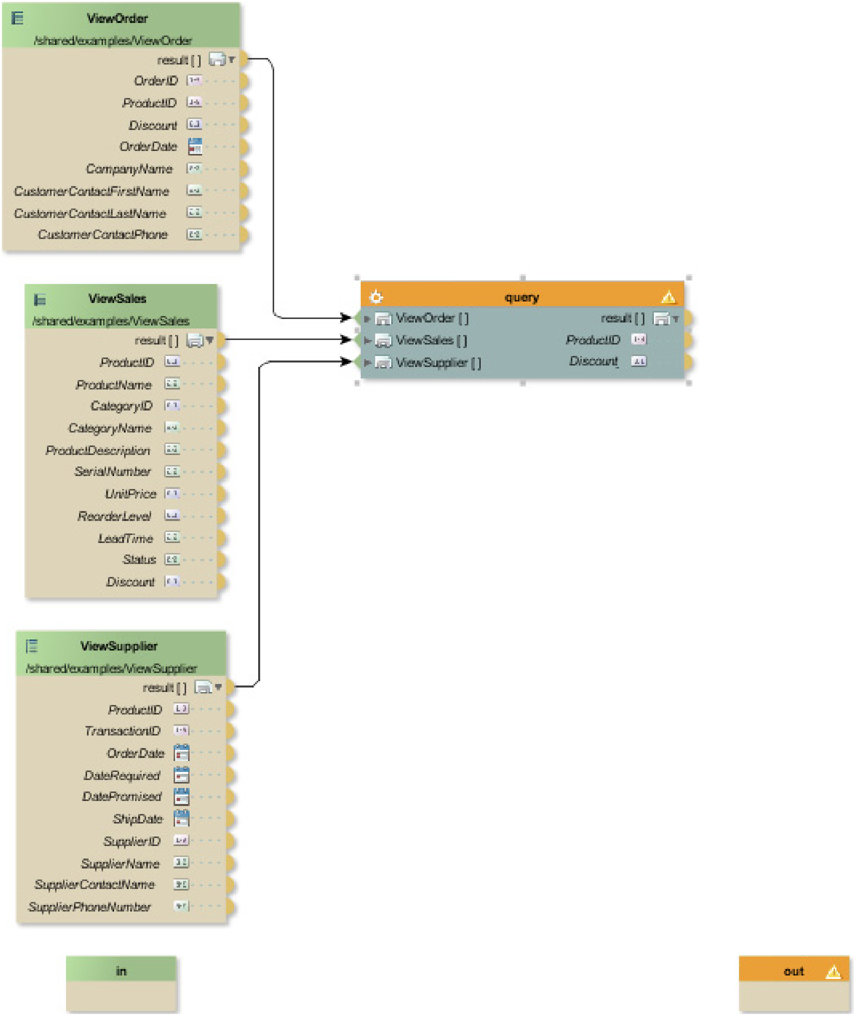
Field	Alias	Output	Sort Type	Sort Order	Group By	Criteria
ViewOrder/OrderID	OrderID	□	UNSORTED		WHERE	
ViewOrder/ProductID	ProductID	☑	UNSORTED		WHERE	
ViewOrder/Discount	Discount	☑	UNSORTED		WHERE	
ViewOrder/OrderDate	OrderDate	□	UNSORTED		WHERE	

a. Select the Output check for ProductID and Discount.

b. Clear the Output check for all other fields.

c. Close the Query Editor.

13. Validate that your query displays the ProductID and Discount outputs. For example, your transform model should now look like the following:



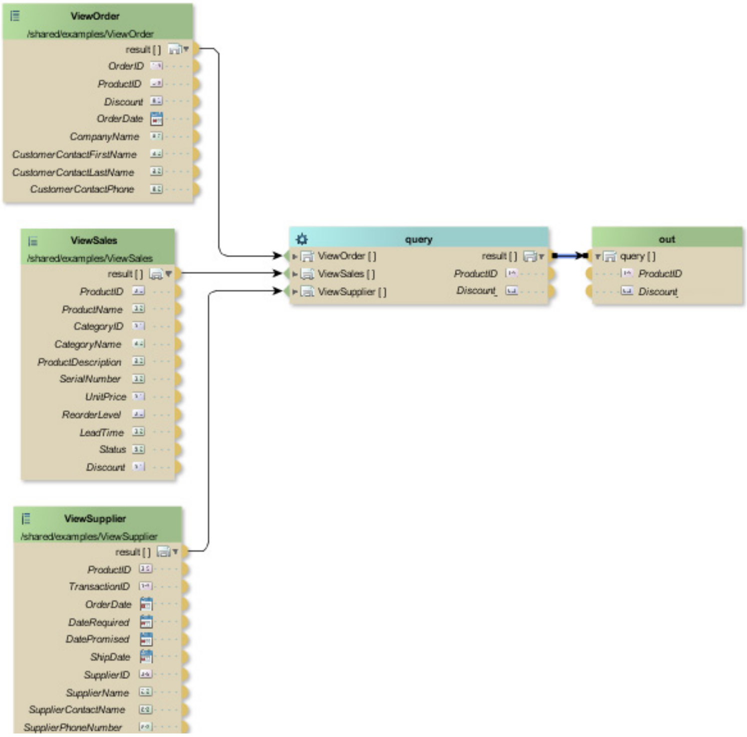
14. Save your transform.

Linking Outputs for Your Transform

The outputs of the Query operation need to be linked to the out for the transform.

To link the outputs from your transform

1. Make sure that Assign Link Mode ( ) is selected.
2. Select the operation handle next to the result output on the query of your transform.
3. Click and drag the link to out.
4. Click Refresh Layout.
5. Validate that your Model tab now looks like the following:



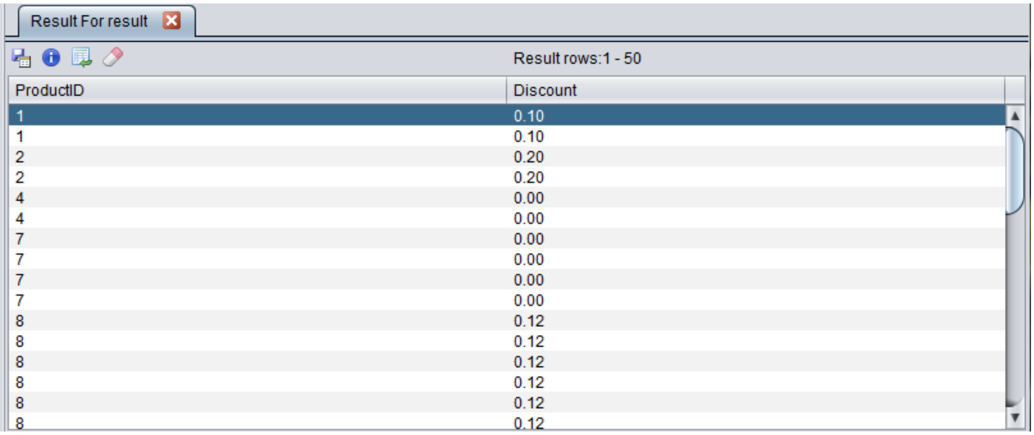
6. Save your transform.

Executing and Testing Your Transform

After designing your sample transform it is valuable to execute it to see what data it retrieves.

To execute and test the results of your transform

1. Select Execute.
2. The right-side of Studio splits and the Result panel opens.
3. Validate that your results look similar to the following:



Result rows:1 - 50

ProductID	Discount
1	0.10
1	0.10
2	0.20
2	0.20
4	0.00
4	0.00
7	0.00
7	0.00
7	0.00
7	0.00
8	0.12
8	0.12
8	0.12
8	0.12
8	0.12
8	0.12

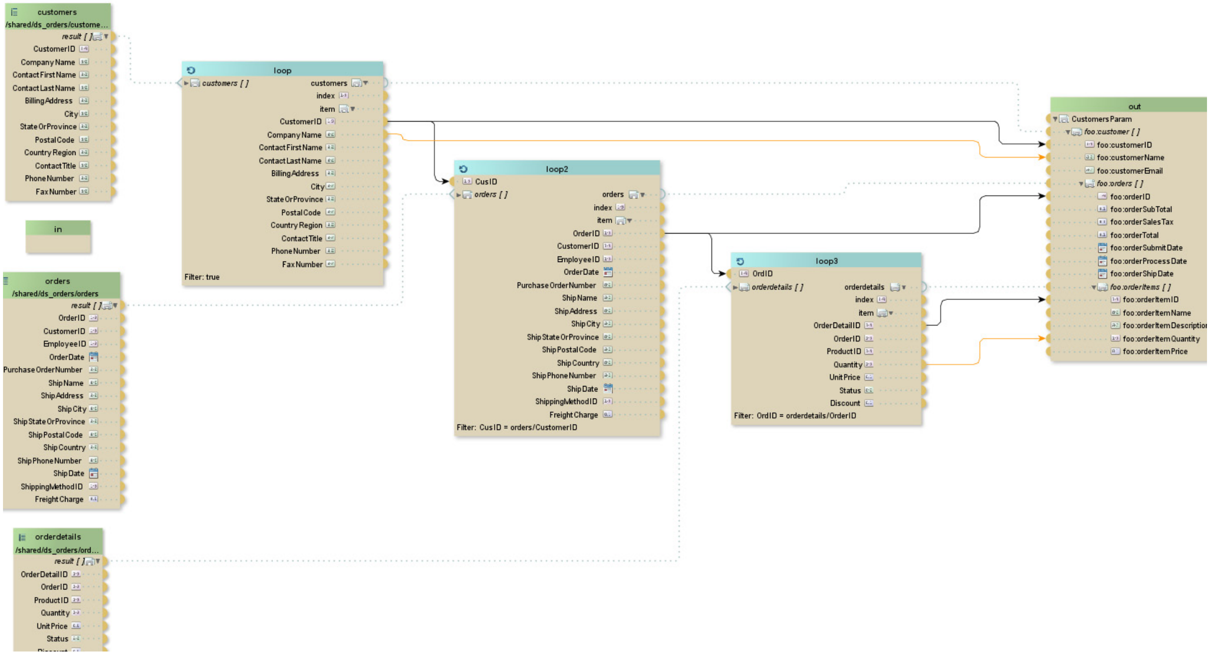
4. Save and close your transform.

Transform Table and XML Data Tutorials

This topic steps you through the creation of a simple transformation that uses the sample data that is shipped with TDV. The steps to create and use this transform include:

- Create an XML Definition Set for the Tutorial, page 41
- Converting Relational to Hierarchical Data Tutorial, page 43
- Converting XML to a View, page 50

The Transformation Editor model can accepts an XML or WSDL source as input, and can generate a tabular mapping to the elements in the source schema. The goal for this tutorial is a transform that looks similar to the following:

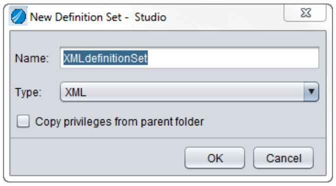


Create an XML Definition Set for the Tutorial

There is one Studio resource that you must create before starting this tutorial. It is a simple XML definition set. This procedure provides the code for you to copy and paste into the Studio editor to create the resource.

To create the XML definition set

1. Open Studio.
2. Select Shared on the Studio resource tree.
3. Right-click and select New Definition Set.
4. Type XMLdefinitionSet.
5. Select XML as the Type.



Name: XMLdefinitionSet

Type: XML

☐ Copy privileges from parent folder

6. Click **OK**.
7. Copy and paste the following XML into the definition set editor:

```
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns:ns1="foo" targetNamespace="foo" attributeFormDefault="unqualified" elementFormDefault="qualified">
  <xs:element name="Customers" type="ns1:Customers"/>
  <xs:complexType name="Customer">
    <xs:sequence>
      <xs:element name="customerID" type="xs:integer"/>
      <xs:element name="customerName" type="xs:string"/>
      <xs:element name="customerEmail" type="xs:string"/>
      <xs:element minOccurs="0" maxOccurs="unbounded" name="orders" type="ns1:Order"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="Order">
    <xs:sequence>
      <xs:element name="orderID" type="xs:integer"/>
      <xs:element name="orderSubTotal" type="xs:float"/>
      <xs:element name="orderSalesTax" type="xs:float"/>
      <xs:element name="orderTotal" type="xs:float"/>
      <xs:element name="orderSubmitDate" type="xs:date"/>
      <xs:element name="orderProcessDate" type="xs:date"/>
      <xs:element name="orderShipDate" type="xs:date"/>
      <xs:element minOccurs="0" maxOccurs="unbounded" name="orderItems" type="ns1:OrderItem"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="OrderItem">
    <xs:sequence>
      <xs:element name="orderItemID" type="xs:integer"/>
      <xs:element name="orderItemName" type="xs:string"/>
      <xs:element name="orderItemDescription" type="xs:string"/>
      <xs:element name="orderItemQuantity" type="xs:int"/>
      <xs:element name="orderItemPrice" type="xs:float"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="Customers">
    <xs:sequence>
      <xs:element minOccurs="0" maxOccurs="unbounded" name="customer" type="ns1:Customer"/>
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

8. Save the definition set.

Converting Relational to Hierarchical Data Tutorial

Relational data is typically saved as tables or views in a relational database. Hierarchical data is typically saved as XML data, and sometimes as tables or views in a hierarchical database such as IMS.

This tutorial uses three of the tables shipped with TDV from the Examples project (customers, orders, and orderdetails) to produce an XML document result.

- Adding the Views to Convert, page 43
- Adding the Loops and Filters Used to Iterate and Select Data, page 44
- Completing the Links Between Loop and out, page 46
- Adding Loop2 to the Model, page 48
- Adding Loop3 to the Model, page 49
- Adding Links to Direct Data Flow, page 49
- Executing the Transform, page 50

Adding the Views to Convert

Add three of the tables shipped with TDV from the Examples project (customers, orders, and orderdetails).

To convert relational to XML data

1. Open Studio.
2. In the Studio resource tree, select Shared.
3. Right-click and select New Transformation.
4. Select Any-Any Transformation and click Next.
5. Type TBL2XML in the Transformation Name field.
6. Click Finish.

   The Transformation Editor opens with the Model tab displayed.
7. From the Studio resource tree, expand Shared/examples.

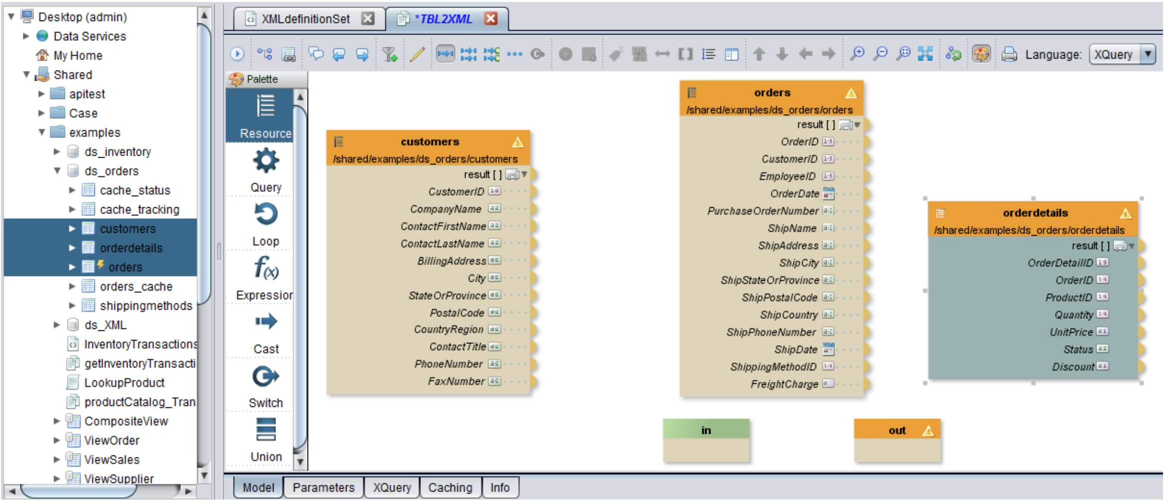
8. Expand Shared/examples/ds_orders.

9. Select the following views and drag them from the resource tree onto the Transformation Editor Model tab:

   — customers

   — orders

   — orderdetails



Language: XQuery

10. Save your transform.

Adding the Loops and Filters Used to Iterate and Select Data

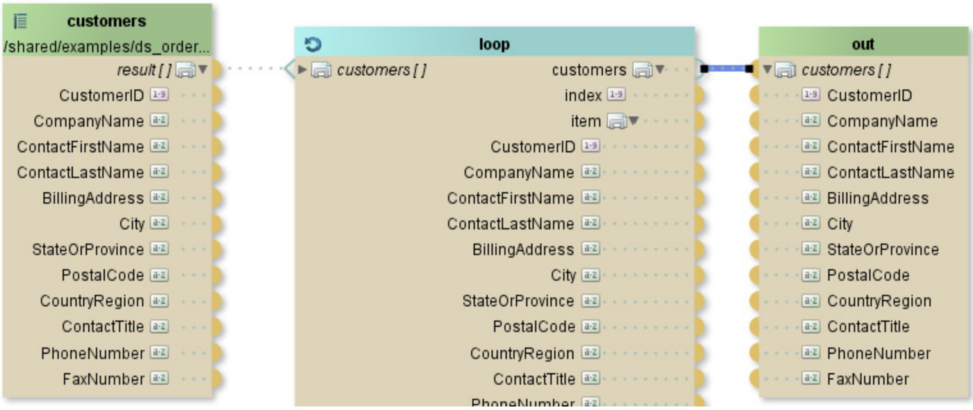
This example makes use of programmatic loops to iterate through and select the data to be transformed.

To add loops and filters

1. Select the Loop Link Mode. Alternatively hold SHIFT key while creating a link (Shift+Minus) icon at the top of the editor.

2. Select the operation handle next to the result column that is listed in customers and drag the line to out.

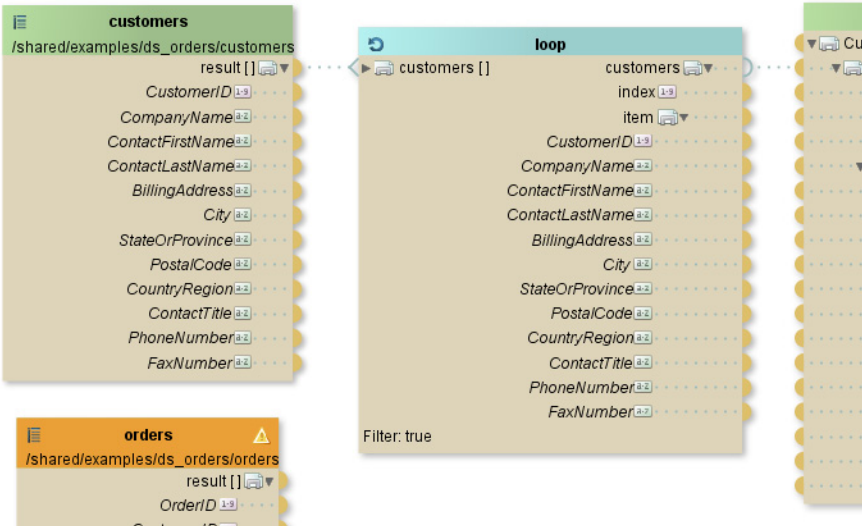
3. Save the transform.



4. Delete the connection between loop and out.
5. On the out container, select the operation handle next to customers and right-click.
6. Select Delete “customers”.
7. Click out to select it.
8. Right-click out and select Add Parameter.
9. Select Browse.
10. Browse to XMLdefinitionSet.
11. Select Type in the Show drop down list on the right.
12. Select Customers from that list.
13. Click **OK**.

    By default, the XML hierarchy is collapsed.
14. Click the arrow next to foo:customer, then foo:orders, and foo:orderitems to expand the hierarchy.
15. Click the Assign Link Mode. Alternatively hold CTRL key while creating a link (CTRL+Minus) icon at the top of the editor.
16. From loop, click in the operation handle next to customers and drag the line to foo:customer.

17. Save your transform.

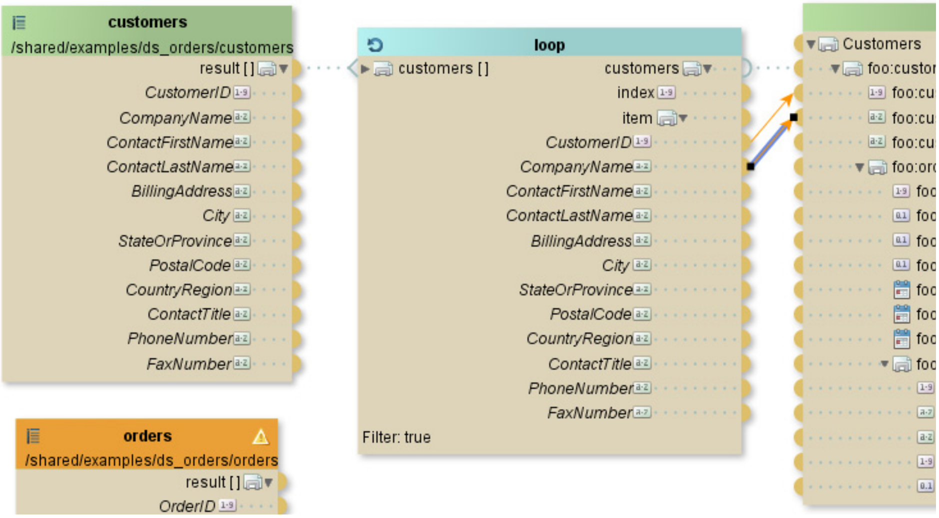


Completing the Links Between Loop and out

To complete loop links

1. Click the Assign Link Mode icon at the top of the editor.
2. Link CustomerID to foo:customerID.

3. Link CompanyName to foo:CustomerName.

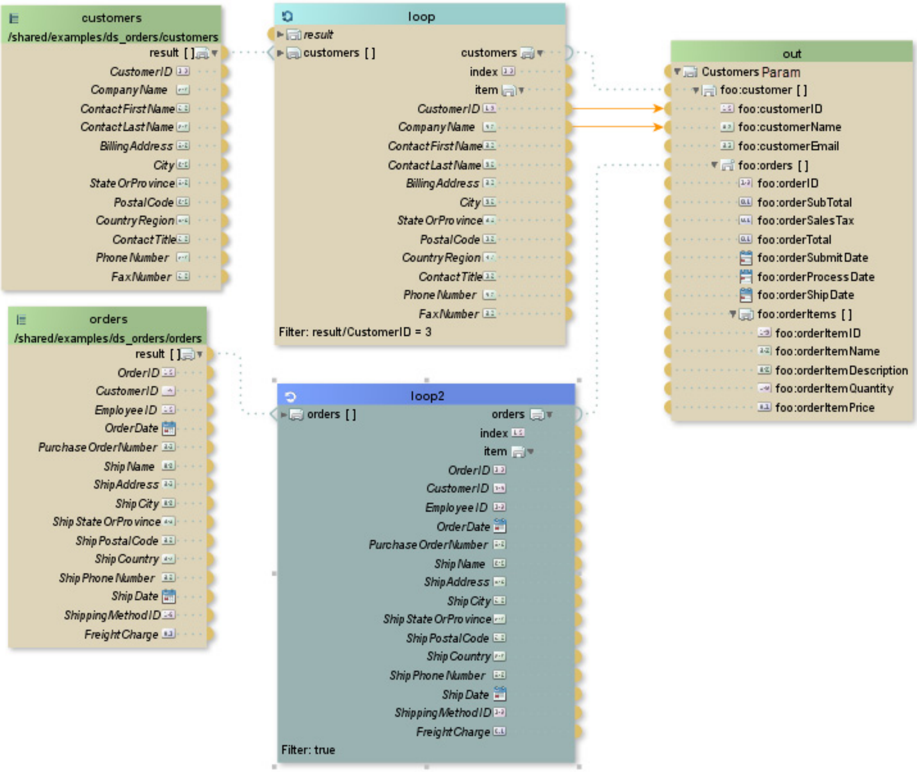


4. Save your transform.

Adding Loop2 to the Model

To add loop2

1. Select the Loop Link Mode.
2. Click in the operation handle next to the result column of the orders table and connect it to the foo:orders column of out.



Filter: result/CustomerID = 3

Filter: true

3. Double-click loop2.
4. In the field, type the following:

   CusID = orders/CustomerID

5. Click **Close**.
6. Save your transform.

Adding Loop3 to the Model

To add loop3

1. Select the Loop Link Mode.
2. Link orderdetails result to foo:orderItems.
3. Double-click loop3.
4. In the field, type the following:

   OrdID = orderdetails/OrderID
5. Save your transform.

Adding Links to Direct Data Flow

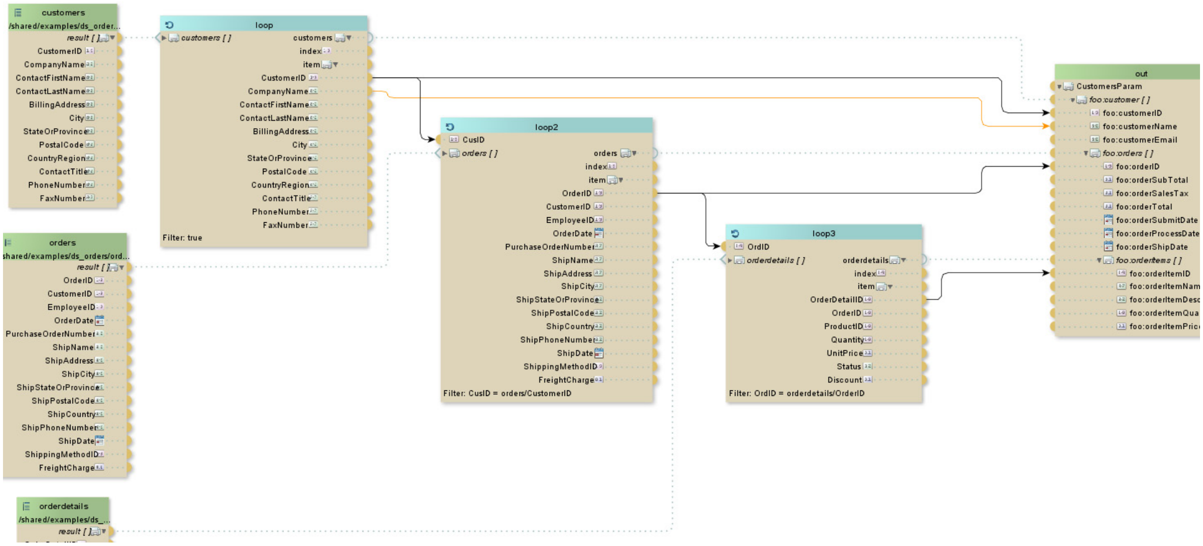
Linking data on certain columns helps direct the flow of data and help select the data for transformation.

To add links

1. Open your transform.
2. Validate and or create links between the following From and to columns.

From Operator	From Column	To Operator	To Column
loop	customers	out	out.foo.customer
	CustomerID	out	out.foo.customerID
	CompanyName	out	foo.customerName
	CustomerID	Loop2	CusID
loop2	orders	out	out.foo.orders [ ]
	OrderID	out	out.foo.orderID
	OrderID	loop3	loop3.OrdID
loop3	orderdetails	out	foo.orderitems [ ]
	OrderDetailID	out	foo.orderitemID

3. Save your transform.



Executing the Transform

When you execute a transform the convert relational data into XML structured hierarchical data, you can use the results to get an idea of what would be produced at runtime.

To execute the transform

1. Execute your transform to review the generated XML code. (Click the execute button.)
2. Click Details on the Results panel to view the Value window.
3. Click OK to close the Value window when you have finished.
4. Save and close your transform.

Converting XML to a View

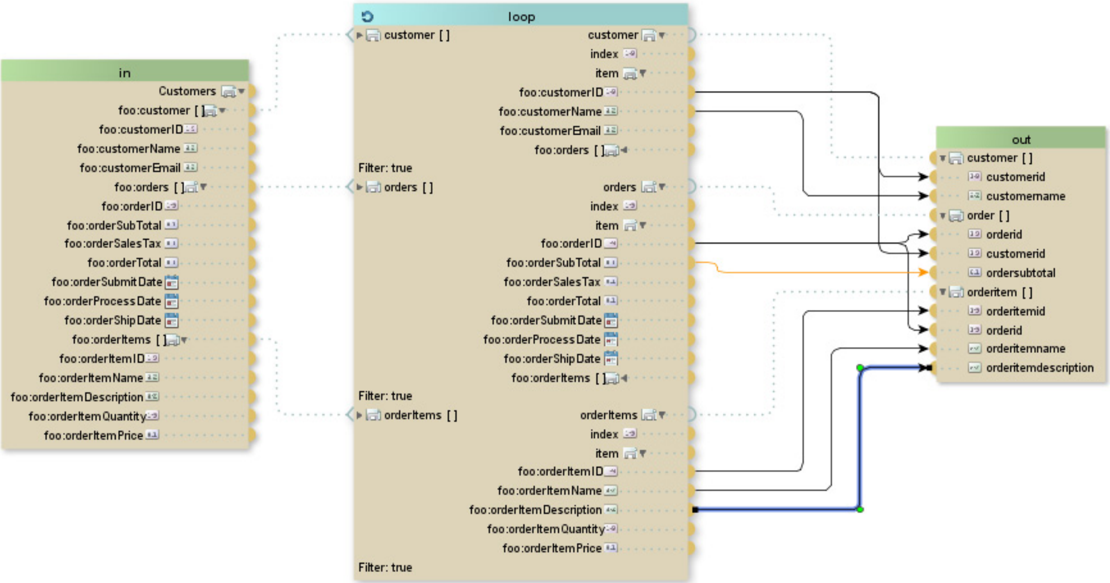
This portion of the tutorial converts the XMLdefinitionset to 3 views. Typically, this type of transformation is useful when data is generated through WSDL or other Web application based XML. The data accumulated in XML or WSDL files can be converted to tabular format and then consumed by other database analysis tools to pattern customer behavior.

Your eventual implementation might need to be more complex than the example used in this tutorial, but it should give you a solid foundation to understand how the Transformation Editor can be used to achieve your goals.

The following topics are included in this tutorial:

- Creating the Transform and Adding the in Parameters, page 51
- Adding Parameters to out, page 52
- Adding the Loop and Iterators, page 54
- Executing the XML2view Transform, page 56

The transformation model that you will create in this tutorial is shown in the following:



Creating the Transform and Adding the in Parameters

To convert XML formatted data to a relational database view

1. Open Studio.
2. Select Shared on the Studio resource tree.
3. Right-click and select New Transformation.
4. Select Any-Any Transformation.

5. Type XML2view.
6. Click OK.
7. On the Model tab of the Transformation Editor, click to select in.
8. Right-click and select Add Parameter.
9. Select Browse.
10. In the Add Definition Type dialog, navigate to and select XMLdefinitionSet.
11. Select Customers from the list on the right (under Show Element).
12. Click OK.

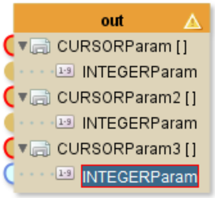
You can click the arrows in the hierarchy to expand and see all of the elements of the XML that you just added to the transform.

Adding Parameters to out

This portion of the tutorial demonstrates two different ways to add and edit parameters.

To add the necessary parameters to out

1. Open your transform.
2. Click to select out.
3. Right-click and select Add Parameter.
4. Select Complex > CURSOR.
5. In the operation handle to the left of CURSORParam, right-click and select Add Parameter.
6. Select Integer > INTEGER.
7. Repeat until you have 3 cursor parameters with integer subparameters.

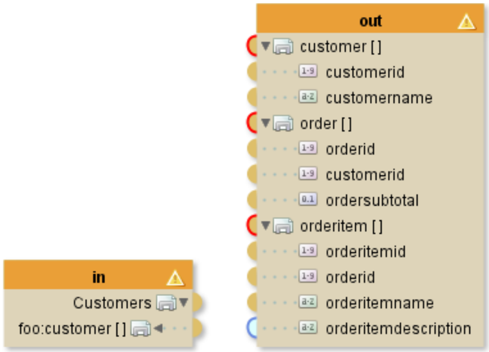


8. Save your transform.
9. Select the CURSORParam row.
10. Right-click and select Rename.

11. Type customer.
12. Select the CURSORParam2 row.
13. Right-click and select Rename.
14. Type order.
15. Select the CURSORParam3 row.
16. Right-click and select Rename.
17. Type orderitem.
18. Add and rename subparameters until your have parameters with the following structure:

Parent Parameter	subparameter	Data Type
customer		CURSOR
	customerid	INTEGER
	customername	VARCHAR
order		CURSOR
	orderid	INTEGER
	customerid	INTEGER
	ordersubtotal	FLOAT
orderitem		CURSOR
	orderitemid	INTEGER
	orderid	INTEGER
	orderitemname	VARCHAR
	orderitemdescription	VARCHAR

19. Save your transform.

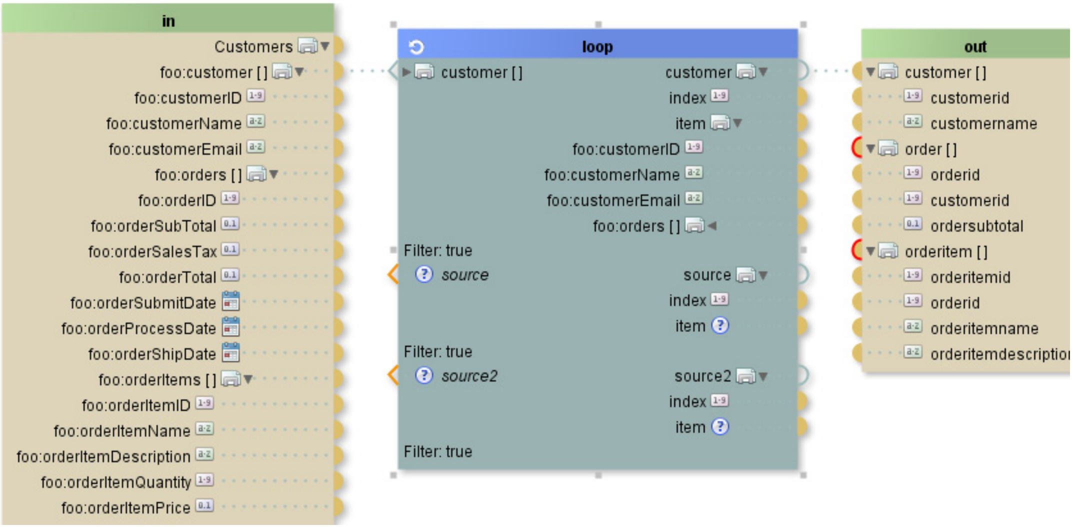


Adding the Loop and Iterators

To add the necessary loop and iterators for the tutorial

1. Select the Loop Link Mode.
2. Click in the operation handle next to the foo:customer column of in and connect it to customer [ ] .
3. Save your transform.
4. Double-lick loop.
5. Click the green plus icon to add a Loop Iterator.
6. Click the green plus icon one more time.
7. Click Close.

8. Save your transform.



9. Validate and or create links between the following From and To columns.

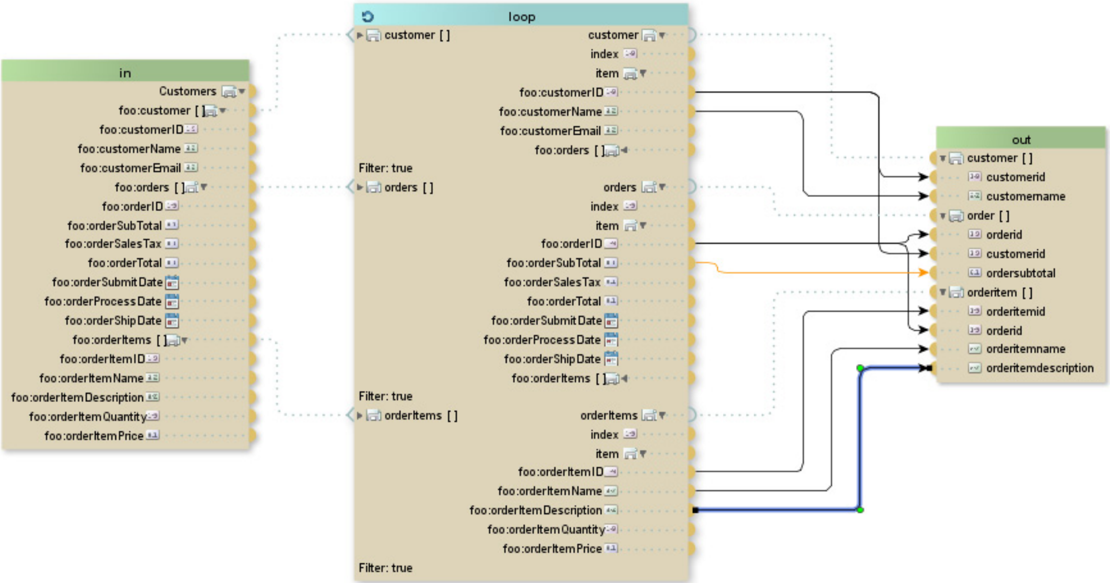
From in	To loop
foo.Customer	foo.customer
foo.orders	source
foo.orderitems	source2

10. Validate and or create links between the following From and To columns.

From loop	To out
customer	customer
foo.customerID	customer : customerid
foo.customerID	order : customerid
foo:customerName	customer : customername
orders	order
foo:orderID	order : orderid

From loop	To out
foo:orderID	orderitem : orderid
foo.orderSubTotal	order : ordersubtotal
orderitems	orderitem
foo:orderItemID	orderitem : orderitemid
foo:orderItemName	orderitem : orderitemname
foo:orderItemDescription	orderitem : orderitemdescription

11. Save your transform.



Executing the XML2view Transform

For this portion of the tutorial, you will be provided with the XML data to copy and paste into the parameter input window so that you can validate how the transform will perform when given data.

To execute the XML2TBL transform

1. Open your transform and click Execute.
2. Copy the following XML into the Input Values for XML2view window:

```
<?xml version="1.0" encoding="utf-8"?>
<CustomersParam xmlns:foo="foo">
 <foo:customer>
  <foo:customerID>1</foo:customerID>
  <foo:customerName>Able Computing</foo:customerName>
  <foo:customerEmail>compositesw.com</foo:customerEmail>
  <foo:orders>
   <foo:orderID>2</foo:orderID>
   <foo:orderSubTotal>232.6</foo:orderSubTotal>
   <foo:orderSalesTax>99.9</foo:orderSalesTax>
   <foo:orderTotal>88.34</foo:orderTotal>
   <foo:orderSubmitDate>2013-1-6</foo:orderSubmitDate>
   <foo:orderProcessDate>2013-3-9</foo:orderProcessDate>
   <foo:orderShipDate>2013-4-5</foo:orderShipDate>
   <foo:orderItems>
    <foo:orderItemID>1009</foo:orderItemID>
    <foo:orderItemName>ldap</foo:orderItemName>
    <foo:orderItemDescription>this is a cumputer.</foo:orderItemDescription>
    <foo:orderItemQuantity>much good</foo:orderItemQuantity>
    <foo:orderItemPrice>99.9</foo:orderItemPrice>
   </foo:orderItems>
  </foo:orders>
 </foo:customer>
</CustomersParam>
```

3. Paste it into the Customers field.
4. Click OK to display the Result panel.
5. Click Display to view the data.

Transform XML Schemas Tutorial

This topic steps you through the creation of a transformation that mutates an XML source to another XML hierarchy based on how the data is navigated.

For example, using the following structure of Students, Teachers and Classes, you can have:

- Students with their classes and each teacher
- Teachers with their classes and the students in each class
- Classes with their students and teachers

The steps to create and use this transform include:

- Create the School.xml Data File for the Tutorial, page 59
- Create an XML Data Source for the Tutorial, page 63
- Create the GetStudents Transformation Procedure, page 64
- Creating the ClassStudent Transformation, page 67
- Adding and Connecting Source Operations, page 68
- Completing the ClassStudent Transformation, page 69

Create the School.xml Data File for the Tutorial

The XML file contain data for the execution of the transform is required for this tutorial. This procedure provides the code for you to copy and paste into the Studio editor to create the simple XML data file.

To create the School.xml data file

1. Open your favorite text editor.
2. Copy and paste the following XML code into the text editor.

```
<?xml version="1.0" encoding="UTF-8"?>
<Classes xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns="http://compositesw.com/transform/example/school">
  <Class>
    <CourseName>BIO-101</CourseName>
    <CourseDescription>Intro to biology</CourseDescription>
    <Department>Science</Department>
    <CreditNumber>1101</CreditNumber>
    <Teacher>
```

```
      <TeacherName>Bob Darwin</TeacherName>
      <TeacherEmail>bdarwin@school.com</TeacherEmail>
    </Teacher>
    <Student><StudentName>Evelina
Ruffino</StudentName><StudentEmail>ERuffino@school.com</StudentEmail></Student>
    <Student><StudentName>Krystal
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    <Student><StudentName>Ernesto
Dangelo</StudentName><StudentEmail>EDangelo@school.com</StudentEmail></Student>
  </Class>
</Classes>
```

3. Save the file with the name `school.xml`.

Create an XML Data Source for the Tutorial

There are some Studio resources that you must create before starting this tutorial.

To create the XML data source

1. Open Studio.
2. Select Shared on the Studio resource tree.
3. Right-click and select New Data Source.
4. Select File-XML.
5. Click **Next**.
6. Type `school`.
7. Browse to the directory location where you saved the `school.xml` data file.
8. Click **OK**.
9. Click Create & Introspect.
10. Select the school.xml file.

11. Click **Next**.

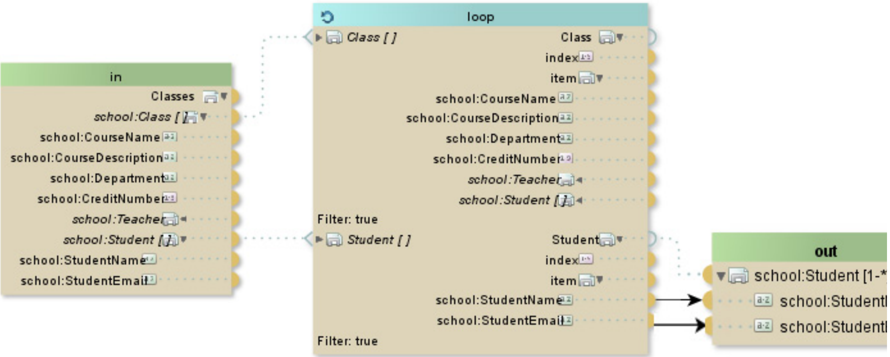
12. Click **Finish**.

13. When introspection is complete, click **OK**.

The XML definition set is created for you.

Create the GetStudents Transformation Procedure

The GetStudents transformation is a simple procedure that will get used as part of a larger XML schema mutation transformation. The following graphic shows the goal for this task:



To create the GetStudents transform

1. Open Studio.

2. In the Studio resource tree, select Shared.

3. Right-click and select New Transformation.

4. Select Any-Any Transformation and click **Next**.

5. Type GetStudents in the Transformation Name field.

6. Click **Finish**.

   The Transformation Editor opens with the Model tab displayed.

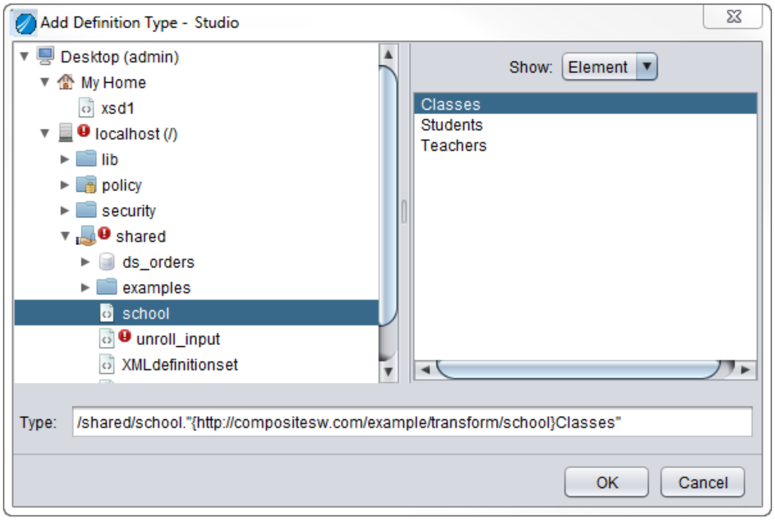
7. Click the in container.

8. Right-click and select Add Parameter.

9. Select Browse.

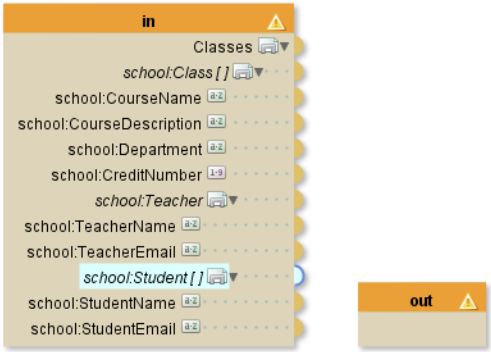
10. Browse to the schoolDefinitions definition set.

11. Select Classes.



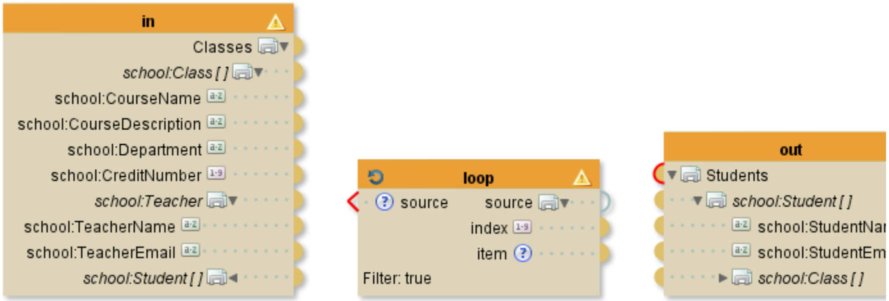
Type: /shared/school."{http://compositesw.com/example/transform/school}Classes"

12. Click **OK**.

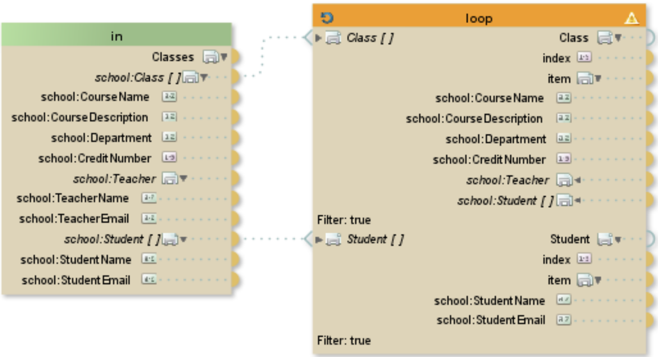


13. Save your transform.

14. From the palette, click and drag Loop onto the editor.



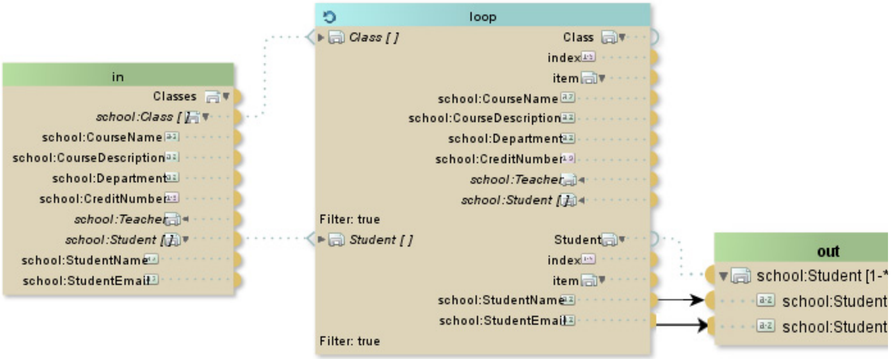
15. Draw a connection from school:Class to source on loop.
16. Click loop to make sure it is selected.
17. Right-click and select Add Source.
18. Draw a connection from school:Student to source on loop.



19. From loop draw a connection from Student to out.

    Out will be populated with an array for the Student element.
20. Connect loop :school:StudentName to out: school:StudentName.
21. Connect loop :school:StudentEmail to out: school:StudentEmail

22. Save the transform.



Creating the ClassStudent Transformation

This task creates the transformation container for this tutorial.

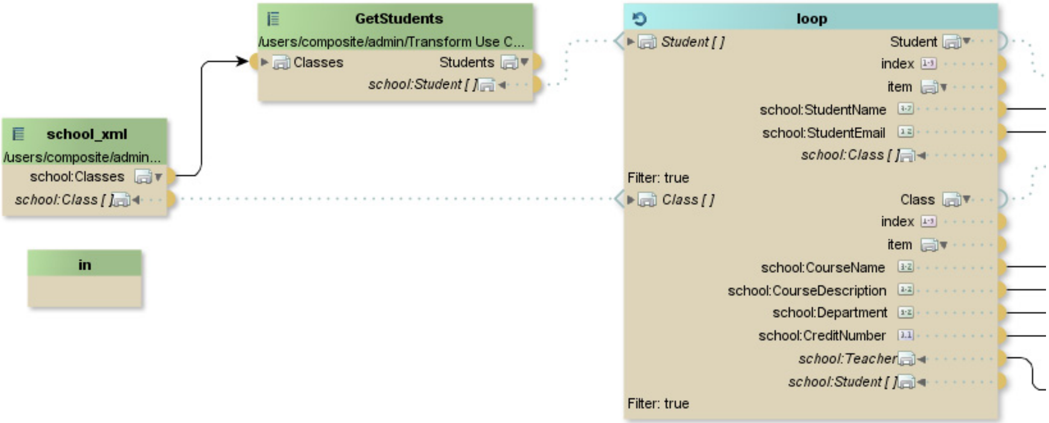
To create the ClassStudent transform

1. Open Studio.
2. In the Studio resource tree, select Shared.
3. Right-click and select New Transformation.
4. Select Any-Any Transformation and click **Next**.
5. Type ClassStudent in the Transformation Name field.
6. Click **Finish**.

The Transformation Editor opens with the Model tab displayed.

Adding and Connecting Source Operations

We need to bring in the XML file with its original hierarchy before we can transform it. The GetStudents simple transformation procedure also helps define the more complex transformation that we are building in this use case. The following partial transform is the goal for this task:

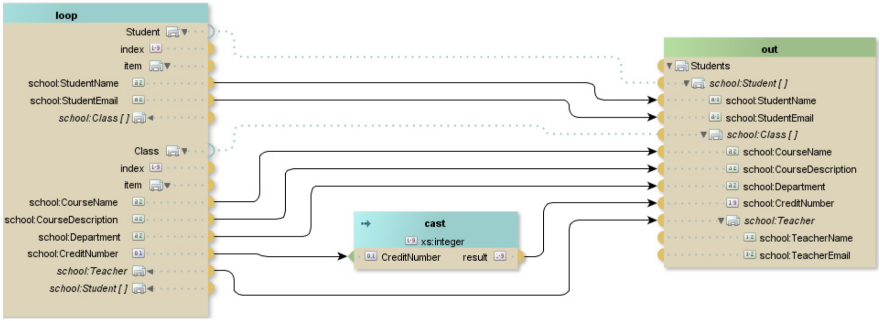


To add and connect the source operations

1. Open your transform.
2. From the Studio resource tree, select and drag the following resources onto the Transformation Editor:
   — school.xml
   — GetStudents
3. From the palette, add a loop to the editor.
4. Select the loop and add a new source.
5. Connect school:Classes to Classes in Get Students.
6. Connect school:Class to one of the sources in the loop.
7. Connect school:Student from GetStudents to the other source in the loop.
8. Save your transform.

Completing the ClassStudent Transformation

In this task the data type of one parameter needs to be transformed using the cast function and the parameters must be connected to out.



To complete the ClassStudent transform

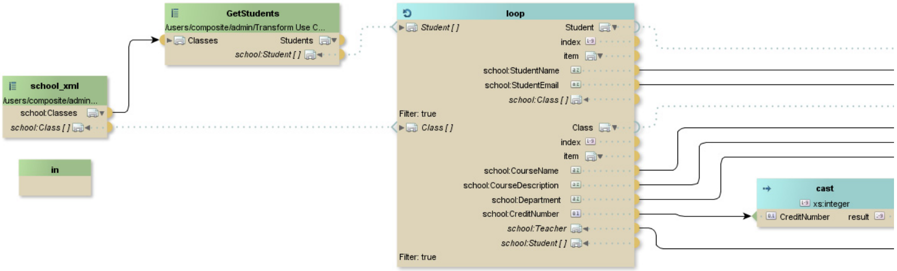
1. Open you transform.
2. From the palette, add the cast operation to the editor.
3. Connect Student to the out container.

   This creates the hierarchy that you need in the out container.
4. Connect the following loop and out parameters:

loop	out
school:StudentName	school:StudentName
school:StudentEmail	school:StudentEmail
Class	school:Class
school:CourseName	school:CourseName
school:CourseDescription	school:CourseDescription
school:Department	school:Department
school:Teacher	school:Teacher

5. Connect school:CreaditNumber to the source parameter in cast.
6. Connect result to school:CreditNumber in out.

7. Double-click cast.
8. In the Type field, select Integer > xs:integer.
9. Click OK.
10. Save your transform.



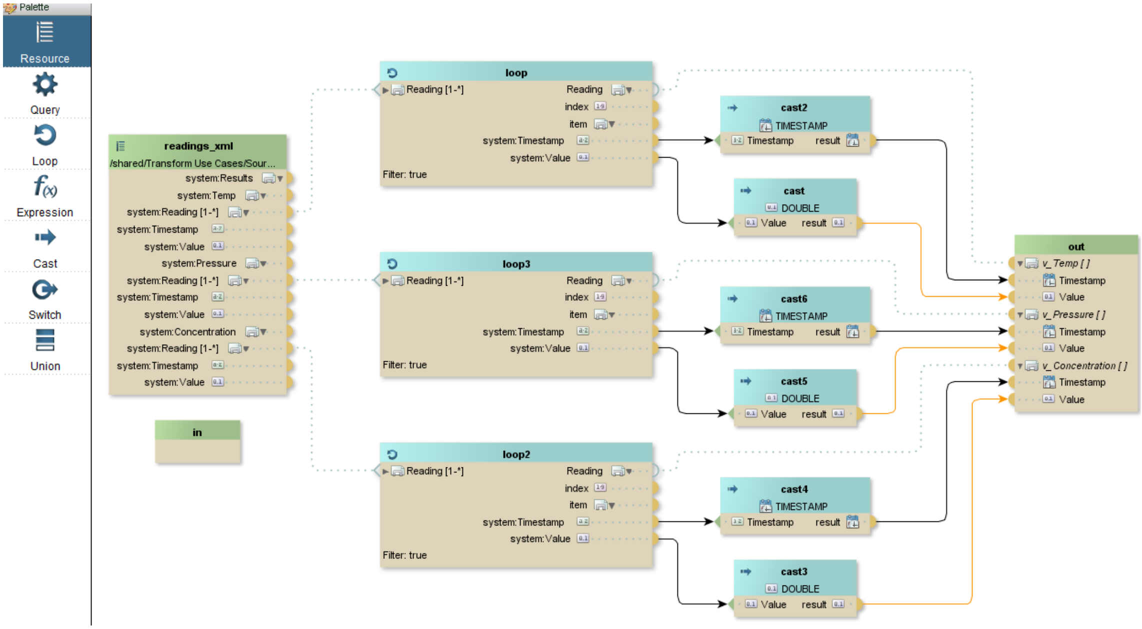
Transform Name and Value Pair Tutorial

This topic steps you through the creation of a transformation that puts XML into a table so it is easier to analyze.

The steps to create and use this transform include:

- Creating an XML Data Source for the Tutorial, page 72
- Starting the NameValue Transformation Procedure, page 74
- Creating the Resource to Loop Connections, page 75
- Connecting the Loop Operations to out, page 78
- Connecting the Loop Operations to the Cast Operations, page 78
- Allowing NULL Output Values, page 80

The goal of this tutorial is a transform similar to the following:



Creating an XML Data Source for the Tutorial

There is one Studio resource that you must create before starting this tutorial. It is a simple XML data source. This procedure provides the code for you to copy and paste into a text file.

To create the XML data source

1. Open a text editor of your choice.
2. Copy and paste the following into the editor:

```
<?xml version="1.0" encoding="UTF-8"?>
<Results xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns="http://compositesw.com/transform/example/system"
   xsi:schemaLocation="http://compositesw.com/transform/example/system
file:///d:/data/transform/xml/systemReadings.xsd">
   <Temp>
      <Reading><Timestamp>2013-04-17T18:00:13-09:00</Timestamp><Value>40.69</Value></Reading>
      <Reading><Timestamp>2013-04-17T19:00:13-09:00</Timestamp><Value>41.41</Value></Reading>
      <Reading><Timestamp>2013-04-17T20:00:13-09:00</Timestamp><Value>33.89</Value></Reading>
      <Reading><Timestamp>2013-04-17T21:00:13-09:00</Timestamp><Value>25.30</Value></Reading>
      <Reading><Timestamp>2013-04-17T22:00:13-09:00</Timestamp><Value>21.45</Value></Reading>
      <Reading><Timestamp>2013-04-17T23:00:13-09:00</Timestamp><Value>25.70</Value></Reading>
      <Reading><Timestamp>2013-04-18T00:00:13-09:00</Timestamp><Value>23.01</Value></Reading>
      <Reading><Timestamp>2013-04-18T01:00:13-09:00</Timestamp><Value>22.27</Value></Reading>
      <Reading><Timestamp>2013-04-18T02:00:13-09:00</Timestamp><Value>15.24</Value></Reading>
      <Reading><Timestamp>2013-04-18T03:00:13-09:00</Timestamp><Value>20.41</Value></Reading>
      <Reading><Timestamp>2013-04-18T04:00:13-09:00</Timestamp><Value>13.96</Value></Reading>
      <Reading><Timestamp>2013-04-18T05:00:13-09:00</Timestamp><Value>7.37</Value></Reading>
      <Reading><Timestamp>2013-04-18T06:00:13-09:00</Timestamp><Value>14.71</Value></Reading>
      <Reading><Timestamp>2013-04-18T07:00:13-09:00</Timestamp><Value>12.30</Value></Reading>
      <Reading><Timestamp>2013-04-18T08:00:13-09:00</Timestamp><Value>2.46</Value></Reading>
      <Reading><Timestamp>2013-04-18T09:00:13-09:00</Timestamp><Value>5.45</Value></Reading>
      <Reading><Timestamp>2013-04-18T10:00:13-09:00</Timestamp><Value>10.34</Value></Reading>
      <Reading><Timestamp>2013-04-18T11:00:13-09:00</Timestamp><Value>19.02</Value></Reading>
      <Reading><Timestamp>2013-04-18T12:00:13-09:00</Timestamp><Value>14.26</Value></Reading>
      <Reading><Timestamp>2013-04-18T13:00:13-09:00</Timestamp><Value>16.90</Value></Reading>
      <Reading><Timestamp>2013-04-18T14:00:13-09:00</Timestamp><Value>13.40</Value></Reading>
      <Reading><Timestamp>2013-04-18T15:00:13-09:00</Timestamp><Value>10.73</Value></Reading>
      <Reading><Timestamp>2013-04-18T16:00:13-09:00</Timestamp><Value>12.87</Value></Reading>
      <Reading><Timestamp>2013-04-18T17:00:13-09:00</Timestamp><Value>20.49</Value></Reading>
      <Reading><Timestamp>2013-04-18T18:00:13-09:00</Timestamp><Value>22.45</Value></Reading>
      <Reading><Timestamp>2013-04-18T19:00:13-09:00</Timestamp><Value>25.30</Value></Reading>
      <Reading><Timestamp>2013-04-18T20:00:13-09:00</Timestamp><Value>32.05</Value></Reading>
      <Reading><Timestamp>2013-04-18T21:00:13-09:00</Timestamp><Value>41.24</Value></Reading>
      <Reading><Timestamp>2013-04-18T22:00:13-09:00</Timestamp><Value>50.50</Value></Reading>
      <Reading><Timestamp>2013-04-18T23:00:13-09:00</Timestamp><Value>47.95</Value></Reading>
   </Temp>
   <Pressure>
      <Reading><Timestamp>2013-04-17T18:00:13-09:00</Timestamp><Value>31.12</Value></Reading>
      <Reading><Timestamp>2013-04-17T19:00:13-09:00</Timestamp><Value>32.28</Value></Reading>
      <Reading><Timestamp>2013-04-17T20:00:13-09:00</Timestamp><Value>31.24</Value></Reading>
      <Reading><Timestamp>2013-04-17T21:00:13-09:00</Timestamp><Value>40.55</Value></Reading>
   <Reading><Timestamp>2013-04-17T22:00:13-09:00</Timestamp><Value>37.60</Value></Reading>
   <Reading><Timestamp>2013-04-17T23:00:13-09:00</Timestamp><Value>44.57</Value></Reading>
   <Reading><Timestamp>2013-04-18T00:00:13-09:00</Timestamp><Value>41.62</Value></Reading>
   <Reading><Timestamp>2013-04-18T01:00:13-09:00</Timestamp><Value>32.64</Value></Reading>
   <Reading><Timestamp>2013-04-18T02:00:13-09:00</Timestamp><Value>26.51</Value></Reading>
   <Reading><Timestamp>2013-04-18T03:00:13-09:00</Timestamp><Value>28.20</Value></Reading>
   <Reading><Timestamp>2013-04-18T04:00:13-09:00</Timestamp><Value>21.63</Value></Reading>
   <Reading><Timestamp>2013-04-18T05:00:13-09:00</Timestamp><Value>15.59</Value></Reading>
   <Reading><Timestamp>2013-04-18T06:00:13-09:00</Timestamp><Value>24.33</Value></Reading>
   <Reading><Timestamp>2013-04-18T07:00:13-09:00</Timestamp><Value>22.03</Value></Reading>
   <Reading><Timestamp>2013-04-18T08:00:13-09:00</Timestamp><Value>28.60</Value></Reading>
   <Reading><Timestamp>2013-04-18T09:00:13-09:00</Timestamp><Value>34.02</Value></Reading>
   <Reading><Timestamp>2013-04-18T10:00:13-09:00</Timestamp><Value>24.19</Value></Reading>
   <Reading><Timestamp>2013-04-18T11:00:13-09:00</Timestamp><Value>17.27</Value></Reading>
   <Reading><Timestamp>2013-04-18T12:00:13-09:00</Timestamp><Value>19.38</Value></Reading>
   <Reading><Timestamp>2013-04-18T13:00:13-09:00</Timestamp><Value>16.52</Value></Reading>
   <Reading><Timestamp>2013-04-18T14:00:13-09:00</Timestamp><Value>14.57</Value></Reading>
   <Reading><Timestamp>2013-04-18T15:00:13-09:00</Timestamp><Value>11.66</Value></Reading>
   <Reading><Timestamp>2013-04-18T16:00:13-09:00</Timestamp><Value>13.55</Value></Reading>
   <Reading><Timestamp>2013-04-18T17:00:13-09:00</Timestamp><Value>22.12</Value></Reading>
   <Reading><Timestamp>2013-04-18T18:00:13-09:00</Timestamp><Value>28.35</Value></Reading>
   <Reading><Timestamp>2013-04-18T19:00:13-09:00</Timestamp><Value>27.98</Value></Reading>
   <Reading><Timestamp>2013-04-18T20:00:13-09:00</Timestamp><Value>25.84</Value></Reading>
   <Reading><Timestamp>2013-04-18T21:00:13-09:00</Timestamp><Value>25.70</Value></Reading>
   <Reading><Timestamp>2013-04-18T22:00:13-09:00</Timestamp><Value>25.03</Value></Reading>
   <Reading><Timestamp>2013-04-18T23:00:13-09:00</Timestamp><Value>24.27</Value></Reading>
</Pressure>
<Concentration>
   <Reading><Timestamp>2013-04-17T18:00:13-09:00</Timestamp><Value>4.27</Value></Reading>
   <Reading><Timestamp>2013-04-17T19:00:13-09:00</Timestamp><Value>-1.36</Value></Reading>
   <Reading><Timestamp>2013-04-17T20:00:13-09:00</Timestamp><Value>-5.61</Value></Reading>
   <Reading><Timestamp>2013-04-17T21:00:13-09:00</Timestamp><Value>-1.19</Value></Reading>
   <Reading><Timestamp>2013-04-17T22:00:13-09:00</Timestamp><Value>6.67</Value></Reading>
   <Reading><Timestamp>2013-04-17T23:00:13-09:00</Timestamp><Value>-0.84</Value></Reading>
   <Reading><Timestamp>2013-04-18T00:00:13-09:00</Timestamp><Value>-4.21</Value></Reading>
   <Reading><Timestamp>2013-04-18T01:00:13-09:00</Timestamp><Value>3.41</Value></Reading>
   <Reading><Timestamp>2013-04-18T02:00:13-09:00</Timestamp><Value>12.19</Value></Reading>
   <Reading><Timestamp>2013-04-18T03:00:13-09:00</Timestamp><Value>12.82</Value></Reading>
   <Reading><Timestamp>2013-04-18T04:00:13-09:00</Timestamp><Value>14.44</Value></Reading>
   <Reading><Timestamp>2013-04-18T05:00:13-09:00</Timestamp><Value>16.39</Value></Reading>
   <Reading><Timestamp>2013-04-18T06:00:13-09:00</Timestamp><Value>20.99</Value></Reading>
   <Reading><Timestamp>2013-04-18T07:00:13-09:00</Timestamp><Value>16.94</Value></Reading>
   <Reading><Timestamp>2013-04-18T08:00:13-09:00</Timestamp><Value>19.92</Value></Reading>
   <Reading><Timestamp>2013-04-18T09:00:13-09:00</Timestamp><Value>15.00</Value></Reading>
   <Reading><Timestamp>2013-04-18T10:00:13-09:00</Timestamp><Value>10.25</Value></Reading>
   <Reading><Timestamp>2013-04-18T11:00:13-09:00</Timestamp><Value>10.41</Value></Reading>
   <Reading><Timestamp>2013-04-18T12:00:13-09:00</Timestamp><Value>20.20</Value></Reading>
   <Reading><Timestamp>2013-04-18T13:00:13-09:00</Timestamp><Value>13.62</Value></Reading>
   <Reading><Timestamp>2013-04-18T14:00:13-09:00</Timestamp><Value>12.87</Value></Reading>
   <Reading><Timestamp>2013-04-18T15:00:13-09:00</Timestamp><Value>6.37</Value></Reading>
   <Reading><Timestamp>2013-04-18T16:00:13-09:00</Timestamp><Value>3.68</Value></Reading>
   <Reading><Timestamp>2013-04-18T17:00:13-09:00</Timestamp><Value>6.22</Value></Reading>
   <Reading><Timestamp>2013-04-18T18:00:13-09:00</Timestamp><Value>-2.26</Value></Reading>
   <Reading><Timestamp>2013-04-18T19:00:13-09:00</Timestamp><Value>2.72</Value></Reading>
   <Reading><Timestamp>2013-04-18T20:00:13-09:00</Timestamp><Value>7.52</Value></Reading>
   <Reading><Timestamp>2013-04-18T21:00:13-09:00</Timestamp><Value>4.78</Value></Reading>
   <Reading><Timestamp>2013-04-18T22:00:13-09:00</Timestamp><Value>6.56</Value></Reading>
```

```
    <Reading><Timestamp>2013-04-18T23:00:13-09:00</Timestamp><Value>5.40</Value></Reading>
  </Concentration>
</Results>
```

3. Save the file as **`readings.xml`** in a directory location that you can easily navigate to from Studio.
4. Open Studio.
5. Select Shared on the Studio resource tree.
6. Right-click and select New Data Source.
7. Select File-XML.
8. Click Next.
9. Name the data source Readings.
10. Next to the Root Path field, click Browse and navigate to the location of the readings.xml file.
11. Click OK.
12. Click Create & Introspect.
13. Make sure readings.xml is selected.
14. Click Next.
15. Click Finish.
16. When introspection completes, click OK.

Starting the NameValue Transformation Procedure

The NameValue transformation is a procedure that will transform XML into a table so it is easier to analyze.

To create the NameValue transform

1. Open Studio.
2. In the Studio resource tree, select Shared.
3. Right-click and select New Transformation.
4. Select Any-Any Transformation and click Next.
5. Type NameValue in the Transformation Name field.
6. Click Finish.

The Transformation Editor opens with the Model tab displayed.

7. From the Studio resource tree, drag the readings.xml resource onto the NameValue transform editor workspace.
8. Add 3 loop operations and 6 cast operations to the transform.
9. Save the transform.

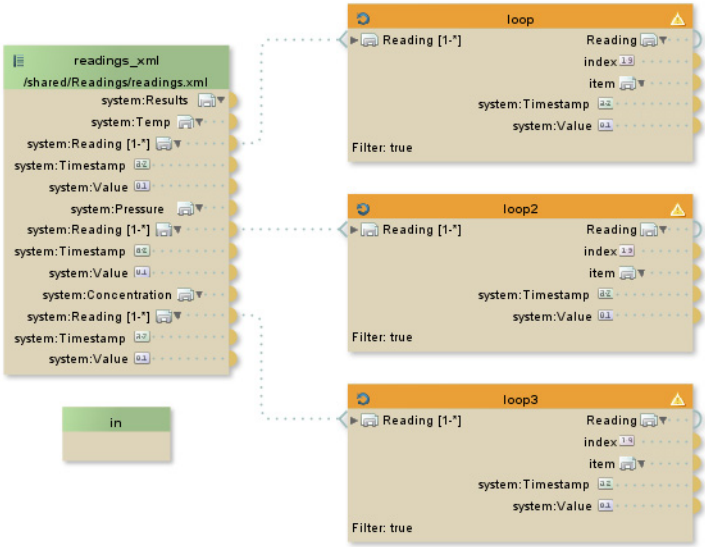
Creating the Resource to Loop Connections

This task creates the connections between the operations that you have added to the transform.

To create the resource to loop connections

1. Open Studio.
2. Open your NameValue transform.
3. Expand the hierarchy in the readings.xml operation.
4. Connect system:Reading[1-*], from under system:Result, to source in loop.
5. Connect system:Reading[1-*], from under system:Pressure, to source in loop2.

6. Connect system:Reading[1-*], from under system:Concentration, to source in loop3.

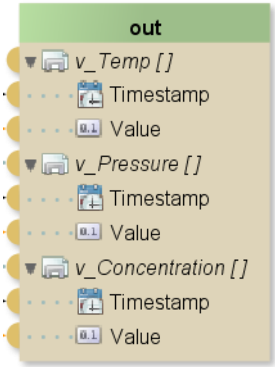


7. Save the transform.

Creating the Cursor Outputs

This procedure creates the outputs for your view.

Instead of creating each subparameter in the out container, you can copy the subparameters and use the paste into right-mouse menu option to create the multiple timestamp and value parameters.



To create the v_Temp cursor outputs

1. Select the out container in the NameValue transform.
2. Right-click and select Add Parameter.
3. Select Complex > Cursor.
4. Name the cursor v_Temp.
5. Right-click the operation handle next to v_Temp.
6. Select Add a parameter.
7. Select Add Parameter with the type Time > Timestamp and named Timestamp.
8. Right-click the operation handle next to v_Temp.
9. Select Add Parameter with the type Decimal > DOUBLE and named Value.

To create the v_Pressure cursor outputs

1. Right-click and select Add Parameter.
2. Select Complex > Cursor.
3. Name the cursor v_Pressure.
4. Right-click the operation handle next to v_Pressure.
5. Select Add a parameter.
6. Select Add Parameter with the type Time > Timestamp and named Timestamp.
7. Right-click the operation handle next to v_Pressure.
8. Select Add Parameter with the type Decimal > DOUBLE and named Value.

To create the v_Concentration cursor outputs

1. Right-click and select Add Parameter.
2. Select Complex > Cursor.
3. Name the cursor v_Concentration.
4. Right-click the operation handle next to v_Concentration.
5. Select Add a parameter.
6. Select Add Parameter with the type Time > Timestamp and named Timestamp.
7. Right-click the operation handle next to v_Concentration.

8. Select Add Parameter with the type Decimal > DOUBLE and named Value.
9. Save the transform.

Connecting the Loop Operations to out

To connect loop operations to out

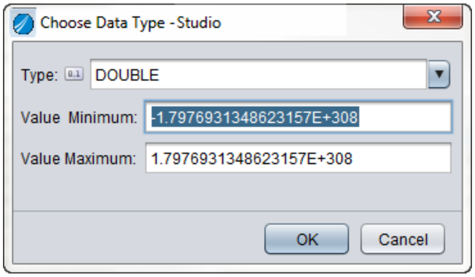
1. Open the NameValue transform.
2. Connect Reading from loop to v_Temp.
3. Connect Reading from loop2 to v_Pressure.
4. Connect Reading from loop3 to v_Concentration.
5. Save the transformation.

Connecting the Loop Operations to the Cast Operations

The XML formatted timestamp and values need to be transformed into data types that will work in a SQL view environment. The NMTOKEN values need to be converted to timestamp and the xs:decimal values need to be converted to DOUBLE.

To connect loop operations to cast operations

1. Open the NameValue transform.
2. Connect loop system:Value to the source in cast.
3. Double-click cast to open the Choose Data Type editor.
4. From the drop down list select Decimal > DOUBLE.
5. For the minimum and maximum values, accept the defaults of:
-1.7976931348623157E+308 **and** 1.7976931348623157E+308



Choose Data Type - Studio

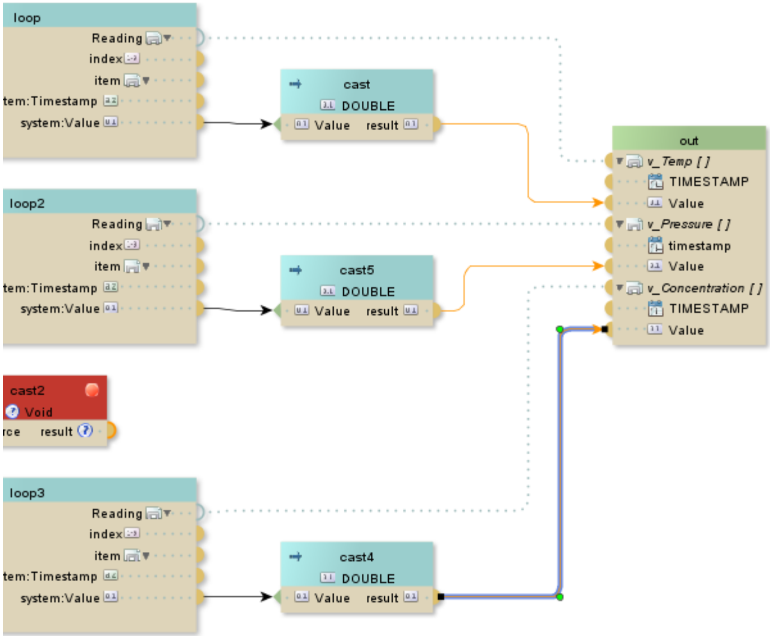
Type: DOUBLE

Value Minimum: -1.7976931348623157E+308

Value Maximum: 1.7976931348623157E+308

6. Connect cast result to the out v_Temp Value parameter.
7. Repeat these steps to create the cast operations for each of the loop system:Value parameters and connect them to the out v_Pressure and v_Concentration Value parameters.

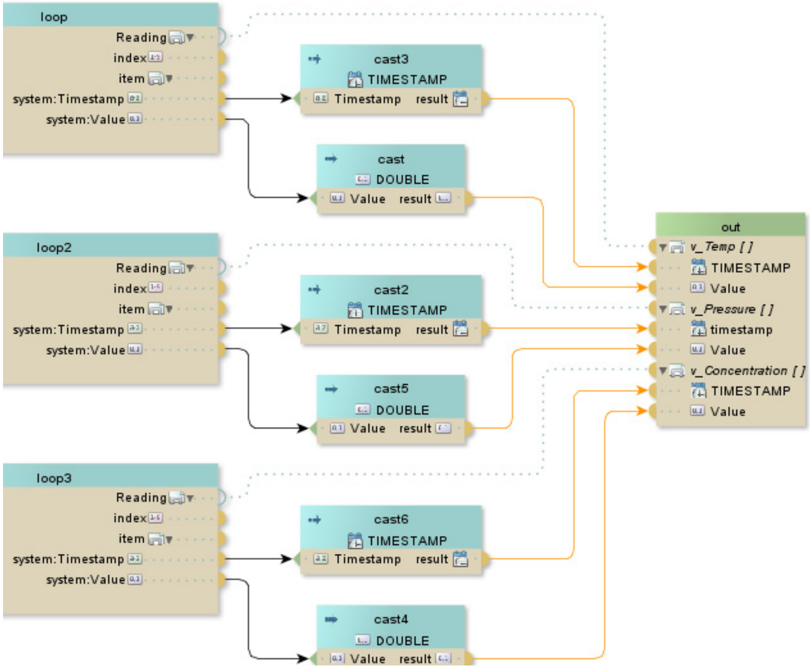
For example, your transform should have cast operations and connections similar to the following:



8. Connect loop system:Timestamp to the source in a cast operation.
9. Double-click cast to open the Choose Data Type editor.
10. From the drop down list select Time > TIMESTAMP.
11. Connect cast result to the out v_Temp Timestamp parameter.

12. Repeat these steps to create the cast operations for each of the loop system:Timestamp parameters and connect them to the out v_Pressure and v_Concentration Timestamp parameters.

For example, your transform should have cast operations and connections similar to the following:



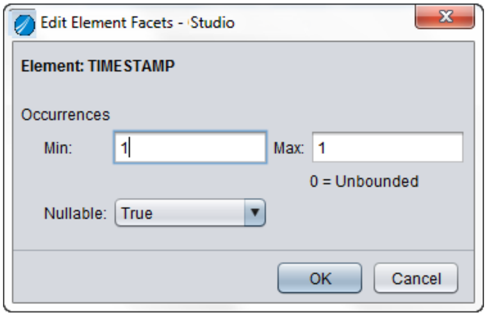
13. Save the transformation.

Allowing NULL Output Values

This same functionality is available from the Model tab.

To allow NULL values

1. Open the NameValue transform.
2. Right-click on any of the parameters and select Change Facets.



Edit Element Facets - Studio

Element: TIMESTAMP

Occurrences

Min: 1 Max: 1

0 = Unbounded

Nullable: True

3. In the Nullable field, select True.
4. Click OK.
5. Repeat this for each output parameter.
6. Save your transform.

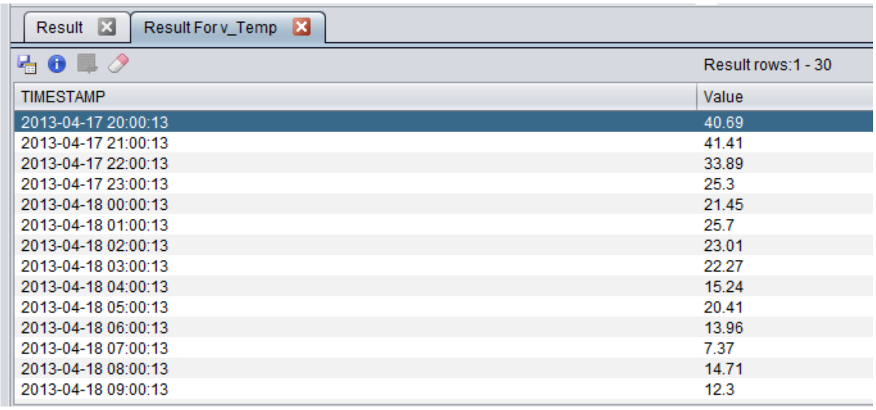
Executing and Testing Your Transform

After designing your sample transform it is valuable to execute it to see what data it retrieves.

To execute and test the results of your transform

1. Select Execute.
2. The right-side of Studio splits and the Result panel opens.
3. Click one of the Display buttons.

4. Validate that your results look similar to the following:



TIMESTAMP	Value
2013-04-17 20:00:13	40.69
2013-04-17 21:00:13	41.41
2013-04-17 22:00:13	33.89
2013-04-17 23:00:13	25.3
2013-04-18 00:00:13	21.45
2013-04-18 01:00:13	25.7
2013-04-18 02:00:13	23.01
2013-04-18 03:00:13	22.27
2013-04-18 04:00:13	15.24
2013-04-18 05:00:13	20.41
2013-04-18 06:00:13	13.96
2013-04-18 07:00:13	7.37
2013-04-18 08:00:13	14.71
2013-04-18 09:00:13	12.3

5. Save and close your transform.

Transform XML to Relational Tutorial

The purpose of this lab is to learn how to use the Any-to-Any Transformation Editor to transform a hierarchical XML document to a “flat” relational structure.

The steps to create and use this transform include:

- Creating the School.xml Data File for the Tutorial, page 83
- Creating an XML Data Source for the Tutorial, page 87
- Creating the SchoolXML2Rel Transformation, page 88
- Creating the SchoolXML2Rel View, page 89

Creating the School.xml Data File for the Tutorial

The XML file contain data for the execution of the transform is required for this tutorial. This procedure provides the code for you to copy and paste into the Studio editor to create the simple XML data file.

To create the School.xml data file

1. Open your favorite text editor.
2. Copy and paste the following XML code into the text editor.

```
<?xml version="1.0" encoding="UTF-8"?>
<Classes xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns="http://compositesw.com/transform/example/school">
  <Class>
    <CourseName>BIO-101</CourseName>
    <CourseDescription>Intro to biology</CourseDescription>
    <Department>Science</Department>
    <CreditNumber>1101</CreditNumber>
    <Teacher>
      <TeacherName>Bob Darwin</TeacherName>
      <TeacherEmail>bdarwin@school.com</TeacherEmail>
    </Teacher>
    <Student><StudentName>Evelina
Ruffino</StudentName><StudentEmail>ERuffino@school.com</StudentEmail></Student>
    <Student><StudentName>Krystal
Deeter</StudentName><StudentEmail>KDeeter@school.com</StudentEmail></Student>
    <Student><StudentName>Temika
Kanter</StudentName><StudentEmail>TKanter@school.com</StudentEmail></Student>
    <Student><StudentName>Zina
Borey</StudentName><StudentEmail>ZBorey@school.com</StudentEmail></Student>
    <Student><StudentName>Eugenio
Bossard</StudentName><StudentEmail>EBossard@school.com</StudentEmail></Student>
```

```
    <Student><StudentName>Bess
Zucker</StudentName><StudentEmail>BZucker@school.com</StudentEmail></Student>
    <Student><StudentName>Gisele
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```

3. Save the file with the name `school.xml`.

Creating an XML Data Source for the Tutorial

There are some Studio resources that you must create before starting this tutorial.

To create the XML data source

1. Open Studio.
2. Select Shared on the Studio resource tree.
3. Right-click and select New Data Source.
4. Select File-XML.
5. Click Next.
6. Type school.
7. Browse to the directory location where you saved the school.xml data file.
8. Click OK.
9. Click Create & Introspect.
10. Select the school.xml file.
11. Click Next.
12. Click Finish.
13. When introspection is complete, click OK.

The XML definition set is created for you.

Creating the SchoolXML2Rel Transformation

To transform XML to relational data

1. Create a folder called Transformations.
2. Right-click the Transformations folder, and select New Transformation.
3. Select Any-Any Transformation, and click Next.
4. Type SchoolXML2Rel, and select Finish.

   The transformation editor opens showing an empty transformation.
5. Expand the data source File_SchoolXML, and drag school.xml to the transformation design area.
6. Completely expand the data nodes (the little triangle to the right of school:Class[1-*]) in the school_xml object to see the entire structure.
7. Drag a loop object from the Transformation Editor palette onto the design area.

   Use a Loop Link to connect the input sequence school:Class[1-*] to the loop source.
8. Select Loop Link Mode on the toolbar.
9. Click and drag to connect the output of the school:Class [1-*] element of the school_xml file to the source input tab of the loop object.
10. Drag another Loop Link from the input sequence school:Student[1-*] to the loop. When the words “insert source” appear, release the mouse button and a new loop source is created.
11. Create an output cursor. Right-click the out block and click Add Parameter.
12. Select Complex > CURSOR.

    A cursor is added to the out block.
13. Rename the cursor to ClassList.
14. Use a Loop Link to connect the loop object’s Student output handle to ClassList input handle of the out object.

    Doing so ensures that the output rows are based on the bottom level of the XML input hierarchy. To connect to the ClassList handle, make sure that when you release the mouse, ClassList[] is highlighted and “insert param” does not appear. If “insert param” appears, you will connect to a newly created parameter instead of ClassList.
15. Expand the school:Teacher node on the loop, so that you see all the columns.

16. Select Assign Link mode by clicking the button on the toolbar.
17. Drag the Assign Link lines from each of the loop's individual data items to the out box. Release the mouse button when the words "insert param" appear, so that a new parameter is created.

    The connection lines are red, the next few steps will change that.
18. Make sure that ClassList[] is at the top of the list. Select ClassList[] and use the toolbar arrow to move it to the top.
19. Select each field under ClassList[], and use the toolbar Move In button to indent.

    The red connection lines vanish, because the newly indented columns are now a different category of data, belonging to the ClassList[] cursor. Their names and types are now defined. All that remains is to reconnect them.
20. Connect all the bottom-level loop fields to the corresponding out fields, and the design is complete.
21. Save the transformation and execute it.

Creating the SchoolXML2Rel View

To create the SchoolXML2Rel view

1. Create a view called SchoolXML2Rel.
2. Drag the SchoolXML2Rel transform into the view.
3. Save the view.
4. Right-click the SchoolXML2Rel view and select Publish.
5. Publish the view as a data service with the name SchoolXML2Rel.
6. Open a command prompt and navigate to the <TDV_install_dir>\apps\jdbc directory.
7. Test the published view with the following command and verify that you see the output and no errors:

```
JdbcSample.bat TDVTraining localhost 9401 admin admin composite "select * from SchoolXML2Rel"
```

SAP Hana View Tutorial

TDV supports multidimensional, calculation, and graphical views for SAP Hana. This tutorial focuses on how to create views that make use of those SAP Hana features.

- Creating a TDV View using an SAP Hana Data Source, page 91
- Using GROUP BY and COUNT with an SAP Hana Data Source, page 91

Creating a TDV View using an SAP Hana Data Source

SAP Hana has several unique data structures that can be introspected and brought into TDV. Because those structures are unique to SAP Hana you need to work with them in a specific way to get the results that are expected.

To create a view using an SAP Hana data source

1. Create a view that selects all the columns from the graphical view or calculation.
2. Create the aggregate function.
3. Refer to that aggregate function from within a view that selects all the columns from the graphical view or calculation.

For example:

```
select count from (select *from graphical_view_name)
where condition
select count from (
select* from "_SYS_BIC"."eps-staging.salesDiscountGuidance.Cubes/DEALS_F")
where site_id=5310563
```

Using GROUP BY and COUNT with an SAP Hana Data Source

Create the base view with GROUP BY to force TDV to select all the columns.

For example

1. Create a View similar to the following which is named NEW_TEST_COUNT:

```
SELECT * from
/users/composite/admin/SAP/New_SAP_Hana/"PUBLIC"/"eps-staging.salesDiscountGuidance.Cubes::DEALS_F"
group by site_id,
QUOTE_KEY,DEAL_TYPE,
GLOBAL_ULTIMATE_ID,
BUSINESS_ENTITY,
DEALS_LIST_PRICE,
DEALS_NET_PRICE
```

2. Create a view that uses the count function on NEW_TEST_COUNT, for example:

```
SELECT
count(*) as TT from
/users/composite/admin/SAP/NEW_TEST_COUNT
where site_id=5310763
```