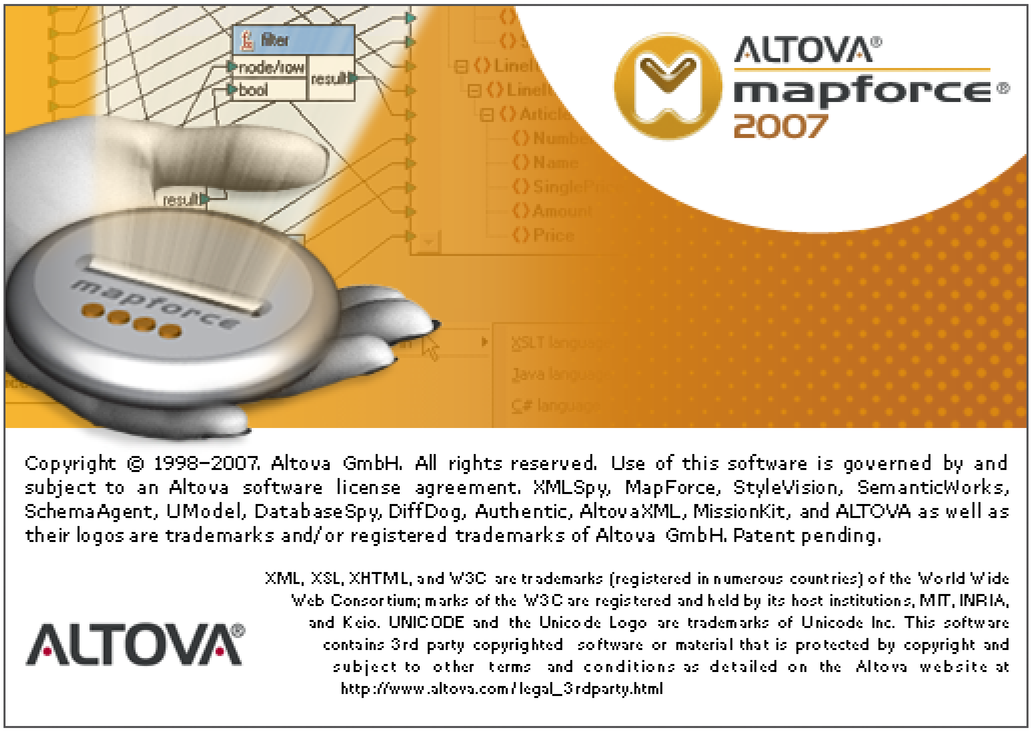
User and Reference Manual



Altova MapForce 2007 User & Reference Manual

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Published: 2007

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Chapter 1

MapForce 2007

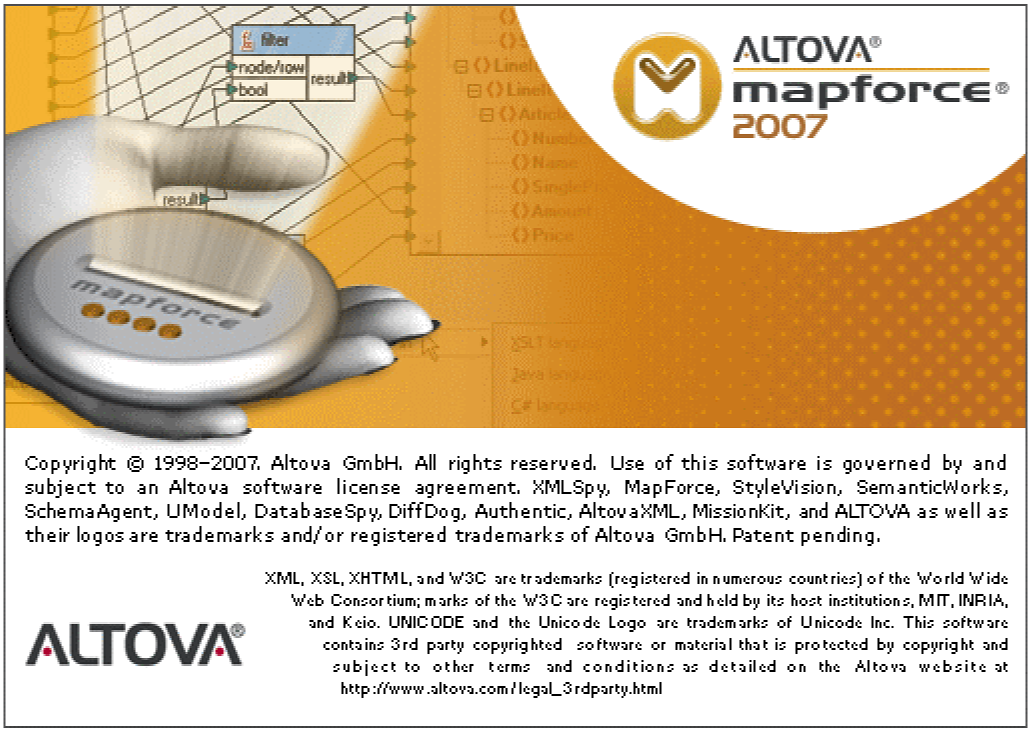
1 MapForce 2007

MapForce® 2007 Standard Edition is a visual data mapping tool for advanced data integration projects.

MapForce® can generate custom mapping code in XSLT 1.0 and 2.0, and supports:

- Schema-to-Schema mapping
- Definition of custom XSLT 1.0 and 2.0 libraries
- Support for XPath 2.0 functions in XSLT 2.0
- Definition of user-defined functions/components, having complex in/outputs
- Advanced search and replace functions in transformation preview data
- XML-Schema substitution groups
- Support for source-driven / mixed content mapping
- Automatic retention of mapping connectors of missing nodes/items
- MapForce plug-in for Eclipse

All transformations are available in one workspace where multiple sources and multiple targets can be mixed, and a rich and extensible function library provides support for any kind of data manipulation.



What is mapping?
Basically the contents of one component are mapped, or transformed, to another component. An XML, or text documentcan be mapped to a different target XML document. The transformation is accomplished by an automatically generated XSLT 1.0 or 2.0 Stylesheet.

When creating an XSLT transformation, a **source schema** is mapped to a **target schema**. Thus elements/attributes in the source schema are "connected" to other elements/attributes in the target schema. As an XML document instance is associated to, and defined by, a schema file, you actually end up mapping two XML documents to each other.

Chapter 2

MapForce overview

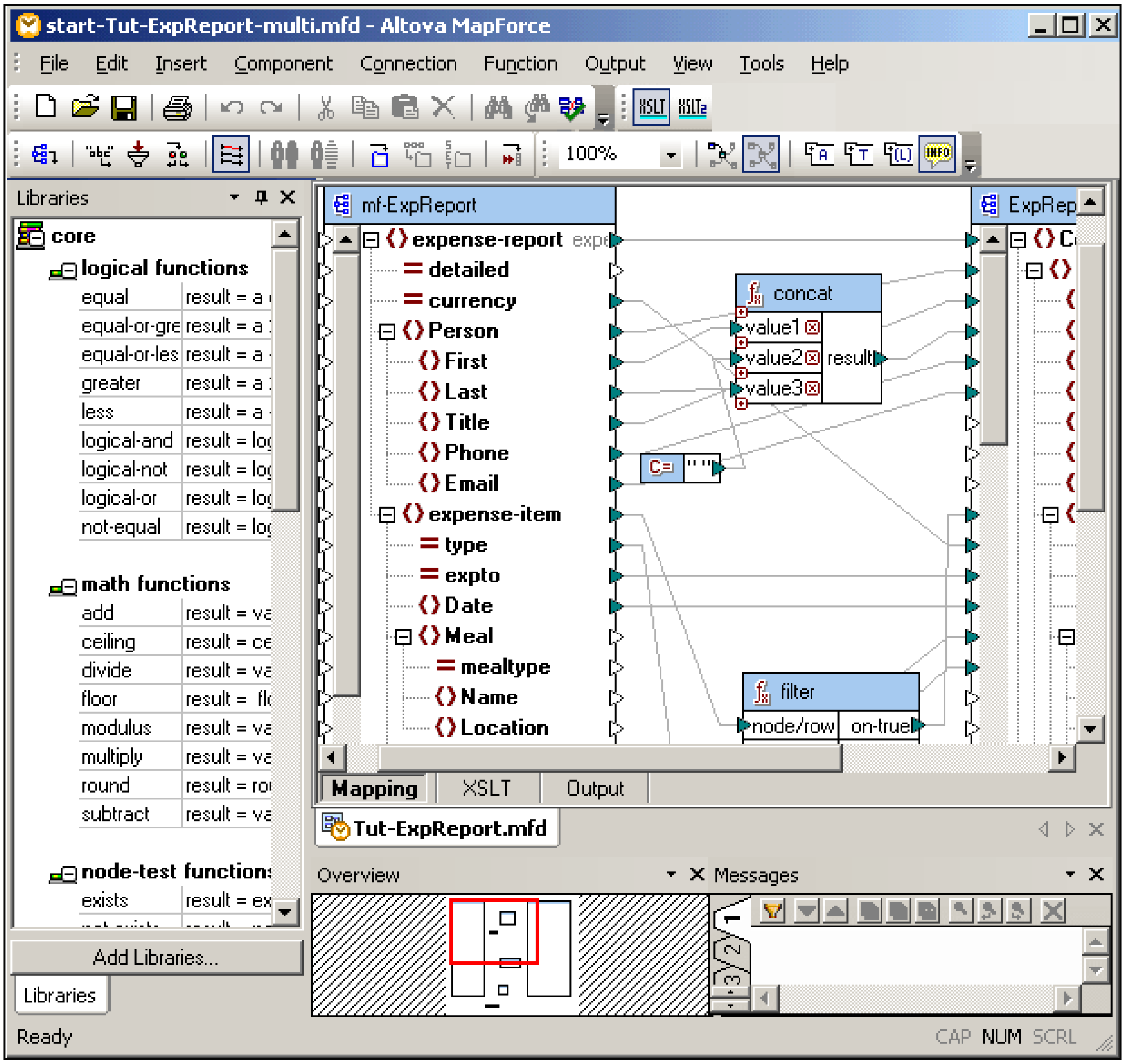
2 MapForce overview

MapForce has four main areas: the Library pane at left, the Mapping tab group at right, as well as the Overview and Messages panes below. The actual mapping process is achieved by manipulating the on-screen graphical elements in the mapping window.

- The **Libraries** pane displays language specific and user defined libraries, as well as the individual library functions. Functions can be directly dragged into the Mapping tab. The **Add Libraries....** button allows you to import external libraries into the tab group.
- The **Mapping** tab displays the graphical elements used to create the mapping (transformation) between the two schemas. The source schema is the "**mf-ExpReport**" component window displaying the source schema tree. The target schema is the " **ExpReport-Target**" window displaying the target schema tree. **Connectors** connect the input and output **icons** of each schema item. Schema **items** can be either elements or attributes.

  The **XSLT, XSLT2**tabs display a preview of the transformation depending on the specific language selected.

  The **Output** tab displays a preview of the transformed, or mapped data, in a text view.
- The **Overview** pane displays the mapping area as a red rectangle, which you can drag to navigate your Mapping.
- The **Messages** pane displays any validation warnings or error messages that might occur during the mapping process. Clicking a message in this pane, highlights it in the Mapping tab for you to correct.


start-Tut-ExpReport-multi.mfd - Altova MapForce
File Edit Insert Component Connection Function Output View Tools Help
100%
Libraries
core
logical functions
equal result = a
equal-or-gre result = a
equal-or-les result = a
greater result = a
less result = a
logical-and result = log
logical-not result = log
logical-or result = log
not-equal result = log
math functions
add result = va
ceiling result = ce
divide result = va
floor result = fl
modulus result = va
multiply result = va
round result = ro
subtract result = va
node-test functions
exists result = ex
Add Libraries...
Libraries
mf-ExpReport
expense-report
detailed
currency
Person
First
Last
Title
Phone
Email
expense-item
type
expto
Date
Meal
mealtype
Name
Location
concat
value1
value2
value3
result
filter
node/row
on-true
ExpRep
Mapping
XSLT
Output
Tut-ExpReport.mfd
Overview
Messages
Ready
CAP NUM SCRL

2.1 Terminology

Library
A Library is a collection of functions visible in the Libraries window. There are several types of functions, core and language specific, as well as user-defined functions. Please see the section on functions for more details.

Component
In MapForce a component is a very generic "object". Almost all graphical elements you can insert/import or place in the Mapping tab, become components.

Components are recognizable by the small **triangles** they possess. These triangles (**input** and **output icons**) allow you to map data by creating a connection between them.

The following graphical elements are all components:

- All schema types: Source and target schemas
-
- All function types: XSLT/XSLT2, as well as Constants, Filters and Conditions

Function
A function is basically an operation on data e.g. **Add**. Functions have input and/or output **parameters,** where each parameter has its own input/output icon. Functions are available in the Libraries window, and are logically grouped. Dragging a function into the Mapping window creates a function component. Please see the section functions and Libraries for more details.

Item
An item is the unit of data that can be mapped from component to component. An item can be either an **element**, an **attribute**

Each **item** has an **input** and **output** icon which allows you to map data from one item to another. It is not mandatory that items be of the same type (element or attribute) when you create a mapping between them.

"Missing" item:
If items have been deleted from one of the components, e.g. a schema element/attribute is deleted from an XML schema, MapForce automatically creates placeholder items and retains the previous connectors.

Input, Output icon
The small triangles visible on components are input and output icons. Clicking an icon and dragging, creates a **connector** which connects to another icon when you "drop" it there. The connector **represents a mapping** between the two sets of data the icons represent. Please see the section "Mapping between components" for more information.

Connector
The connector is the **line** that joins two icons. It represents the **mapping** between the two sets of data the icons represent. Please see the section "Mapping between components" for more information.

Several types of connector can be defined:

- Target Driven (Standard) connectors, see: "source-driven / mixed content vs. standard mapping"
- Copy-all connectors, please see "Copy-all connections"
- Source Driven (mixed content) connectors, see "source driven and mixed content mapping"

Constant

A constant is a component that supplies fixed data to an input icon. The data is entered into a dialog box when creating the component. There is only one output icon on a constant function. You can select from the following types of data: Number, and All other (String).

Filter: Node/Row

A filter is a component that uses two input and output parameters: **node/row** and **bool**, and **on-true**, **on-false**. If the Boolean is true, then the value/content of the node/row parameter is forwarded to the **on-true** parameter.

The **on-false** output parameter, outputs the complement node set defined by the mapping, please see Multiple target schemas / documents for more information.

IF-Else Condition

A condition is a component which allows you to pass on different sets of data depending on the outcome of a preset condition. The component header displays the text **if-else**. Please see Condition, in the Reference section for an example.

- The first input parameter is a **bool**, which contains the data you are checking against.
- The **value-true** input parameter supplies the data to be passed on, as a result, if the condition is true.
- The **value-false** supplies the data to be passed on if the condition is false.
- The **result** parameter outputs the data supplied by the value-true/false input parameters.

2.2 MapForce components

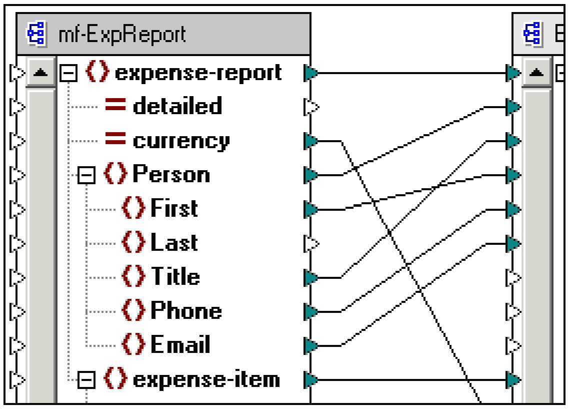
When creating a mapping, single, or multiple **data sources**, can be mapped to multiple **target components.**

- Data sources can be: XML-Schemas/documents
- Target components can be: XML-Schemas/documents

The mapping process allows the source data to be selectively transformed (or manipulated using functions) before it is output, or made available in the Output preview window.

To create a schema component (source):

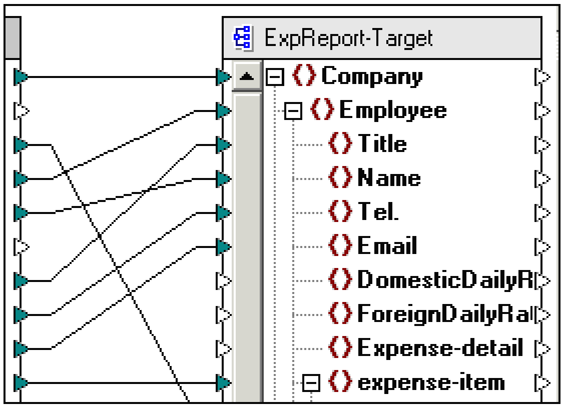
1. Click the **Insert | XML Schema/File** icon .
2. Select the schema file you want to use, from the "Open", dialog box.
   A further dialog box appears prompting you to select an **XML instance** file, if you intend to use this schema as a **data source** in this mapping.
3. Click **Yes** if this is the case, and select the **XML instance** file.
   The schema component now appears in the Mapping tab.



You can now connect the schema source output icons, with the target (or function) input icons, to create your mappings.

To create a schema component (target)

1. Click the **Insert | XML Schema/File** icon .
2. Select the schema file you want to use from the "Open", dialog box.
   Select **No** when you are prompted to supply an **XML instance** file.
3. Select the **Root element** of the schema you want to use (Company) and click OK.



The schema (snippet) with the root element appears as a schema component.

The **target schema** is the basis of the XML document you want to have **generated** by the transformation.

The target schema/document can, of course, differ dramatically from the source schema. This is where the mapping process comes in, you can map any item in the source schema to any other item (element/attribute), in the target schema. The source data then appears at the position defined by your mapping, in the target document.

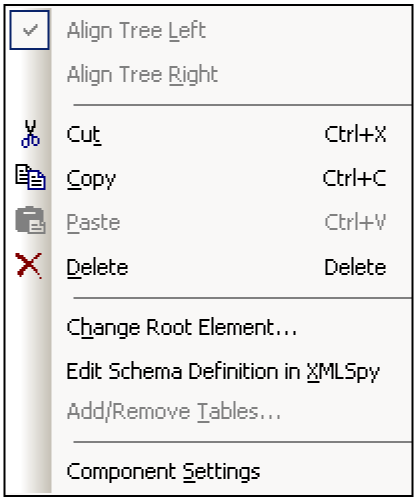
You can also define multiple output schemas. MapForce then generates XSLT for each target schema. You can then selectively preview the different output schemas in the Output preview window.

Please note:

It is not necessary to associate an XML Instance document to a **target schema**. If you do so, then the XML instance document is ignored and does not affect the transformation in any way.

Clicking the root element of a schema and hitting the ***** key on the numeric keypad, expands all the schema items!

Schema component **context menu**
Right clicking a schema component in the Mapping window opens the context menu.



Align tree left

Aligns all the items along the left hand window border. This display is useful when creating mappings from the source schema.

Align tree right

Aligns all the items along the right hand window border. This display is useful when creating mappings to the target schema.

Cut/Copy/Paste/Delete

The standard MS Windows Edit commands, allow you to cut, copy etc., any components or functions visible in the mapping window. All connectors will be retained except for those which would have to be replaced.

Change Root element

Allows you to change the root element of the XML instance document. Useful in the target schema window, as this limits or preselects the schema data.

Edit Schema definition in XMLSpy.

Starts XMLSpy and opens the schema file, ready for you to edit.

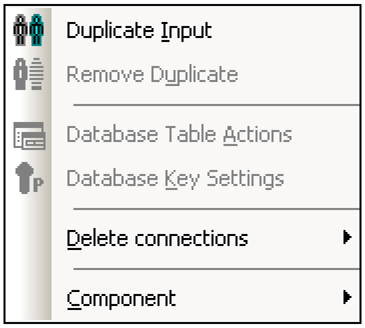
Component Settings

Opens the Component Settings dialog box.

Allows you to select the input and/or output XML Instance. Please see **Component Settings** for more information on these settings.

Item Context menu

Right clicking an **item** in a component, opens a context menu with options enabled for the specific type of component.



Duplicate input

Inserts a copy/clone of the selected item, allowing you to map multiple input data to this item. Duplicate items do not have output icons, you cannot use them as data sources. Please see the Duplicating input items section in the tutorial for an example of this.

Please note:
Complex parameters of inlined user-defined functions/structures cannot be duplicated. Please see "Complex user-defined function - XML node as input" for more information.

Remove duplicate

Removes a previously defined duplicate item. Please see the Duplicating input items section in the tutorial for more information.

Delete connections

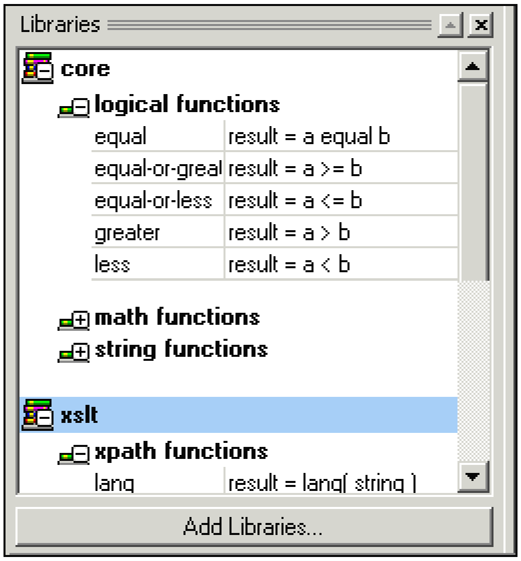
Allows you to delete connections related to that specific item: all direct connections, all incoming, or outgoing, child connections.

Component

Opens the Component Settings dialog box for the specific component.

2.3 Functions and libraries

The **Libraries** pane displays the available libraries for the currently selected programming language, as well as the individual **functions** of each library. Functions can be directly dragged into the **Mapping** tab. Once you do this, they become function components.



core
- logical functions

equal	result = a equal b
equal-or-great	result = a >= b
equal-or-less	result = a <= b
greater	result = a > b
less	result = a < b

- math functions
- string functions

xslt
- xpath functions

lang	result = lang(string)

The standard **core** and **xslt** libraries are always loaded when you start MapForce, and do not need to be added by the user. The **Core** library is a collection of functions that can be used to produce all types of output: XSLT. The other libraries (XSLT, XSLT2, XPath2, Lang etc.) contain functions associated with each separate type of output.

Selecting:
XSLT, enables the core and XSLT functions (XPath 1.0 and XSLT 1.0 functions).

XSLT2, enables the core, XPath 2.0, and XSLT 2.0 functions.

XPath 2.0 restrictions:
Several XPath 2.0 functions dealing with sequences are currently not available.

To use a function in Mapping window:

1. First select the **programming language** you intend to generate code for, by clicking one of the output icons in the title bar: XSLT/XSLT2.
   The functions associated with that language are now visible in the Libraries window. The expand and contract icons show, or hide the functions of that library.
2. Click the **function name** and drag it into the Mapping window.
3. Use drag and drop to connect the input and output parameters to the various icons.

   Note that placing the mouse pointer over the "result = xxx" expression in the library pane, displays a ToolTip describing the function in greater detail.

Function tooltips:
Explanatory text (visible in the libraries pane) on individual functions, can now be toggled on/off by clicking the "Show tips" icon INFO in the title bar. Placing the mouse pointer over a function header, displays the information on that function.

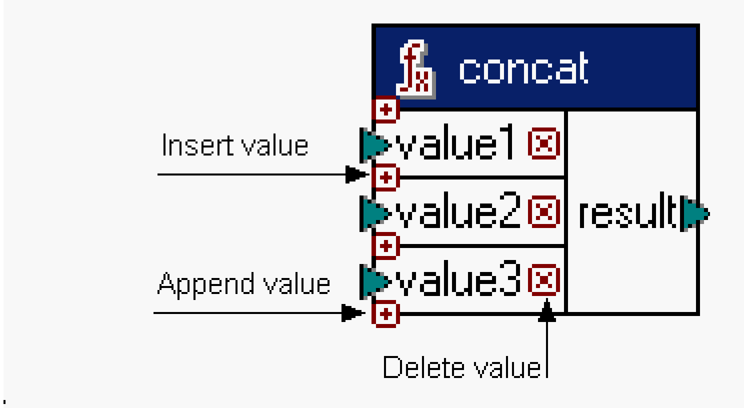
To add new function libraries:

MapForce allows you to create and integrate your own function libraries please see the sections: ""Adding custom XSLT 1.0 functions" "Adding custom XSLT 2.0 functions" and " User-defined functions" for more information.

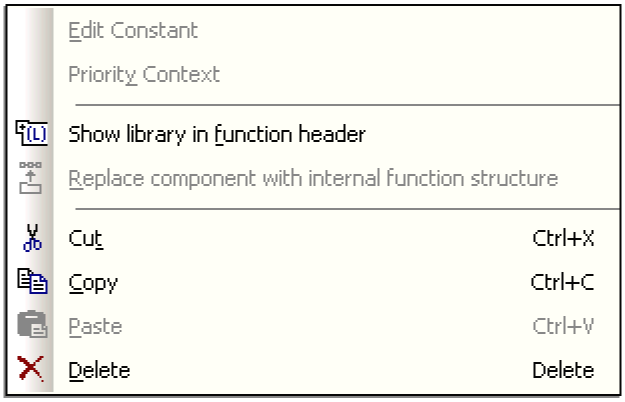
Please note:
custom functions/libraries can be defined for XSLT.

Extendable functions
Several functions available in the function libraries are extendable: for e.g. the concat and "logical-and" functions. The parameters of these types of function can be inserted/appended and deleted at will. Clicking the "plus" icon inserts or appends the same type of parameter, while clicking the check mark deletes the parameter.

Please note: "dropping" a connector on the "plus" symbol, automatically inserts/appends the parameter and connects it.



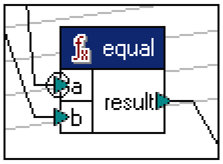
Function context menu:
Right clicking a function in the Mapping window, opens the context window.


Edit Constant
Priority Context
Show library in function header
Replace component with internal function structure
Cut Ctrl+X
Copy Ctrl+C
Paste Ctrl+V
Delete Delete

Edit Constant
Allows you to change the entry currently defined in the Constant component. A Constant is added by clicking the **Insert Constant** icon .

Priority Context
When applying a function to different items in a schema, MapForce needs to know what the context node will be. All other items are then processed relative to this one.

This is achieved by designating the item (or node) as the priority context. A circle appears around the icon so designated. Please see Priority Context in the Reference section, for an example.



Show library in function header
Displays the library name in the function component.

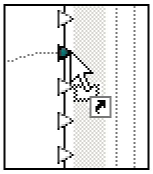
Replace component with internal function structure
Replaces the user-defined component/function with its constituent parts.

Cut/Copy/Paste/Delete
The standard MS Windows Edit commands, allow you to cut, copy etc., any components or functions visible in the mapping window. All connectors will be retained except for those which would have to be replaced.

2.4 Mapping between components

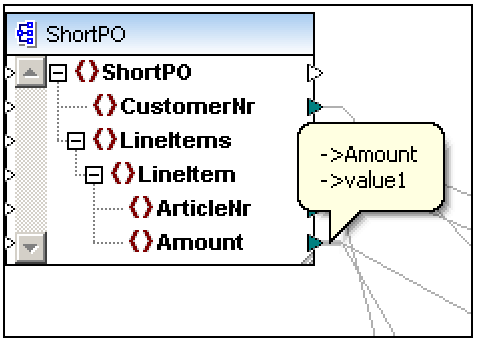
A **connector** visualizes the **mapping** between the two sets of data and allows the **source** data (value) to appear, or be transformed, into the target schema/document .

- **Components** and **functions** have small "connection" triangles called: **input** or **output** icons. These **icons** are positioned to the left and/or right of all "mappable" **items**.
- Clicking an icon and dragging, creates the **mapping connector**. You can now drop it on another icon. A link icon appears next to the text cursor when the drop action is allowed.



- Clicking an **item name** (element/attribute) automatically selects the correct **icon** for the dragging action.
- An **input icon** can only have one connector. If you try and connect a second connector to it, a prompt appears asking if you want to replace or **duplicate** the input icon.
- An **output icon** can have several connectors, each to a different input icon.
- Positioning the mouse pointer over the straight section of a connector (close to the input/output icon) highlights it, and causes a popup to appear. The popup displays the name(s) of the item(s) at the other end of the connector. If multiple connnectors have been defined from the same output icon, then a maximum of ten item names will be displayed.

  Clicking the straight section of the connector highlights it and allows you to reposition it by dragging it elsewhere.



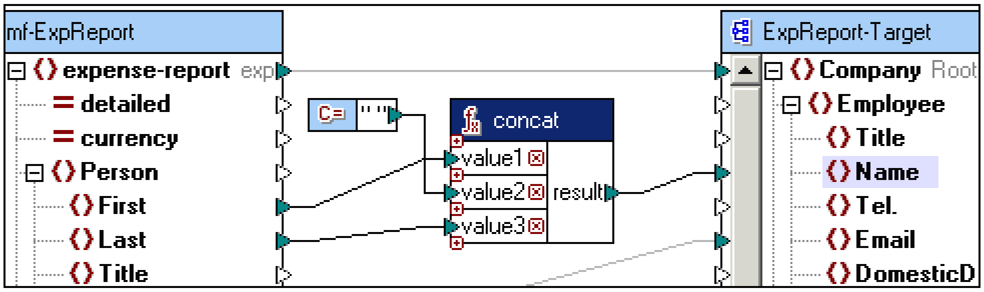
Number of connectors

Input and output icons appear on most components, there is not, however, a one to one relationship between their numbers.

- Each **schema item** (element/attribute) has an input and output icon.
-
- Schemacomponents, only have output icons within user-defined functions.
- Duplicated items only have input icons. This allows you to map multiple inputs to them. Please see Duplicating Input items for more information.
- **Functions** can have any number of input and output icons, **one** for each **parameter**. E.g. the Add Function has two input icons, and one output icon.
- **Special** components, can have any number of icons, e.g. the Constant component only

has an output icon.

This example shows how you can use the **concat** function to combine the First and Last names and place the result in the Title element. The constant component, supplies the space character between the two names.



2.4.1 Connector properties

Connectors and their properties:

- Clicking a connector highlights it in red.
- Hitting the **Del** key, while highlighted, deletes it immediately.
- Right clicking a connector, opens the connector context menu.
- Double clicking a connector, opens the Connection Settings dialog box.

Viewing connectors

MapForce allows you to selectively view the connectors in the mapping window.

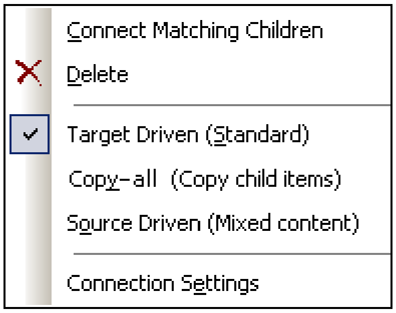
Show selected component connectors
Switches between showing:

- all mapping connectors, or
- those connectors relating to the currently selected component.

Show connectors from source to target
Switches between showing:

- connectors that are **directly** connected to the currently selected component, or
- connectors linked to the currently selected component, originating from source and terminating at the target components.

Connector context menu:



Connect Matching Children
Delete
Target Driven (Standard)
Copy-all (Copy child items)
Source Driven (Mixed content)
Connection Settings

Connect matching children
Opens the "Connect Matching Children" dialog box, allowing you to change the connection settings and connect the items when confirming with OK.

Delete
Deletes the selected connector.

Target Driven (Standard)
Changes the connector type to Standard mapping, please see: "Source-driven / mixed content vs. standard mapping" for more information.

Copy-all
Changes the connector type to "Copy-all" and connects all child items of the same name in a graphically optimized fashion, please see "Copy-all connections" for more information.

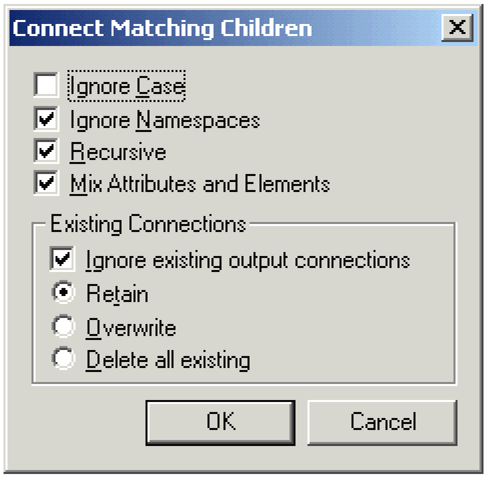
Source Driven (mixed content)
Changes the connector type to source-driven / mixed content, please see: "Source driven and

mixed content mapping" for more information.

Connection settings:
Opens the Connections Settings dialog, in which you can define the specific mixed content settings as well as the connector annotation settings, please see the Connection section in the Reference section.

Connect matching Children dialog box
This command allows you to create multiple connectors between items of the **same name** in both the source and target components.

1. Connect two (parent) items that share identically named **child items** in both components.
2. Right click the connector and select the **Connect matching child elements** option.



Connect Matching Children

☐ Ignore Case
☑ Ignore Namespaces
☑ Recursive
☑ Mix Attributes and Elements

Existing Connections

☑ Ignore existing output connections
● Retain
○ Overwrite
○ Delete all existing

3. Select the required options discussed in the text below, and click OK to create the mappings.

   Mappings are created for all the child items that have identical names and adhere to the settings defined in the dialog box.

Please note:
The settings you define here are retained, and are applied when connecting two items, if the "**Auto connect child items**" icon in the title bar is active. Clicking the icon, switches between an active and deactive state.

Ignore Case:
Ignores the case of the child item names.

Ignore Namespaces:
Ignores the namespaces of the child items.

Recursive:
Having created the first set of connectors, the grandchild items are then checked for identical names. If some exist, then connectors are also created for them. The child elements of these items are now checked, and so on.

Mix Attributes and Elements:
Allows the creation of connectors between items of the same name, even if they are of different types e.g. two "Name" items exist, but one is an element, the other an attribute. If set active, a connector is created between these items.

Existing connections:

Ignore existing output connections:
Creates **additional** connectors to other components, even if the currently existing output icons already have connectors.

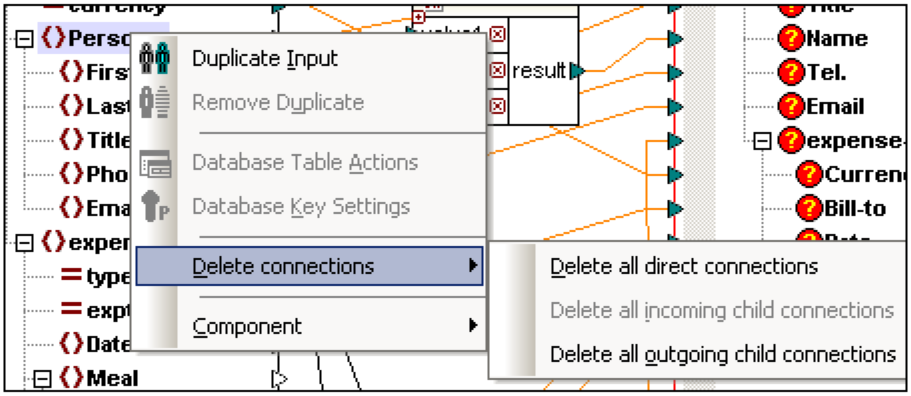
Retain
Retains existing connectors.

Overwrite:
Recreates connectors, according to the settings defined. Existing connectors are scrapped.

Delete all existing:
Deletes all existing connectors, before creating new ones.

Deleting connections

Connectors that have been created using the Connect Matching Children dialog, or during the mapping process can be removed as a group.



Right click the item name in the component, not the connector itself, Person in this example. Select **Delete Connections | Delete all ... connections**.

Delete all direct connections:
Deletes all connectors directly mapped to, or from, the current component to any other source or target components.

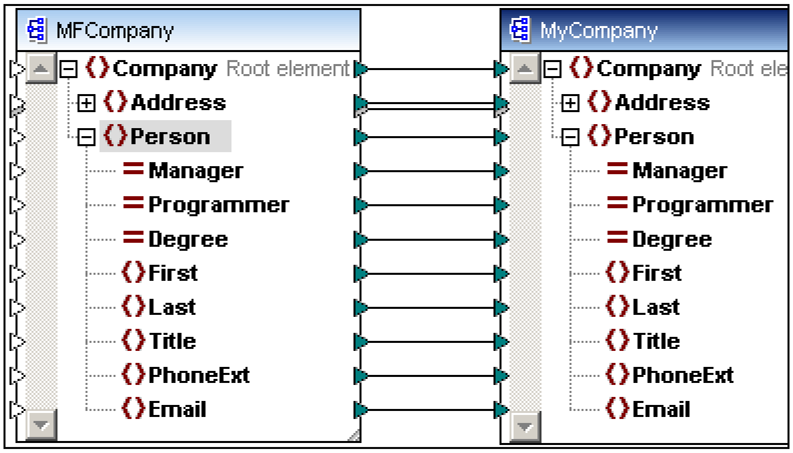
Delete all incoming child connections:
Only active if you have right clicked an item in a target component. Deletes all incoming child connectors.

Delete all outgoing child connections:
Only active if you have right clicked an item in a source component. Deletes all outgoing child connectors.

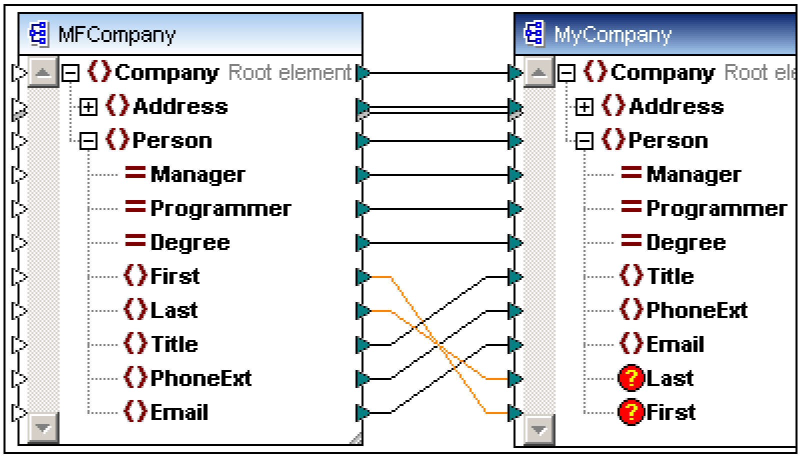
2.4.2 Missing items

When working with large components, XML schemas, it is likely that the structure of one of the components may change e.g. elements or attributes are added/deleted to an XML schema. MapForce now uses placeholder items to retain all the connectors, and any relevant connection data between components, when items have been deleted.

Example:
Using the **MFCompany.xsd** schema file as an example. The schema is renamed to MyCompany.xsd and a connector is created between the Company item in both schemas. This creates connectors for all child items between the components, if the Autoconnect Matching Children is active.



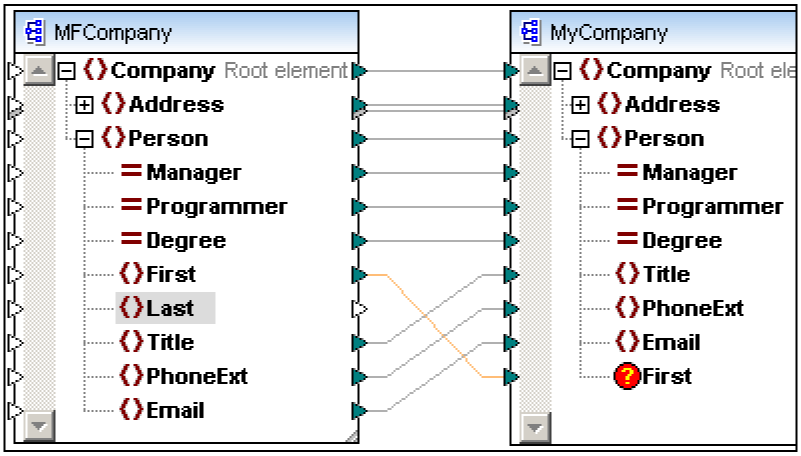
While editing MyCompany.xsd, in XMLSpy, the First and Last items in the schema are deleted. Returning to MapForce opens a Changed Files notification dialog box, prompting you to reload the schema. Clicking Reload updates the components in MapForce.



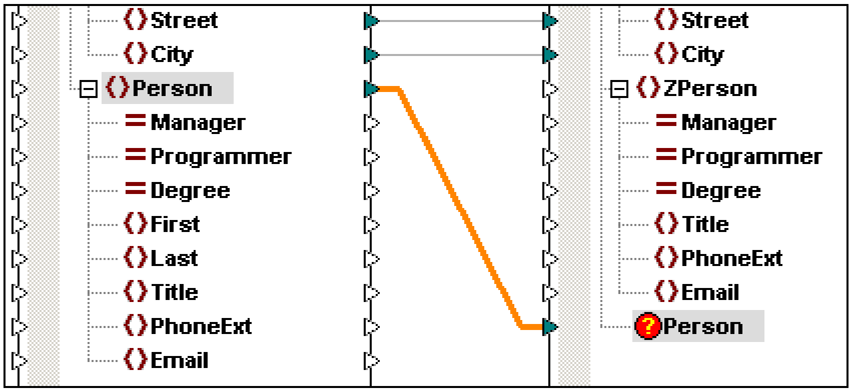
The deleted **items** and their **connectors** are now marked in the MyCompany component. You could now reconnect the connectors to other items if necessary, or delete the connectors.

Note that you can still preview the mapping (or generate code), but that warnings will appear in the Messages window if you do so at this point. All connections to, and from, missing items are ignored during preview or code-generation.

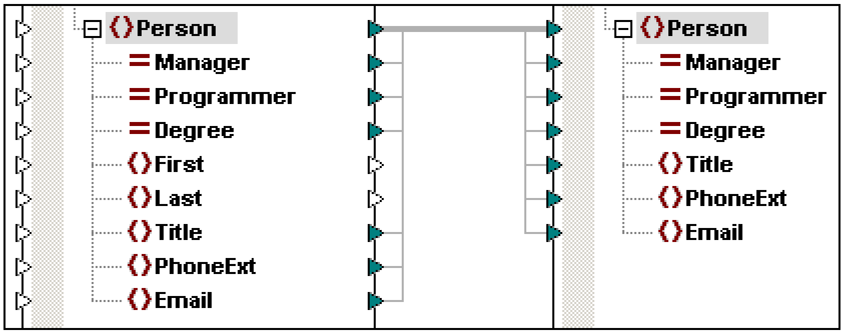
Clicking one of the highlighted connectors and deleting it, removes the "missing" item from the component, e.g. Last, in MyCompany.



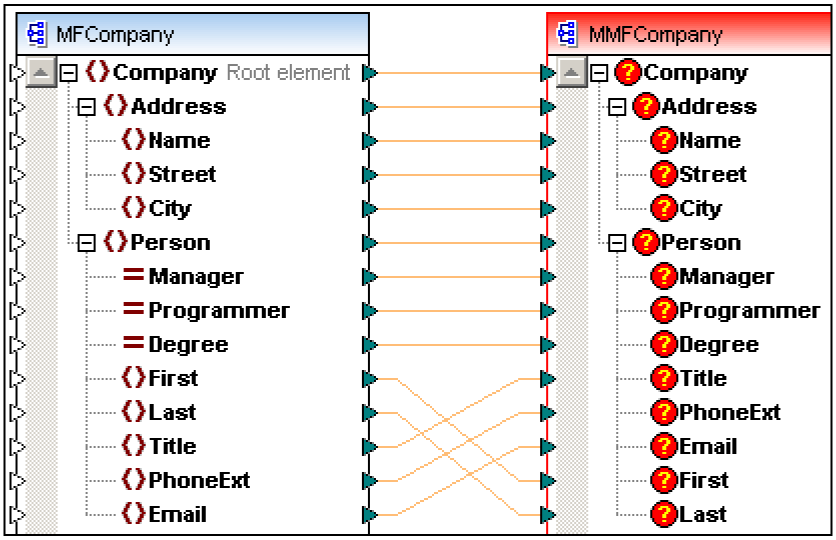
Renamed items:
If a parent item is renamed e.g. Person to ZPerson, then the original parent item connector is retained and the child items and their connectors are deleted.



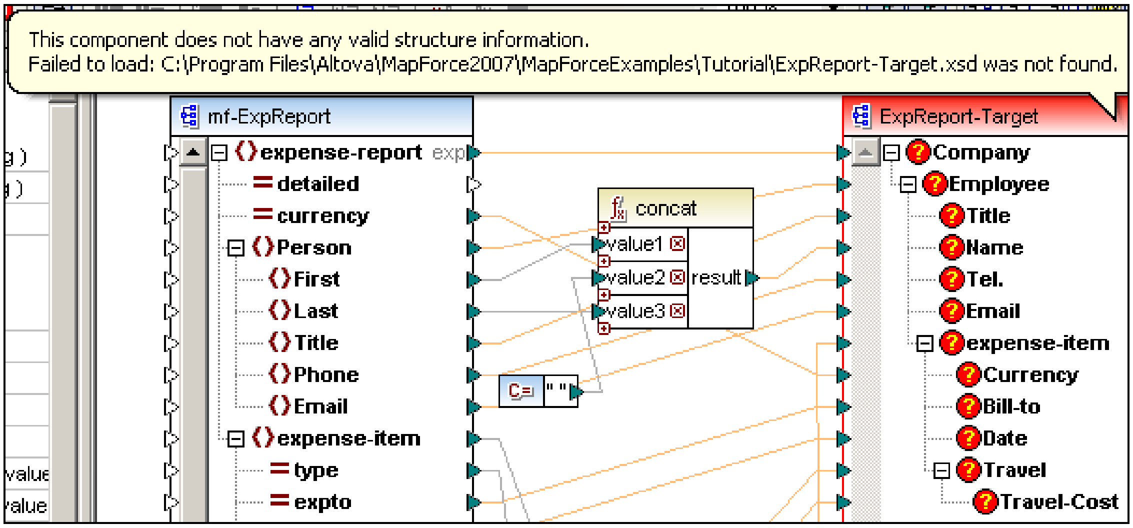
"Copy all" connectors and missing items:
Copy all connections are treated in the same way as normal connections, with the only difference being that the connectors to the missing items are not retained or displayed.



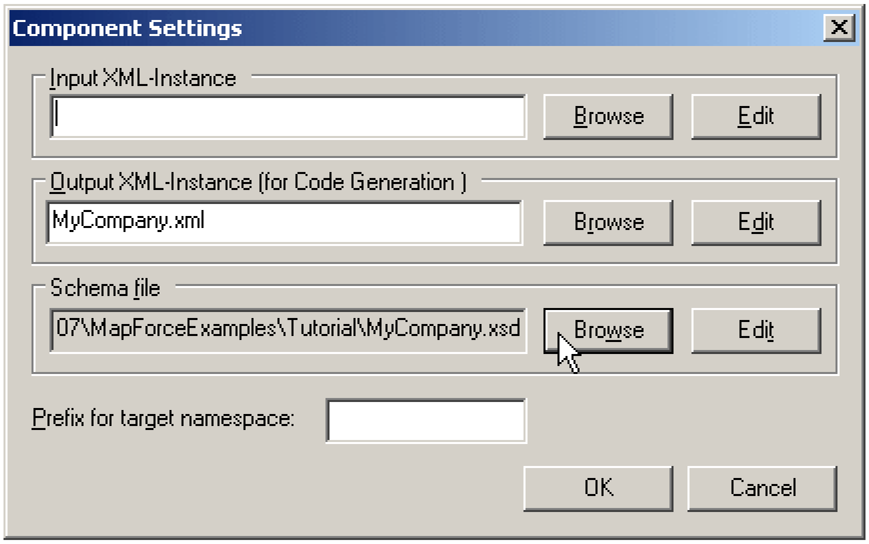
Renamed or deleted component sources:
If the **data source** of a component i.e. schema. has been renamed or deleted, then all items it contained are highlighted. The red frame around the component denotes that there is no valid connection to a schema and prevents preview and code generation.



Placing the mouse cursor over the highlighted component, opens a popup containing pertinent information.


This component does not have any valid structure information.
Failed to load: C:\Program Files\Altova\MapForce2007\MapForceExamples\Tutorial\ExpReport-Target.xsd was not found.

Double clicking the highlighted component opens the Component Settings dialog box. Clicking the Browse button in the **Schema file** group allows you to select a different, or backed-up version of the schema. Please see "Component" in the Reference section for more information.



Component Settings

Input XML-Instance

Output XML-Instance (for Code Generation): MyCompany.xml

Schema file: 07\MapForceExamples\Tutorial\MyCompany.xsd

Prefix for target namespace:

All valid/correct connections will be retained if you select a schema, of the same structure.

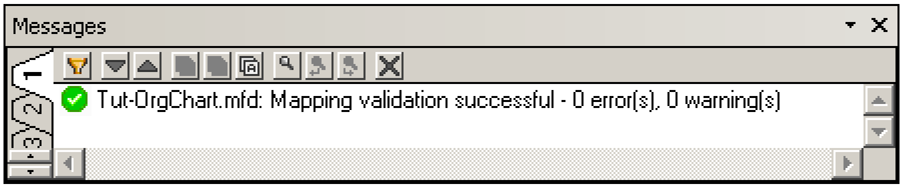
2.5 Validating mappings and mapping output

Connectors and validation
It is not mandatory for functions or components to be mapped. The Mapping tab is a work area where you can place any available components. XSLT 1.0, XSLT 2 is only generated for those components for which valid connections exist.

To validate your mapping:

- Click the Validate Mapping icon , or select the menu item **File | Validate Mapping.**
- Click one of the preview tabs, (XSLT, XSLT 2.0, or Output), or
- Select the menu option **File | Generate XSLT/XSLT2**

A validation message appears in the Messages window.



Tut-OrgChart.mfd: Mapping validation successful - 0 error(s), 0 warning(s)

Note that you can use multiple message tabs if you project contains many separate mapping files. Click one of the numbered tabs in the Messages window, and click the preview tab for a different mapping in your project. The validation message now appears in the tab that you selected. The original message in tab 1, is retained however.

Use the different icons of the Messages tab to:

- Filter the message types, errors or warnings
- Scroll through the entries
- Copy message text to the clipboard
- Find a specific string in a message
- Clear the message window.

Validation messages:

- Validation successful - X Error(s), Y Warning(s).

Warnings, alert you to something, while still enabling the mapping process and preview of the transformation result to continue. It is therefore possible for a mapping to have 0 errors and Y warnings.

Errors, halt the transformation process and deliver an error message. An XSLT, XQuery, or Output preview is not possible when an error of this type exists. Clicking a validation message in the Messages window, highlights the offending component icon in the Mapping window.

Component connections and validation results:

Free standing components

- Do not generate any type of error or warning message.

Partially connected components can generate two types of warning:

- If a function component **input icon** is unconnected, an error message is generated and the transformation is halted.

- If the function **output icon** is unconnected, then a warning is generated and the transformation process continues. The offending component and its data are ignored, and are not mapped to the target document.

Validating mapped OUTPUT:
Clicking the Output tab uses the MapForce, XSLT 1.0/2.0 or XQuery engine, to transform the data and produce a result in a Text view. If the data is mapped to an XML Schema, then the resulting XML document can be validated against the underlying schema.

- Click the Validate button to validate the document against the schema. A "Output XML document is valid" message, or a message detailing any errors appears.

2.6 XSLT, Output tab - generating XSLT

The XSLT, XSLT2, and Output tabs of the Mapping tab group, supply a **preview** of the generated XSLT and of the resulting transformation using the XML instance file.

To save the generated XSLT code:

1. Select the menu option **File | Generate code in | XSLT 1.0 (or XSLT 2.0).**
2. Browse for the folder where you want to save the XSLT file.
3. A message appears when the generation was successful.
4. Navigate to the previously defined folder, where you will find the generated XSLT file.

To save the XML data visible in the Output tab.

1. Click the Output tab to preview the mapping result.
2. Click the "**Save generated output**" icon 💾, and specify where you want the result to be saved.

To transform an XML/Schema file using the generated XSLT:

1. Open the XML file in the editor of your choice (**XMLSpy** for example).
2. Assign the XSLT file to the XML file (**XSL/XQuery | Assign XSL**)
3. Start the transformation process (**XSL/XQuery | XSL Transformation**)
   The transformed XML document appears in your editor.

Please note:
Opening a mapping that contains features available in a higher-level MapForce edition is not possible. E.g.
A mapping containing Web service features in the Professional version, or database mappings the Standard editions is not possible.

Chapter 3

MapForce tutorial

3 MapForce tutorial

Tutorial example:
In the tutorial, a simple employee travel expense report will be mapped to a more complex company report.

Each employee fills in the fields of the personal report. This report is mapped to the company report and routed to the Administration department. Extra data now has to be entered in conjunction with the employee, the result being a standardized company expense report.

Further formatting, cost summation, and conditional viewing options of the expense report, are made possible by having the target XML document associated with StyleVision Power Stylesheet designed in StyleVision.

Aim of the tutorial:

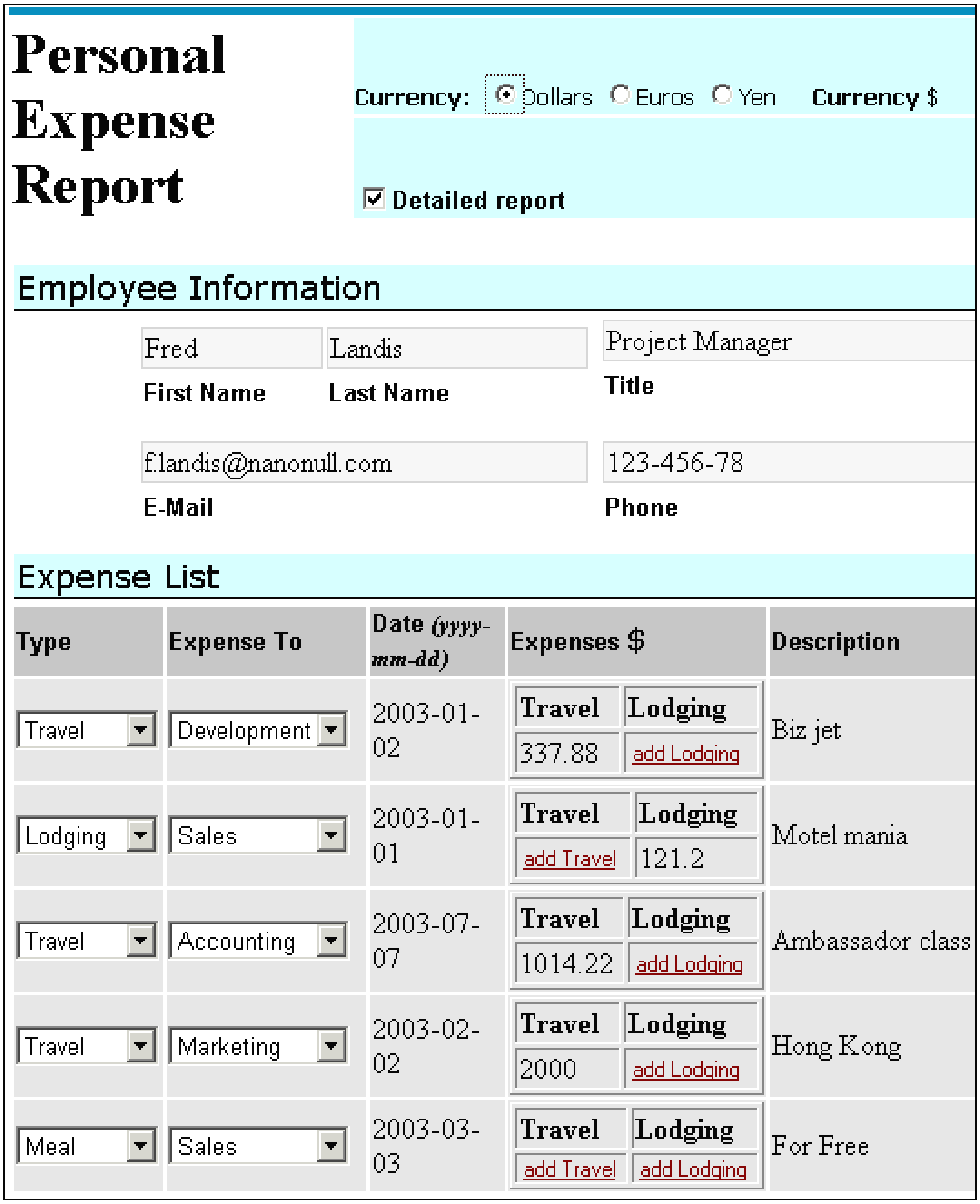
- To transform the **personal expense report** to a company expense travel report
- **Selectively filter** the source data and only let the travel expense records through
- Generate an XSLT transformation file
- Transform the personal expense report to the company expense report using the generated XSLT file
- Assign an StyleVision Power Stylesheet to the resulting XML file, enabling you to view and edit the resulting file in the Authentic View

The tutorial makes use of the following components:

- source and (multiple) target schemas
- several functions including: concat, filter, equal and constants

Files used in the tutorial:
All the files used in this tutorial are available in the **...\MapForceExamples\Tutorial** folder. If you used the default installation path/folder then the location is **c:\Program Files\Altova\MapForce2007\MapForceExamples\Tutorial\**. The XSLT and transformed XML files are also supplied.

Tutorial files:	**Personal expense report**
Tut-ExpReport.mfd	The expense report mapping (single target)
Tut-ExpReport-multi.mfd	The multi-schema target expense report mapping
mf-ExpReport.xml	Personal expense report XML instance document
mf-ExpReport.xsd	Associated schema file
mf-ExpReport.sps	StyleVision Power Stylesheet used to view the personal expense report in Authentic View of XMLSpy, or Authentic Desktop.
	Company expense report
ExpReport-Target.xml	Company expense report XML instance document
ExpReport-Target.xsd	Associated schema file
ExpReport-Target.sps	StyleVision Power Stylesheet used to view the Company expense report in Authentic View of XMLSpy, or Authentic Desktop.



Personal Expense Report

Currency: ● Dollars ○ Euros ○ Yen Currency $

☑ Detailed report

Employee Information

Fred	Landis	Project Manager
First Name	Last Name	Title
f.landis@nanonull.com		123-456-78
E-Mail		Phone

Expense List

Type	Expense To	Date (yyyy-mm-dd)	Expenses $		Description
			Travel	Lodging	
Travel	Development	2003-01-02	337.88	add Lodging	Biz jet
Lodging	Sales	2003-01-01	add Travel	121.2	Motel mania
Travel	Accounting	2003-07-07	1014.22	add Lodging	Ambassador class
Travel	Marketing	2003-02-02	2000	add Lodging	Hong Kong
Meal	Sales	2003-03-03	add Travel	add Lodging	For Free

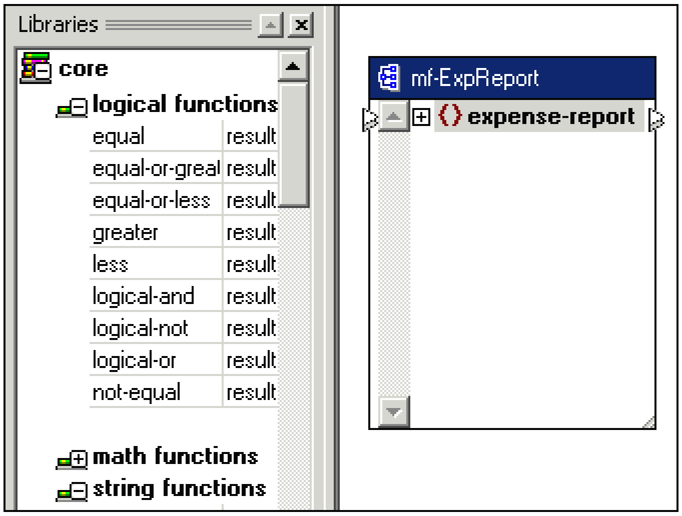
3.1 Setting up the mapping environment

This section deals with defining the source and target schemas we want to use for the mapping.

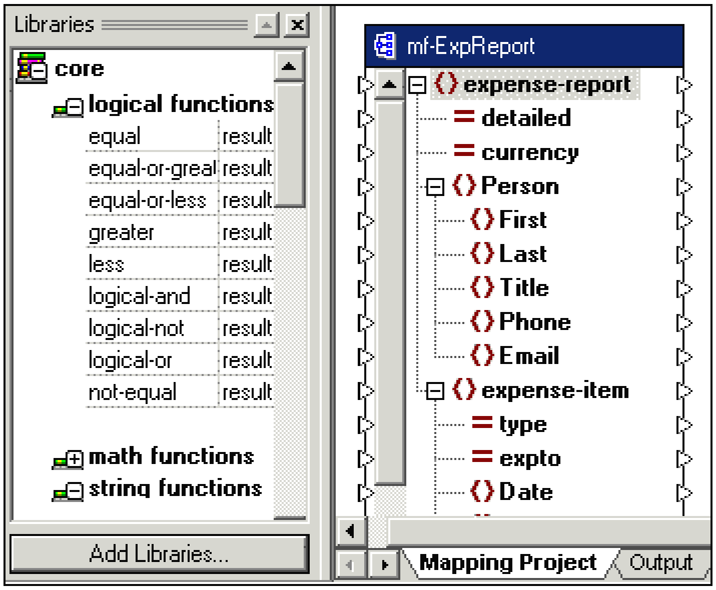
- Start MapForce.

Creating the source schema component:

1. Click the **Insert XML Schema/File** icon.
2. Select the **mf-ExpReport.xsd** file from the Open dialog box.
   You are now prompted for a sample XML file to provide the data for the preview tab.
3. Click Yes, and select the **mf-ExpReport.xml** file.
   The source schema component now appears in the Mapping tab.

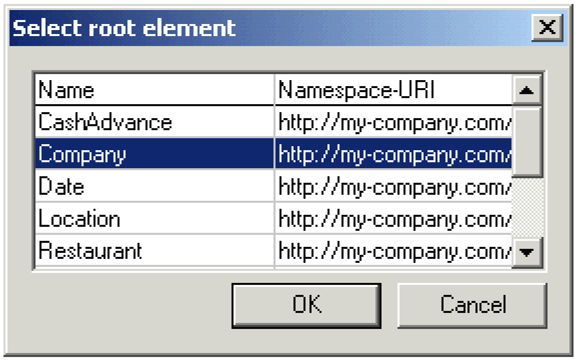


4. Click the **expense-report** entry and hit the * key, on the numeric keypad, to view all the items.
5. Click the expand icon at the lower right of the component window, and resize the window.



Creating the target schema component:

1. Click the **Insert XML Schema/File** icon.
2. Select the **ExpReport-Target.xsd** file from the Open dialog box.
   You are now prompted for a sample XML file for this schema.
3. Click No, and select **Company** as the root element of the target document.

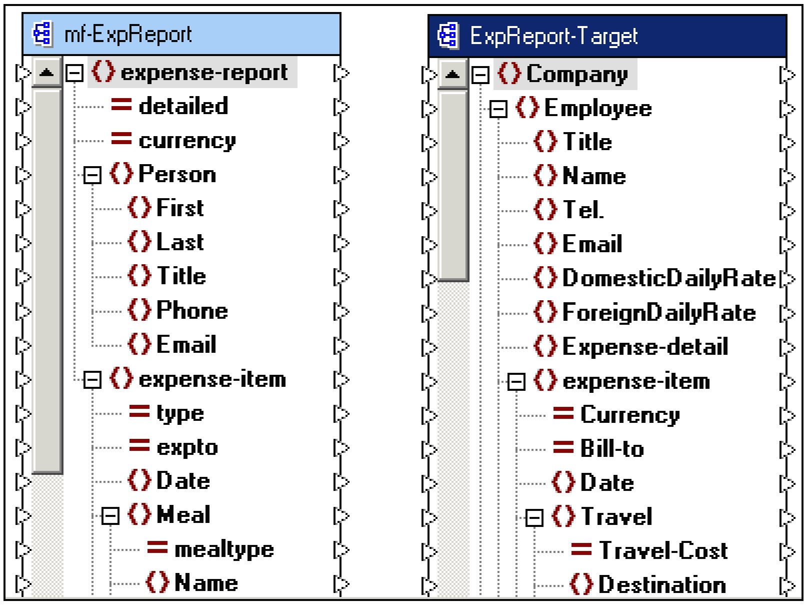


Select root element

Name	Namespace-URI
CashAdvance	http://my-company.com/
Company	http://my-company.com/
Date	http://my-company.com/
Location	http://my-company.com/
Restaurant	http://my-company.com/

The target schema component now appears in the mapping tab.

4. Click the **Company** entry and hit the * key on the numeric keypad to view all the items.
5. Click the expand window icon and resize the window.

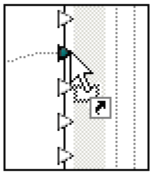


We are now ready to start mapping schema items from the source to the target schema.

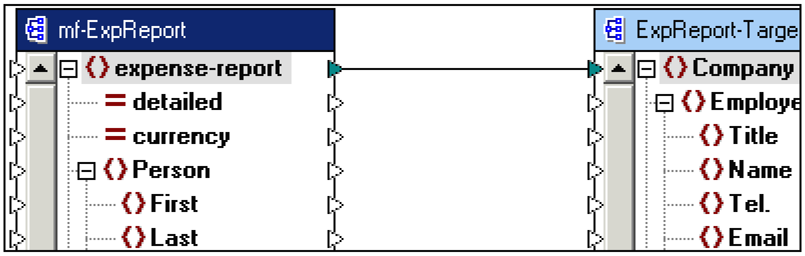
3.2 Mapping schema items

This section deals with defining the mappings between the source and target schema items.

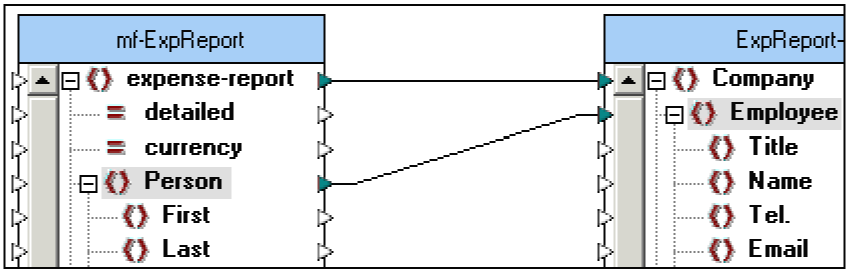
1. Click the **expense-report** item in the source schema and drag.
   A connector line is automatically created from the output icon and is linked to the mouse pointer which has now changed shape.
2. Move the mouse pointer near to the **Company** item in the target schema, and "drop" the connector the moment the mouse pointer changes back to the arrow shape. A small link icon appears below the mouse pointer, and the input icon is highlighted when the drop action will be successful.



A connector has now been placed between the source and target schemas. A mapping has now been created from the schema source to the target document.



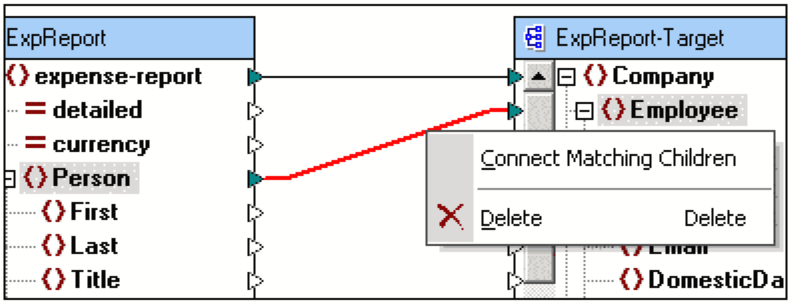
3. Use the above method to create a mapping between the Person and Employee items.



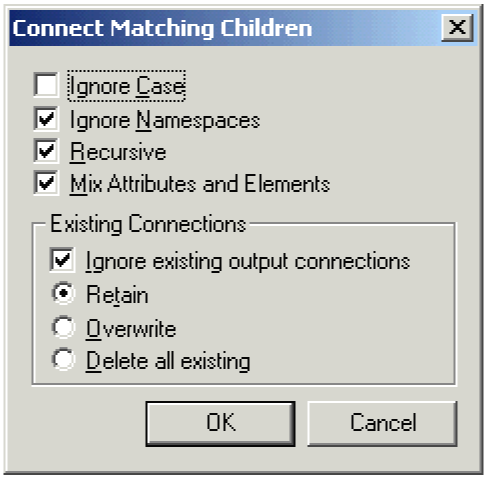
Auto-mapping

MapForce allows you to automatically connect child elements of the same name in both schemas. For more information please see the section on Connector properties.

1. Right click the "Person" connector and select "Connect matching children" from the pop-up menu.
   If the child items are automatically connected, auto connect child items is active.



This opens the Connect Matching Children dialog box.



Connect Matching Children

☐ Ignore Case

☑ Ignore Namespaces

☑ Recursive

☑ Mix Attributes and Elements

Existing Connections

☑ Ignore existing output connections

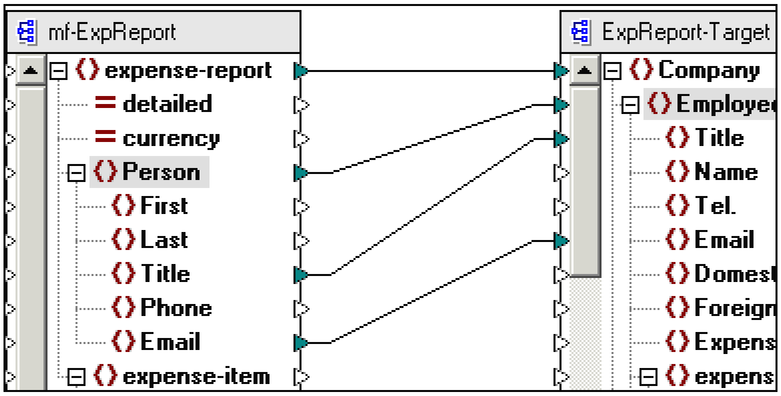
● Retain

○ Overwrite

○ Delete all existing

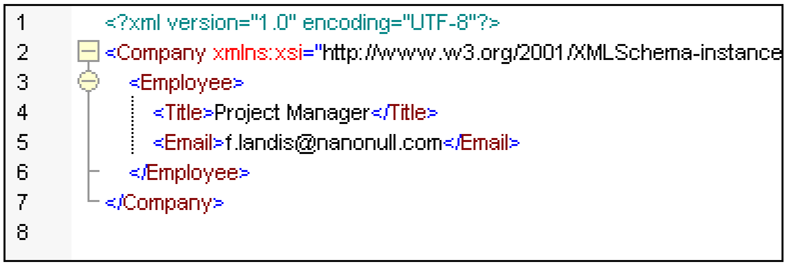
OK Cancel

2. Activate all four check boxes, and click OK.



Mappings have been automatically created for the **Title** and **Email** items of both schemas.

3. Click the Output tab to see if there is a result.



```
<?xml version="1.0" encoding="UTF-8"?>
<Company xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance
  <Employee>
    <Title>Project Manager</Title>
    <Email>f.landis@nanonull.com</Email>
  </Employee>
</Company>
```

You will notice that the Title and Email fields contain data originating from the XML Instance document.

4. Click the Mapping tab to continue mapping.

Please note:

The settings you select in the Connect Matching Children dialog box, are retained until you change them. These settings can be applied to a connection by either: using the context menu, or by clicking the Auto connect child items icon to activate, or deactivate this option.

3.3 Using functions to map data

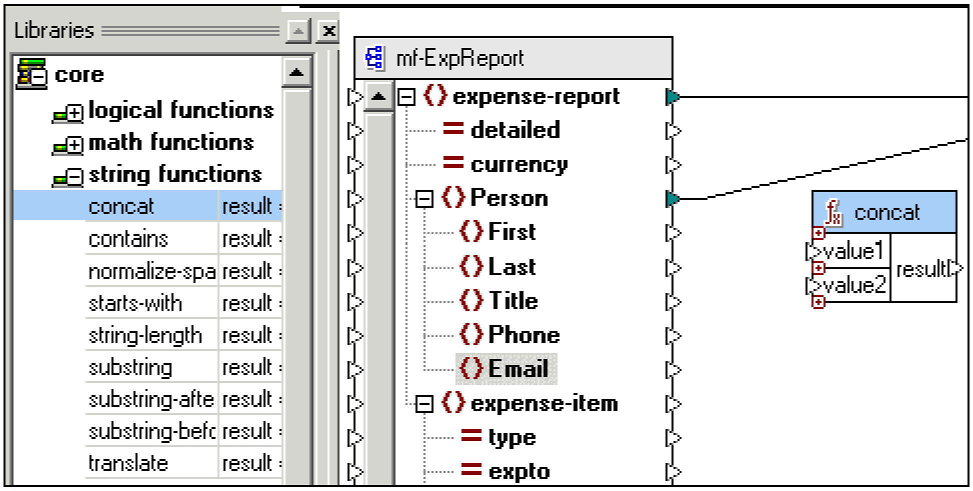
The aim of this section is to combine two sets of data from the source schema, and place the result in a single item in the target document. Please note, that some of the previously defined mappings are not shown in the following screen shots for the sake of clarity.

This will be done by:

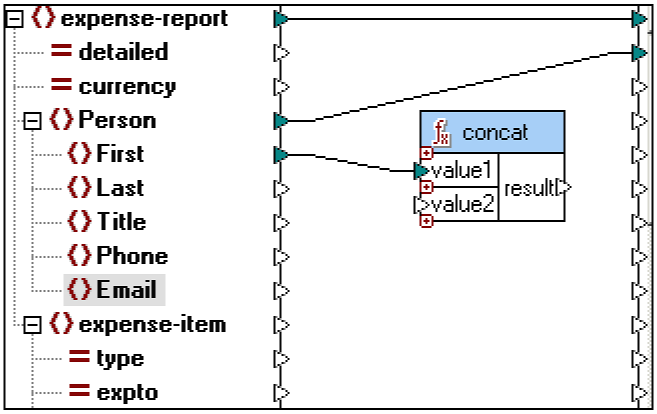
- Using the **Concat** string function to combine the **First** and **Last** elements of the source schema
- Using a **Constant** function to supply the space character needed to separate both items
- Placing the result of this process into the **Name** item of the target schema.

Using functions to combine items:

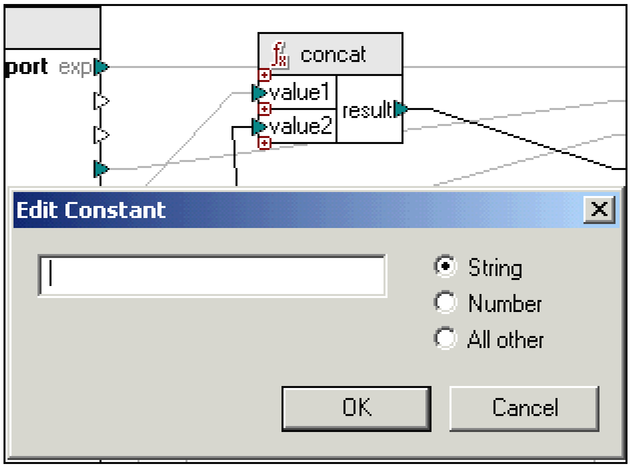
1. Click the **concat** entry of the string functions group, in the Core library, and drag it into the Mapping tab



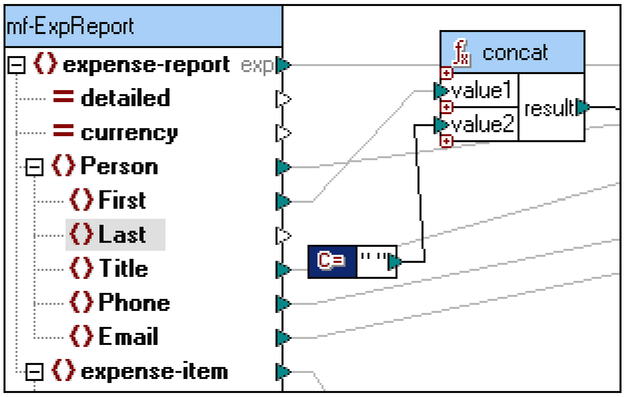
2. Create a connection between item **First** and **value1** of the concat component.



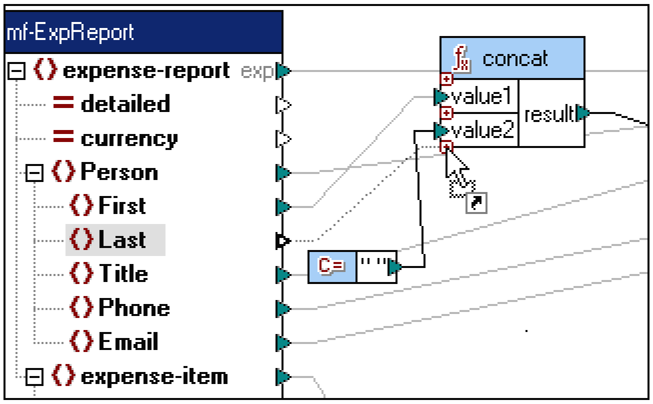
3. Click the **Insert Constant** icon "abc" in the icon bar, to insert a constant component.



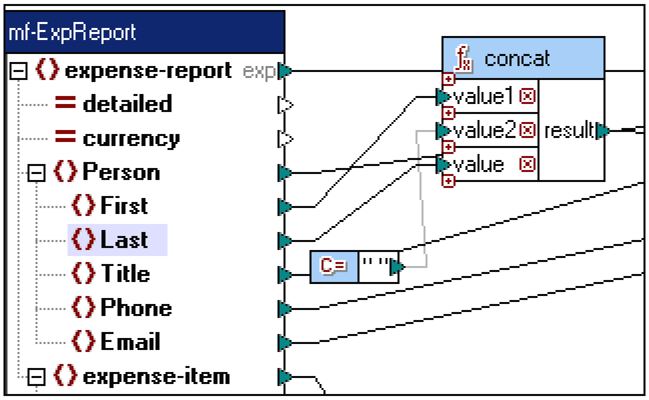
4. Enter a space character in the text box and click OK.
 The constant component is now in the working area. Its contents are displayed next to the output icon.
5. Create a connection between the **constant** component and **value2** of the concat component.



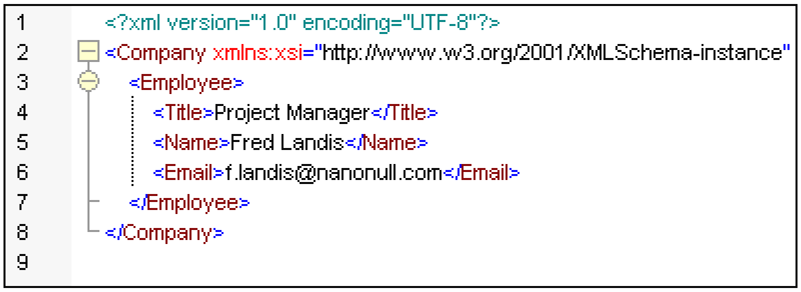
6. Click the item **Last** and drop the connector on the "**+**" icon of the concat function, just below **value2**. The text cursor changes to show when you can drop the connector.



This automatically enlarges the concat function by one more item (value), to which the Last item is connected.



7. Connect the **result** icon of the concat component, to the **Name** item in the target schema.
8. Click the **Output** tab to see the result of the current mapping.

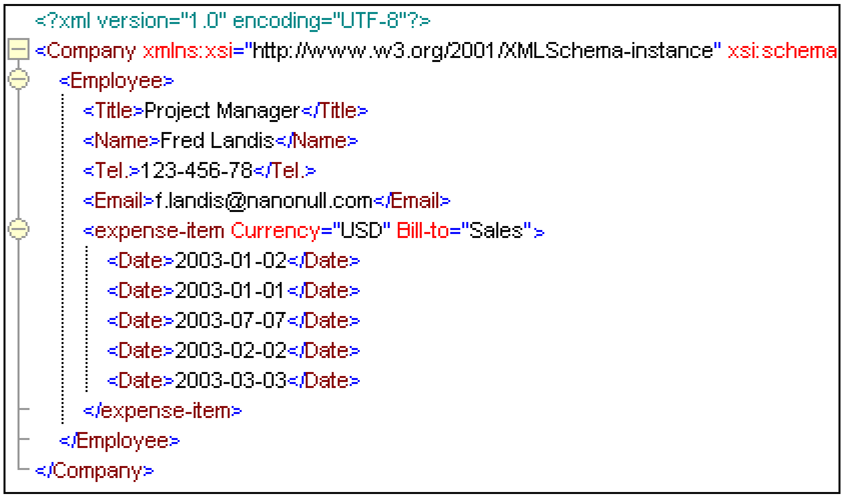


```
<?xml version="1.0" encoding="UTF-8"?>
<Company xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  <Employee>
    <Title>Project Manager</Title>
    <Name>Fred Landis</Name>
    <Email>f.landis@nanonull.com</Email>
  </Employee>
</Company>
```

You will see that the Person name "Fred Landis" is now contained between the **Name** tags. The first and last name have been separated by a space character as well.

Mapping the rest of the personal data:

1. Create mappings between the following items:
   - currency to Currency
   - Phone to Tel.
   - expto to Bill-to
   - Date to Date
2. Click the Output tab to see the result.



```
<?xml version="1.0" encoding="UTF-8"?>
<Company xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schema
  <Employee>
    <Title>Project Manager</Title>
    <Name>Fred Landis</Name>
    <Tel.>123-456-78</Tel.>
    <Email>f.landis@nanonull.com</Email>
    <expense-item Currency="USD" Bill-to="Sales">
      <Date>2003-01-02</Date>
      <Date>2003-01-01</Date>
      <Date>2003-07-07</Date>
      <Date>2003-02-02</Date>
      <Date>2003-03-03</Date>
    </expense-item>
  </Employee>
</Company>
```

There are currently five items originating from the assigned XML instance file.

Please note:
Functions can be grouped into user-defined functions/components to maximize screen space. Please see the section on "User-defined functions/components" for an example on how to combine the concat and constant functions into a single user-defined function/component.

3.4 Filtering data

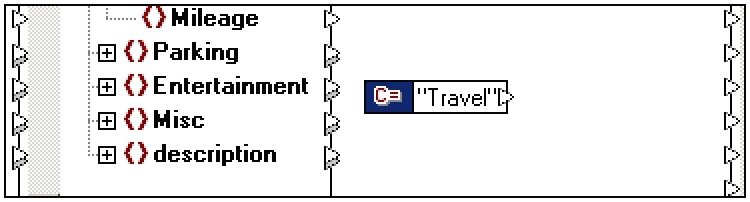
The aim of this section is to filter out the Lodging and Meal expenses, and only pass on the Travel expenses to the target schema/document.

This will be done by:

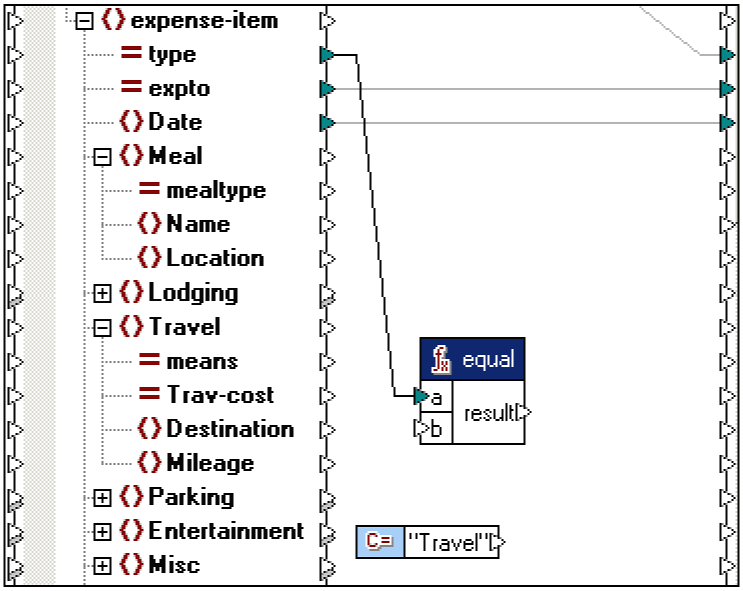
- Using the **Equal** function to test the value of a source item
- Using a **Constant** function to supply the comparison string that is to be tested
- Using the **Filter** function which passes on the Travel data, if the bool input value is true
- Placing the on-true result of this process, into the **expense-item** element of the target schema/document.

Filtering data:

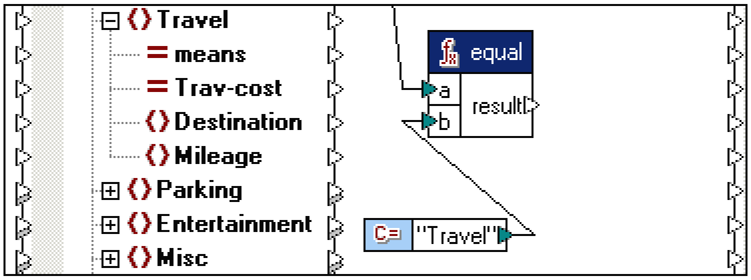
1. Insert a constant component and enter the string **Travel** in the input field.



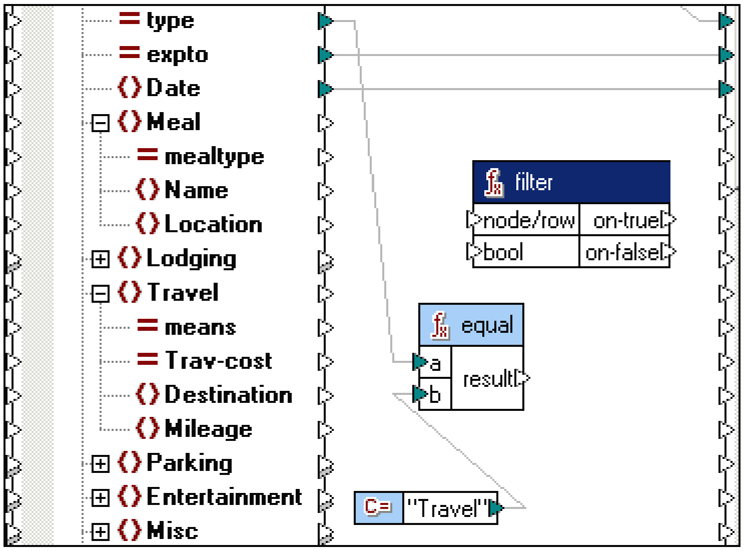
2. Insert the logical function **equal** from the core library (logical functions group).
3. Connect the (expense-item) **type** item in the source schema, to the **a** parameter of the equal function.



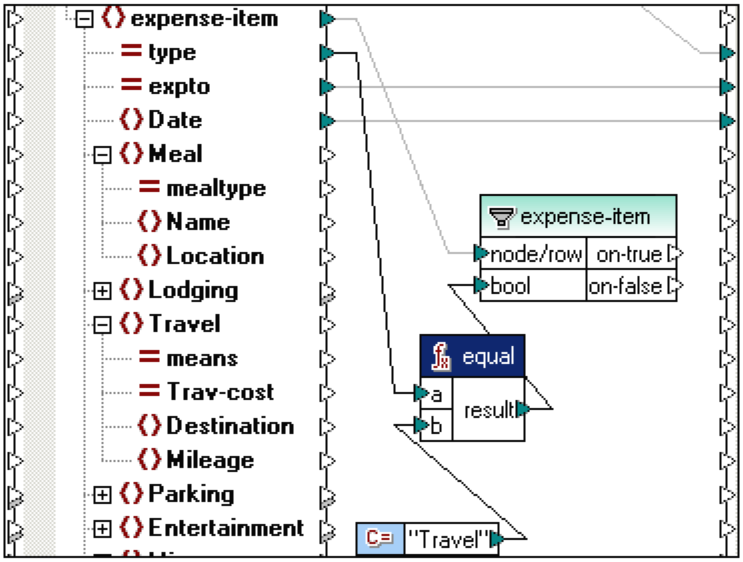
4. Connect the **result** icon of the constant component, to the **b** parameter of the equal function.



5. Select the menu option **Insert | Filter for Nodes/Rows**.



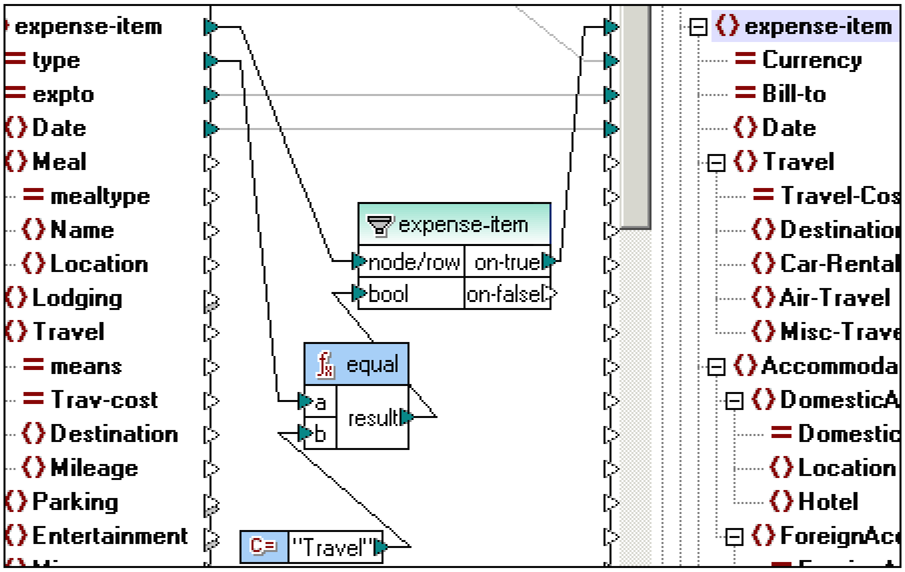
6. Connect the **result** icon of the **equal** component, to the **bool** parameter of the **filter** component.
7. Connect the **expense-item** icon of the source schema with the **node/row** parameter of the filter component.



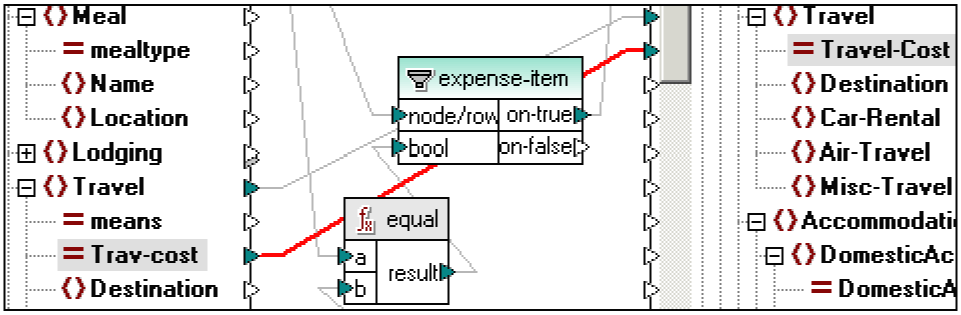
Note that the filter component name, now changes to "expense-item".

8. Connect the **on-true** icon of the **filter** component with the **expense-item** element of the

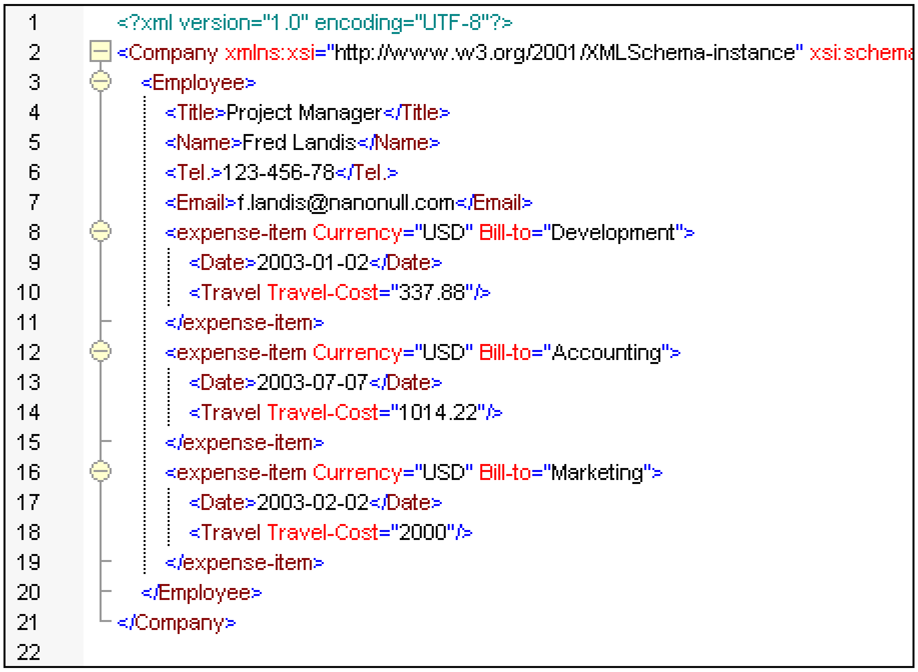
target document.



9. Connect the **Travel** item in the source schema, with the **Travel** item in the target schema/document.
10. Connect the **Trav-cost** item with the **Travel-Cost** item in the target schema/document.



11. Click the Output tab to see the result.



```
<?xml version="1.0" encoding="UTF-8"?>
<Company xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schema
  <Employee>
    <Title>Project Manager</Title>
    <Name>Fred Landis</Name>
    <Tel.>123-456-78</Tel.>
    <Email>f.landis@nanonull.com</Email>
    <expense-item Currency="USD" Bill-to="Development">
      <Date>2003-01-02</Date>
      <Travel Travel-Cost="337.88"/>
    </expense-item>
    <expense-item Currency="USD" Bill-to="Accounting">
      <Date>2003-07-07</Date>
      <Travel Travel-Cost="1014.22"/>
    </expense-item>
    <expense-item Currency="USD" Bill-to="Marketing">
      <Date>2003-02-02</Date>
      <Travel Travel-Cost="2000"/>
    </expense-item>
  </Employee>
</Company>
```

Please note:

> The **on-false** parameter of the filter component, outputs the **complement** node set that is mapped by the result parameter. In this example it would mean all **non-travel** expense items.

The number of expense-items have been reduced to three. Checking against the supplied **mf-ExpReport.xml** file, reveals that only the Travel records remain, the Lodging and Meal records have been filtered out.

3.5 Generating XSLT 1.0 and 2.0 code

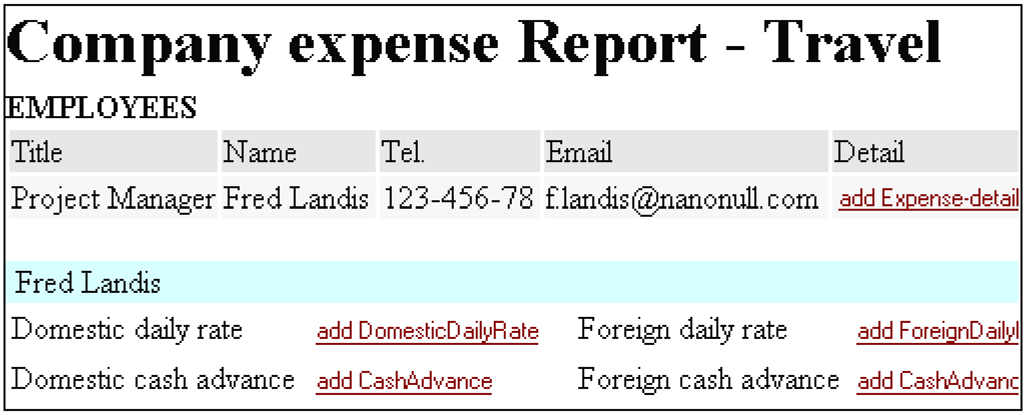
MapForce generates two flavors of XSLT code.

1. Select the menu item **File | Generate code in | XSLT 1.0 (or XSLT 2.0)**.
2. Select the folder you want to place the generated XSLT file in, and click OK.
   A message appears showing that the generation was successful.
3. Navigate to the designated folder and you will find the XSLT with the file name **MapToExpReport-Target.xslt**

To transform the personal expense report to the company expense report:

Having installed either XMLSpy, or Authentic Desktop you can easily transform the source to the target document.

1. Start XMLSpy, or Authentic Desktop and open the supplied **mf-ExpReport.xml** document.
2. Select the menu option **Tools | Options** and click the **XSL** tab.
3. Enter **.xml** in the *Default file extension of output file field*, and click OK.
4. Select the menu option **XSL/XQuery | XSL Transformation**.
5. Select the previously generated **MapToExpReport-Target.xslt** file, and click OK.
   An XSL Output.xml file is created.
   XMLSpy automatically selects the correct XSLT engine for the transformation.
6. Select the menu option **Authentic | Assign a StyleVision Power Stylesheet**.
7. Select the supplied stylesheet **ExpReport-Target.sps** and click OK.
8. Click the **Authentic** tab to switch to the Authentic view.



Company expense Report - Travel

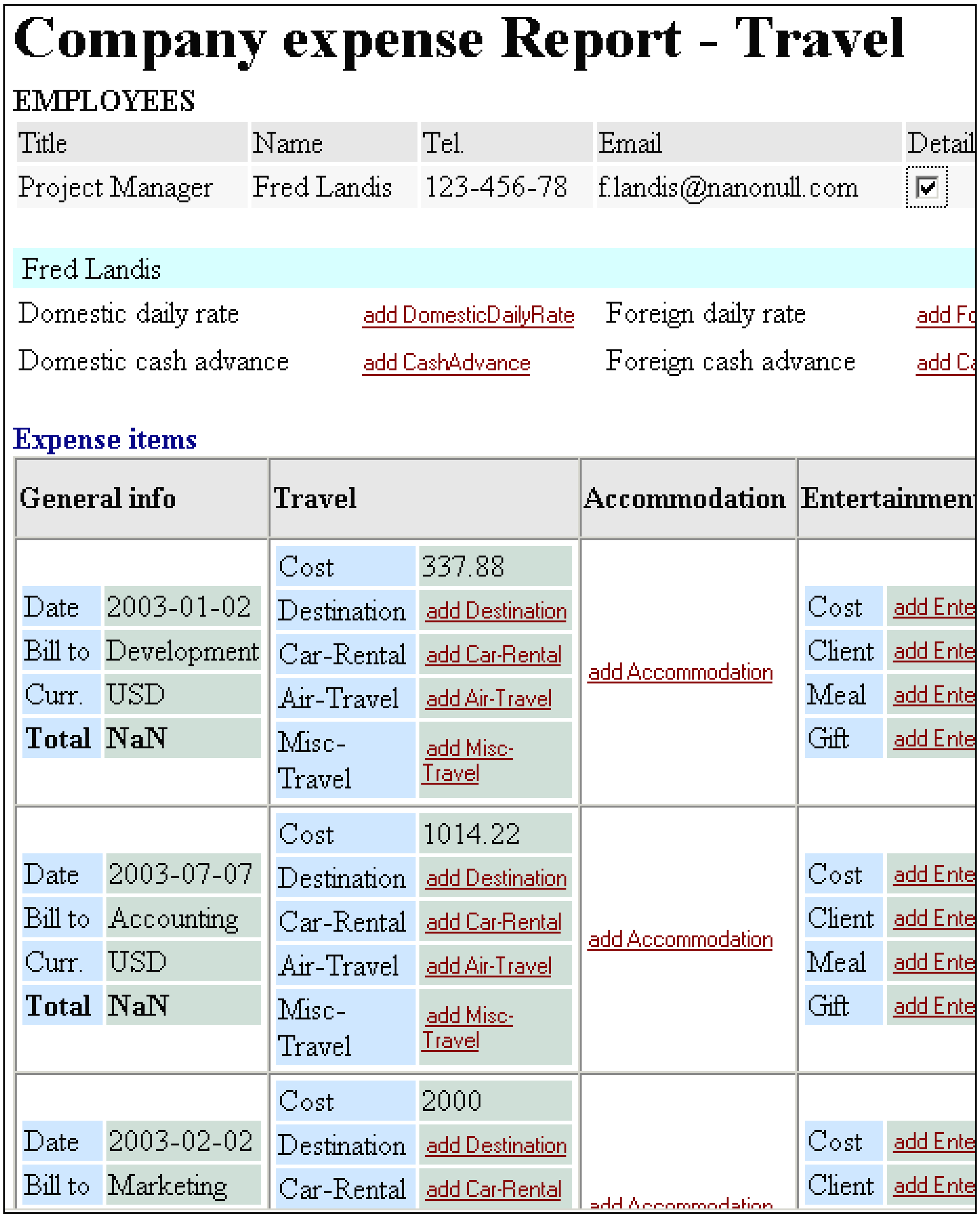
EMPLOYEES

Title	Name	Tel.	Email	Detail
Project Manager	Fred Landis	123-456-78	f.landis@nanonull.com	add Expense-detail

Fred Landis

Domestic daily rate	add DomesticDailyRate	Foreign daily rate	add ForeignDailyI
Domestic cash advance	add CashAdvance	Foreign cash advance	add CashAdvanc

9. Click the **add Expense-detail** text in the Detail column.
   The field changes to a check box.
10. Click the check box to see the detailed expenses.



Company expense Report - Travel

EMPLOYEES

Title	Name	Tel.	Email	Detail
Project Manager	Fred Landis	123-456-78	f.landis@nanonull.com	☑

Fred Landis

Domestic daily rate	add DomesticDailyRate	Foreign daily rate	add Fo
Domestic cash advance	add CashAdvance	Foreign cash advance	add Ca

Expense items

General info	Travel	Accommodation	Entertainmen
Date 2003-01-02 Bill to Development Curr. USD **Total NaN**	Cost 337.88 Destination add Destination Car-Rental add Car-Rental Air-Travel add Air-Travel Misc-Travel add Misc-Travel	add Accommodation	Cost add Ente Client add Ente Meal add Ente Gift add Ente
Date 2003-07-07 Bill to Accounting Curr. USD **Total NaN**	Cost 1014.22 Destination add Destination Car-Rental add Car-Rental Air-Travel add Air-Travel Misc-Travel add Misc-Travel	add Accommodation	Cost add Ente Client add Ente Meal add Ente Gift add Ente
Date 2003-02-02 Bill to Marketing	Cost 2000 Destination add Destination Car-Rental add Car-Rental	add Accommodation	Cost add Ente Client add Ente

The expense report can now be completed with extra information relating to Accommodation, Entertainment and Misc. costs if necessary.

Please note:

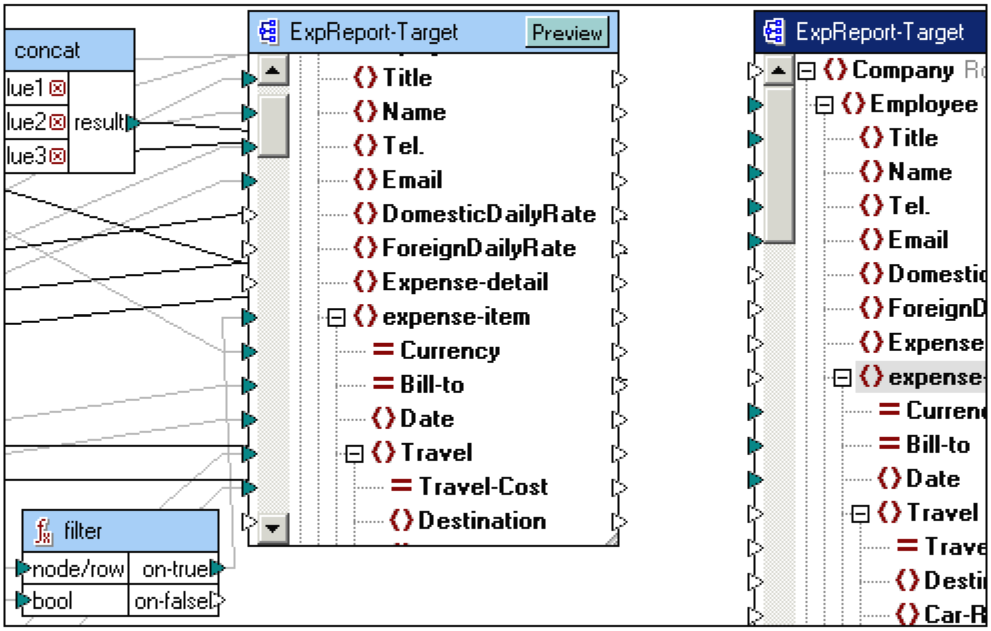
The Total field automatically sums up all Cost fields of each record. Once a number exists in all these fields, the Total field becomes live and the NaN (Not a Number) entry disappears. Subsequent changing of any of the Cost fields, automatically adjusts the Total field.

3.6 Multiple target schemas / documents

This section deals with creating a second target schema / document, into which **non-travel** expense records will be placed, and follows on from the current tutorial example **Tut-ExpReport.mfd**.

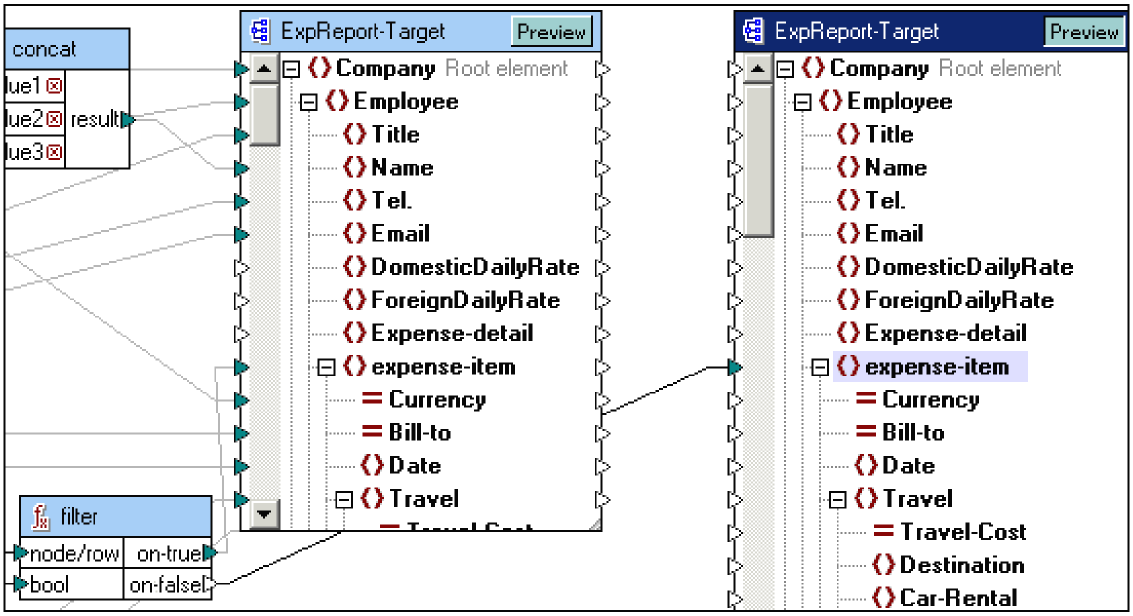
Creating the second target schema component:

1. Click the **Insert XML Schema/File** icon.
2. Select the **ExpReport-Target.xsd** file from the Open dialog box.
   You are now prompted for a sample XML file for this schema.
3. Click No, and select **Company** as the root element of the target document.
   The target schema component now appears in the Mapping tab.
4. Click the **Company** entry and hit the * key on the numeric keypad to view all the items.
5. Click the expand window icon and resize the component. Place the schema components so that you can view and work on them easily.
   There is now one source schema, **mf-expReport**, and two target schemas, both **ExpReport-Target,** visible in the Mapping tab.



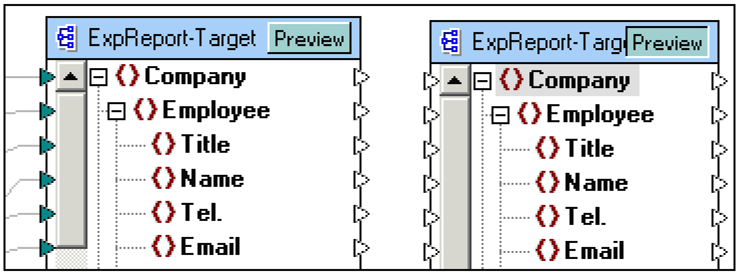
Filtering out the non-travel data:

1. Connect the **on-false** icon of the **filter** component with the **expense-item** element of the **second** target schema / document.



A message appears stating that you are now working with multiple target schemas / documents.

2. Click OK to confirm.



An **Preview icon** is now visible in the title bar of each target schema component.

Clicking the Preview icon defines which of the target schema data is to be displayed, when you subsequently click the XSLT, XSLT2, XQuery, or Output tabs.

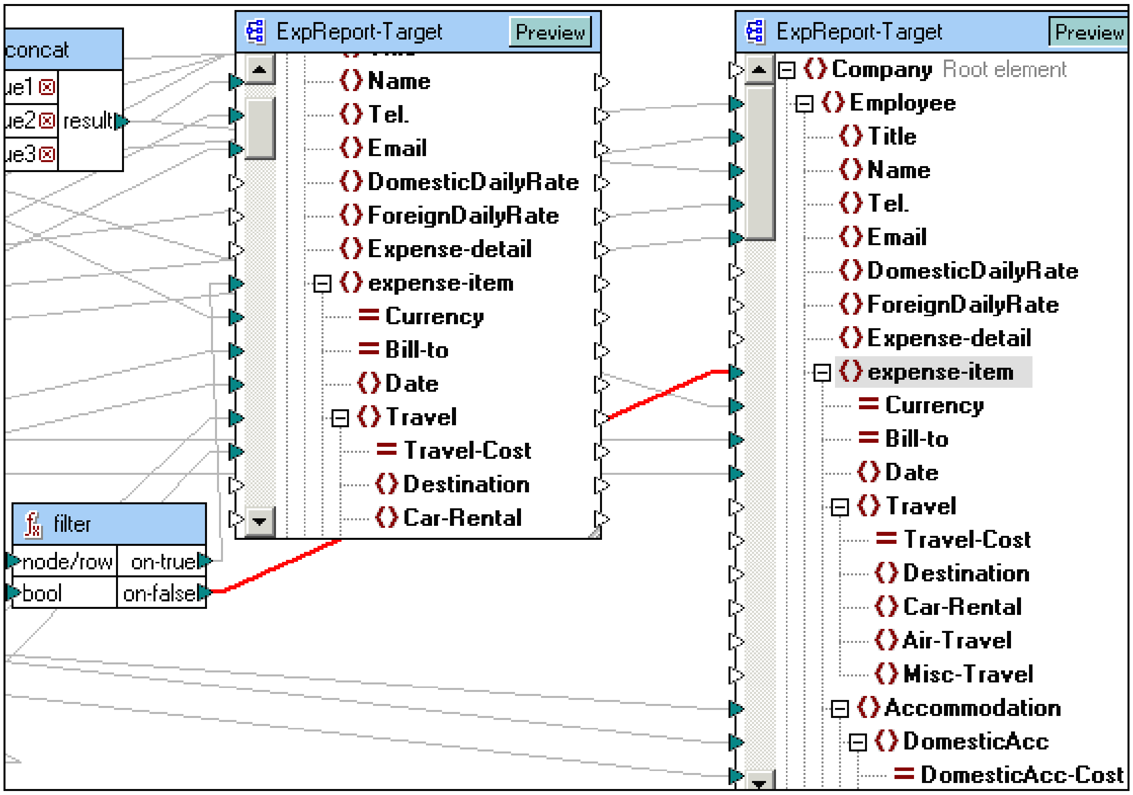
Creating mappings for the rest of the expense report data:

1. Connect the **Lodging** item in the source schema to **Accommodation** in the second target schema.
2. Connect the **Lodging** item to **DomesticAcc**.
3. Connect the **Lodge-Cost** item to **DomesicAcc-Cost**.
4. Create the following mappings between the source schema and second target schema. You created the same connectors for the first target schema, so there is nothing new here:

Source schema - connect:	**to... second Target schema**
Person	Employee
Result of **existing** First and Last concatenation	Name
Title	Title
Phone	Tel.
Email	Email
currency	Currency

expto
Date

Bill-to
Date

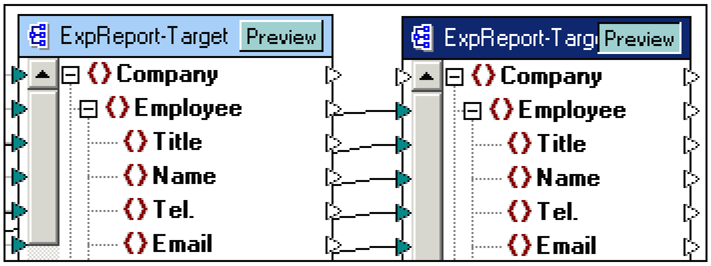


3.6.1 Viewing and generating multiple target schema output

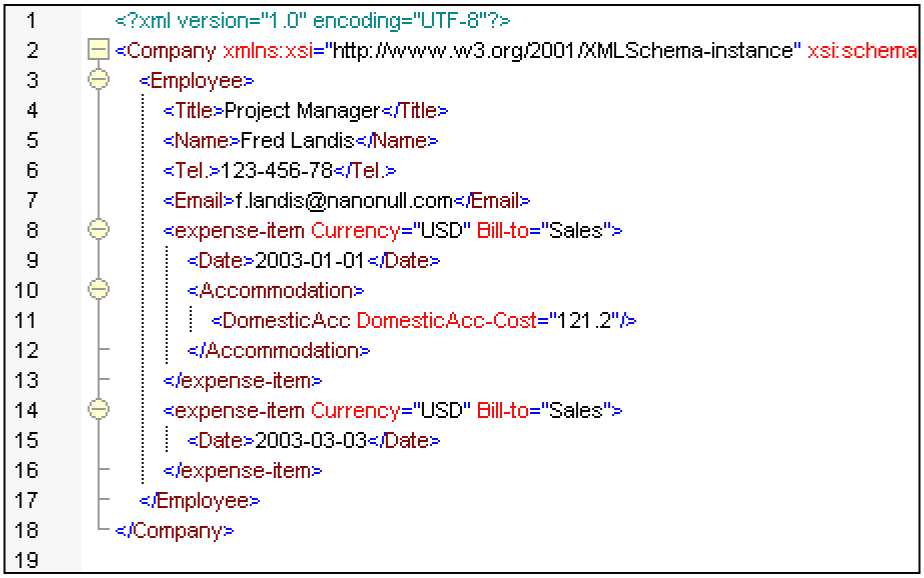
Clicking the Preview icon lets you select which of the schema targets you want to preview.

To view specific XSLT output:

1. Click the **Preview icon** in the title bar of the **second** schema component, to make it active.



2. Click the **Output** tab of the Mapping tab group.



```
<?xml version="1.0" encoding="UTF-8"?>
<Company xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schema
  <Employee>
    <Title>Project Manager</Title>
    <Name>Fred Landis</Name>
    <Tel.>123-456-78</Tel.>
    <Email>f.landis@nanonull.com</Email>
    <expense-item Currency="USD" Bill-to="Sales">
      <Date>2003-01-01</Date>
      <Accommodation>
        <DomesticAcc DomesticAcc-Cost="121.2"/>
      </Accommodation>
    </expense-item>
    <expense-item Currency="USD" Bill-to="Sales">
      <Date>2003-03-03</Date>
    </expense-item>
  </Employee>
</Company>
```

The XML output contains two records both billed to Sales: the Domestic Accommodation cost of $121.2 and an Expense-item record which only contains a date. This record originates from the expense-item Meal. There is currently no mapping between meal costs and domestic accommodation costs, and even if there were, no cost would appear as the XML instance does not supply one.

Please note:

You can save this XML data by clicking the **Save generated output** icon, while viewing the XML output in the preview window.

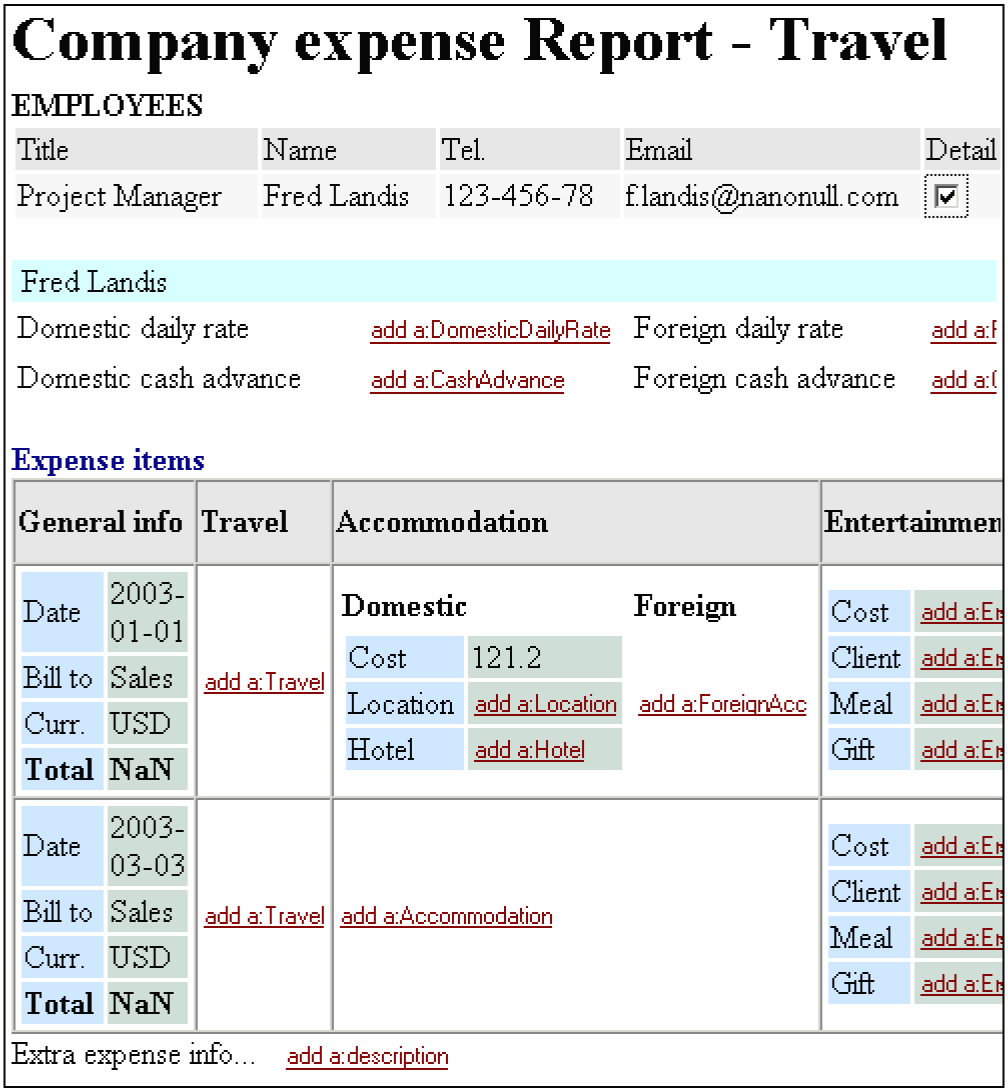
The resulting XML instance file can also be validated against the target schema, by clicking the validate button.

To generate XSLT 1.0 / XSLT 2.0 code for multiple target schemas:

1. Select the menu item **File | Generate code in | XSLT 1.0 (or XSLT 2.0)**.
2. Select the folder you want to place the generated XSLT files, and click OK.
   A message appears showing that the generation was successful.
3. Navigate to the designated folder and you will find two XSLT files with the file names:

MapToExpReport-Target.xslt and **MapToExpReport-Target2.xslt**

4. Having installed either XMLSpy, or Authentic Desktop, assign either of these two XSLT files to the **mf-ExpReport.xml** file, and start the transformation process.
5. Assign the supplied stylesheet, **ExpReport-Target.sps** to the file, and click the Authentic tab.



Company expense Report - Travel

EMPLOYEES

Title	Name	Tel.	Email	Detail
Project Manager	Fred Landis	123-456-78	f.landis@nanonull.com	☑

Fred Landis

Domestic daily rate	add a:DomesticDailyRate	Foreign daily rate	add a:F
Domestic cash advance	add a:CashAdvance	Foreign cash advance	add a:(

Expense items

General info	Travel	Accommodation	Entertainmen
Date 2003-01-01 Bill to Sales Curr. USD **Total** **NaN**	add a:Travel	**Domestic** Cost 121.2 Location add a:Location Hotel add a:Hotel **Foreign** add a:ForeignAcc	Cost add a:En Client add a:En Meal add a:En Gift add a:En
Date 2003-03-03 Bill to Sales Curr. USD **Total** **NaN**	add a:Travel	add a:Accommodation	Cost add a:En Client add a:En Meal add a:En Gift add a:En

Extra expense info... add a:description

3.7 Mapping multiple source items, to single target items

In this section two simple employee travel expense reports will be mapped to a single company report. This example is a simplified version of the mapping you have already worked through in the Multiple target schemas / documents section of this tutorial.

Aim of this section:
To merge two **personal travel expense reports** into a company expense travel report.

Please note that the files used in this example, have been optimized to show how to map data from two input XML files into a single item in the target schema, this is not meant to be a real-life example.

Files used in this section:

mf-ExpReport.xml	Input XML file used in previous section
mf-ExpReport2.xml	The second input XML file
mf-ExpReport-combined.xml	The resulting file when the mapping has been successful
ExpReport-combined.xsd	The target schema file into which the two XML source data will be merged.
ExpReport-combined.sps	The StyleVision Stylesheet used to view the mapping result in Authentic view.
Tut-ExpReport-msource.mfd	The mapping file for this example

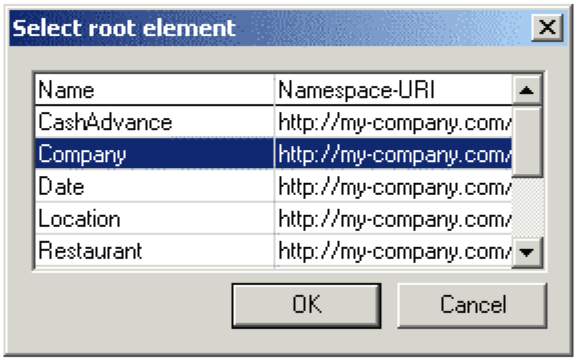
Please note:

The files used in this section are also available in the **...\MapForceExamples\Tutorial** folder.

3.7.1 Creating the mappings

The method described below, is a recapitulation of how to set up the mapping environment.

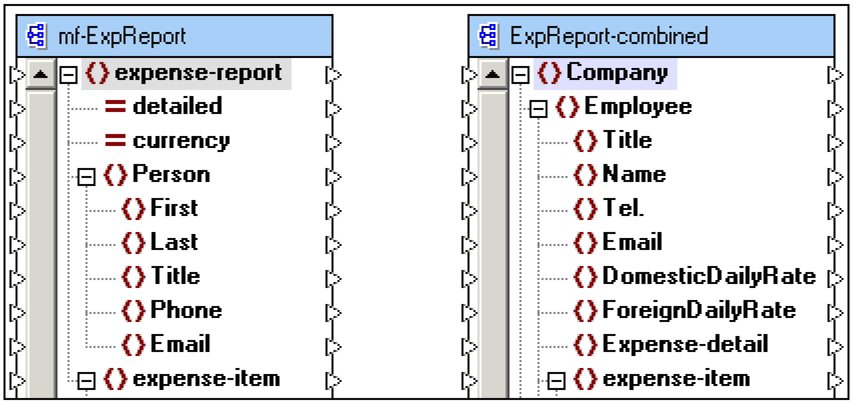
1. Click the **Insert XML Schema/File** icon.
2. Select the **mf-ExpReport.xsd** file from the Open dialog box, and select the **mf-ExpReport.xml** file as the XML instance file.
3. Click the **expense-report** entry, hit the * key on the numeric keypad to view all the items; resize the component if necessary.
4. Click the **Insert XML Schema/File** icon.
5. Select the **ExpReport-combined.xsd** file from the Open dialog box. You are now prompted for a sample XML file for this schema.
6. Click No, and select **Company** as the root element of the target document.



Name	Namespace-URI
CashAdvance	http://my-company.com/
Company	http://my-company.com/
Date	http://my-company.com/
Location	http://my-company.com/
Restaurant	http://my-company.com/

The target schema component now appears in the mapping tab.

7. Click the **Company** entry, hit the * key on the numeric keypad to view all the items, and resize the window if necessary.



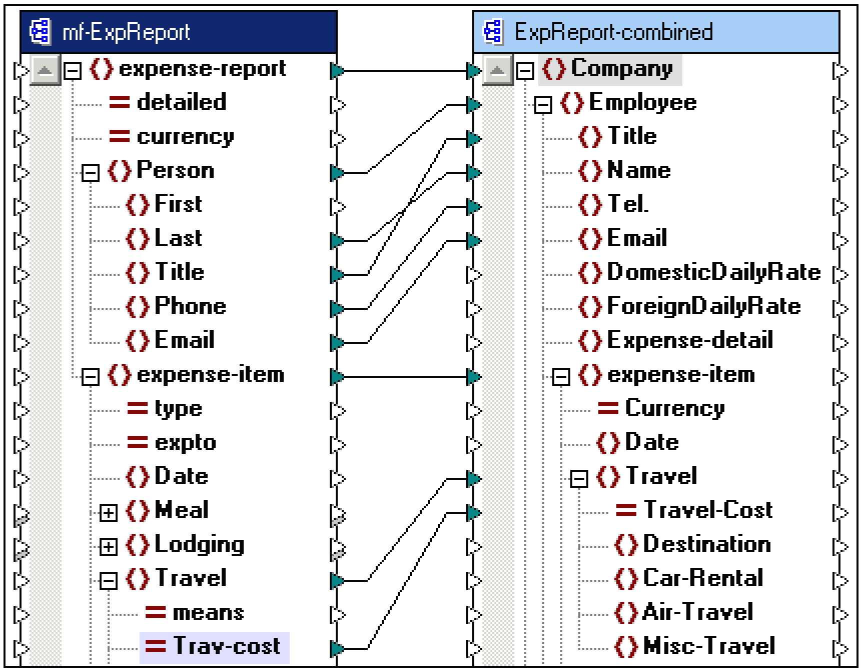
Make sure that the "Auto connect child items" icon is deactivated, before you create the following mappings.

Create the following mappings between the two components:

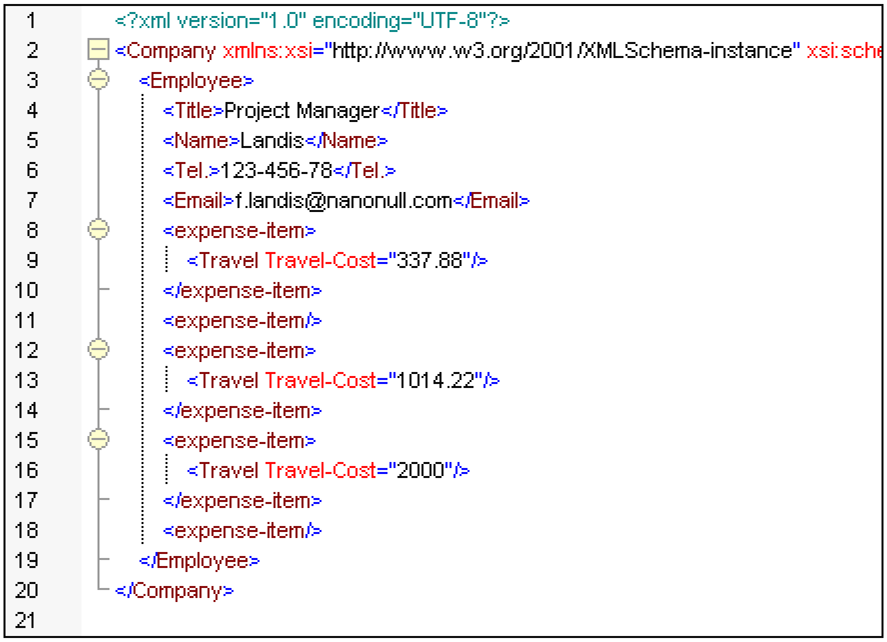
- Expense-report to Company
- Person to Employee
- Last to Name
- Title to Title
- Phone to Tel.
- Email to Email
- expense-item to expense-item
- Travel to Travel and

- Trav-cost to Travel-Cost.

  The mapping is shown below.



8. Click the Output tab to see the result of the current mapping.



```
<?xml version="1.0" encoding="UTF-8"?>
<Company xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:sche
    <Employee>
        <Title>Project Manager</Title>
        <Name>Landis</Name>
        <Tel.>123-456-78</Tel.>
        <Email>f.landis@nanonull.com</Email>
        <expense-item>
            <Travel Travel-Cost="337.88"/>
        </expense-item>
        <expense-item/>
        <expense-item>
            <Travel Travel-Cost="1014.22"/>
        </expense-item>
        <expense-item>
            <Travel Travel-Cost="2000"/>
        </expense-item>
        <expense-item/>
    </Employee>
</Company>
```

Please note:

Empty <expense-item/> tags are generated when child items of a **mapped parent item** , exist in the source file, which have not been mapped to the target schema. In this case, only the travel items of the expense-item parent have been mapped. There are however, two other expense items in the list: one lodging and one meal expense item. Each one of these items generates an empty parent expense-item tag.

To avoid generating empty tags, create a filter such as the one described previously in the tutorial, under Filtering data.

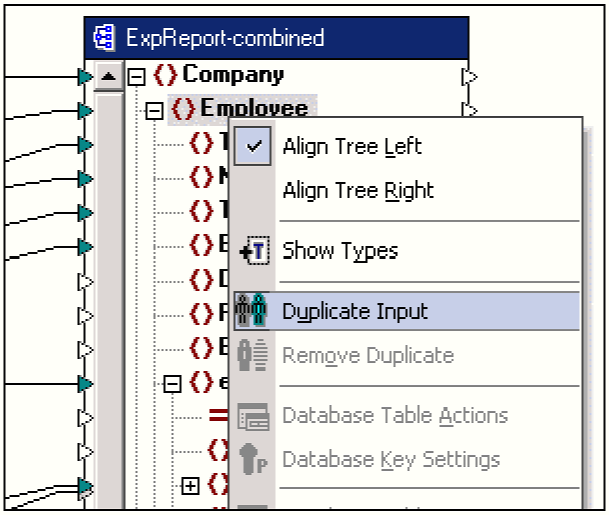
3.7.2 Duplicating input items

We now need to duplicate the **input items** to be able to create mappings from a different source XML file. To achieve this we will:

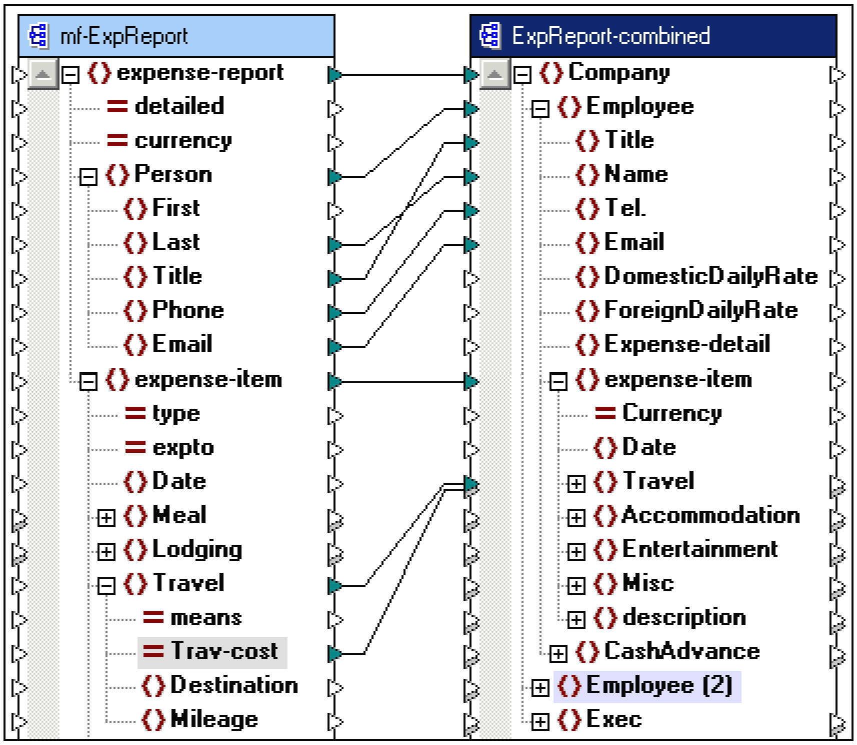
- add the **second** XML source file, and
- create mappings from it, to the "same" inputs in the target XML file.

Duplicating input items:

1. Right click the Employee entry in the target XML file.
2. Select the menu option **Duplicate input.**

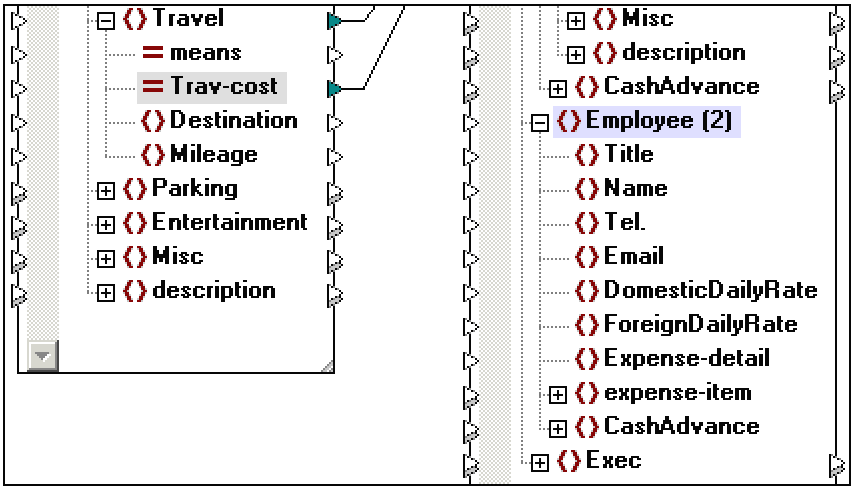


A second Employee item has now been added to the component, as **Employee(2)**.



3. Click the expand icon to see the items below it.

The **structure** of the new Employee item, is an exact copy of the original, except for the fact that there are **no output icons** for the duplicated items.

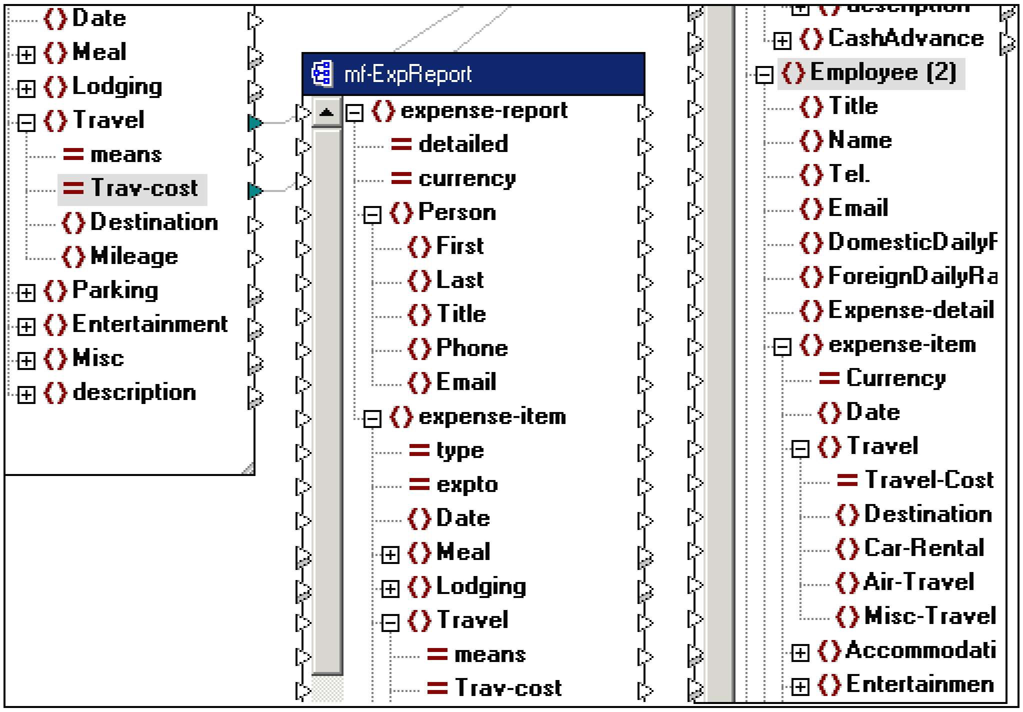


You can now use these new duplicate items as the **target** for the second source XML data file.

Use the same method as before, to insert the second XML instance file:

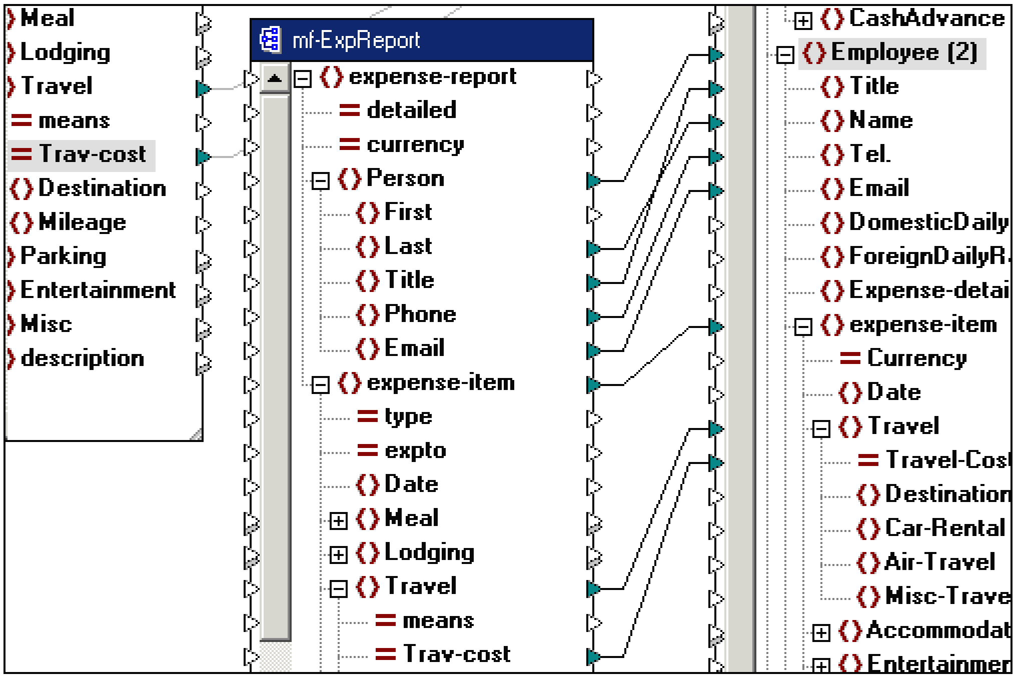
1. Click the **Insert Schema | XML instance** icon.
2. Select the **mf-ExpReport.xsd** file from the Open dialog box, click Yes, and select the **mf-ExpReport2.xml** file as the XML instance file.
3. Click the **expense-report** entry, hit the * key on the numeric keypad to view all items, and resize the component if necessary.

   For the sake of clarity, the new component has been placed between the two existing ones in the following graphics.

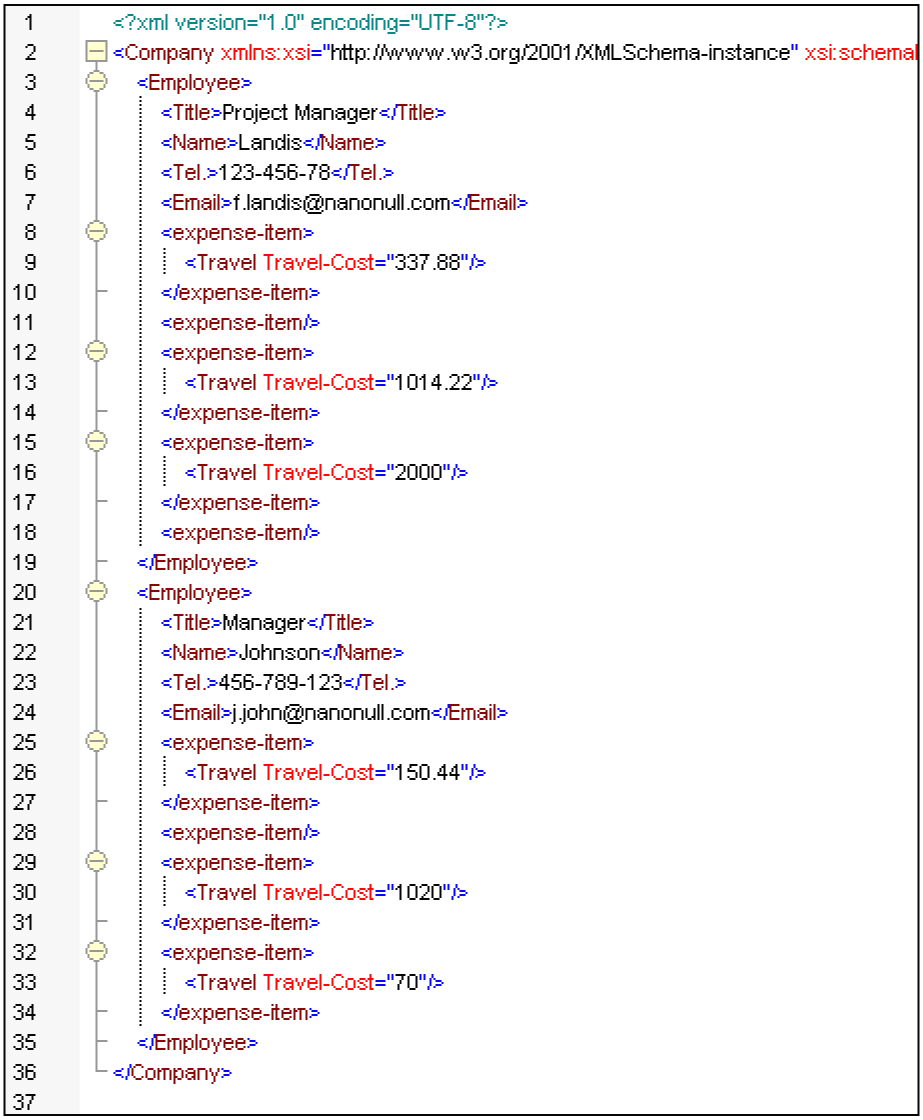


4. Create the same mappings that were defined for the first XML source file:

- Person to Employee(2)
- Last to Name
- Title to Title
- Phone to Tel.
- Email to Email
- expense-item to expense-item
- Scroll down, and map Travel to Travel, and
- Trav-cost to Travel-Cost.



5. Click the Output tab to see the result of the mapping.



```xml
<?xml version="1.0" encoding="UTF-8"?>
<Company xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemal
	<Employee>
		<Title>Project Manager</Title>
		<Name>Landis</Name>
		<Tel.>123-456-78</Tel.>
		<Email>f.landis@nanonull.com</Email>
		<expense-item>
			<Travel Travel-Cost="337.88"/>
		</expense-item>
		<expense-item/>
		<expense-item>
			<Travel Travel-Cost="1014.22"/>
		</expense-item>
		<expense-item>
			<Travel Travel-Cost="2000"/>
		</expense-item>
		<expense-item/>
	</Employee>
	<Employee>
		<Title>Manager</Title>
		<Name>Johnson</Name>
		<Tel.>456-789-123</Tel.>
		<Email>j.john@nanonull.com</Email>
		<expense-item>
			<Travel Travel-Cost="150.44"/>
		</expense-item>
		<expense-item/>
		<expense-item>
			<Travel Travel-Cost="1020"/>
		</expense-item>
		<expense-item>
			<Travel Travel-Cost="70"/>
		</expense-item>
	</Employee>
</Company>
```

The data of the second expense report has been added to the output file. Johnson and his travel costs have been added to the expense items of Fred Landis in the company expense report.

To save the generated output to a file:

- Click the Save icon which appears in the title bar when the Output tab is active.

The file, mf-ExpReport-combined.xml, is available in the ...**\MapforceExamples\Tutorial** folder. Please note that it has been assigned an SPS file, which allows you to view the XML file in Authentic View of Authentic Desktop, or XMLSpy.

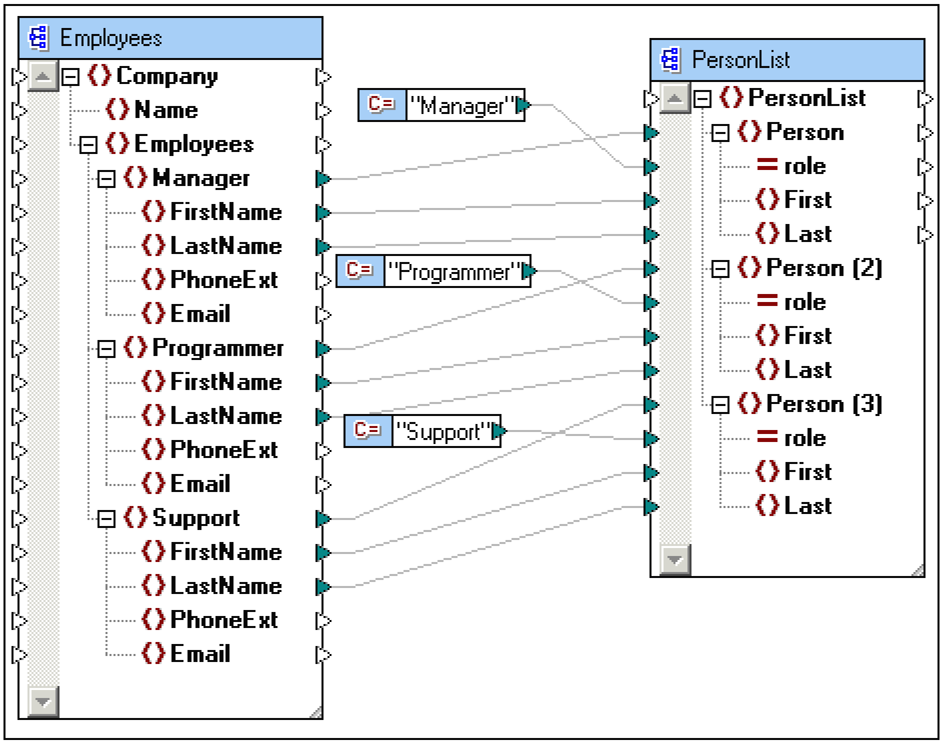
To remove duplicated items:

- Right click the duplicate item and select the **Remove Duplicate** entry from the menu.

To see a further example involving duplicate items, please see the **PersonList.mfd** sample file available in the **...\MapForceExamples** folder.

In the example:

- Different elements of the source document are mapped to the "same" element in the target Schema/XML document.
- Specific elements (Manager etc.) are mapped to a generic one using a "role" attribute.



Chapter 4

Source driven / mixed content mapping

4 Source driven / mixed content mapping

MapForce supports source driven / mixed content mapping. Source driven / mixed content mapping enables you to automatically map text and child nodes in the same sequence that they appear in the XML source file.

Source-driven mapping can, of course, also be applied to XML schema **complexType** items if you wish. Child nodes will then be mapped according to their sequence in the XML source file.

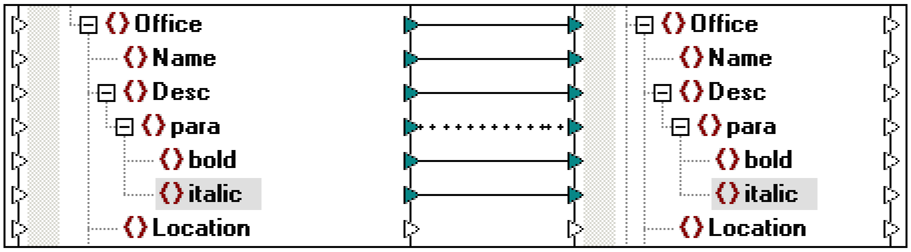
Source driven / mixed content mapping supports:

- XML schema complexTypes as **source** components,
- XML schema complexTypes of type mixed content, i.e. mixed=true, as **source** components,
- XML schema complexTypes (including mixed content), as **target** components

Please note:

Mixed content **text nodes** can only be mapped in their entirety; you cannot limit, or transform the data they contain. Filters, or any other type of function, cannot be used to access text node data.

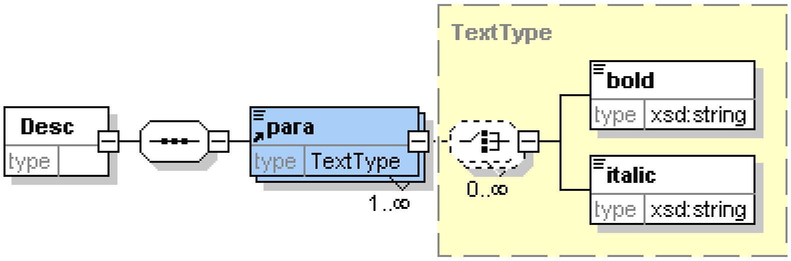
The image below shows an example of mixed content mapping. The para element is of mixed content, and the connector is shown as a dotted line to highlight this.



Right clicking a connector and selecting Connection settings, allows you to annotate, or label the connector. Please see section "Connection" in the Reference section for more information.

The files used in the following example (**Tut-Orgchart.mfd**) are available in the ...\ **MapForceExamples\Tutorial** folder.

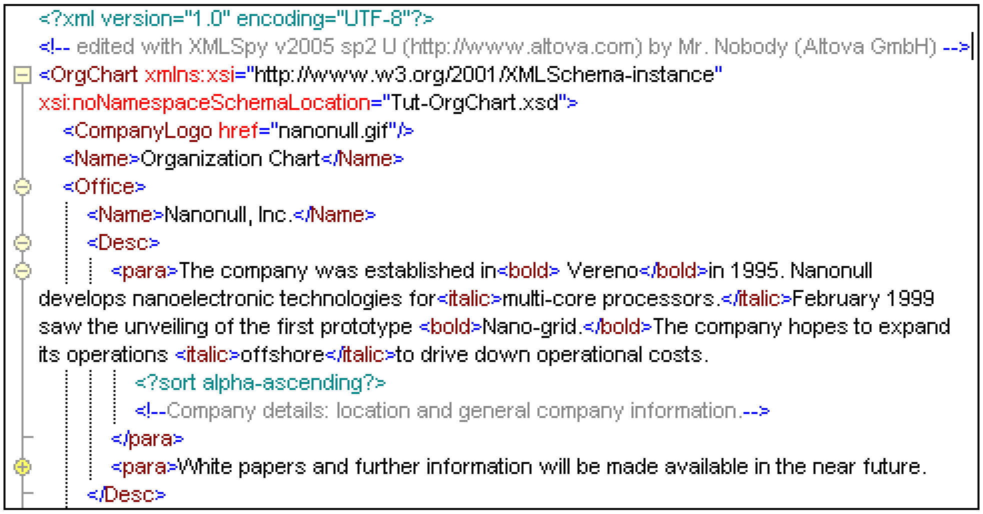
The image below shows the content model of the Description element (Desc) of the **Tut-OrgChart.xsd** schema file. This definition is identical in both the source and target schemas used in this example.



Content model of **para** element:

- para is a complexType with **mixed** = true, of type TextType.
- bold and italic elements are both of type **xsd:string**, they have not been defined as recursive in this example. i.e. neither bold, nor italic are of type "TextType".
- bold and italic elements can appear any number of times in any sequence within para.
- any number of text nodes can appear within the para element, interspersed by any number of bold and italic elements.

Source XML instance:
A portion of the XML file used in this section is shown below. Our area of concern is the mixed content element "para", along with it's child nodes "bold" and "italic". Please note that the para element also contains a Processing Instruction (sort alpha-ascending) as well as Comment text (Company details...) which can also be mapped, see "mixed content settings".



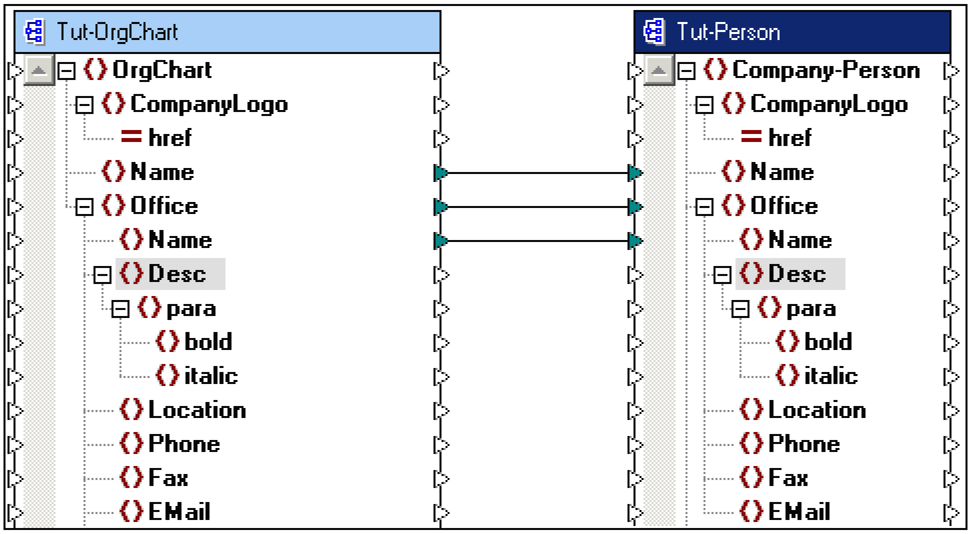
```
<?xml version="1.0" encoding="UTF-8"?>
<!-- edited with XMLSpy v2005 sp2 U (http://www.altova.com) by Mr. Nobody (Altova GmbH) -->
<OrgChart xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="Tut-OrgChart.xsd">
  <CompanyLogo href="nanonull.gif"/>
  <Name>Organization Chart</Name>
  <Office>
    <Name>Nanonull, Inc.</Name>
    <Desc>
      <para>The company was established in<bold> Vereno</bold>in 1995. Nanonull
develops nanoelectronic technologies for<italic>multi-core processors.</italic>February 1999
saw the unveiling of the first prototype <bold>Nano-grid.</bold>The company hopes to expand
its operations <italic>offshore</italic>to drive down operational costs.
        <?sort alpha-ascending?>
        <!--Company details: location and general company information.-->
      </para>
      <para>White papers and further information will be made available in the near future.
    </Desc>
```

Please note the **sequence** of the text and bold/italic nodes of Nanonull., Inc in the XML instance file, they are:

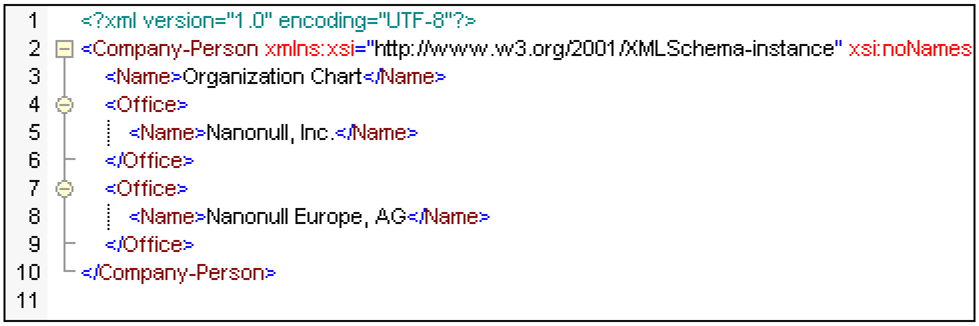
<para> The company...
    <**bold**>Vereno</**bold**>in 1995 ...
    <**italic**>multi-core...</**italic**>February 1999

<**bold**>Nano-grid.</**bold**>The company ...
<**italic**>offshore...</**italic**>to drive...
</para>

Mapping
The initial state of the mapping is shown below.



Output of above mapping:
The result of the initial mapping is shown below: Organization Chart as well as the individual office names have been output.



```
<?xml version="1.0" encoding="UTF-8"?>
<Company-Person xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:noNames
  <Name>Organization Chart</Name>
  <Office>
    <Name>Nanonull, Inc.</Name>
  </Office>
  <Office>
    <Name>Nanonull Europe, AG</Name>
  </Office>
</Company-Person>
```

4.1 Default settings: mapping mixed content

Creating mixed content connections between items:

1. Select the menu option **Connection | Auto Connect matching children** to activate this option, if it is not currently activated.
2. Connect the **Desc** item in the source schema, with the **Desc** item in the target schema.

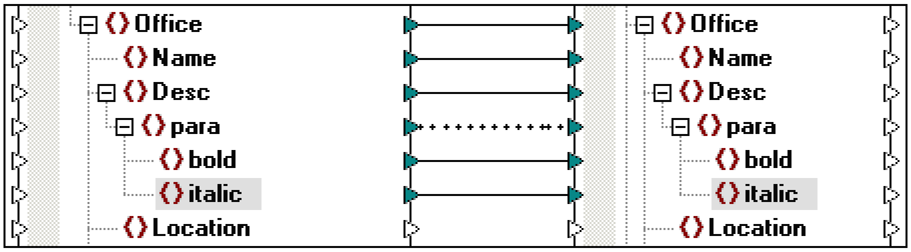
   A message appears, asking if you would like to create a mixed content connection. You are also notified that the text and child items will be transferred in the same order they appear in the XML source file.

3. Click Yes to create a mixed content connector.

Please note:

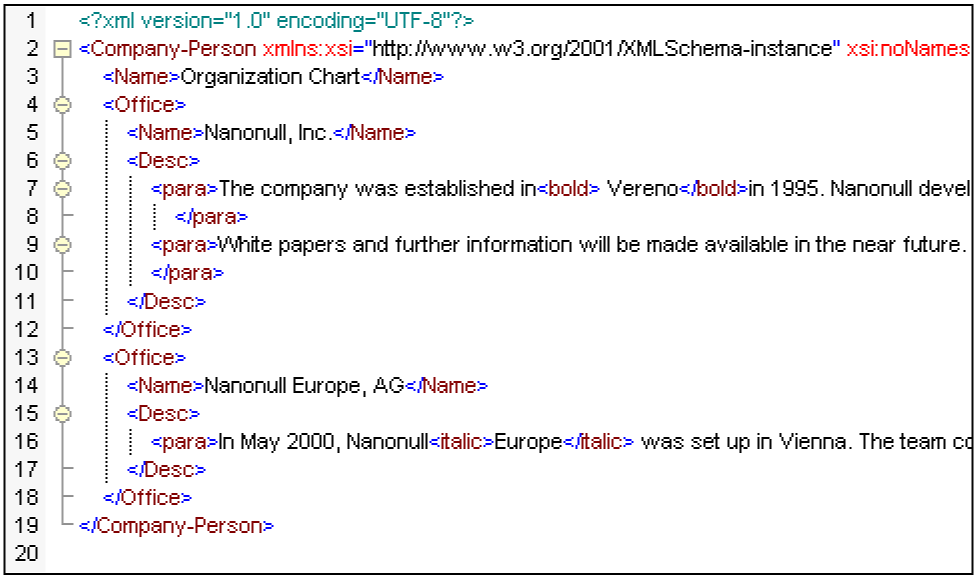
Although the Desc is not of mixed content, a message appears because the auto-connect option has been activated, and para exists in both source and target components. Para is of content, and makes the message appear at this point.

The mixed-content message also appears if you only map the para items directly, without having the autoconnect option activated.



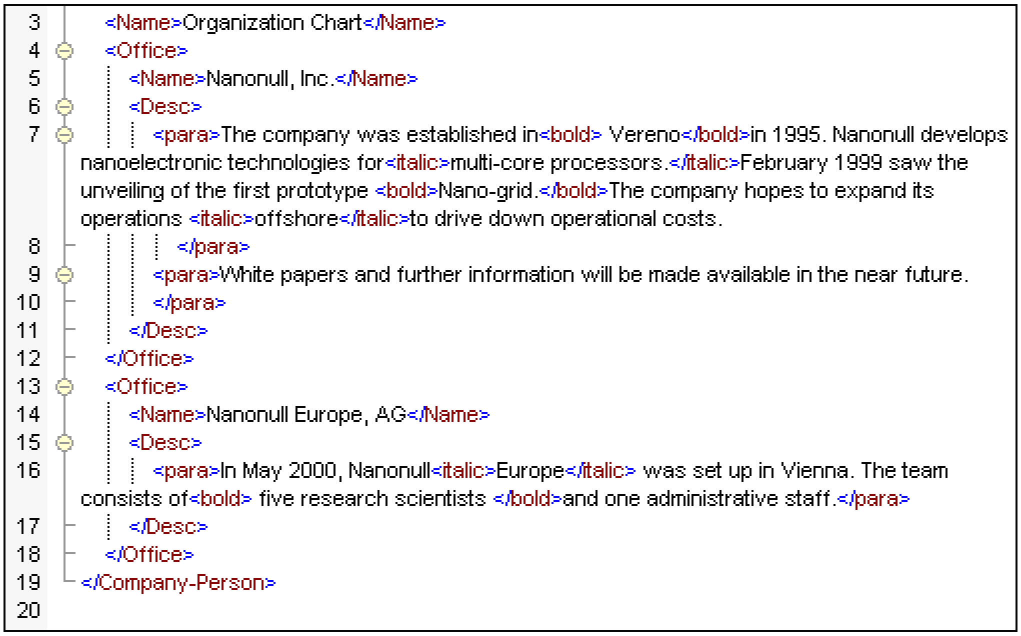
All child items of Desc have been connected. The connector joining the para items is displayed as a dotted line, to show that it is mixed content.

4. Click the Output tab to see the result of the mapping.



```
<?xml version="1.0" encoding="UTF-8"?>
<Company-Person xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:noNames
  <Name>Organization Chart</Name>
  <Office>
    <Name>Nanonull, Inc.</Name>
    <Desc>
      <para>The company was established in<bold> Vereno</bold>in 1995. Nanonull devel
        </para>
      <para>White papers and further information will be made available in the near future.
      </para>
    </Desc>
  </Office>
  <Office>
    <Name>Nanonull Europe, AG</Name>
    <Desc>
      <para>In May 2000, Nanonull<italic>Europe</italic> was set up in Vienna. The team co
    </Desc>
  </Office>
</Company-Person>
```

5. Click the word **Wrap** icon , to view display the complete text in the Output window.



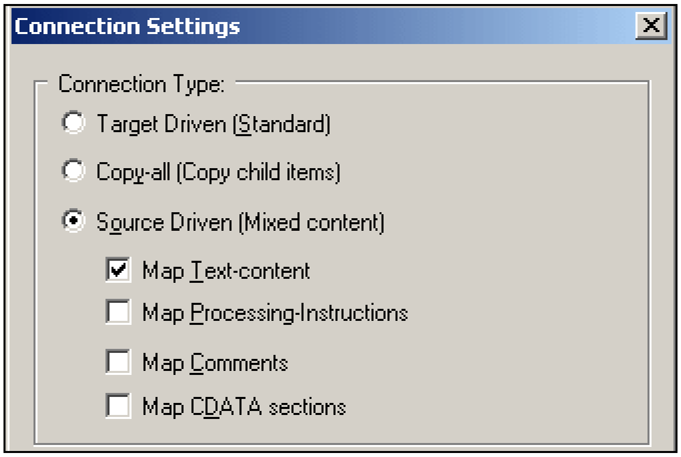
```
  <Name>Organization Chart</Name>
  <Office>
    <Name>Nanonull, Inc.</Name>
    <Desc>
      <para>The company was established in<bold> Vereno</bold>in 1995. Nanonull develops nanoelectronic technologies for<italic>multi-core processors.</italic>February 1999 saw the unveiling of the first prototype <bold>Nano-grid.</bold>The company hopes to expand its operations <italic>offshore</italic>to drive down operational costs.
        </para>
      <para>White papers and further information will be made available in the near future.
      </para>
    </Desc>
  </Office>
  <Office>
    <Name>Nanonull Europe, AG</Name>
    <Desc>
      <para>In May 2000, Nanonull<italic>Europe</italic> was set up in Vienna. The team consists of<bold> five research scientists </bold>and one administrative staff.</para>
    </Desc>
  </Office>
</Company-Person>
```

The mixed content text of each office description has been mapped correctly; the text, as well as the bold and italic tag content, have been mapped as they appear in the XML source file.

6. Switch back to the Mapping view.

Removing text nodes from mixed content items:

1. Right click the para connector and select **Connection Settings**.



Connection Settings

Connection Type:

○ Target Driven (Standard)

○ Copy-all (Copy child items)

● Source Driven (Mixed content)

☑ Map Text-content

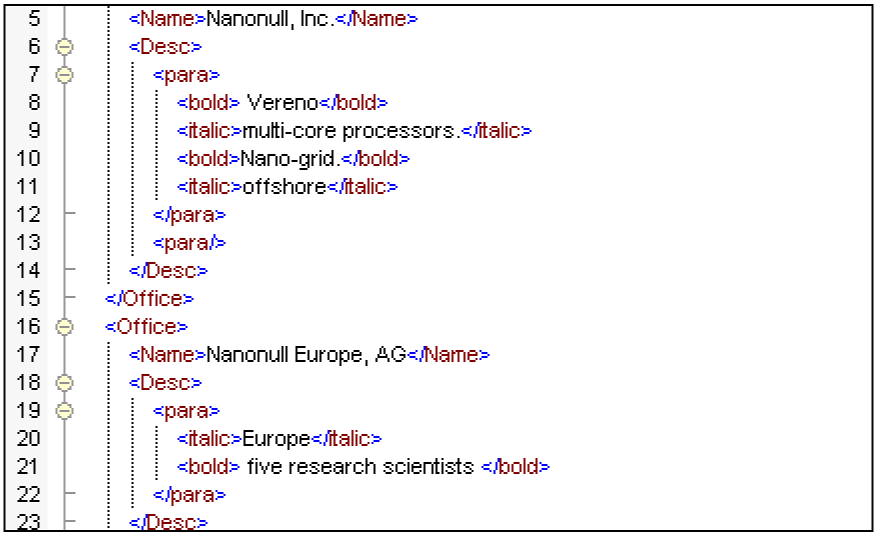
□ Map Processing-Instructions

□ Map Comments

□ Map CDATA sections

The image shows the default settings when you first create mixed content mapping. The "Map Text content" check box is active per default.

2. **Deactivate** the Map Text content check box and click OK to confirm.
3. Click the Output tab to see the result of the mapping.



```
    <Name>Nanonull, Inc.</Name>
    <Desc>
      <para>
        <bold> Vereno</bold>
        <italic>multi-core processors.</italic>
        <bold>Nano-grid.</bold>
        <italic>offshore</italic>
      </para>
      <para/>
    </Desc>
  </Office>
  <Office>
    <Name>Nanonull Europe, AG</Name>
    <Desc>
      <para>
        <italic>Europe</italic>
        <bold> five research scientists </bold>
      </para>
    </Desc>
```

Result:

- all **text** nodes of the para element have been removed.
- mapped bold and italic text content remain
- bold and italic item **sequence** still follow that of the source XML file!

Text nodes and mixed content mapping:

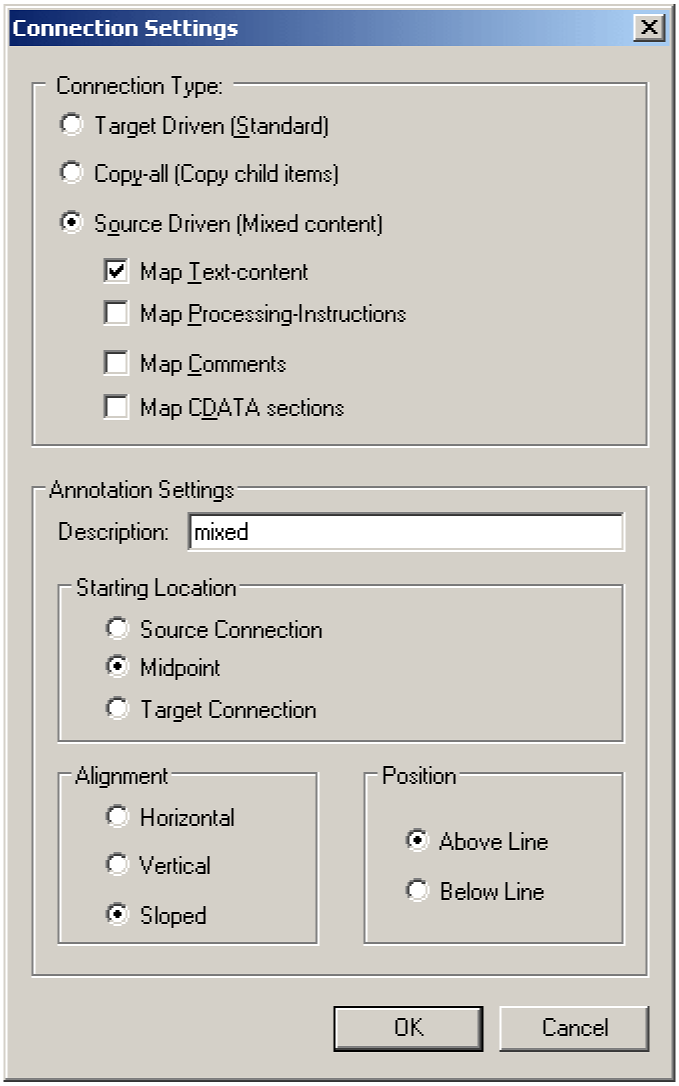
- Text nodes can only be mapped in their entirety; you cannot limit, or transform the data they contain. All text nodes of the para element are either mapped, or excluded, as in the example above.
- Filters, or any other type of function, cannot be used to access text node data.
- Mixed content child node data, i.e. data enclosed in bold/italic tags in this example, can of course be mapped individually. If a connector exists, then the child data will be mapped.
- There is currently no way of accessing the text node(s) of a mixed content element, for further processing, or filtering.

Mixed content settings:

- Right click the para connector and select Connection Settings.

  This opens the Connection Settings dialog box in which you can define the specific (mixed content) settings of the current connector. Note that unavailable options are greyed out.

  Please note that these settings also apply to **complexType** items which do not have any text nodes!



Connection Settings

Connection Type:

○ Target Driven (Standard)

○ Copy-all (Copy child items)

● Source Driven (Mixed content)

☑ Map Text-content

□ Map Processing-Instructions

□ Map Comments

□ Map CDATA sections

Annotation Settings

Description: mixed

Starting Location

○ Source Connection

● Midpoint

○ Target Connection

Alignment

○ Horizontal

○ Vertical

● Sloped

Position

● Above Line

○ Below Line

Target Driven (Standard)
Changes the connector type to Standard mapping, please see: "Source-driven / mixed content vs. standard mapping" for more information.

Source Driven (mixed content)
Changes the connector type to source driven / mixed content, and enables the selection of additional elements to be mapped. The additional elements have to be **child items** of the mapped item in the XML source file, to be able to be mapped.

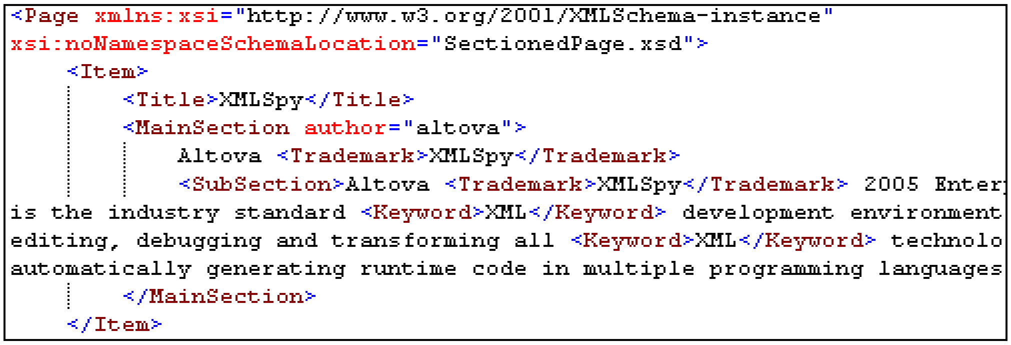
Annotation settings:
Individual connectors can be labeled for clarity.

1. Double click a connector and enter the name of the connector in the Description field. This enables all the options in the Annotation Settings group.
2. Use the remaining groups to define the position and alignment of the label.

4.2 Mixed content example

The following example is available as "**ShortApplicationInfo.mfd**" in the ...\ **MapForceExamples** folder.

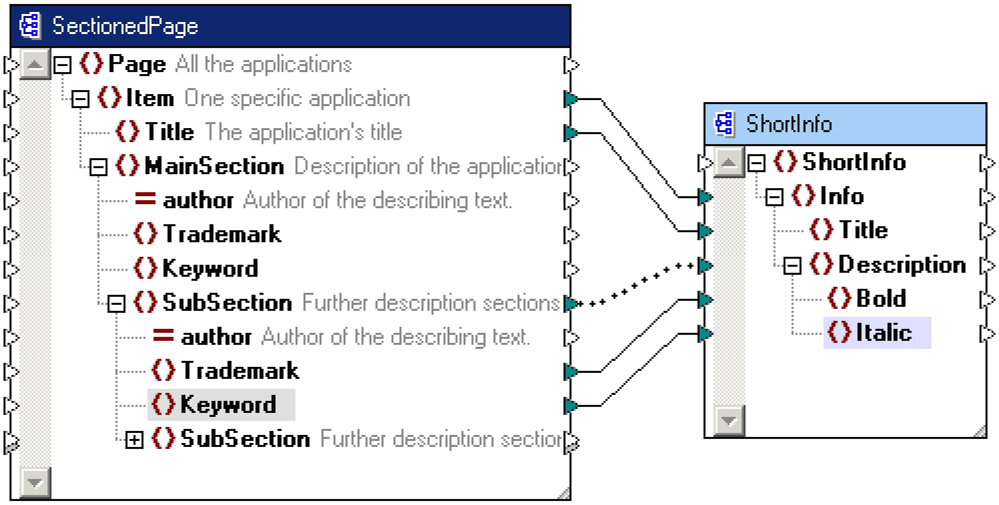
A snippet of the XML source file for this example is shown below.



```
<Page xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="SectionedPage.xsd">
    <Item>
        <Title>XMLSpy</Title>
        <MainSection author="altova">
            Altova <Trademark>XMLSpy</Trademark>
            <SubSection>Altova <Trademark>XMLSpy</Trademark> 2005 Enter
is the industry standard <Keyword>XML</Keyword> development environment
editing, debugging and transforming all <Keyword>XML</Keyword> technolo
automatically generating runtime code in multiple programming languages
        </MainSection>
    </Item>
```

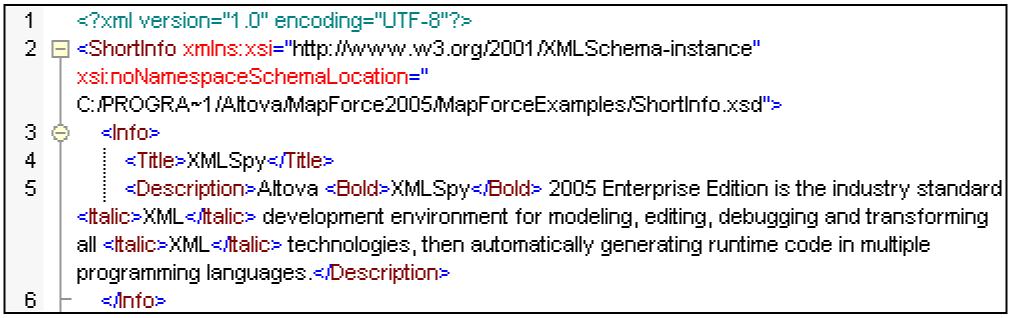
The mapping is shown below. Please note that:

- The Subsection item connector is of mixed content, and is mapped to the Description item in the target XML/schema.
- Trademark text is mapped to the Bold item in the target
- Keyword text is mapped to the Italic item in the target


SectionedPage
Page All the applications
Item One specific application
Title The application's title
MainSection Description of the application
author Author of the describing text.
Trademark
Keyword
SubSection Further description sections
author Author of the describing text.
Trademark
Keyword
SubSection Further description section
ShortInfo
ShortInfo
Info
Title
Description
Bold
Italic

Mapping result:

- The mixed content text of each description has been mapped correctly; the text, as well as the bold and italic tag content, have been mapped as they appear in the XML source file.



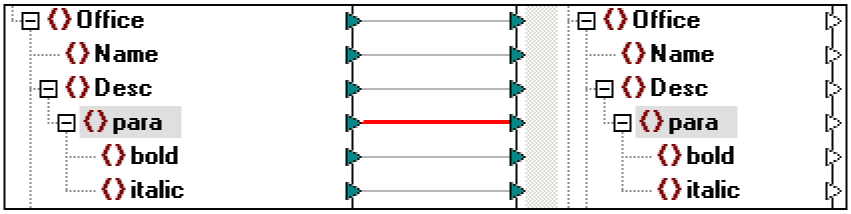
```
<?xml version="1.0" encoding="UTF-8"?>
<ShortInfo xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="
C:/PROGRA~1/Altova/MapForce2005/MapForceExamples/ShortInfo.xsd">
  <Info>
    <Title>XMLSpy</Title>
    <Description>Altova <Bold>XMLSpy</Bold> 2005 Enterprise Edition is the industry standard
<Italic>XML</Italic> development environment for modeling, editing, debugging and transforming
all <Italic>XML</Italic> technologies, then automatically generating runtime code in multiple
programming languages.</Description>
  </Info>
```

4.3 Source-driven / mixed content vs. standard mapping

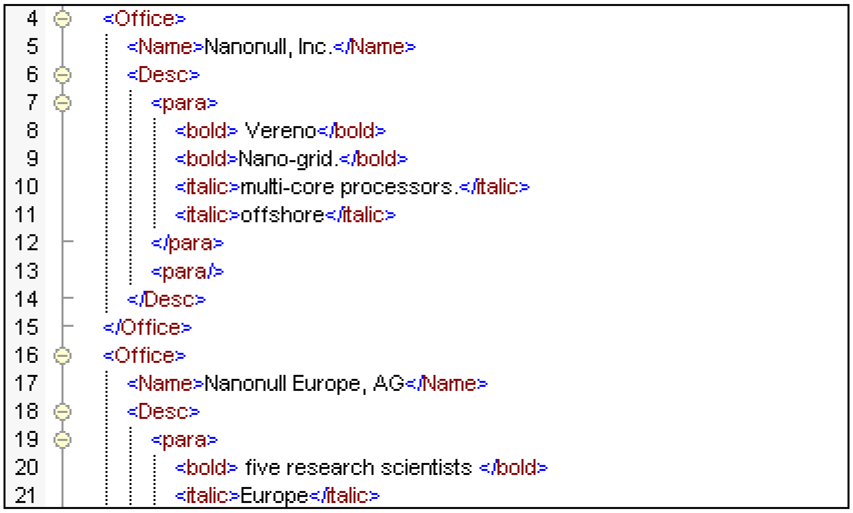
This section describes the results when defining standard mappings (or using standard connectors) on mixed content items. The files used in the following example (**Tut-Orgchart.mfd**) are available in the ...**\MapForceExamples\Tutorial** folder.

Creating standard connections between mixed content items:

1. Right click the para connector and select **Target Driven (Standard)** from the popup window.
   The connector now appears as a solid line.



2. Click the Output tab to see the result of the mapping.



```
<Office>
  <Name>Nanonull, Inc.</Name>
  <Desc>
    <para>
      <bold> Vereno</bold>
      <bold>Nano-grid.</bold>
      <italic>multi-core processors.</italic>
      <italic>offshore</italic>
    </para>
    <para/>
  </Desc>
</Office>
<Office>
  <Name>Nanonull Europe, AG</Name>
  <Desc>
    <para>
      <bold> five research scientists </bold>
      <italic>Europe</italic>
```

Result:

- all **text** nodes of the para element have been removed.
- mapped bold and italic text content remain
- However, bold and italic item **sequence** follow that of the **target** XML/schema file!

Target Driven (Standard) - properties
Standard mapping means the normal method of mapping used in MapForce, i.e.:

- Mixed content text node content is not supported/mapped.
- The sequence of child nodes is dependent on the target XML/schema file.

  In this example:
  For each **para** element, first **map all bold** items, then map **all italic** items. This results in the child item sequence shown above: bold, bold - italic, italic. The content of each item is mapped if a connector exists.

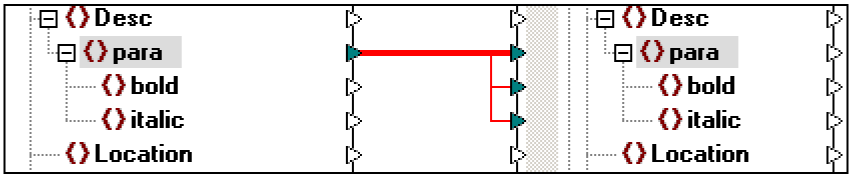
Please note:
If one of the child nodes/items use the **anyType** datatype, then the node **content** is not mapped - only the **empty** item/node name is transferred to the target component!

The **anyType** datatype, allows unconstrained content (including mixed content), and MapForce cannot automatically ascertain the varied structure of such types of nodes.

Change the datatype to anySimple type, or a more specific type e.g. xs:string, if empty nodes appear in the output window, or define a complexType in the schema and map the respective items.

Copy-all mapping:

1. Right click the para connector and select **Copy-all** from the popup window.
   The connector now appears as a solid line with the child items branching out of, and below it. Please see "Copy-all connections" for more information.



Chapter 5

Copy-all connections

5 Copy-all connections

This type of connection allow you to organize your workspace and automatically connect **all** identical items in source and target components, meaning that, depending on the source and target **type**:

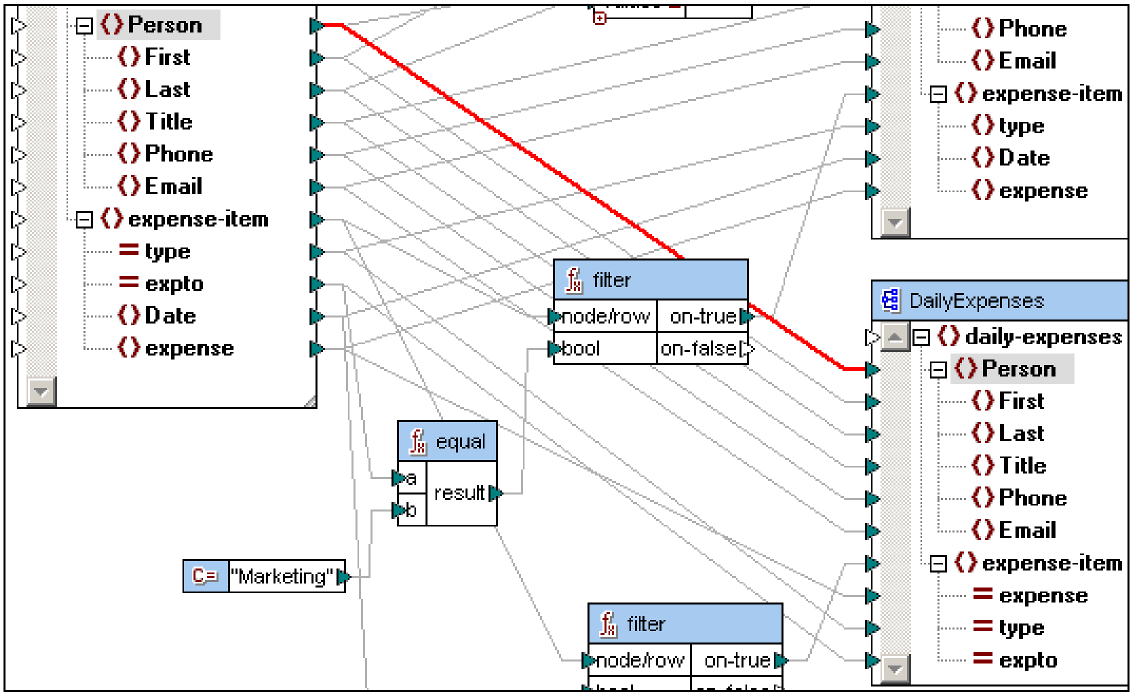
- all source child items are **copied** to the target component, if either the source and target **types** are **identical**, or if the target type is xs:anyType
- if the source and target **types** are **not identical,** and if the target type is not xs:anyType, the source data is transferred/mapped to the respective target items of the same name and the same hierarchy level. If the names of the target items differ, then the target item is not created.
- Note that only the names of the child items, but not their individual types, are compared/matched.

Currently Copy-all connections are supported:

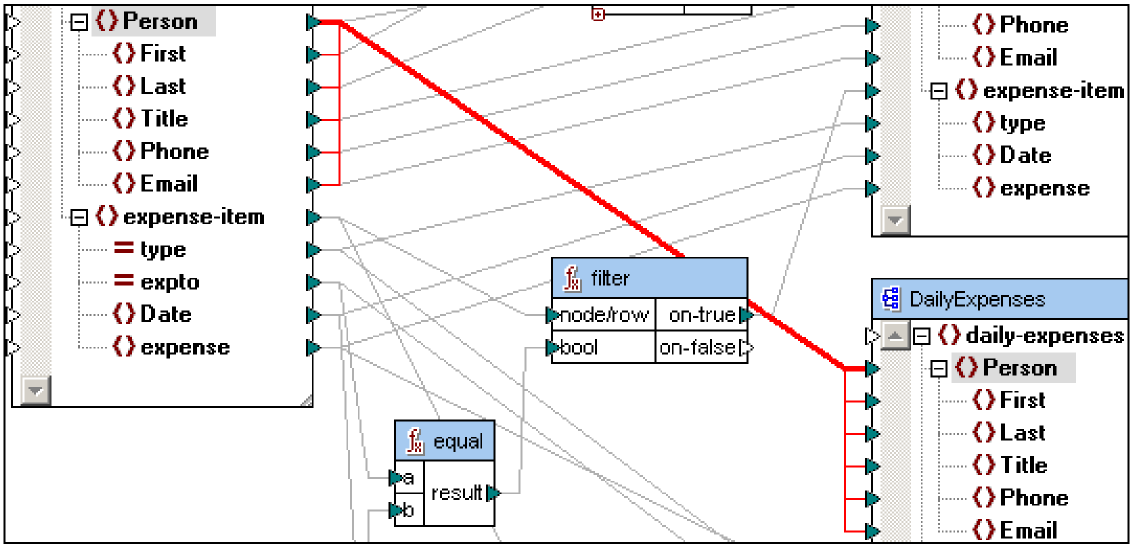
- between XML schema complex types, and
- between complex components (XML schema, and complex user-defined functions/components containing the same corresponding complex parameters, please see "Complex output components - defining" for an example.

The example below shows these connectors using the **MarketingAndDailyexpenses.mfd** file in the ...**MapForceExamples** folder.

1. Right click the Person component and select "Copy-all" from the context menu.
   A prompt appears reminding you that the target connectors will be deleted.



2. Click OK if you want to create Copy-all connectors.



All connectors to the target component, and all source and target items with identical names are created.

Please note:

- When the existing target connections are deleted, connectors from other source components, or other functions are also deleted.
- This type of connection cannot be created between an item and the root element of a schema component.
- Individual connectors cannot be deleted, or reconnected from the Copy-all group, once you have used this method.

Copy-all connections and user-defined functions

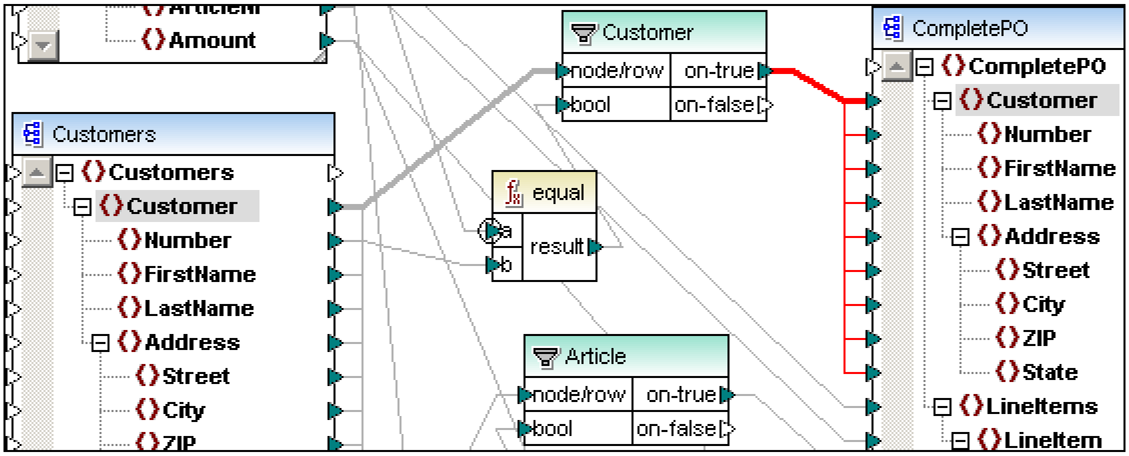
When creating Copy-all connections between a schema and a user-defined function of type "Inline", the two components must be based on the same schema! It is not necessary that they both have the same root elements however. Please see "Complex output components - defining" for an example.

Copy-all connections and filters

Copy-all connections can also be created through filter components if the source component:

- consists of structured data, meaning a schema component.
- receives data through a complex output parameter of a user-defined function, or Web service.
- receives data through another filter component.

Only the filtered data is passed on to the target component.



Copy-all connections through filters cannot be created if the source component:

- is an "exists" type of component
- is a "function" component e.g. "equal"

To define a copy-all connection through a filter component:

1. Right click the filter **output** connector i.e. the right hand **on-true**/on-false connector.
2. Select Copy-all (Copy child items) from the context menu.
   The copy-all connector between items of the same name are created.

Please note:

To change the connector back to a different type, make sure you right click connector on the output side of the filter, the left hand connector cannot be used to change the connection type.

Chapter 6

MapForce How To...

6 MapForce How To...

This section deals with common tasks that will be encountered when creating your own mappings.

The tasks covered are:

- Mapping multiple tables to one XML file
- How to map data to the root element of target components
- Using boolean values in XSLT 1.0
- Mixed content data and MapForce
- Defining the Priority context
- MapForce command-line parameters
- Using input functions to override values, and act as parameters in command line execution
- Filter components - Tips
- Node testing

6.1 Mappings and root element of target documents

Root element of target XML files
When creating a mapping to the root element of the target Schema/XML file, please make sure that only one element is passed on to the target XML, as an XML document may only have one root element.

Use the filter component to limit the mapped data to a single element or record.

Root element not limited:
If you do not limit the target schema root element, then all source elements/records are inserted between the first root element.

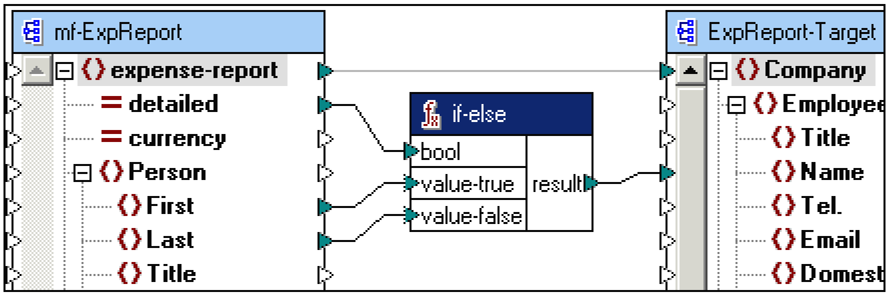
6.2 Boolean values and XSLT 1.0

Currently XSLT processors can only process values as strings. The values supplied by the "detailed" element in this example, can only be "true" or "false" (as defined in the schema file).

The example below tries to create an **if-else construct**, using the bool value of "detailed". Depending on the content, you should either see the First, or Last name of the Person element in the Target schema.

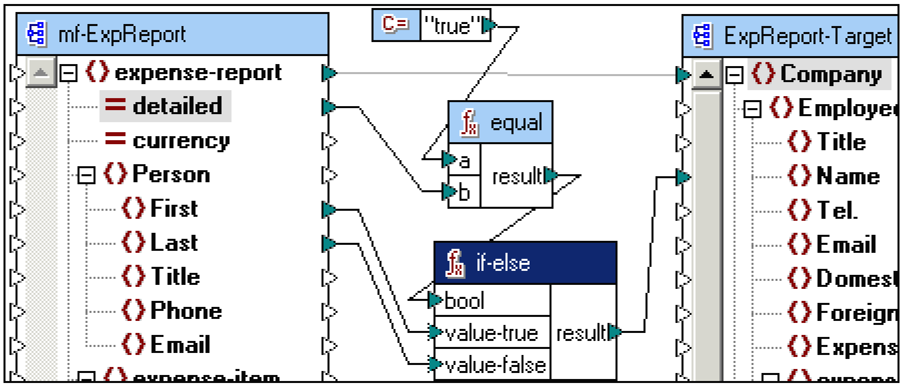
Trying out this mapping however, shows that whatever the bool value of detailed is, true or false, you will always have the contents of First in the target schema. XSLT currently takes **all string input** as True, so this method cannot be used to directly check a boolean value.

Clicking the "Insert Condition" icon inserts the IF-Else condition function.



To use boolean values as comparison values in XSLT:

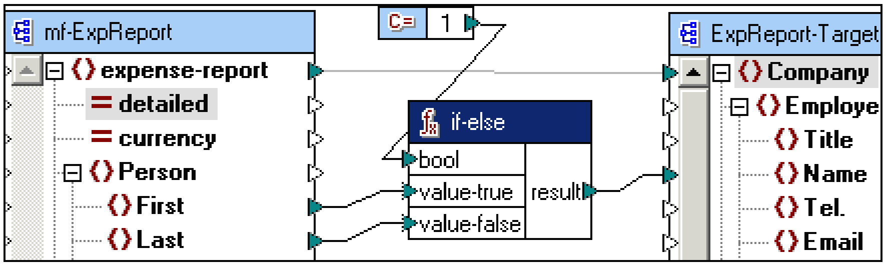
1. Supply a boolean value using the **constant** component, e.g. true.
2. Use the **equal** component to check if the value of the constant, is equal to the content of the boolean node, detailed.
3. Pass the **result** of the comparison on to the **bool** parameter of the **if-else** condition. If the **detailed** element supplies **true**, then the equal result parameter is also true.



- If the bool value (of if-else) is **true**, then the value of **First** is passed on to the target schema.
- If **false**, then the value of **Last** is passed on to the target schema.

Forcing boolean values:

There might be instances where you want to predefine, or force the result of a condition.



1. Connect the constant component directly to the **bool** parameter of an if-else/filter component.
2. Select the **Number** radio button in the "Insert constant" dialog box, and
3. Enter **1** for True, and **0** for false - depending on the condition you want satisfied.

6.3 Boolean comparison of input nodes

Data type handling in boolean functions (difference between MapForce 2007 SP1 and SP2)
During the evaluation of the core functions, less-than, greater-than, equal, not-equal, less equal, and greater equal, the evaluation result of two input nodes depends on the input values as well as the data types used for the comparison.

Example:
The 'less than' comparison of the integer values 4 and 12, yields the boolean value "true", since 4 is less than 12. If the two input strings contain '4' and '12', the lexical analysis results in the output value false", since '4' is alphabetically greater than the first character '1' of the second operand (12).

If all "input" data types are of the same type, e.g. all input nodes are numerical types, or strings, then there is no difference between the SP1 and SP2 versions.

Differing input node types (only version SP2):
If the input nodes are of differing types, e. g. integer and string, or string and date, then version SP2 introduces a new rule:

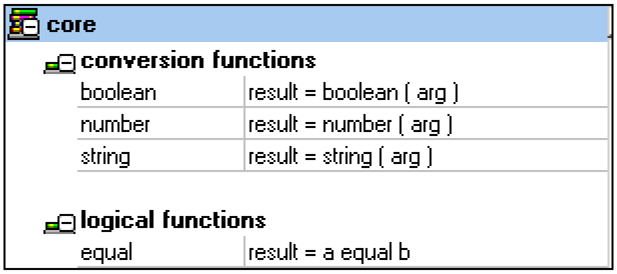
The data type used for the comparison **is always the most general, i. e. least restrictive, input data type** of the two input types.

Before comparing two values, all input values are converted to a common datatype. Using the previous example; the datatype "string" is less restrictive than "integer". Comparing integer value 4 with the string '12', converts integer value 4 to the string '4', which is then compared with the string '12'.

The type handling for comparing mixed types, follows the XSLT2 guidelines and prevents any content-sensitive type conversion strategies. The advantage is that the logic is fixed by the mapping and does not change dynamically.

Additional checks:
Version SP2 additionally checks mappings for incompatible combinations and raises validation errors and warnings if necessary. Examples are the comparison of dates with booleans, or "datetimes" with numerical values.

In order to support explicit data type conversion, Version SP2 introduces three new **type conversion** functions to the core library: "boolean", "number" and "string". In the previously mentioned context, these three functions are suitable to govern the interpretation of comparisons.



core

conversion functions

boolean	result = boolean (arg)
number	result = number (arg)
string	result = string (arg)

logical functions

equal	result = a equal b

Adding these conversion functions to input nodes of related functions might change the common data type and the result of the evaluation in the desired manner. E. g. if string nodes store only numeric values, a numerical comparison is achieved by adding the "number" conversion function (in the **conversion** section of the **core** library) to each input node.

6.4 Priority Context

When applying a function to different items in a schema, MapForce needs to know what the context node will be. All other items are then processed relative to this one. This is achieved by designating the item (or node) as the priority context.

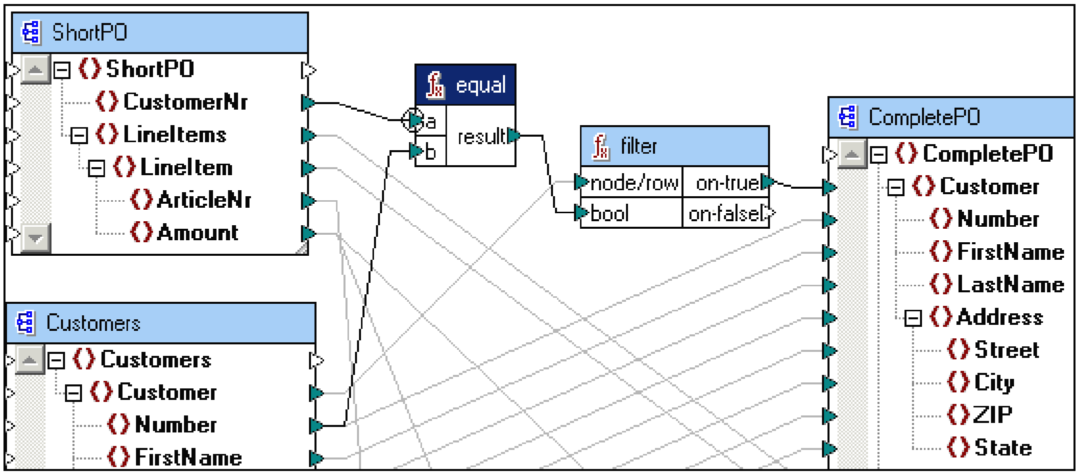
The **CompletePO.mfd** file available in the **...\MapForceExamples** folder, is shown below.

Please note that there are multiple source components in this example. **ShortPO, Customers, and Articles** are all schemas with associated XML instance files. The data from each, are then mapped to the CompletePO schema / XML file. The priority context icon, is enclosed in a circle as a visual indication.

- The **CustomerNr** in ShortPO is compared with the item **Number** in the Customers file.
- **CustomerNr** has been designated as the **priority context**, and is placed in the **a** parameter of the equal function.
- The **Customers** file is then searched (**once**) for the **same** number. The **b** parameter contains the Number item from the Customers file.
- If the number is found, then the result is passed to the **bool** parameter of the **filter** function.
- The **node/row** parameter passes on the **Customers** data to "on-true" when the bool parameter is true, i.e. when the same number has been found.
- The rest of the customer data is then passed on as: Number, FirstName, LastName items, are all connected to the corresponding items in the target schema.

Designating the **b** parameter of the equal function (i.e. item Number), as the **priority context** would cause:

- MapForce to load the first Number into the **b** parameter
- Check against the **CustomerNr** in **a,** if not equal,
- Load the next Number into **b**, check against a, and
- Iterate through every Number in the file while trying to find that number in ShortPO.



6.5 Command line parameters

The command line parameter syntax for MapForce is shown below.

General syntax:
MapForce.exe Filename [(/XSLT | /XSLT2) outputdir [/LOG logFileName]]

- The square brackets **[...]** denote optional.
- The round brackets **(...)** denote a parameter group containing several choices.
- There are six main parameter groups as shown in the examples below.

Description of parameters:

Filename	YourMAPFORCEfile.**MFD** **If the path, or file name contains a space, please use quotes around the path/file name i.e. "c:\Program Files\...\Filename"**
/XSLT	generates all XSLT files
/XSLT2	generates all XSLT files
Outputdir	directory the log file is to be placed in
/LOG	LogFileName, name of the log file to be generated

Examples:

MapForce.exe Filename starts MapForce and opens the file defined by Filename.

I) generate all XSLT files and output a log file.
MapForce.exe Filename /XSLT outputdir /LOG logFileName

6.6 Input values, overrides and command line parameters

MapForce allows you to create special input components that can:

- define an **override,** or alternative, value for data being input by the current mapping, and
- use this input component as a **parameter** in the command line execution of the compiled mapping.

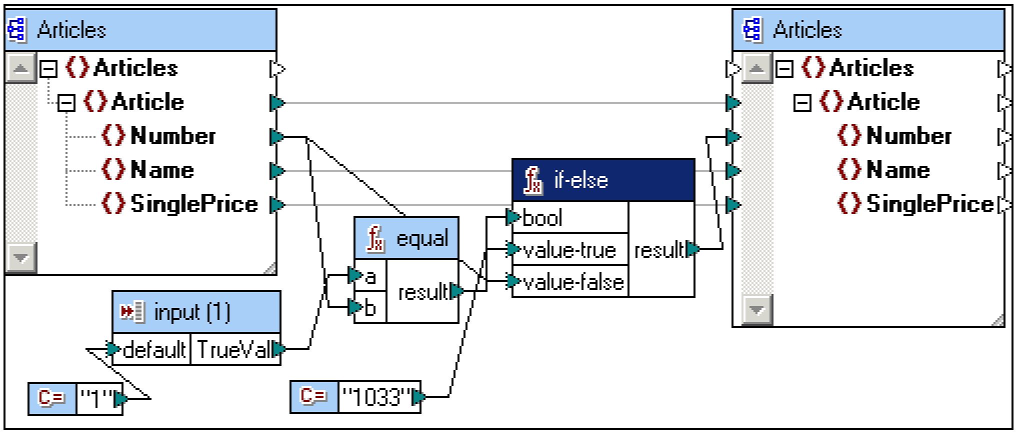
Please note:

This specific type of input component cannot be used **inside** a user-defined function.

The mapping below, uses such an input component. The aim of this mapping is to search for a specific article number, and replace it with a value 1033, if found. If the search is not successful, retain the current number.

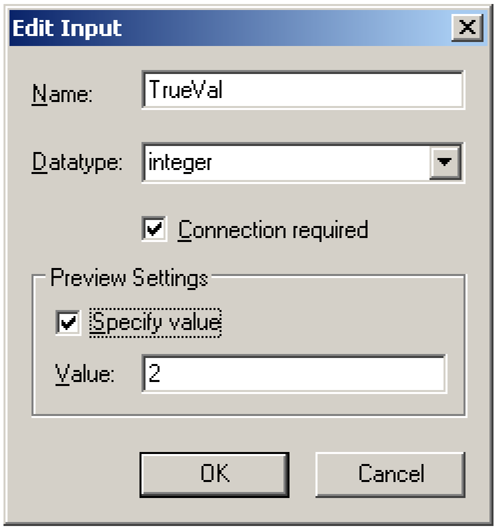
What the input component allows you to do, is override the current input which is 1, and replace it with whatever you define in the input component. Please note that the input in this example is a constant, i.e. 1, but that this will generally not be the case in a complex mappings, where the input can be any type of data from any input source.

The input component further doubles as an **input parameter** for the command line execution of the generated mapping code!



The above example uses the Articles.xsd schema and Articles.xml files, available in the ...\ **MapForceExamples** folder. The article numbers in the source XML file are 1, 2, 3, and 4.

1. Use the menu option **Function | Insert Input** to insert the component.
   This opens the Create Input dialog box.
2. Enter a name for the function and select the datatype you want to use.
3. Click in the **Value** field, of the Preview Settings group, and enter a value. In this case, enter a value **different** from the one supplied by the constant, e.g. 2.



Name: TrueVal

Datatype: integer

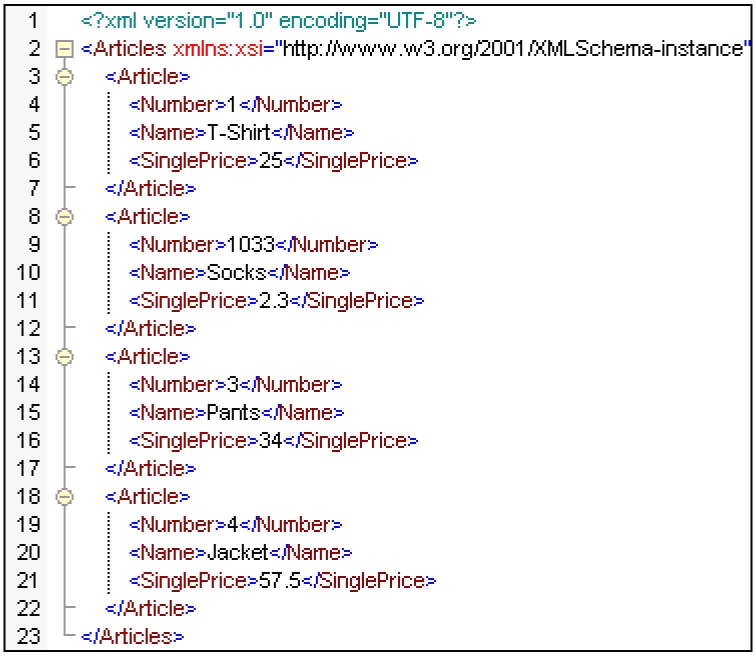
☑ Connection required

Preview Settings

☑ Specify value

Value: 2

4. Click the Output tab to see the result of the mapping.



```
<?xml version="1.0" encoding="UTF-8"?>
<Articles xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  <Article>
    <Number>1</Number>
    <Name>T-Shirt</Name>
    <SinglePrice>25</SinglePrice>
  </Article>
  <Article>
    <Number>1033</Number>
    <Name>Socks</Name>
    <SinglePrice>2.3</SinglePrice>
  </Article>
  <Article>
    <Number>3</Number>
    <Name>Pants</Name>
    <SinglePrice>34</SinglePrice>
  </Article>
  <Article>
    <Number>4</Number>
    <Name>Jacket</Name>
    <SinglePrice>57.5</SinglePrice>
  </Article>
</Articles>
```

The original article number 2, has been changed to 1033. The value supplied by the input component i.e. 2, has taken precedence over the value supplied by the constant, which was 1.

Input values and Code generation:
Values or strings entered in the "Create/Edit input" dialog box are only applicable when previewing results in the Output tab!

A value or string entered in the "Value" field of the "Create/Edit Input" dialog box, only takes effect when **previewing** output in MapForce, it has no affect on the generated code.

The value supplied by the "**default**" input item/icon is used for the **preview,** if "Specify value" is **inactive.**

Code generation uses the value specified by, or connected to, the **default** item of the input component, if the parameter is not used/supplied in the command line.

Using input values as parameters in command line execution of mappings:
Input values can be used as parameters when calling the generated mapping, where:

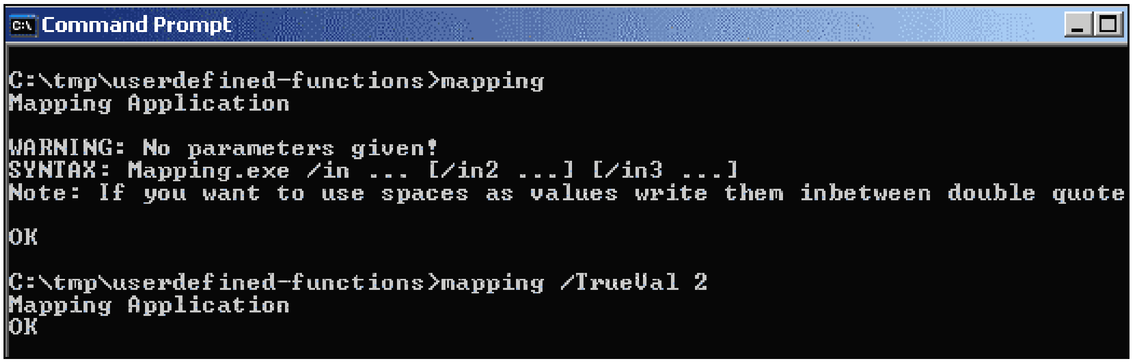
- the generated application name is **Mapping.exe**
- the input value name "**TrueVal**" is the first parameter, and
- the input value "**2**" is the second parameter.

The command line thus becomes:

mapping.exe /TrueVal 2

Please note:
Running mapping.exe without parameters, displays a warning message, and help on the command line syntax needed.

- "Preview Settings" are NOT used if the specific command line parameters are not supplied during command line execution of the generated EXE file, e.g. **mapping.exe.** In this case the default, or data supplied by the connected item is used.



```
C:\tmp\userdefined-functions>mapping
Mapping Application

WARNING: No parameters given!
SYNTAX: Mapping.exe /in ... [/in2 ...] [/in3 ...]
Note: If you want to use spaces as values write them inbetween double quote

OK

C:\tmp\userdefined-functions>mapping /TrueVal 2
Mapping Application
OK
```

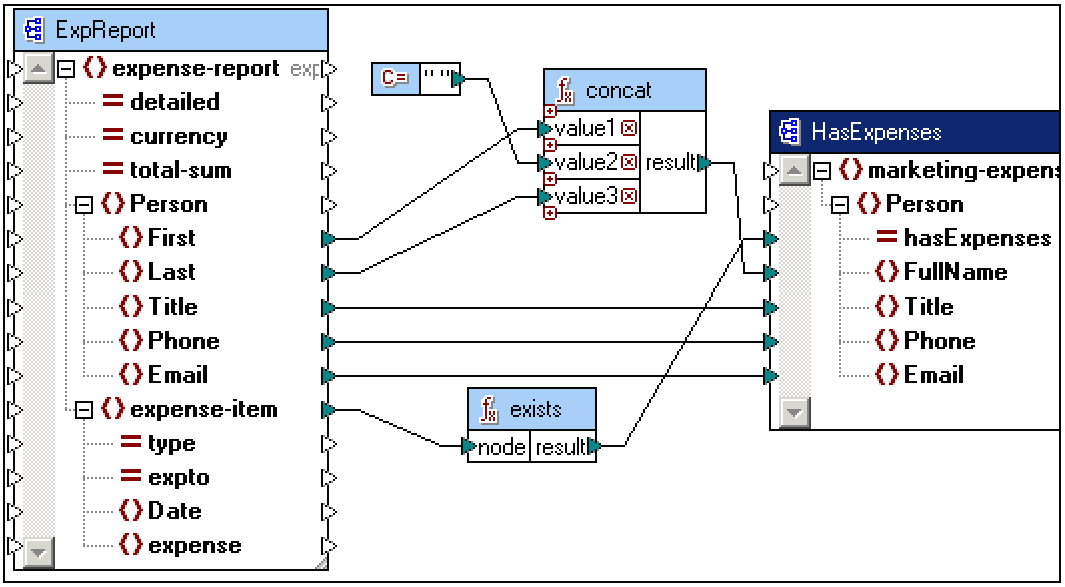
6.7 Node testing

The node testing functions allow you to test for the existence of nodes in the **XML instance** files. Elements or attributes defined as optional in the XML Schema, may, or may not, appear in the XML instance file. Use these functions to perform the specific node test and base further processing on the result.

Exists

Returns true if the node exists, else returns false.
The "HasMarketingExpenses.mfd" file in the ...**MapForceExamples** folder contains the small example shown below.

If an expense-item exists in the source XML, then the "hasExpenses" attribute is set to "true" in the target XML/Schema file.

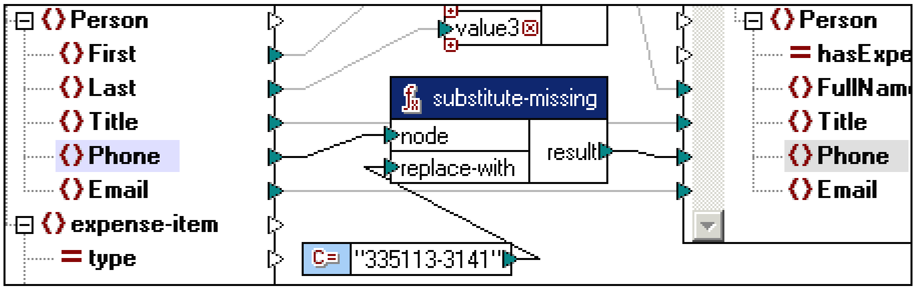


Not-exist

Returns false if the node exists, else returns true.

substitute missing

Used to map the current field content if the node exists in the XML source file, otherwise use the item mapped to the "replace-with" parameter.



In the image above, the existence of the node "Phone" is checked in the XML instance file. If the node is not present, then the value supplied by the constant is mapped.

6.8 Using DTDs as "schema" components

MapForce 2006 SP2 and above, support namespace-aware DTDs for source and target components. The namespace-URIs are extracted from the DTD "xmlns"-attribute declarations, to make mappings possible.

Adding DTD namespace URIs
There are however some DTDs, e.g. DTDs used by StyleVision, which contain xmlns*-attribute declarations, without namespace-URIs. These DTDs have to be extended to make them useable in MapForce.

- The DTD has to be altered by defining the xmlns-attribute with the namespace-URI as shown below:

```
<!ATTLIST fo:root
        xmlns:fo CDATA #FIXED 'http://www.w3.org/1999/XSL/Format'
        ...
>
```

Chapter 7

User-defined functions

7 User-defined functions

MapForce allows you to create user-defined functions (within user-defined libraries) which can contain any number of input and outputs where any of these can be in the form of: simple values, or XML nodes.

There are two types of user-defined functions: those defined as "Inline" and the others as "Standard", please see Inline vs. Standard user-defined functions for more information. Also note that user-defined functions can be changed from the one type to the other.

The main use of user-defined functions is to combine data sources, as well as input and output components, into a single user-defined function / component, which can be used across different mappings.

User-defined functions can be:

- built from scratch, or
- use functions currently available in the mapping tab.
- imported into other mappings by loading the mapping file as a library.

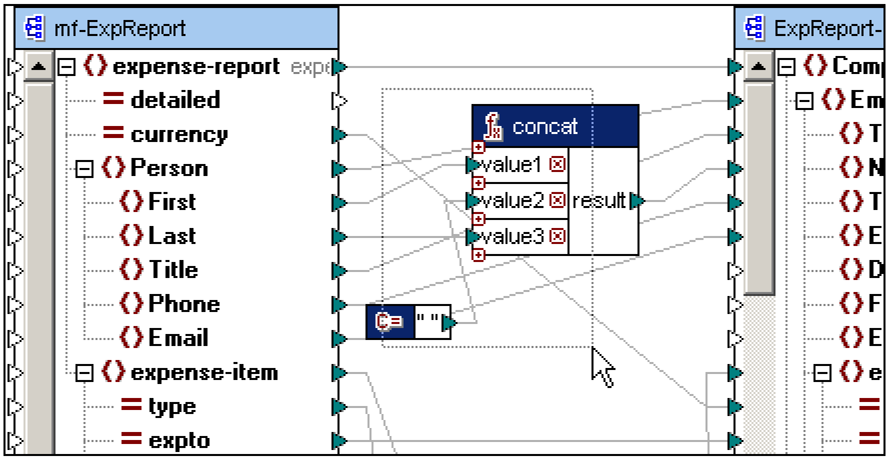
User-defined functions **cannot** be:

- saved as part of a custom library *.mff file as they are stored in the .mfd mapping file. Please see Adding custom libraries on how to create your own function libraries, and Viewing User-defined functions in mff files to see how they are managed.

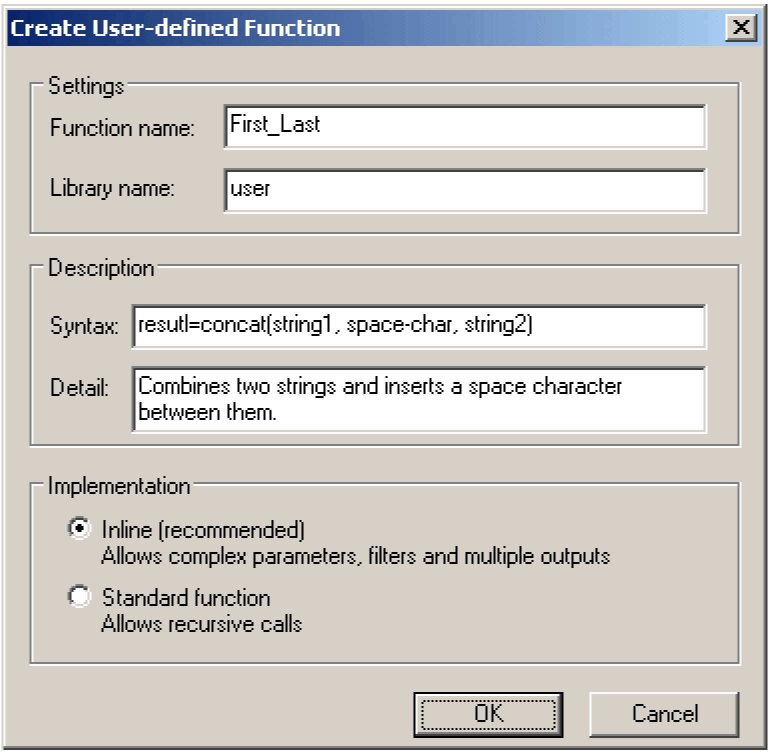
This example uses the **Tut-ExpReport.mfd** file available in the ...**MapForceExamples** folder.

To create a user defined function:

1. Drag to mark both the concat and the constant functions (you can also hold down the CTRL key and click the functions individually).



2. Select the menu option **Function | Create User-Defined Function from Selection**.
3. Enter the name of the new user-defined function (First_Last).
   Note: valid characters are: alphanumeric, a-z, A-Z, 0-9 as well as underscore "_", hyphen/dash "-" and colon ":".
4. Use the Syntax and Detail fields to add extra information on the new function, and click OK to confirm.
   The library name "user" is supplied as a default, you can of course define your own library name in this field.



Create User-defined Function

Settings

Function name: First_Last

Library name: user

Description

Syntax: resutl=concat(string1, space-char, string2)

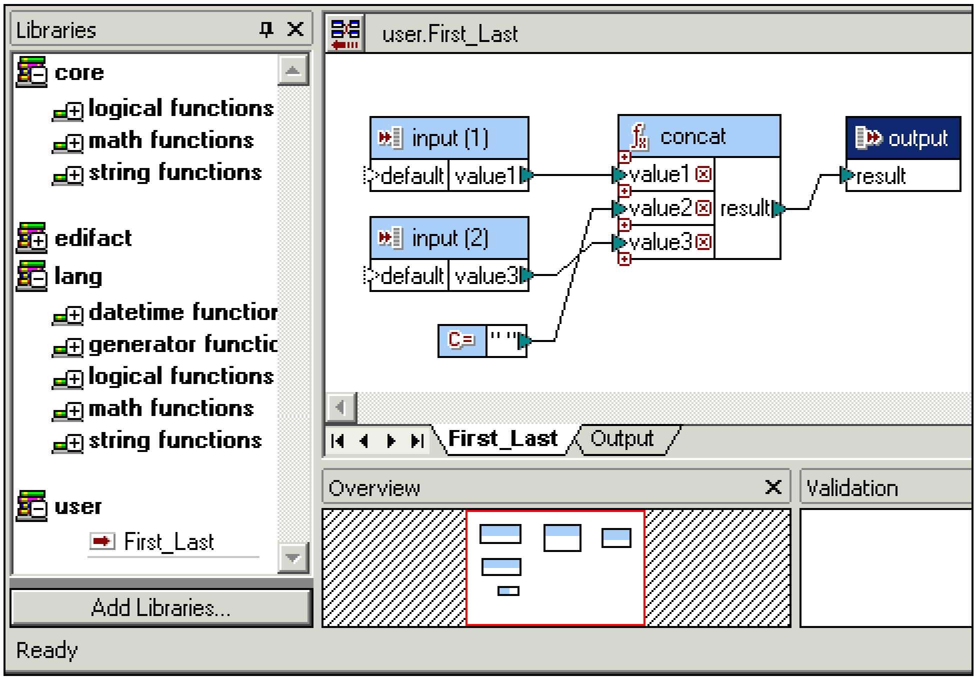
Detail: Combines two strings and inserts a space character between them.

Implementation

● Inline (recommended)
Allows complex parameters, filters and multiple outputs

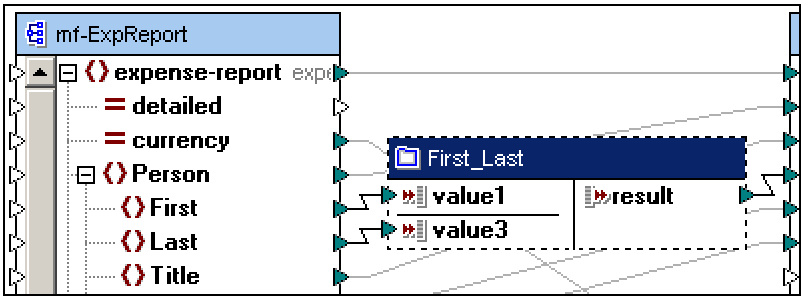
○ Standard function
Allows recursive calls

The individual elements that make up the function group appear in a tab with the function name. The new library "user" appears in the Libraries pane with the function name "First_Last" below it.



Click the Home button to return to the mapping window. The three functions have now been combined into a single function called First_Last.

User-defined functions of type "Inline" are displayed with a dashed outline.



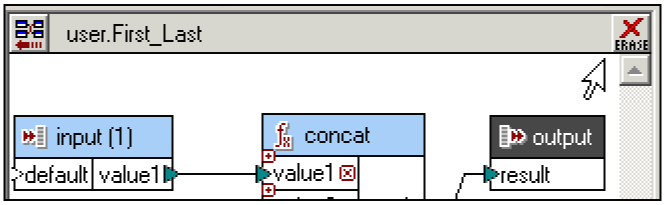
Connect the First and Last items to the input parameters of the user-defined function, and the result parameter to the Name item. Dragging on the function name in the Libraries pane and dropping it in the mapping window, allows you to use it elsewhere.

Please note:

Double clicking a user-defined function, displays the individual components in a tab of that name. User-defined functions can be defined to contain complex inputs/outputs (XML nodes etc.) as well as multiple output components. Please see "Standard user-defined function" and "Complex user-defined function" for more information.

To delete a user-defined function from a library:

1. Double click the specific user-defined function in the Libraries window. The user-defined function is visible in its tab.
2. Click the **Erase** button in the title bar to delete the function.



Reusing - exporting and importing User-defined functions:

User-defined functions, defined in one mapping, can be imported into any other mapping:

1. Click the **Add Libraries** button, at the base of the Libraries tab, and select a previously defined ***.mfd** file, that contains the user-defined function(s) you want to import.

   The user-defined functions now appear in the Libraries window (under "user" if that is the default library you selected). You can of course enter anything in the "Library name" when defining the user-defined function.
2. Drag the imported function into the mapping to make use of it.

To change the user-defined function "type":

1. Double click the user-defined function to see its constituent components.
2. Select the menu option **Function | Function settings** and click the radio button of the type you want to change it to, Standard or Inline.

Viewing user-defined functions under a custom library

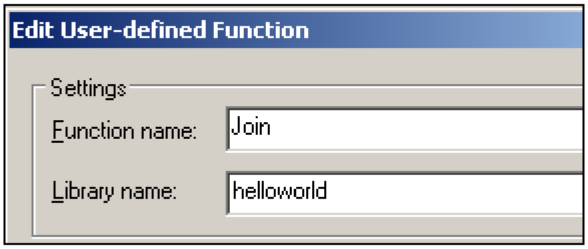
If you have created your own *.mff custom library file using the example in the Adding custom libraries section, it is possible to see newly added user-defined functions there, but not to save, or assign them, to the *.mff library file.

Example:

You previously created a **helloworld.mff** library file, which contains the string function "hello", and saved it under ...**MapForceLibraries**.

You now create a new mapping file and add two new user-defined functions:

- Function 1 is called **Join** and is saved under the same Library name as the *.**mff** library i.e. **helloworld** in the user-defined section.



Edit User-defined Function

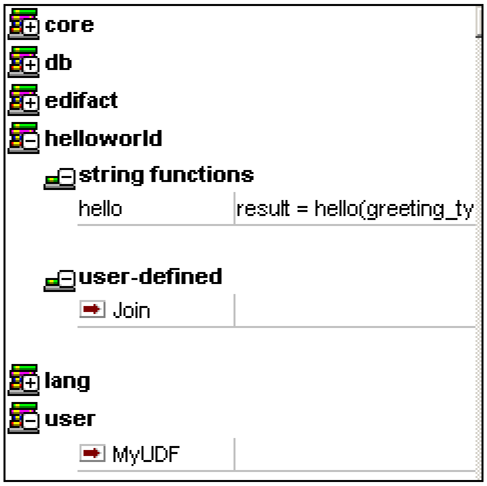
Settings

Function name: Join

Library name: helloworld

- Function 2 is called MyUDF and is saved under the default user-defined library name " **user**".

  The libraries pane now contains the initial **helloworld** library with the string function "hello", as well as the user-defined function called "Join".



The libraries pane also contains the "**user**" library containing the user-defined function MyUDF.

Note
The Join user-defined function is only **displayed** as part of the helloworld library, although it is actually a part of the current mapping file *.mfd along with MyUDF.

To load/import these two user-defined files in a different mapping:

Having saved the previous mapping file e.g. MyFuncs.mfd.

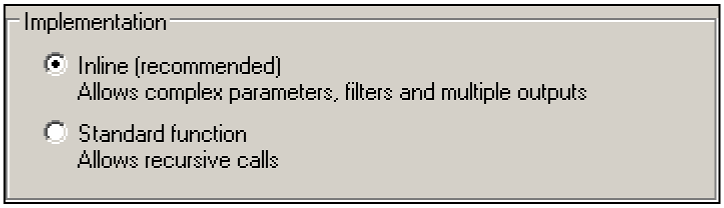
1. Open the mapping file that you want to import the user-defined functions into.
2. Click the **Add Libraries** button at the base of the window, click Add and select the MyFuncs.mfd file that contains the functions then click OK.
   Both user-defined functions appear in their previous locations.

7.1 Inline vs. Standard user-defined functions

The main difference between these two types of functions is the level of complexity that they each support, and the implementation of each during code generation.

The graphical representation of the two types also differ:

- Standard user-defined functions are shown with a **solid** outline
- Inline user-defined functions are shown with a **dashed** outline



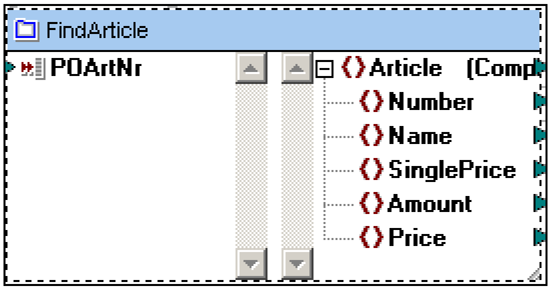
Implementation

● Inline (recommended)
Allows complex parameters, filters and multiple outputs

○ Standard function
Allows recursive calls

Inline user-defined functions **support**:

- Complex input and output components i.e. XML schema nodes
- Multiple output components within a function
- Direct connection of filters to input components
- Exist type functions on input component e.g. exists, not exists, substitute-missing



Inline user-defined functions **do not support**:

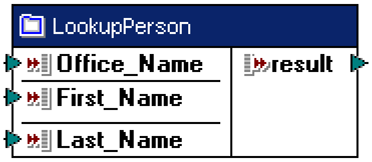
- The setting of a priority context on a parameter
- Recursive calls to user-defined functions

Code generation:
In essence an inline user-defined component implements the constituent components of the user-defined function instead of generating a function call. All parameters are evaluated and purged.

If the user-defined function is defined as inlined, filters and exists-like functions can be used because MapForce generates code that works exactly as the function's constituent components.

Standard user-defined function **support**:

- Only simple input components
- Only a single output component
- Recursive calls to user-defined functions (where the exit condition must be supplied, e. g. use an If-Else condition where one branch, or value, exits the recursion)
- Setting a priority context on a parameter



Please note:
Although Standard user-defined functions **do not** support complex input and output components, they **can be created** in this type of function. An error message appears when you try to preview the result of the mapping, and prompts if you want to change the current Standard type user-defined function, into one of type "Inline".

Standard user-defined functions **do not support**:

- Complex input and output components i.e. XML schema nodes
- Direct connection of filters to input components
- Exist type functions on input components:
  - Exists
  - Not exists
  - Substitute-missing

  Code generation:
  A standard user-defined component generates code for a function call, where inputs and outputs are passed as parameters. At runtime, the input parameter values are evaluated first, then the function is called for each occurrence of the input data.

To change the user-defined function "type":

1. Double click the user-defined function to see its constituent components.
2. Select the menu option **Function | Function settings** and click the radio button of the type you want to change it to, Standard or Inline.

Please note:
If the user-defined function was originally of type "standard" with a priority context, and was subsequently changed to one of type "inline", then the priority context is hidden and deactivated. Changing the same function back to "standard", shows the priority context and enables it once again.

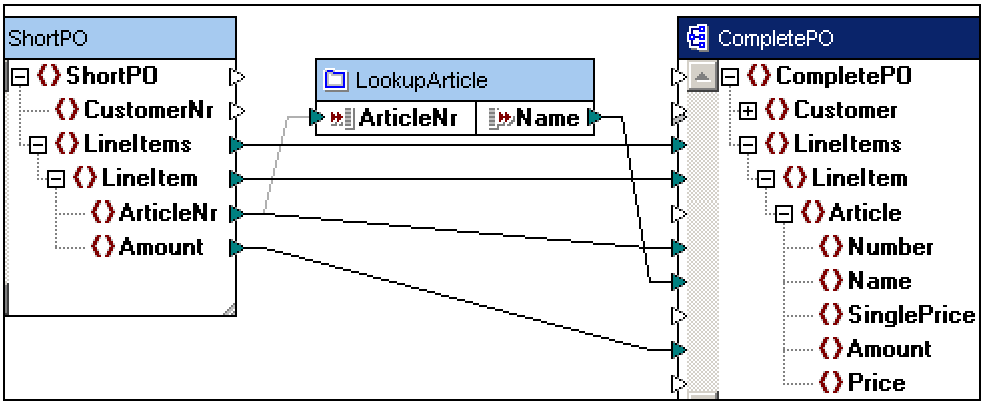
User-defined functions and Copy-all connections
When creating Copy-all connections between a schema and a user-defined function of type "Inline", the two components must be based on the same schema! It is not necessary that they both have the same root elements however. Please see "Complex output components - defining" for an example.

7.2 Standard user-defined function

This example is provided as the **lookup-standard.mfd** file available in the ...\ **MapForceExamples** folder.

Aim:
To create a generic look-up function that:

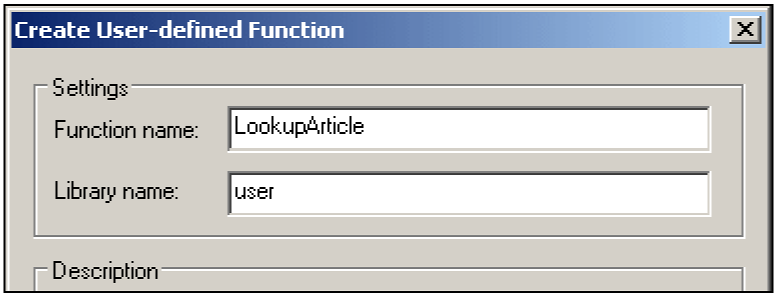
- supplies Articles/Number data from the Articles XML file, to be compared to Article numbers of a different XML file, ShortPO in this case.



- Insert the ShortPO.xsd and assign ShortPO.xml as the source XML file.
- Insert the CompletePO.xsd schema file, and select CompletePO as the root element.
- Insert a new user-defined function using the method described below.

To create a user defined function from scratch:

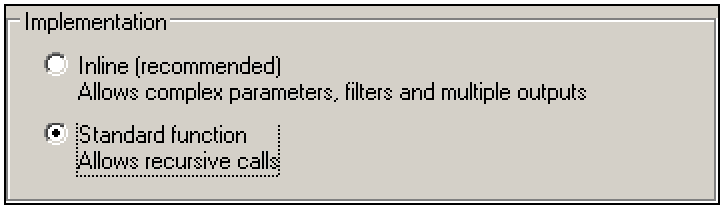
1. Select the menu option **Function | Create User-defined function**.
2. Enter the name of the function e.g. LookupArticle.



Function name: LookupArticle

Library name: user

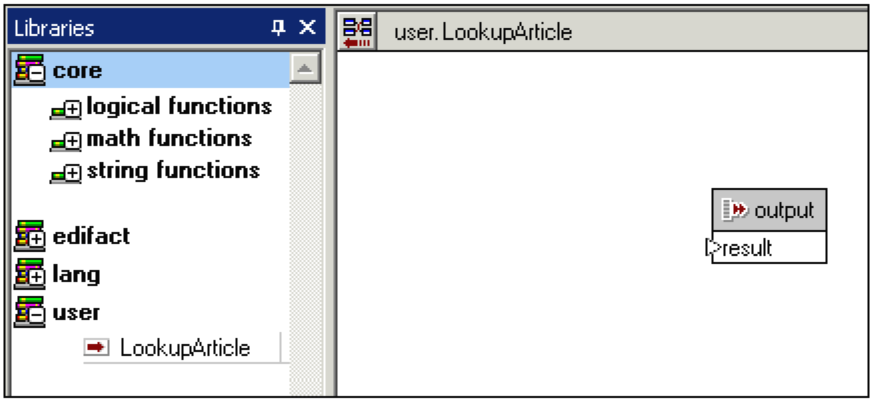
3. Select the "Standard function" radio button and click OK to confirm



○ Inline (recommended)
Allows complex parameters, filters and multiple outputs

● Standard function
Allows recursive calls

A tab only containing only one item, an output function, is displayed.

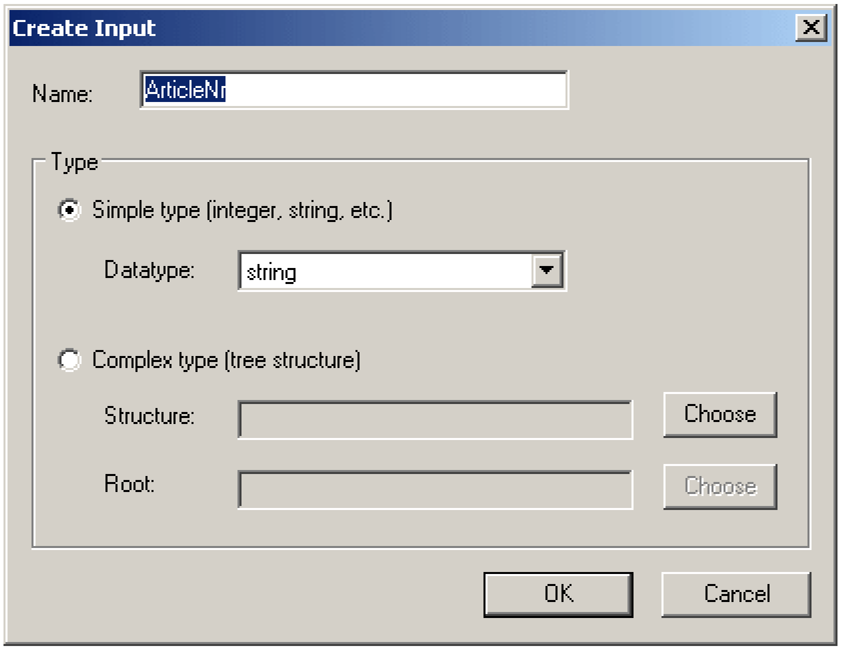


This is the working area used to define the user-defined function.

A new library has been created in the Libraries pane with the name "user" and the function name "LookupArticle".

3. Click the **Insert Schema/XML file** icon to insert the **Articles** schema and select the XML file of the same name to act as the data source.

4. Click the **Insert input component** icon to insert an input component.
5. Enter the name of the input parameter, ArticleNr in this case, and click OK.


Create Input

Name: ArticleNr

Type

● Simple type (integer, string, etc.)

Datatype: string

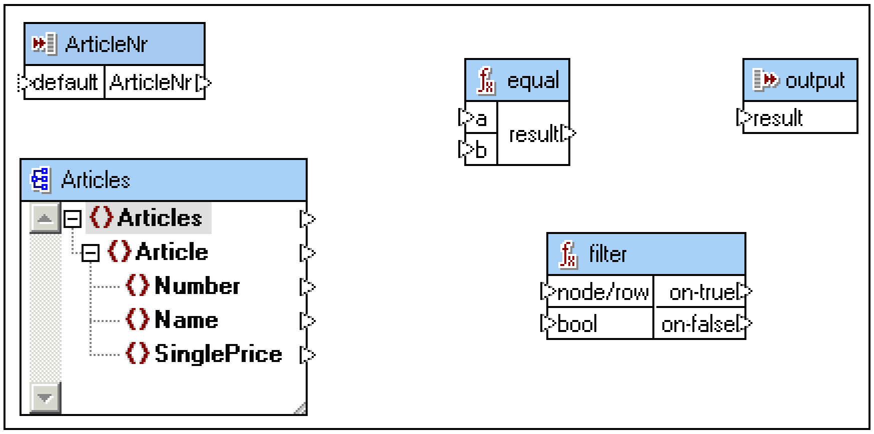
○ Complex type (tree structure)

Structure:

Root:

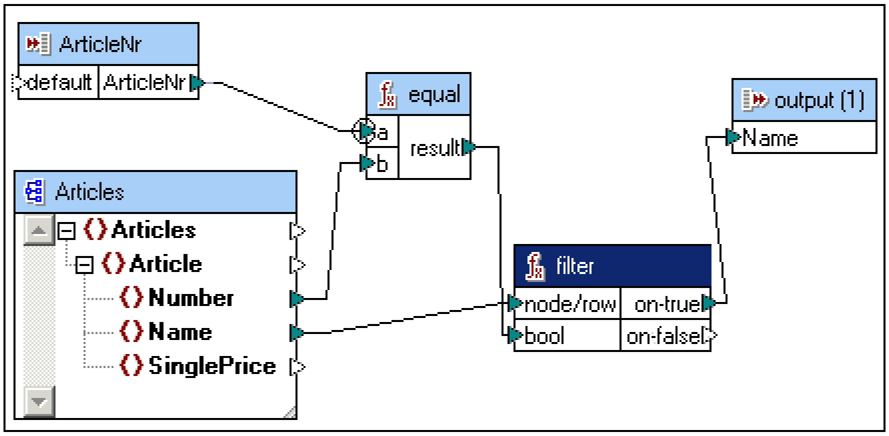
This component acts as a data input to the user-defined function and supplies the input icon of the user-defined function.
6. Insert an "**equal**" component by dragging it from the core library/logical functions group.

7. Insert a **filter** component by clicking the Insert Filter icon in the toolbar.



Use the diagram below as an aid to creating the mappings in the user-defined function, please take note of the following:

8 Right click the **a** parameter and select **Priority context** from the pop up menu.
9. **Double click** the output function and enter the name of the output parameter, in this case "**Name**".



This ends the definition of the user-defined function.

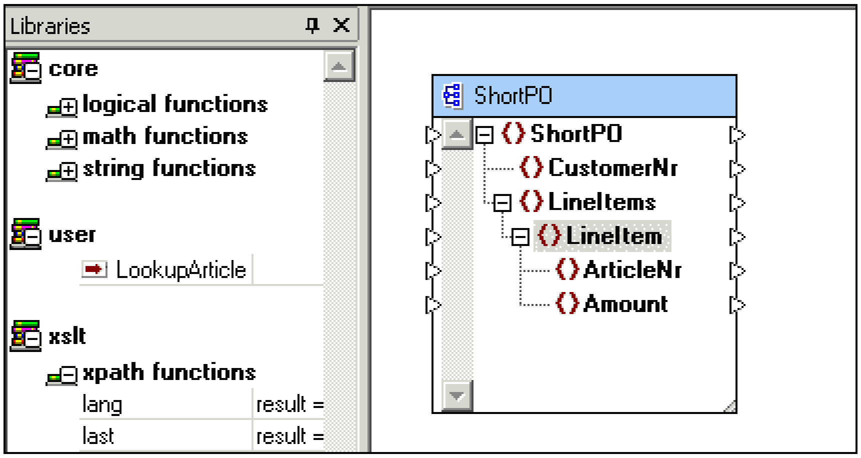
Please note:

Double clicking the input and output functions opens a dialog box in which you can change the datatype of the input parameter, as well as define if the function is to have an input icon (Connection required) in this dialog.

The user-defined function:

- has one **input** function, ArticleNr, which receives data from the ShortPO XML file.
- **compares** the ShortPO ArticleNr, with the Article/Number from the **Articles** input XML instance file, inserted into the user-defined function for this purpose.
- uses a **filter** component to forward the Article/Name records to the output component, if the comparison returns true.
- has one output function, Name, which forwards the Article Name records to the CompletePO XML file.

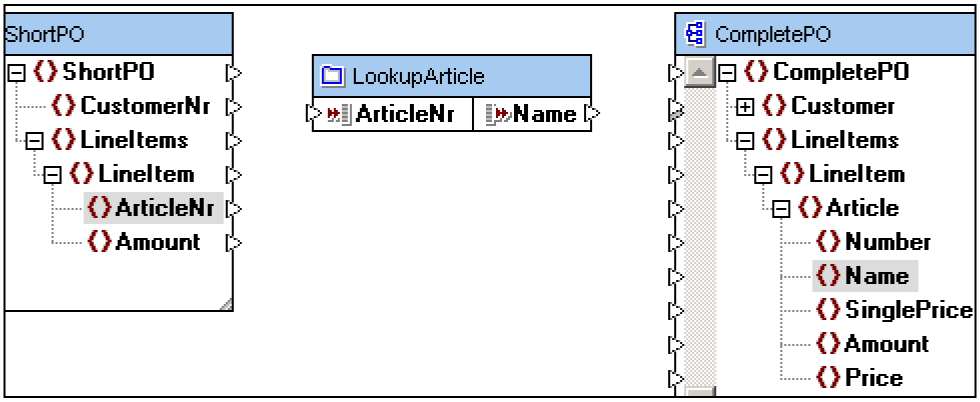
10. Click the Home icon to return to the mapping.
The LookupArticle user-defined function, is now available under the user library.



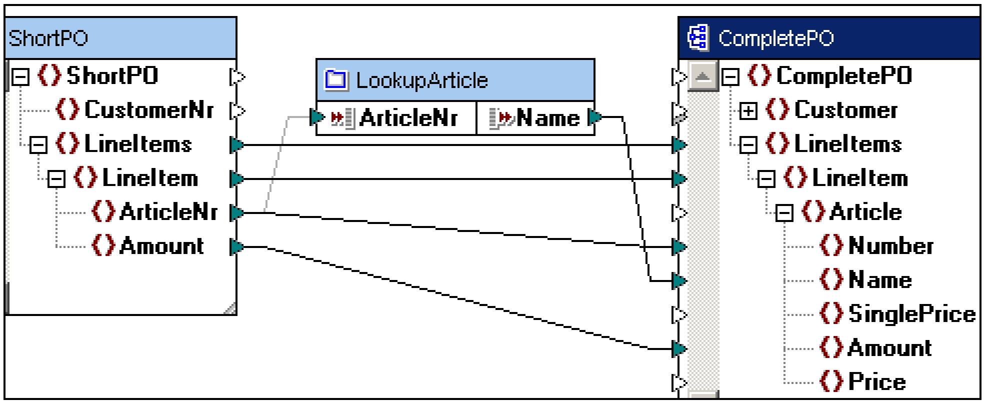
11. Drag the LookupArticle function into the Mapping window.

    The user-defined function is displayed:

- with its name "LookupArticle" in the title/function bar,
- with named input and output icons.



10. Create the mappings displayed in the graphic below and click the Output tab to see the result of the mapping.



Please note:

Using **filters** in user-defined functions only make sense if the source-component is also in the same user-defined function.

Filters can only be used to supply data **into** a user-defined function using input components, if you have defined it as an inline function.

7.3 Complex user-defined function - XML node as input

This example is provided as the **lookup-udf-in.mfd** file available in the ...**MapForceExamples** folder. What this section will show, is how to define an inline user-defined function that contains a complex input components.

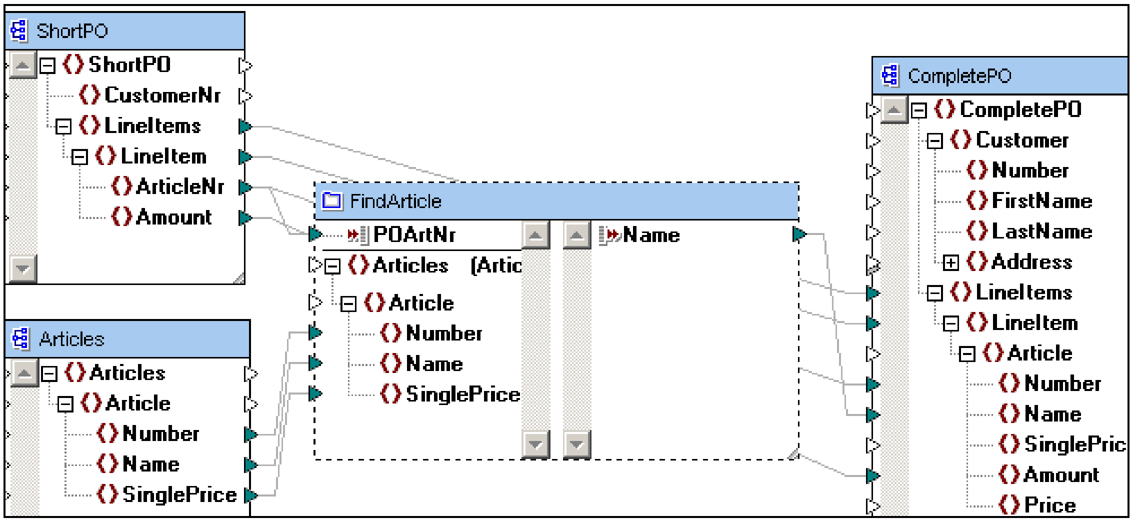
Note that the user-defined function "FindArticle" consists of two halves.

A left half which contains the input parameters:

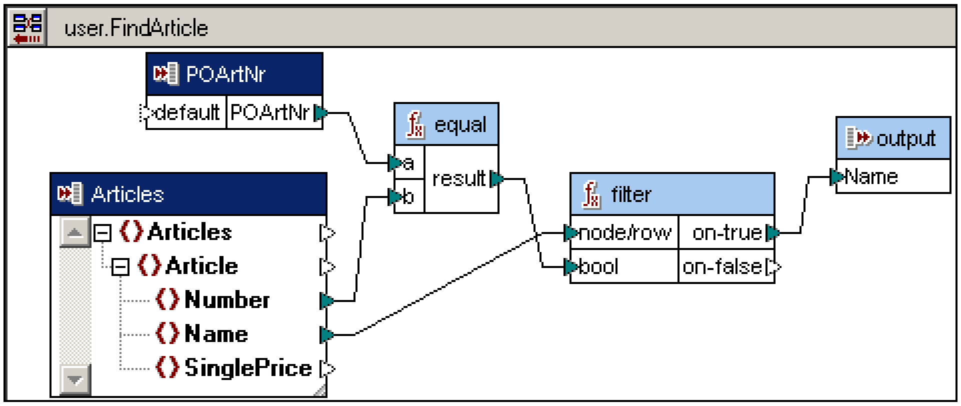
- a simple input parameter **POArtNr**
- a complex input component **Articles,** with mappings directly to its XML child nodes

A right half which contains:

- a simple output parameter called "**Name"**.



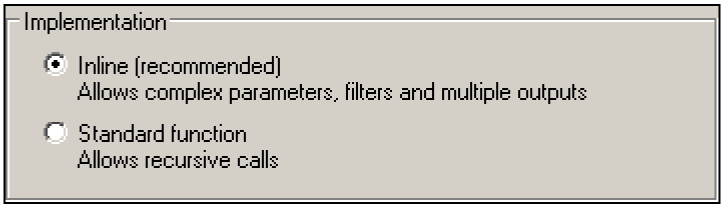
The screenshot below shows the constituent components of the user-defined function, the two input components at left and the output component at right.



7.3.1 Complex input components - defining

Defining complex input components:

1. Create a user-defined function in the usual manner, i.e. **Function | Create User-Defined function** and click Enter to confirm. Note that the **Inline...** option is automatically selected.

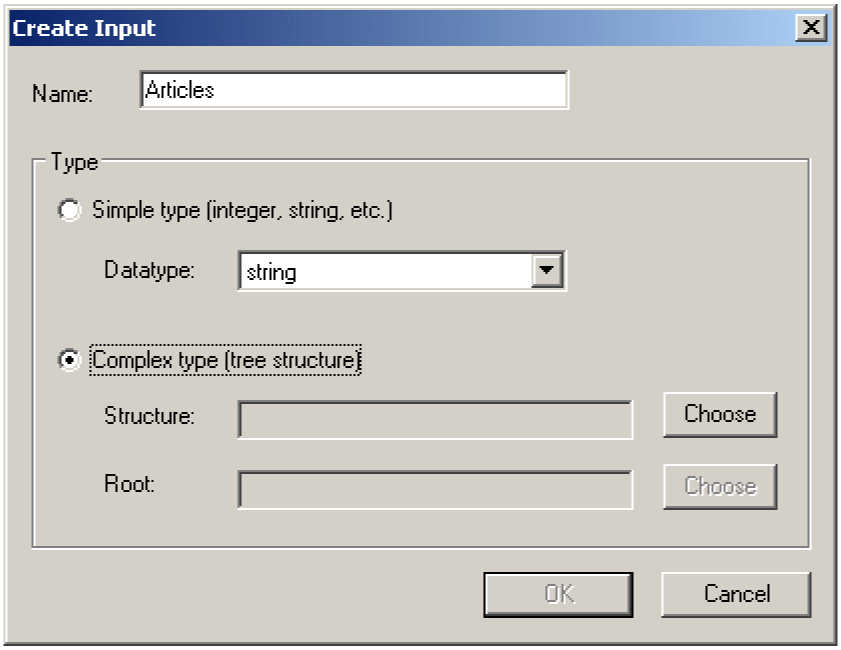


Implementation

● Inline (recommended)
Allows complex parameters, filters and multiple outputs

○ Standard function
Allows recursive calls

2. Click the **Insert input component** icon in the icon bar.
3. Enter the name of the component into the Name field.



Create Input

Name: Articles

Type

○ Simple type (integer, string, etc.)

Datatype: string

● Complex type (tree structure)

Structure:

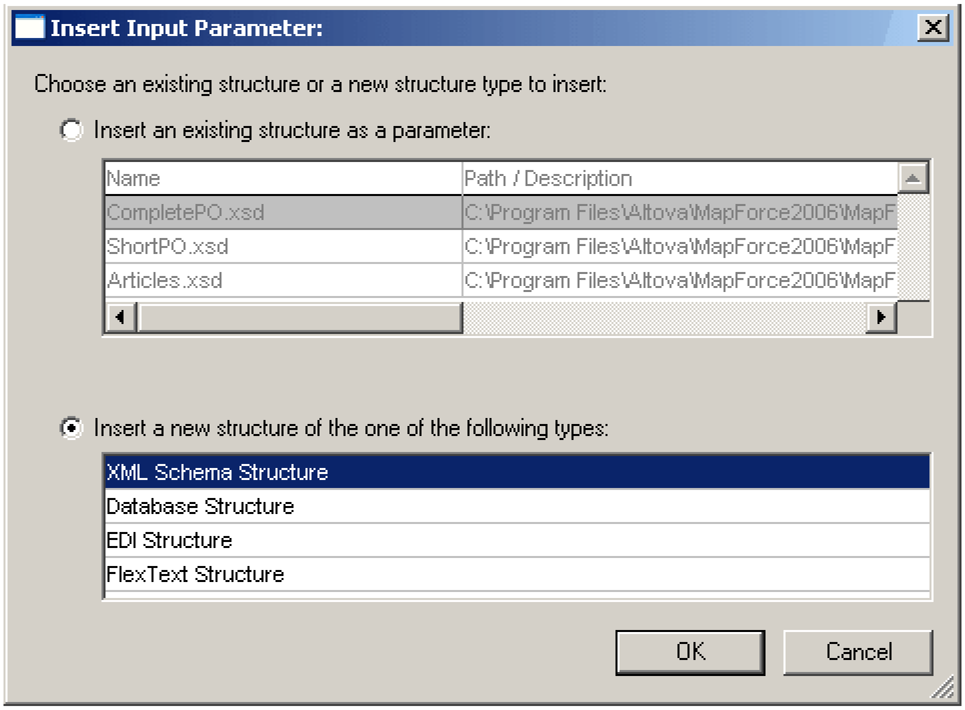
Root:

4. Click the **Complex type** radio button, then click the "Choose" button next to the Structure field.
This opens the "Insert Input Parameter" dialog box.

   The top list box displays the **existing** components in the mapping, in this example three schemas. Note that this list contains all of the components that have been inserted into the active mapping: e.g. XML schema file.

   The lower list box allows you to select a new complex data structure i.e. XML Schema file.

5. Click "Insert new structure... " radio button, select the XML Schema structure entry, and click OK to continue.



Insert Input Parameter:

Choose an existing structure or a new structure type to insert:

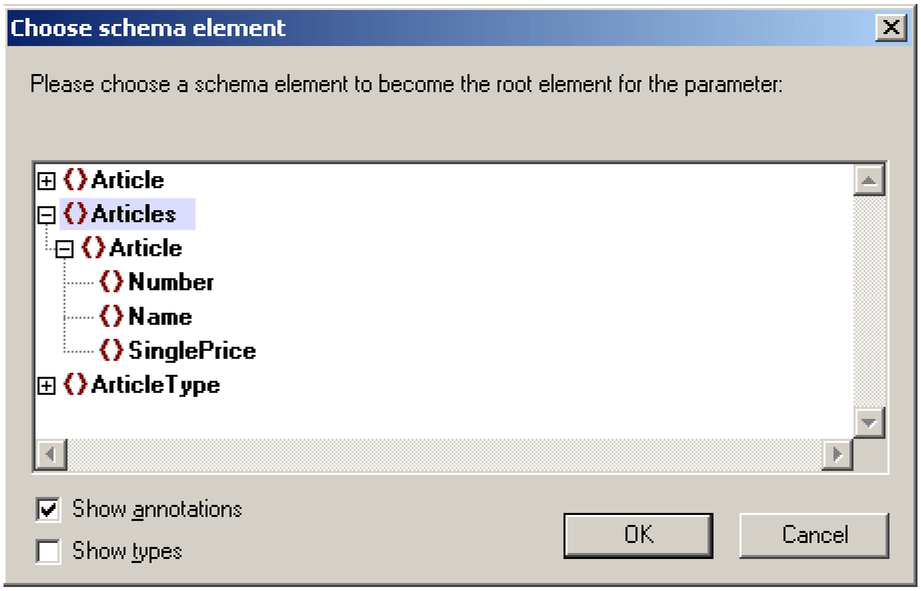
○ Insert an existing structure as a parameter:

Name	Path / Description
CompletePO.xsd	C:\Program Files\Altova\MapForce2006\MapF
ShortPO.xsd	C:\Program Files\Altova\MapForce2006\MapF
Articles.xsd	C:\Program Files\Altova\MapForce2006\MapF

● Insert a new structure of the one of the following types:

- XML Schema Structure
- Database Structure
- EDI Structure
- FlexText Structure

6. Select the Articles.xsd from the "Open" dialog box.
7. Click the element that you would like to become the root element in the component, e.g. Articles, and click OK to confirm.



Choose schema element

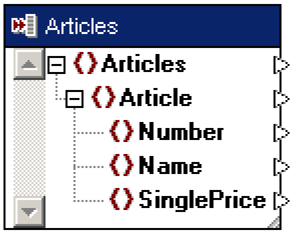
Please choose a schema element to become the root element for the parameter:

```
⊞ {} Article
⊟ {} Articles
   ⊟ {} Article
        {} Number
        {} Name
        {} SinglePrice
⊞ {} ArticleType
```

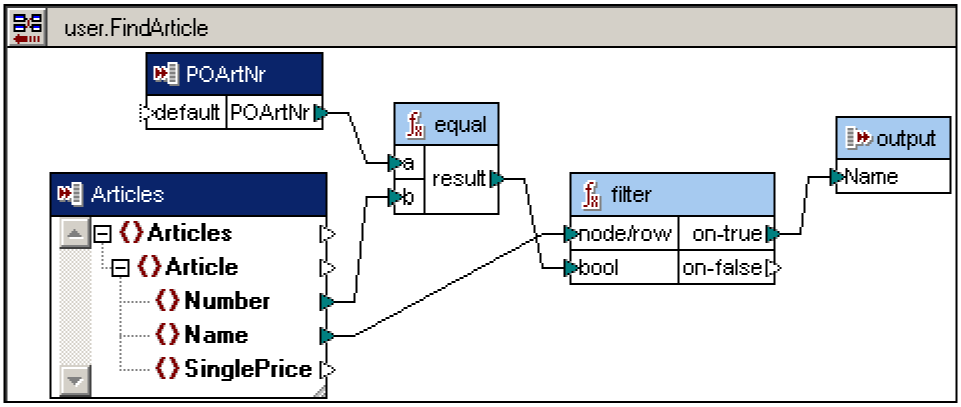
☑ Show annotations

□ Show types

The Articles component is inserted into the user-defined function. Please note the input icon to the left of the component name. This shows that the component is used as a complex input component.



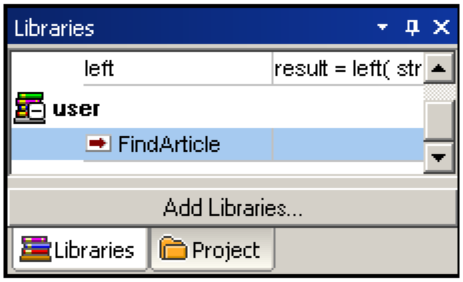
8. Insert the rest of the components as shown in the screenshot below, namely: a second "simple" input component, filter, equal and output components, and connect them as shown.



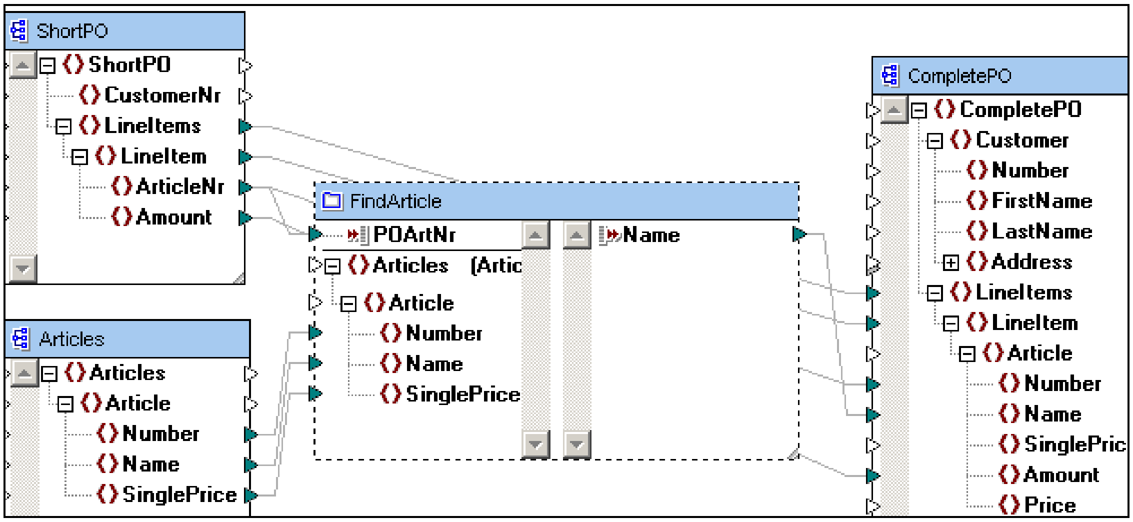
Please note:

- The Articles input component receives its data from outside of the user-defined function. Input icons that allow mapping to this component, are available there.
- An XML instance file to provide data from within the user-defined function, cannot be assigned to a complex input component.
- The other input component input(1), supplies the ShortPO article number data to which the Articles | Number is compared.
- The filter component filters out the records where both numbers are identical, and passes them on to the output component.

10. Click the Home icon ⊞ to return to the mapping.
11. Drag the newly created user-defined component from the Libraries pane into the mapping.



12. Create the connections as shown in the screenshot below.

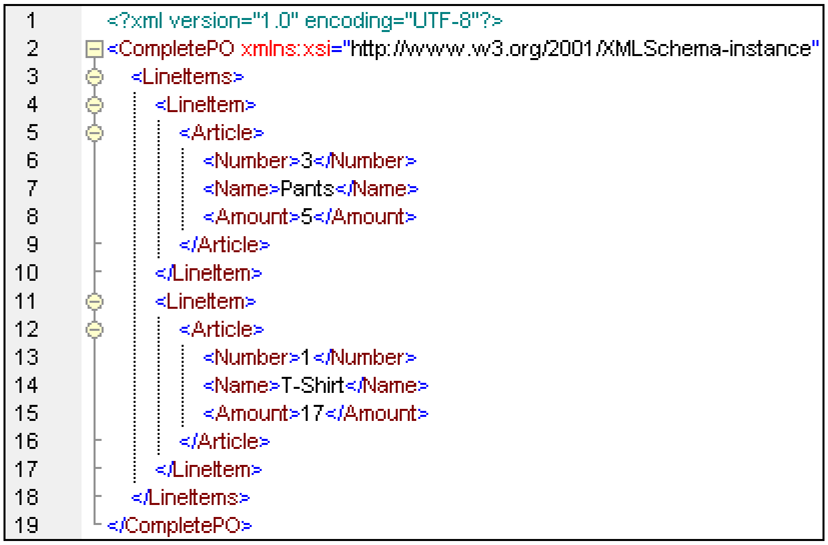


The left half contains the input parameters to which items from two schema/xml files are mapped:

- ShortPO supplies the data for the input component **POArtNr**
- Articles supplies the data for the complex input component. The Articles.xml instance file was assigned to the Articles schema file when the component was inserted.
- The complex input component **Articles** with its XML child nodes, to which data has been mapped from the Articles component.

The right half contains:

- a simple output parameter called **"Name"**, which passes on the filtered line items which have the same Article number, to the Name item of Complete PO.



```
<?xml version="1.0" encoding="UTF-8"?>
<CompletePO xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    <LineItems>
        <LineItem>
            <Article>
                <Number>3</Number>
                <Name>Pants</Name>
                <Amount>5</Amount>
            </Article>
        </LineItem>
        <LineItem>
            <Article>
                <Number>1</Number>
                <Name>T-Shirt</Name>
                <Amount>17</Amount>
            </Article>
        </LineItem>
    </LineItems>
</CompletePO>
```

Please note:
When creating **Copy-all** connections between a schema and a user-defined function of type "Inline", the two components must be based on the same schema! It is not necessary that they both have the same root elements however.

7.4 Complex user-defined function - XML node as output

This example is provided as the **lookup-udf-out.mfd** file available in the ...\ **MapForceExamples** folder. What this section will show is how to define an inline user-defined function that allows a complex output component.

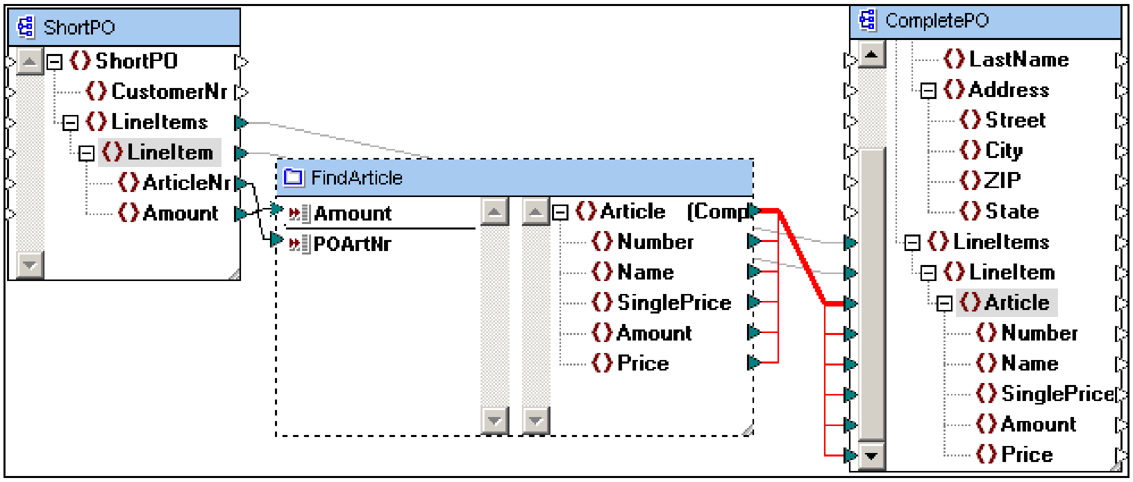
Note that the user-defined function FindArticle consists of two halves.

A left half which contains the input parameter:

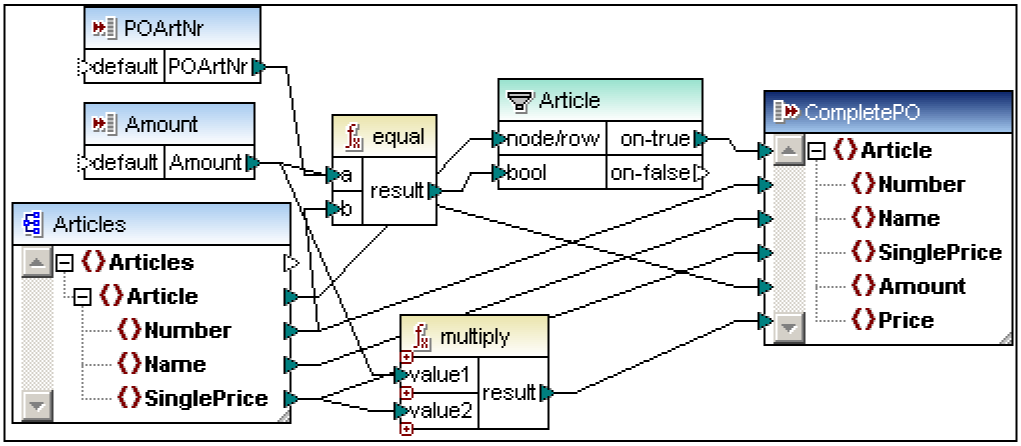
- a simple input parameter **POArtNr**

A right half which contains:

- a complex output component **Article (CompletePO)** with its XML child nodes mapped to CompletePO.



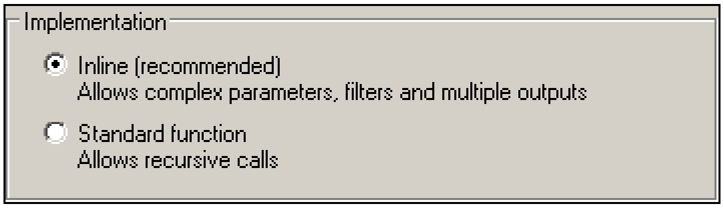
The screenshot below shows the constituent components of the user-defined function, the input component at left and the complex output component at right.



7.4.1 Complex output components - defining

Defining complex output components:

1. Create a user-defined function in the usual manner, i.e. **Function | Create User-Defined function** and click Enter to confirm. Note that the **Inline...** option is automatically selected.

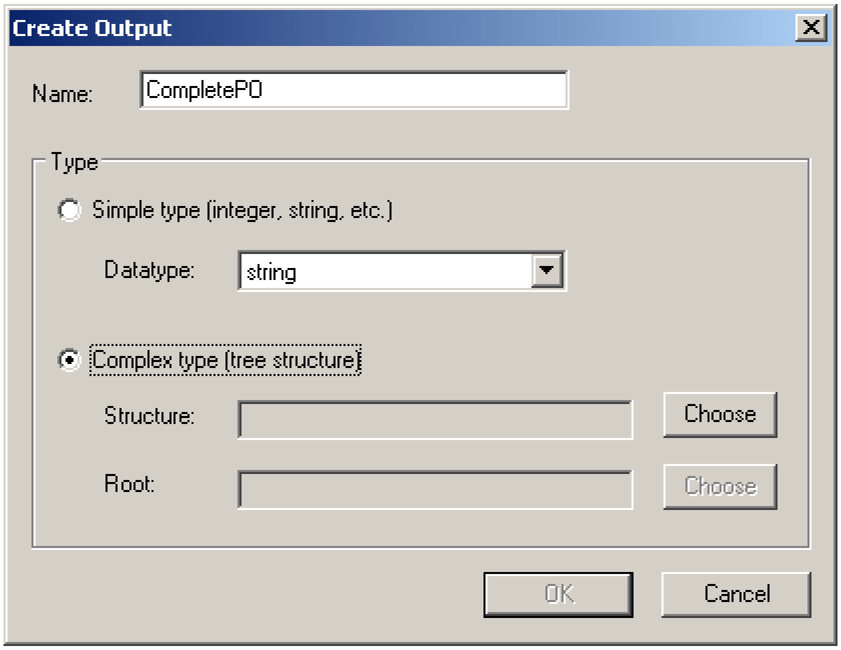


Implementation

● Inline (recommended)
Allows complex parameters, filters and multiple outputs

○ Standard function
Allows recursive calls

2. Click the Insert output icon in the icon bar, and enter a name e.g. CompletePO.



Create Output

Name: CompletePO

Type

○ Simple type (integer, string, etc.)

Datatype: string

● Complex type (tree structure)

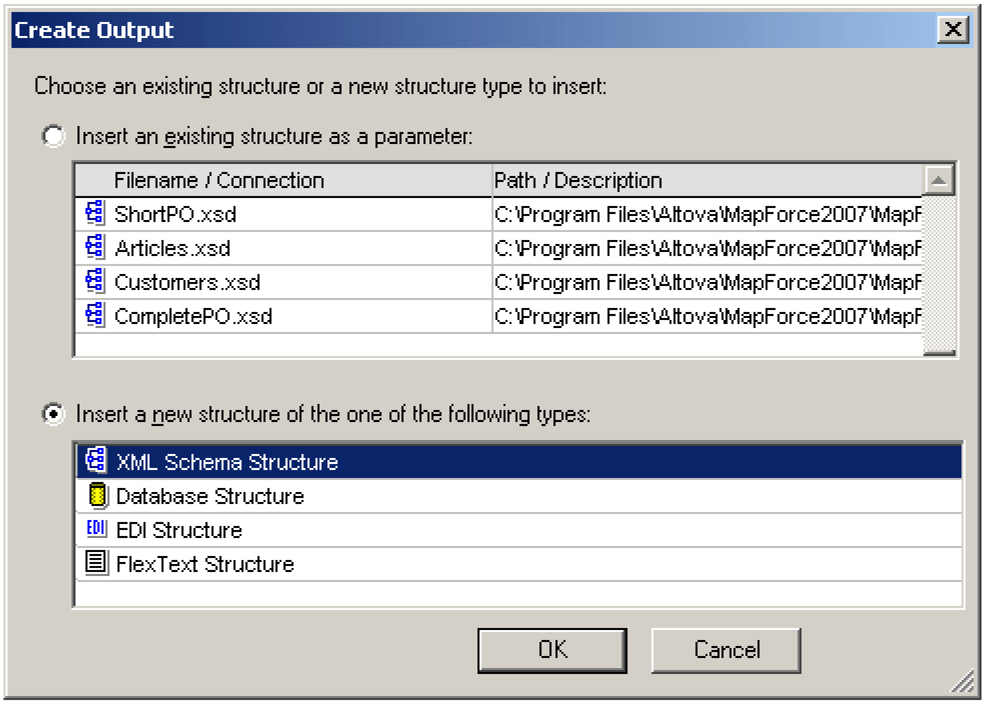
Structure:

Root:

3. Click the **Complex type** radio button, then click the "Choose" button. This opens the "Insert Input Parameter" dialog box.

   The top list box displays the **existing** components in the mapping, in this example three schemas. Note that this list contains all of the components that have been inserted into the active mapping: e.g. XML Schema file.

   The lower list box allows you to select a new complex data structure i.e. XML Schema file.



Create Output

Choose an existing structure or a new structure type to insert:

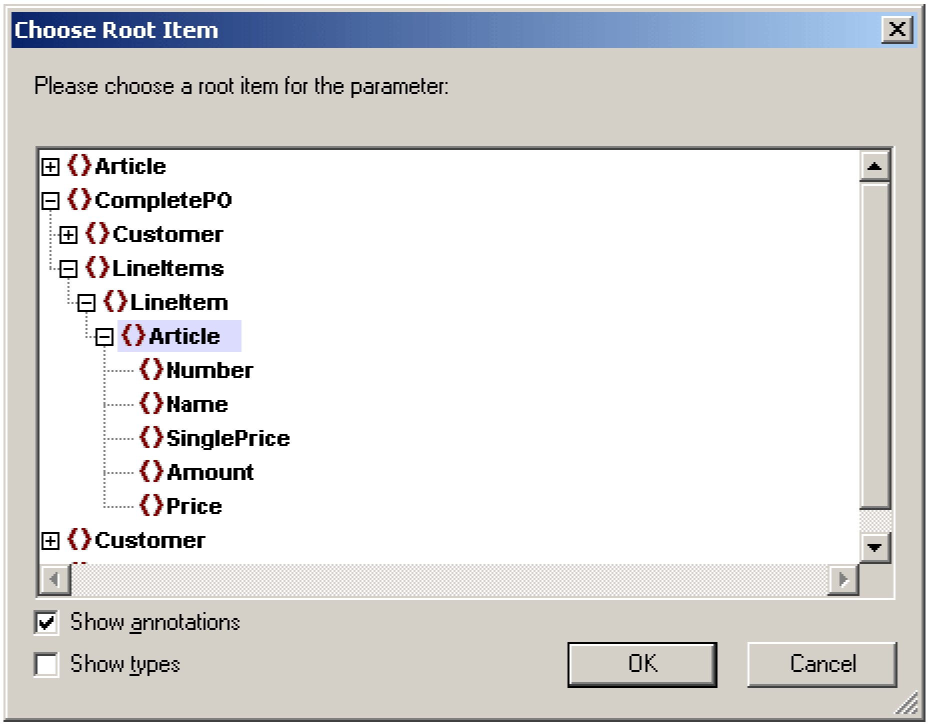
○ Insert an existing structure as a parameter:

Filename / Connection	Path / Description
ShortPO.xsd	C:\Program Files\Altova\MapForce2007\MapF
Articles.xsd	C:\Program Files\Altova\MapForce2007\MapF
Customers.xsd	C:\Program Files\Altova\MapForce2007\MapF
CompletePO.xsd	C:\Program Files\Altova\MapForce2007\MapF

● Insert a new structure of the one of the following types:

- XML Schema Structure
- Database Structure
- EDI Structure
- FlexText Structure

4. Click "**Insert new structure...** " radio button, select the XML Schema structure entry, and click OK to continue.
5. Select the **CompletePO.xsd** from the "Open" dialog box.
6. Click the element that you would like to become the root element in the component, e.g. **Article**, and click OK to confirm.



Choose Root Item

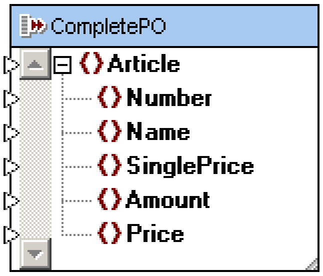
Please choose a root item for the parameter:

```
⊞ {}Article
⊟ {}CompletePO
   ⊞ {}Customer
   ⊟ {}LineItems
      ⊟ {}LineItem
         ⊟ {}Article
               {}Number
               {}Name
               {}SinglePrice
               {}Amount
               {}Price
⊞ {}Customer
```

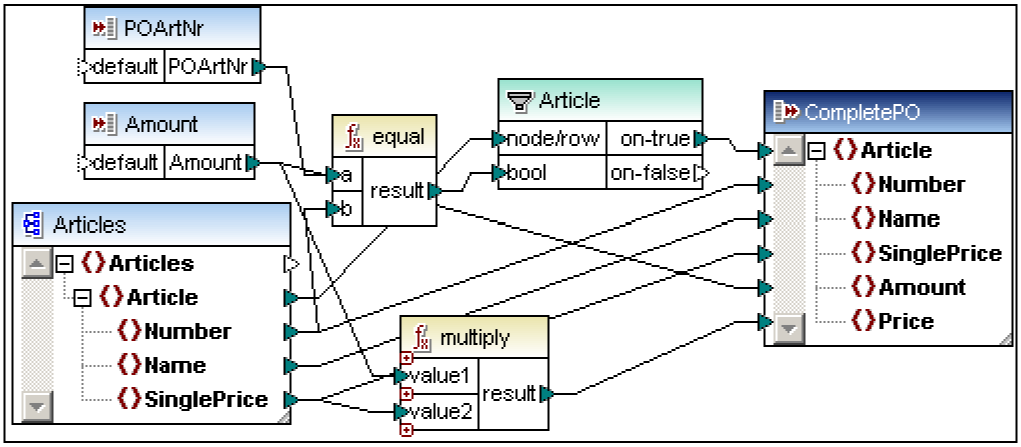
☑ Show annotations

☐ Show types

The CompletePO component is inserted into the user-defined function. Please note the output icon to the left of the component name. This shows that the component is used as a complex output component.



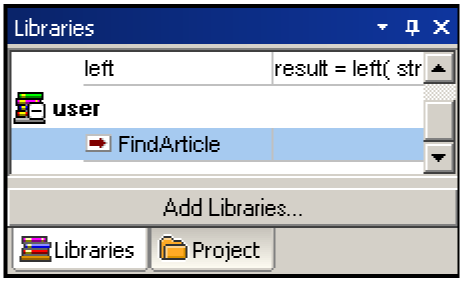
7. Insert the Articles schema/XML file into the user-defined function and assign the Articles.xml as the XML instance.
8. Insert the rest of the components as shown in the screenshot below, namely: two "simple" input components, filter, equal and multiply components, and connect them as shown.



Please note:

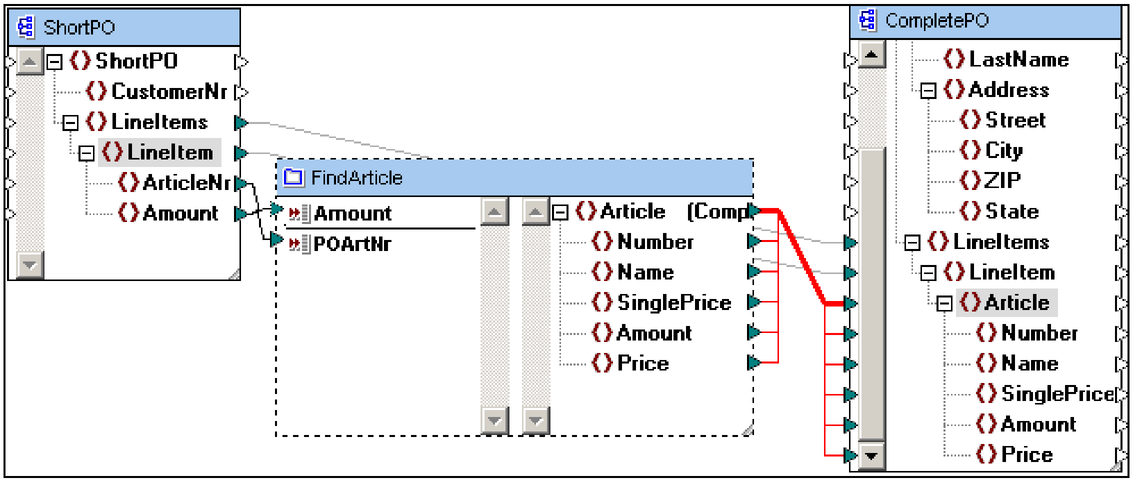
- The Articles component receives its data from the Articles.xml instance file, within the user-defined function.
- The input components supply the POArtNr (article number) and Amount data to which the Articles | Number & Price are compared.
- The filter component filters out the records where both numbers are identical, and passes them on to the CompletePO output component.

9. Click the Home icon to return to the mapping.
10. Drag the newly created user-defined component from the Libraries pane into the mapping.



11. Create the connections as shown in the screenshot below.

Having created the Article connector, right click it and select "Copy-all" from the context menu. The rest of the connectors are automatically generated, and are highlighted in the screenshot below.



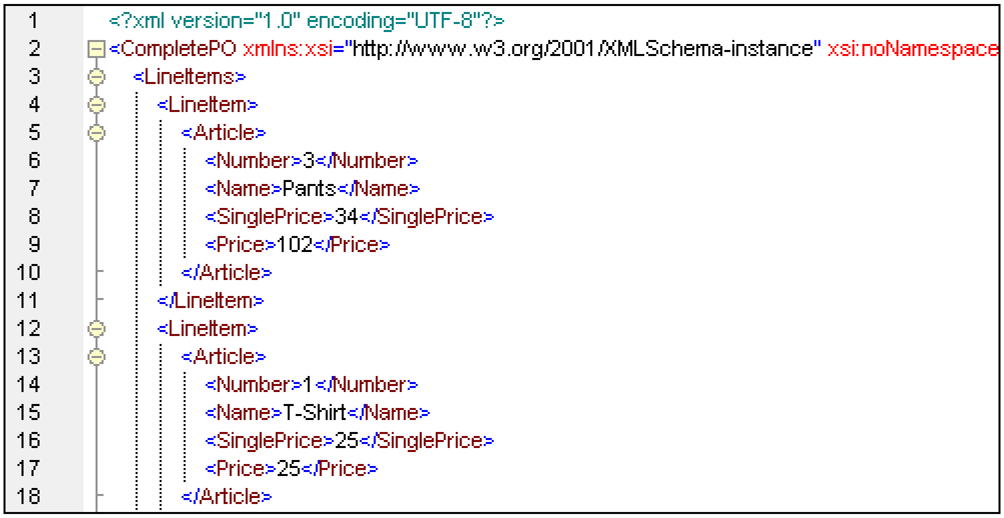
Please note:
When creating Copy-all connections between a schema and a user-defined function of type "Inline", the two components must be based on the same schema! It is not necessary that they both have the same root elements however.

The left half contains the input parameter to which a single item is mapped:

- ShortPO supplies the article number to the **POArtNr** input component.

The right half contains:

- a complex output component called "Article (CompletePO)" with its XML child nodes, which maps the filtered items, of the same Article number, to CompletePO.

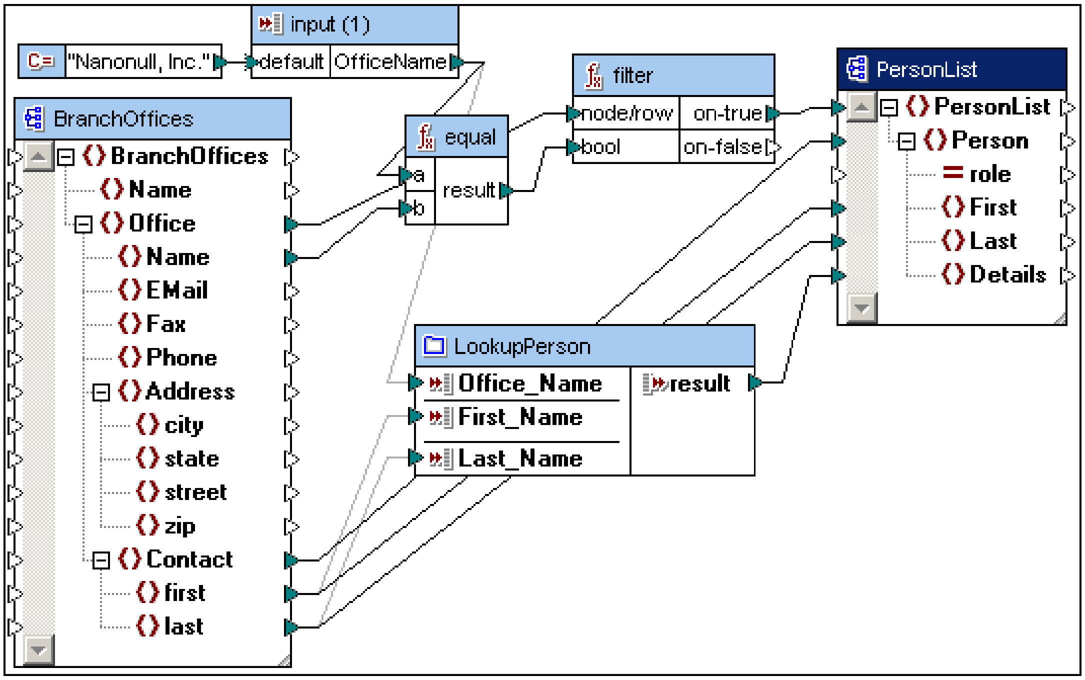


```
<?xml version="1.0" encoding="UTF-8"?>
<CompletePO xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:noNamespace
  <LineItems>
    <LineItem>
      <Article>
        <Number>3</Number>
        <Name>Pants</Name>
        <SinglePrice>34</SinglePrice>
        <Price>102</Price>
      </Article>
    </LineItem>
    <LineItem>
      <Article>
        <Number>1</Number>
        <Name>T-Shirt</Name>
        <SinglePrice>25</SinglePrice>
        <Price>25</Price>
      </Article>
```

7.5 User-defined function - example

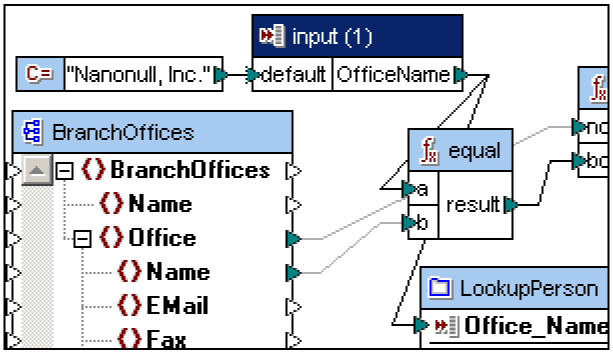
The PersonByListBranchOffice.mfd file available in the ...**MapForceExamples** folder, describes the following features in greater detail:

- Nested User-defined functions e.g. **LookupPerson**
- Look-up functions that generate a string output e.g. **LookupPerson**
- **Optional** input-parameters which can also supply a **default** value e.g. the **EqualAnd** component (contained in the LookupPerson component)
- **Configurable** input parameters, which can also double as a command line parameter(s) when executing the generated mapping code!



Configurable input parameters
The input (1) component receives data supplied when a mapping is executed. This is possible in two ways:

- as a command line parameter when executing the generated code, e.g. Mapping.exe /OfficeName "Nanonull Partners, Inc."
- as a preview value when using the MapForce Engine to preview the data in the Output window.

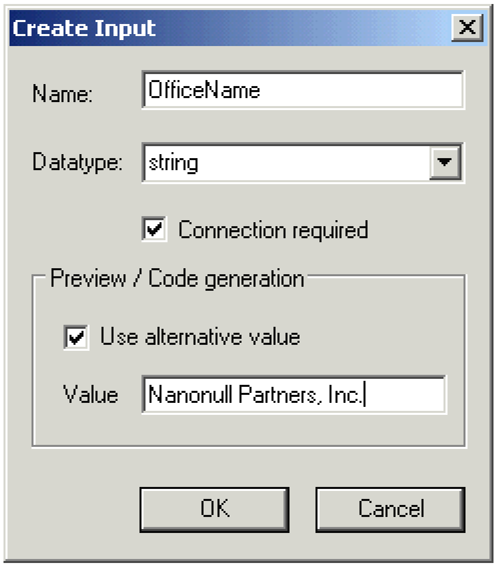


To define the Input value:

1. Double click the input (1), component and enter a different value in the "Value" text box of the Preview Mode group e.g. "Nanonull Partners, Inc.", and click OK to confirm.
2. Click the Output tab to see the effect.
   A different set of persons are now displayed.

   Please note that the data entered here is only used in "preview" mode i.e. when clicking the Output tab. If a value is not entered, or the check box is deactivated, then the data mapped to the input icon "default" is used.

   Please see Input values, overrides and command line parameters for more information.



Create Input

Name: OfficeName

Datatype: string

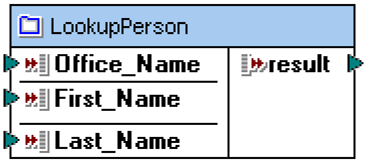
☑ Connection required

Preview / Code generation

☑ Use alternative value

Value Nanonull Partners, Inc.

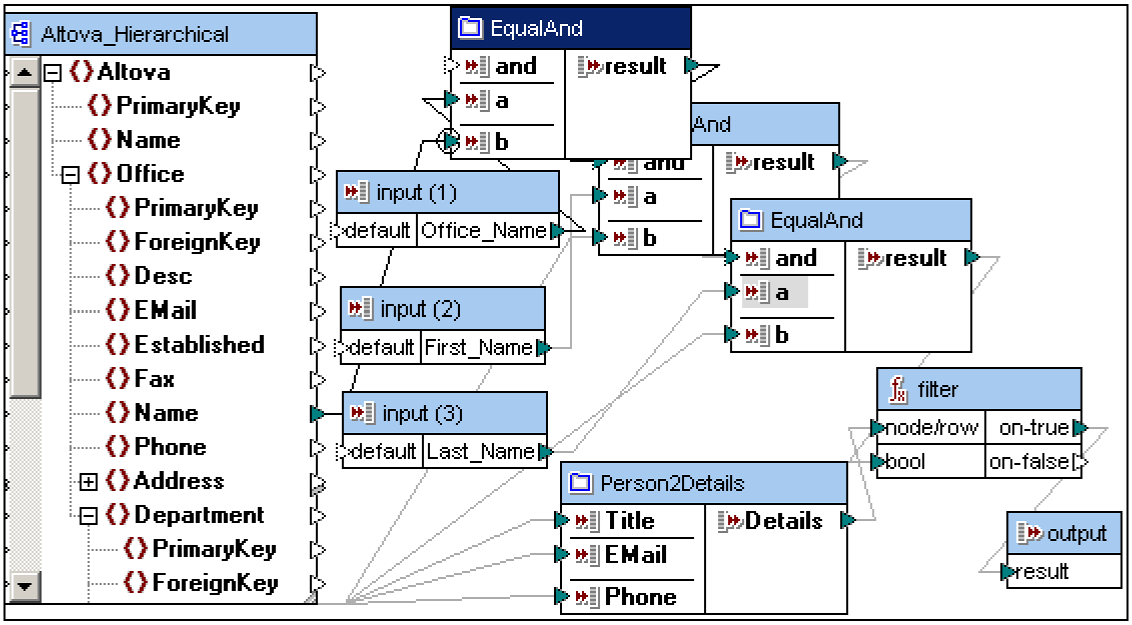
LookupPerson component



Double clicking this user-defined component displays its constituent components shown below. What this component does is:

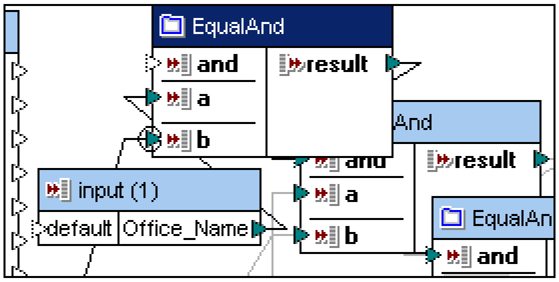
- Compares the Office, First, and Last names of BranchOffices.xml, with the same fields of the Altova_Hierarchical.xml file, using the **input** components and the **EqualAnd** user-defined components.
- Combines the Email, PhoneExt and Title items using the **Person2Details** user-defined function
- Passes on the combined person data to the **output** component if the previous EqualAnd comparisons are all true (i.e. supplied "true" to the filter component).

A user-defined function always outputs a value, which may even be an empty string! This would be the case if the filter component bool value is false. Only an empty string would be output instead of data supplied by the Person2Details component.



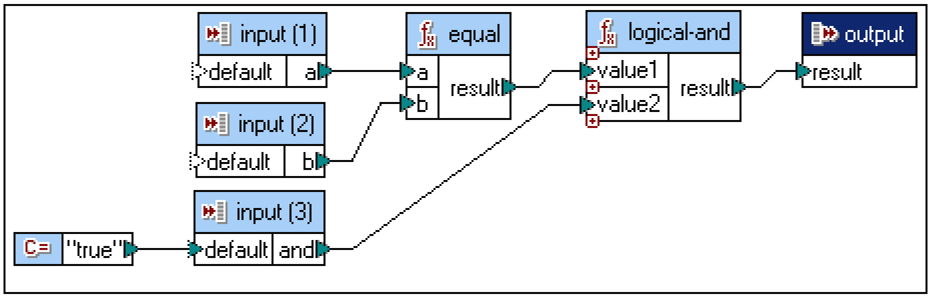
- The three **input** components, input (1) to input (3), receive their data from the BranchOffices.xml file.
- The **EqualAnd** component compares two values and provides an **optional** comparison value, as well as a default value.
- Person2Details combines three person fields and passes on the result to the filter component.

EqualAnd component



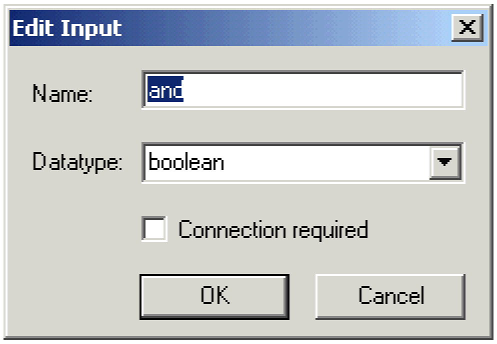
Double clicking this user-defined component displays its constituent components shown below. What this component does is:

- Compare two input parameters **a** and **b**, and pass the result on to the logical-and component. Note that the **b** parameter has been defined as the **priority context** (right click the icon to do so). This ensures that the person data of the specific office, supplied by the input parameter **a**, is processed first.
- **Logical-and** the result of the first comparison, with an **optional** input parameter, Input (3)
- Pass on the boolean value of this comparison to the output parameter.



Optional parameters

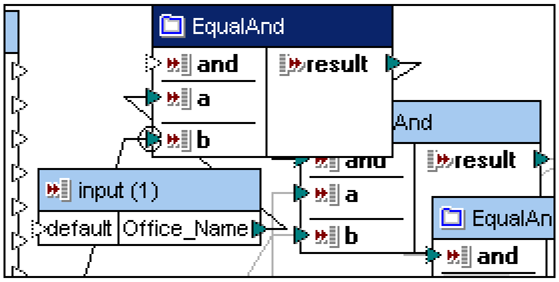
Double clicking the "input (3)" parameter, of the EqualAnd user-defined function shown above, allows you to make parameters optional, by unchecking the "Connection required" check box.


Edit Input

Name: and

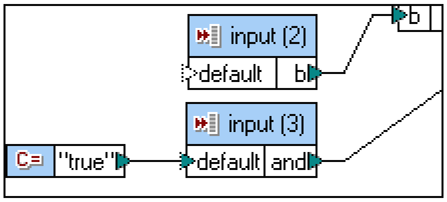
Datatype: boolean

☐ Connection required



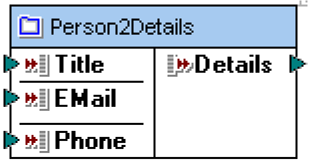
If "Connection required" is **unchecked**, then:

- A mapping connector is not required for the input icon of this user-defined function, e.g. the **and** parameter of the first EqualAnd function, does not have an input connector. The input icon has a dashed outline to show this visually.
- A **default** value can be supplied by connecting a component, within the user-defined function e.g. using a constant component containing the value "true".



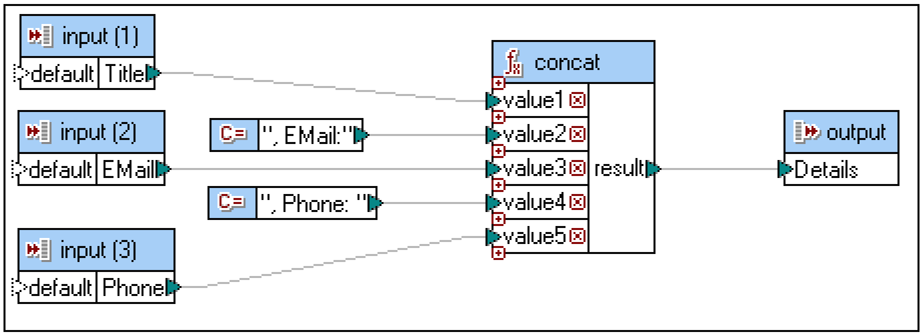
- A mapping from another item, mapped to the optional Input, takes precedence over the default value. E.g. the "and" parameter of second EqualAnd function, receives input data from the "result" parameter of the first EqualAnd user-defined function.

Person2Details component



Double clicking this user-defined component displays its constituent components shown below. What this component does is:

- Concatenate three inputs and pass on the result string to the output parameter.
- Double clicking an output parameter allows you to change the parameter name (Details), and select the datatype (String).



Chapter 8

Adding custom XSLT 1.0 functions

8 Adding custom XSLT 1.0 functions

MapForce allows you to extend the installed XSLT function libraries with your own custom functions. This option is made available when you select XSLT as the output, by clicking the XSLT icon, or selecting **Output | XSLT 1.0**.

XSLT files appear as libraries, and display all **named templates** as functions below the library name.

- Functions must be declared as Named Templates conforming to the XSLT 1.0 specification in the XSLT file.
- If the imported XSLT file imports, or includes other XSLT files, then these XSLT files and functions will be imported as well.
- Each named template appears as a function below each library name.
- The amount of mappable input icons, depends on the number of parameters used in the template call; optional parameters are also supported.
- Updates to imported XSLT files, occur at program start.
- Namespaces are supported

Please note:

When writing named templates please make sure that the XPath statements used in the template are bound to the correct namespace(s). The namespace bindings of the mapping can be viewed by clicking the XSLT tab. Please see: the XSLT 1.0 implementation specific document for more information.

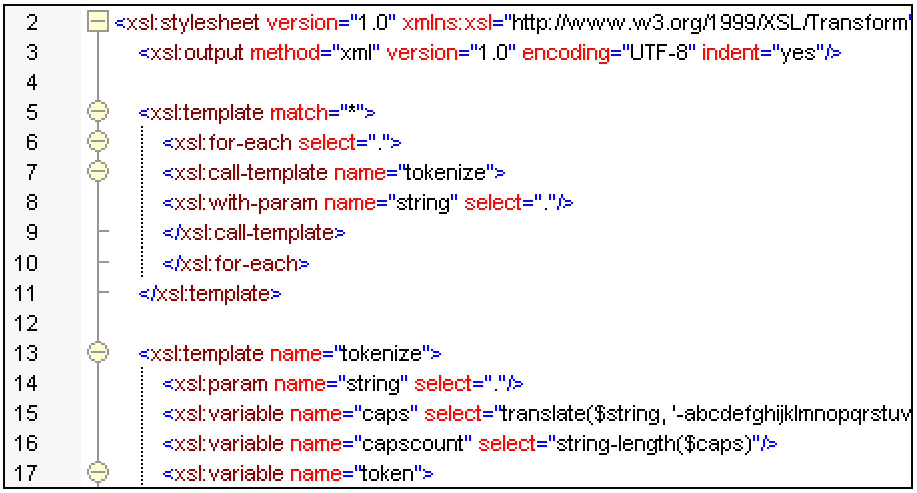
The files needed for the simple example shown below, are available in the ...\ **MapForceExamples** directory.

- Name-splitter.xslt
- Name-splitter.xml (the XML instance file for Customer.xsd)
- Customers.xsd
- CompletePO.xsd

Please see: Aggregate functions for an additional example of using named templates to sum nodes.

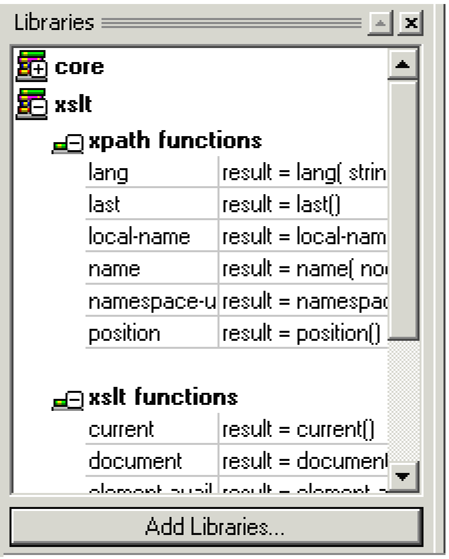
To add a custom XSLT function:

1. Create an XSLT file that achieves the transformation/result you want.
   The example below, **Name-splitter.xslt**, shows a named template called "**tokenize**" with a single parameter "string". What the template does, is work through an input string and separate capitalized characters with a space for each occurrence.



```
<xsl:stylesheet version="1.0" xmlns:xsl="http://www.w3.org/1999/XSL/Transform"
    <xsl:output method="xml" version="1.0" encoding="UTF-8" indent="yes"/>

    <xsl:template match="*">
        <xsl:for-each select=".">
        <xsl:call-template name="tokenize">
        <xsl:with-param name="string" select="."/>
        </xsl:call-template>
        </xsl:for-each>
    </xsl:template>

    <xsl:template name="tokenize">
        <xsl:param name="string" select="."/>
        <xsl:variable name="caps" select="translate($string, '-abcdefghijklmnopqrstuv
        <xsl:variable name="capscount" select="string-length($caps)"/>
        <xsl:variable name="token">
```

2. Click the **Add Libraries** button, and then click the Add button in the following dialog box.



core

xslt

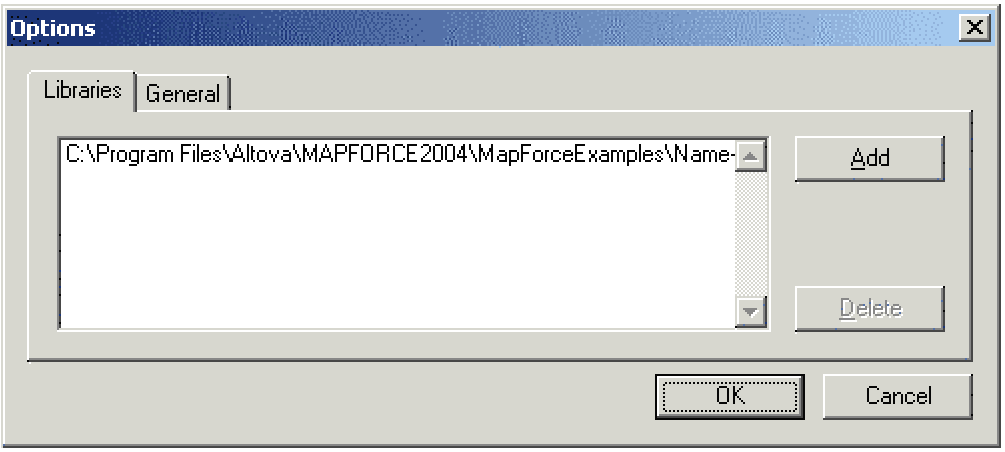
xpath functions

lang	result = lang(strin
last	result = last()
local-name	result = local-nam
name	result = name(no
namespace-u	result = namespac
position	result = position()

xslt functions

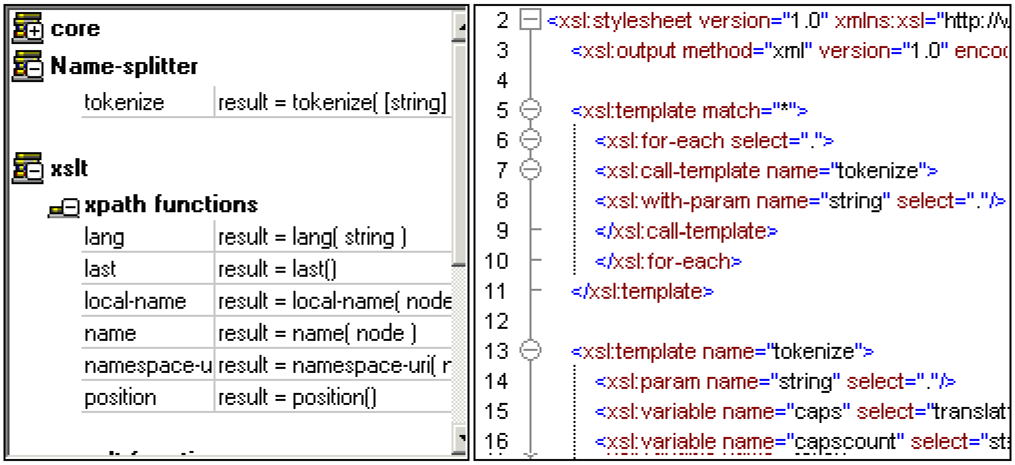
current	result = current()
document	result = documen

3. Select the XSL, or XSLT file, that contains the named template you want to act as a function, in this case **Name-splitter.xslt**. The XSLT file appears in the Libraries tab.



C:\Program Files\Altova\MAPFORCE2004\MapForceExamples\Name-

4. Click **OK** to insert the new function.

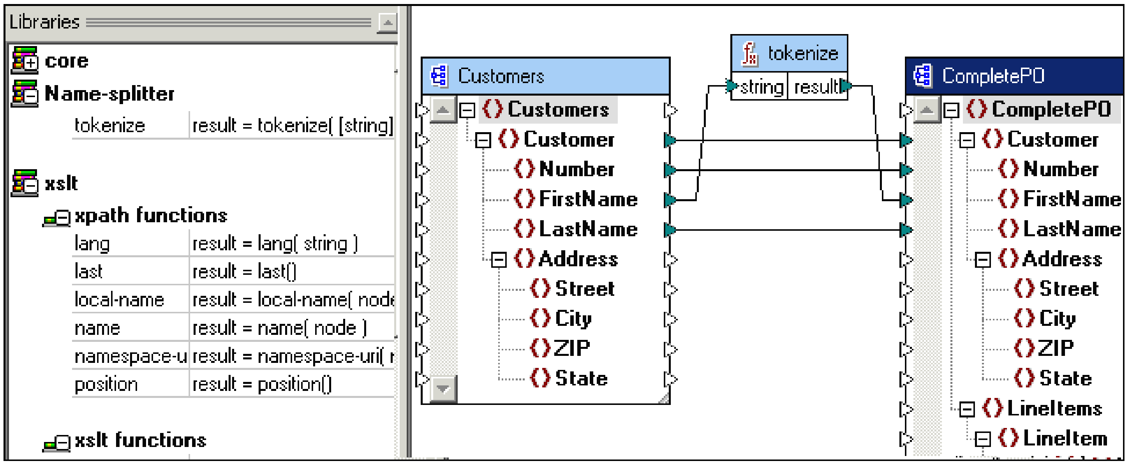


tokenize	result = tokenize([string]
lang	result = lang(string)
last	result = last()
local-name	result = local-name(node
name	result = name(node)
namespace-u	result = namespace-uri(r
position	result = position()

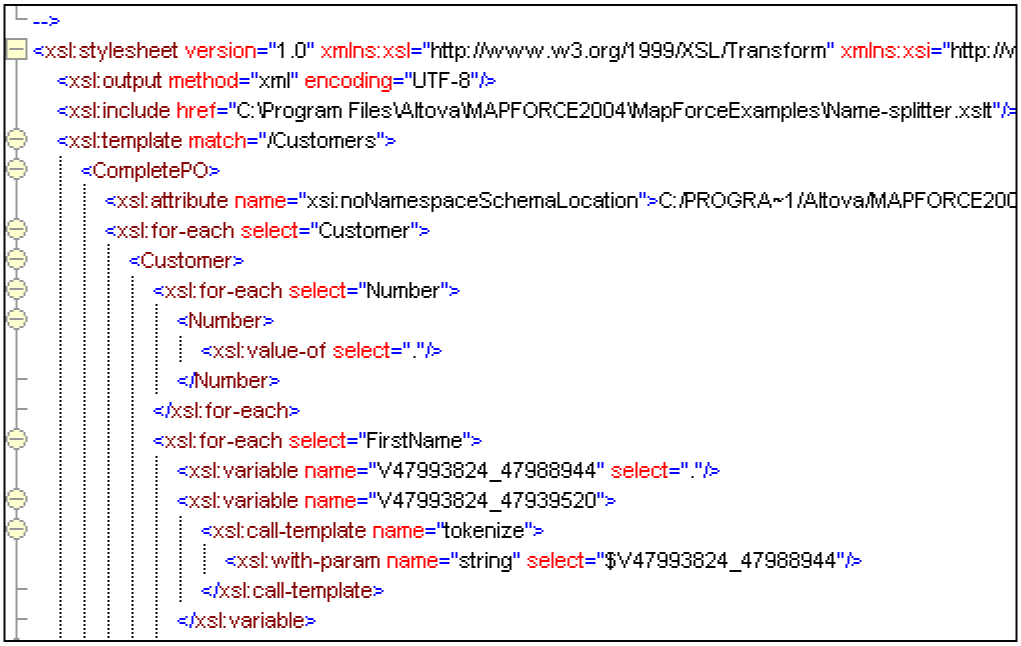
```
<xsl:stylesheet version="1.0" xmlns:xsl="http://w
  <xsl:output method="xml" version="1.0" encod

  <xsl:template match="*">
    <xsl:for-each select=".">
    <xsl:call-template name="tokenize">
    <xsl:with-param name="string" select="."/>
    </xsl:call-template>
    </xsl:for-each>
  </xsl:template>

  <xsl:template name="tokenize">
    <xsl:param name="string" select="."/>
    <xsl:variable name="caps" select="translat
    <xsl:variable name="capscount" select="st
```

The XSLT file name appears in the library window, along with the function(s) defined as named templates, below it. In this example **Name-splitter** with the **tokenize** function.

5. Drag the function into the Mapping window, to use it in you current mapping, and map the necessary items, as show in the screenshot below.



6. Click the XSLT tab to see the generated XSLT code.

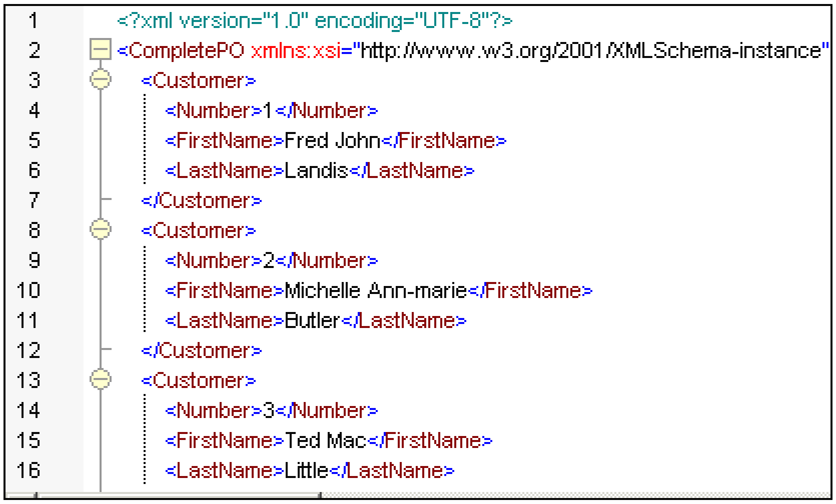


```
-->
<xsl:stylesheet version="1.0" xmlns:xsl="http://www.w3.org/1999/XSL/Transform" xmlns:xsi="http://v
  <xsl:output method="xml" encoding="UTF-8"/>
  <xsl:include href="C:\Program Files\Altova\MAPFORCE2004\MapForceExamples\Name-splitter.xslt"/
  <xsl:template match="/Customers">
    <CompletePO>
      <xsl:attribute name="xsi:noNamespaceSchemaLocation">C:/PROGRA~1/Altova/MAPFORCE200
      <xsl:for-each select="Customer">
        <Customer>
          <xsl:for-each select="Number">
            <Number>
              <xsl:value-of select="."/>
            </Number>
          </xsl:for-each>
          <xsl:for-each select="FirstName">
            <xsl:variable name="V47993824_47988944" select="."/>
            <xsl:variable name="V47993824_47939520">
              <xsl:call-template name="tokenize">
                <xsl:with-param name="string" select="$V47993824_47988944"/>
              </xsl:call-template>
            </xsl:variable>
```

Please note:

As soon as a named template is used in a mapping, the XSLT file containing the named template is **included** in the generated XSLT code (**xsl:include href...**), and is **called** using the command **xsl:call-template**.

7. Click the Output tab to see the result of the mapping.



```
<?xml version="1.0" encoding="UTF-8"?>
<CompletePO xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  <Customer>
    <Number>1</Number>
    <FirstName>Fred John</FirstName>
    <LastName>Landis</LastName>
  </Customer>
  <Customer>
    <Number>2</Number>
    <FirstName>Michelle Ann-marie</FirstName>
    <LastName>Butler</LastName>
  </Customer>
  <Customer>
    <Number>3</Number>
    <FirstName>Ted Mac</FirstName>
    <LastName>Little</LastName>
```

To delete custom XSLT functions:

1. Click the **Add Libraries** button.
2. Click to the specific XSLT **library name** in the Libraries tab
3. Click the Delete button, then click OK to confirm.

Chapter 9

Adding custom XSLT 2.0 functions

9 Adding custom XSLT 2.0 functions

MapForce also allows you to import XSLT 2.0 functions that occur in an XSLT 2.0 document in the form:

<xsl:function name="MyFunction">

Please see: the XSLT 2.0 implementation specific document for more information, as well as Aggregate functions for an additional example of using named templates to sum nodes.

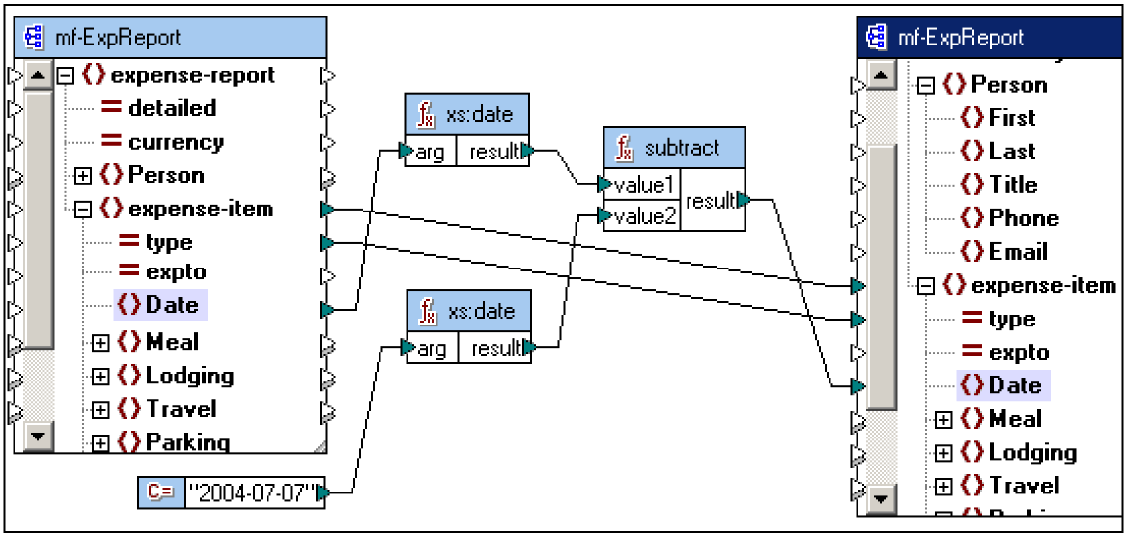
Datatypes in XPath 2.0
If your XML document references an XML Schema and is valid according to it, you must explicitly construct or cast datatypes that are not implicitly converted to the required datatype by an operation.

In the XPath 2.0 Data Model used by the Altova XSLT 2.0 Engine, all **atomized** node values from the XML document are assigned the `xdt: untypedAtomic` datatype. The `xdt: untypedAtomic` type works well with implicit type conversions.

For example,

- the expression `xdt: untypedAtomic("1") + 1` results in a value of 2 because the `xdt: untypedAtomic` value is **implicitly** promoted to `xs: double` by the addition operator.
- Arithmetic operators implicitly promote operands to `xs: double`.
- Value comparison operators promote operands to `xs: string` before comparing.

In some cases, however, it is necessary to **explicitly** convert to the required datatype.



To allow date calculations, as shown in the example above, the value of the Date element, although defined as being of type xs:date datatype, must be explicitly converted to xs:date (using the xs:date constructor) before it can be used for a date calculation.

Similarly, the string constant "2004-07-07" must also be explicitly converted to the xs:date datatype before being used for a date calculation.

The subtract function when performed on two xs:date values, is actually the abstract op:subtract-dates function which returns an xdt:dayTimeDuration value.

Chapter 10

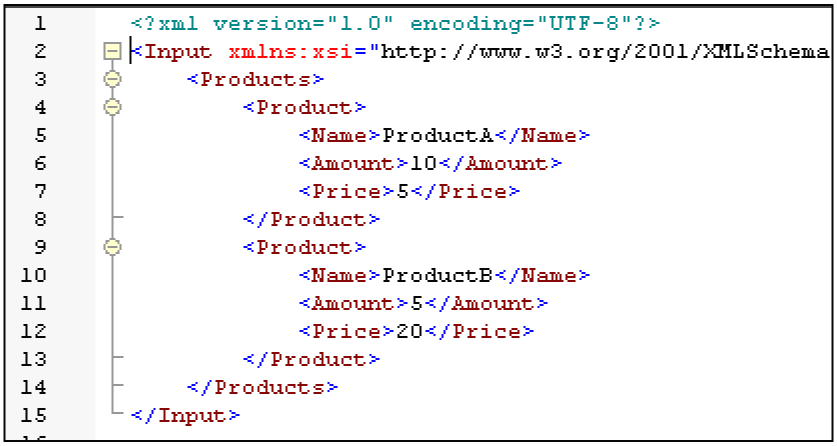
Aggregate functions - summing nodes in XSLT1 and 2

10 Aggregate functions - summing nodes in XSLT1 and 2

This section describes the method you can use to process multiple nodes of an XML instance document and have the result mapped as a single value to a target item. The files used in this example are available in the ...**\MapforceExamples\Tutorial** folder and consists of:

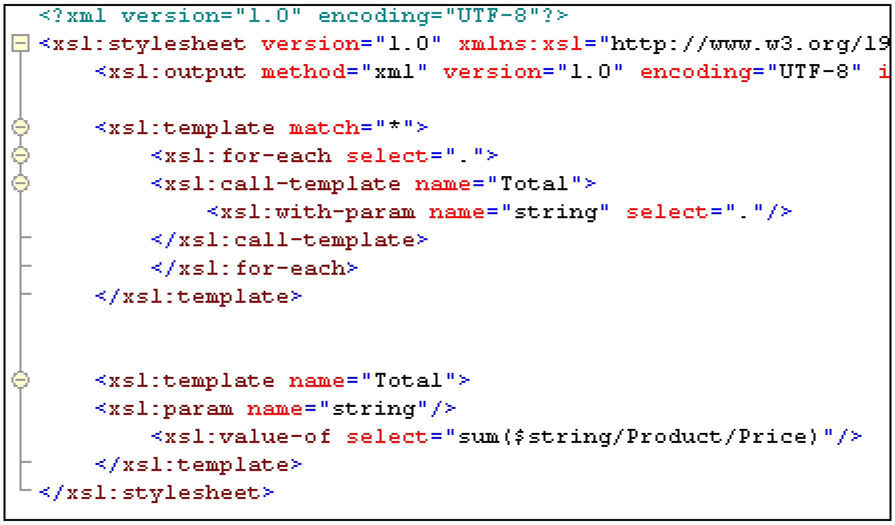
Summing-nodes.mfd	mapping
input.xml	input XML file
input.xsd and output.xsd	source and target schema files
Summing-nodes.xslt	xslt file containing a named template to sum the individual nodes

The screenshot below shows the **XML input** file. The aim of the example is to sum the Price fields of any number of products, in this case products A and B.



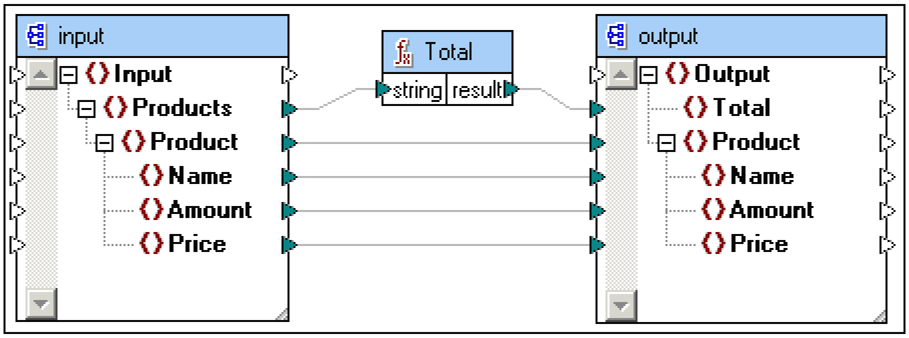
```
<?xml version="1.0" encoding="UTF-8"?>
<Input xmlns:xsi="http://www.w3.org/2001/XMLSchema
    <Products>
        <Product>
            <Name>ProductA</Name>
            <Amount>10</Amount>
            <Price>5</Price>
        </Product>
        <Product>
            <Name>ProductB</Name>
            <Amount>5</Amount>
            <Price>20</Price>
        </Product>
    </Products>
</Input>
```

The screenshot below shows the XSLT stylesheet which uses the named template "**Total**" and a single parameter "string". What the template does, is work through the XML input file and sum all the values obtained by the XPath expression **/Product/Price**, in the document.

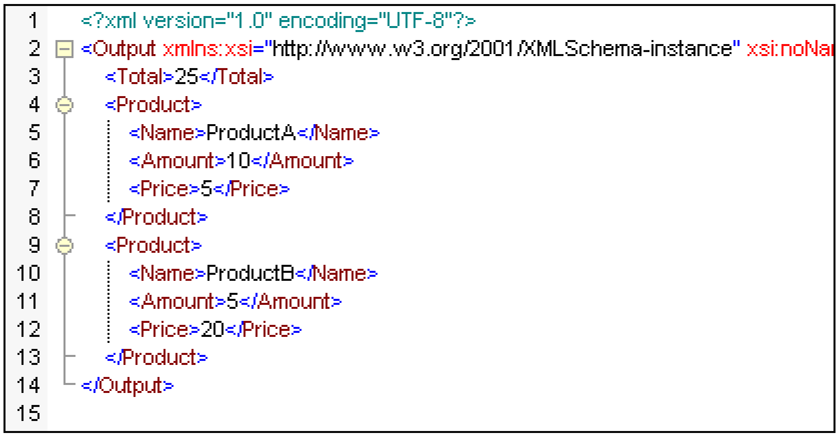


```
<?xml version="1.0" encoding="UTF-8"?>
<xsl:stylesheet version="1.0" xmlns:xsl="http://www.w3.org/19
    <xsl:output method="xml" version="1.0" encoding="UTF-8" i

    <xsl:template match="*">
        <xsl:for-each select=".">
        <xsl:call-template name="Total">
            <xsl:with-param name="string" select="."/>
        </xsl:call-template>
        </xsl:for-each>
    </xsl:template>


    <xsl:template name="Total">
    <xsl:param name="string"/>
        <xsl:value-of select="sum($string/Product/Price)"/>
    </xsl:template>
</xsl:stylesheet>
```

1. Click the **Add Libraries** button, and select the Libraries tab of the Options dialog box.
2. Click the Add button and select the **Summing-nodes.xslt** file from the ...\ **MapforceExamples\Tutorial** folder.
3. Drag in the Total function from the newly created Summing-nodes library and create the mappings as shown below.



4. Click the Output tab to preview the mapping result.

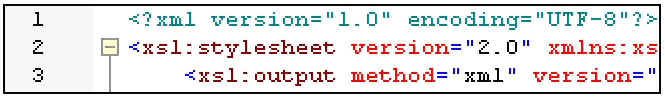


```
<?xml version="1.0" encoding="UTF-8"?>
<Output xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:noNa
    <Total>25</Total>
    <Product>
        <Name>ProductA</Name>
        <Amount>10</Amount>
        <Price>5</Price>
    </Product>
    <Product>
        <Name>ProductB</Name>
        <Amount>5</Amount>
        <Price>20</Price>
    </Product>
</Output>
```

The two Price fields of both products have been added and placed into the Total field.

To sum the nodes in XSLT 2.0:

- Change the stylesheet declaration in the template to ... version="2.0".



```
<?xml version="1.0" encoding="UTF-8"?>
<xsl:stylesheet version="2.0" xmlns:xs
    <xsl:output method="xml" version="
```

Chapter 11

Type conversion checking

11 Type conversion checking

From MapForce **2006 SP2** on, the generated applications and preview (with the builtin execution engine) check for type-conversion errors in more detail, inline with XSLT2 and XQUERY.

Converting values from one type to another may now result in a runtime-error, where in prior versions of MapForce would have produced some type of result.

Example: conversion of a xs:string 'Hello', to xs:decimal

MapForce **2006** Versions up to, and including **SP1**:

XSLT:	'Hello' (or 'NaN' when passed to a function dealing with number)
XSLT2:	error: "invalid lexical value"
Xquery:	error: "invalid lexical value"
Preview with BUILTIN-engine:	0
C++ app:	0
C# app:	error: "values not convertable"
Java app:	error: "values not convertable"

MapForce **2006 SP2**:

XSLT:	'Hello' (or 'NaN' when passed to a function dealing with number)
XSLT2:	error: "invalid lexical value"
Xquery:	error: "invalid lexical value"
Preview with BUILTIN-engine:	**error: "string-value 'Hello' could not be converted to decimal"**
C++ app:	**error: "values not convertable"**
C# app:	error: "values not convertable"
Java app:	error: "values not convertable"

If type-conversion-errors occur, check that the types have been handled correctly. E.g. use the lang:numeric() function, to check if the source-value may be converted into a number, and then an if-else component to pass a different value in case it fails (e.g. a constant containing -1, on the value-false parameter).

Chapter 12

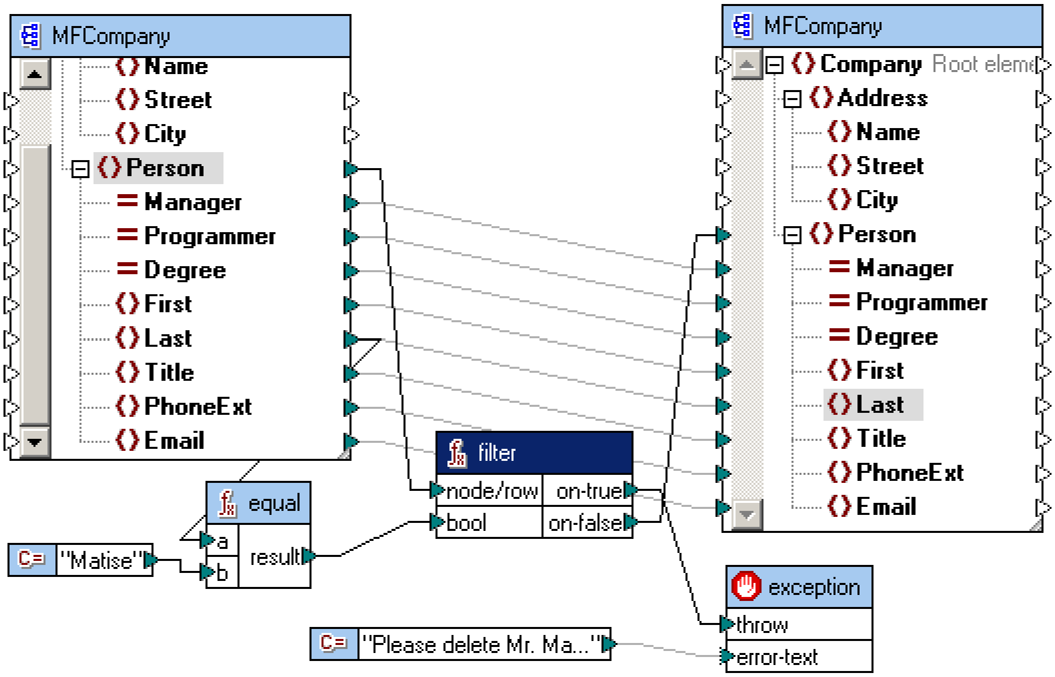
MapForce Exceptions

12 MapForce Exceptions

MapForce provides support for the definition of exceptions. You can define the condition that will throw an error. When the condition is satisfied, a user-defined message appears and the mapping process is stopped. The **ExpenseLimit.mfd** file in the MapForceExamples folder is a sample mapping that contains an exception function.

To insert an exception component:

- Select the menu option **Insert | Exception**, or click the Exception icon in the icon bar.



The example above shows how exceptions are defined in mappings. The exception should be triggered when the Last name of a person equals "Matise".

- The **equal** component checks to see if Last equals Matise, and the bool result is passed on to the filter component.
- When the condition is satisfied, i.e. Matise is **True**, the **on-true** parameter of the filter component activates the exception and the mapping process is stopped. (Note that you can also connect the exception to the on-false parameter, if that is what you need.)
- The error text supplied by the **constant** component is output.
- The error text appears in the Output tab, and also when running the compiled code.

Please note:
It is very important to note the filter placement in the example:

- **Both parameters** of the filter component, on-true and on-false, must be mapped! One of them needs to be mapped to the fault component, and the other, to the target component that receives the filtered source data. If this is not the case, the exception component will never be triggered.

- The **exception** and **target** components must be **directly connected** to the **filter** component. Functions, or other components, may not be placed between the filter and either the exception, or target components.

- When generating **XSLT 2.0** and **XQuery** code, the exception appears in the Messages window, and a Preview failed message box appears. Clicking the OK button in the message box switches to the respective XSLT2 or XQuery tab, and the line that triggered the exception is automatically highlighted.

Chapter 13

MapForce plug-in for Eclipse

13 MapForce plug-in for Eclipse

Eclipse 3.x is an open source framework that integrates different types of applications delivered in form of plugins. MapForce for the Eclipse Platform, is an Eclipse Plug-in that allows you to access the functionality of a previously installed MapForce Edition from within the Eclipse 3.0 / 3.1 / 3.2 Platform.

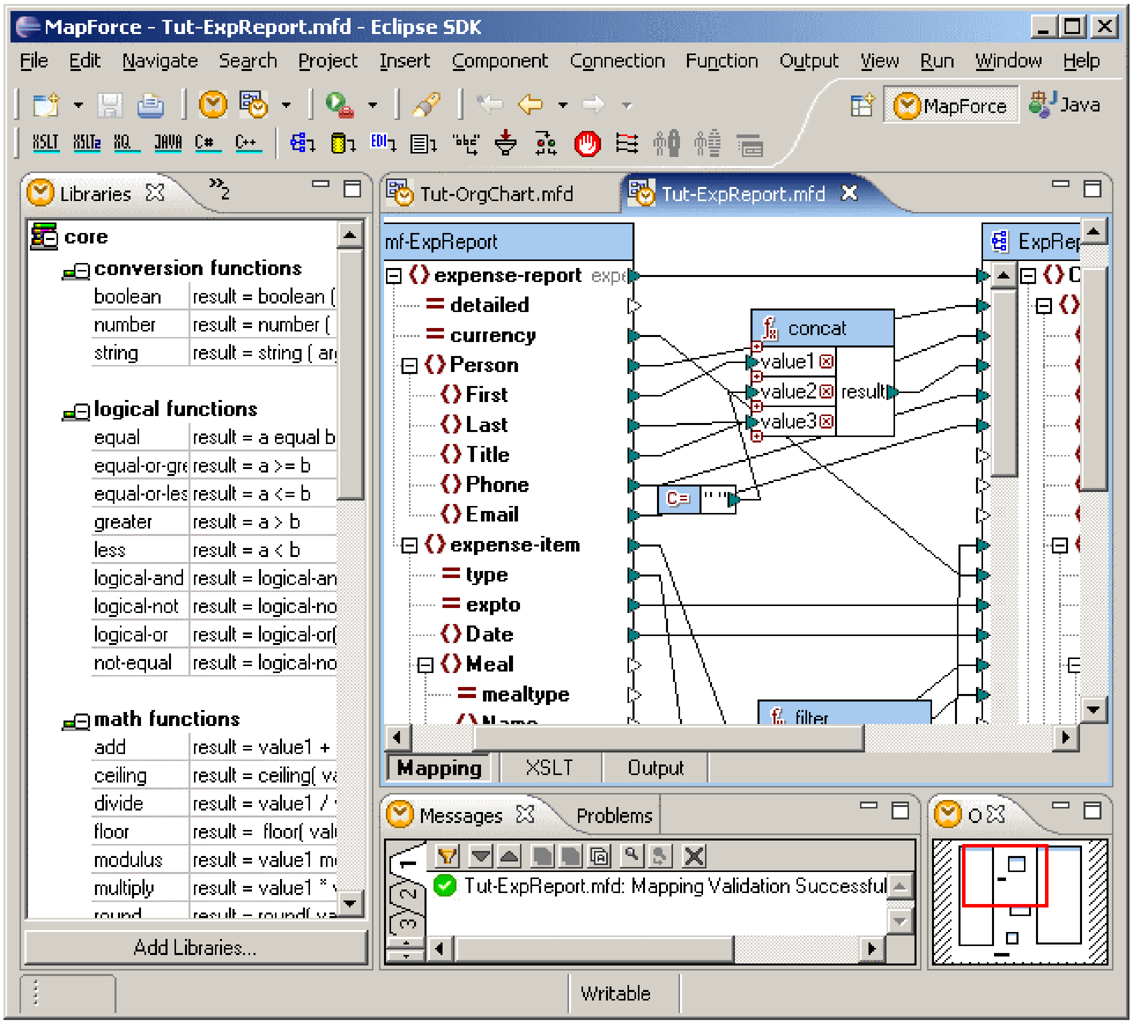
Installation Requirements

To successfully install the MapForce Plug-in for Eclipse 3.x, you need the following:

- The specific MapForce Edition you intend to use: Enterprise, Professional, or Standard
- The Eclipse 3.x package, as well as
- The appropriate Java Runtime Edition

The MapForce Plug-in for Eclipse supplies the following functionality:

- A fully-featured visual data mapping tool for advanced data integration projects.
- Code generation capability in the Edition specific programming languages.
- MapForce user help under the menu item **Help | MapForce| Table of Contents.**



core

conversion functions

boolean	result = boolean (
number	result = number (
string	result = string (ar

logical functions

equal	result = a equal b
equal-or-gre	result = a >= b
equal-or-les	result = a <= b
greater	result = a > b
less	result = a < b
logical-and	result = logical-an
logical-not	result = logical-no
logical-or	result = logical-or(
not-equal	result = logical-no

math functions

add	result = value1 +
ceiling	result = ceiling(va
divide	result = value1 /
floor	result = floor(valu
modulus	result = value1 m
multiply	result = value1 *
round	result = round(va

Tut-ExpReport.mfd: Mapping Validation Successful

13.1 Installing MapForce plugin

Installing the MapForce Plug-in for Eclipse:
To install the MapForce Plug-in:

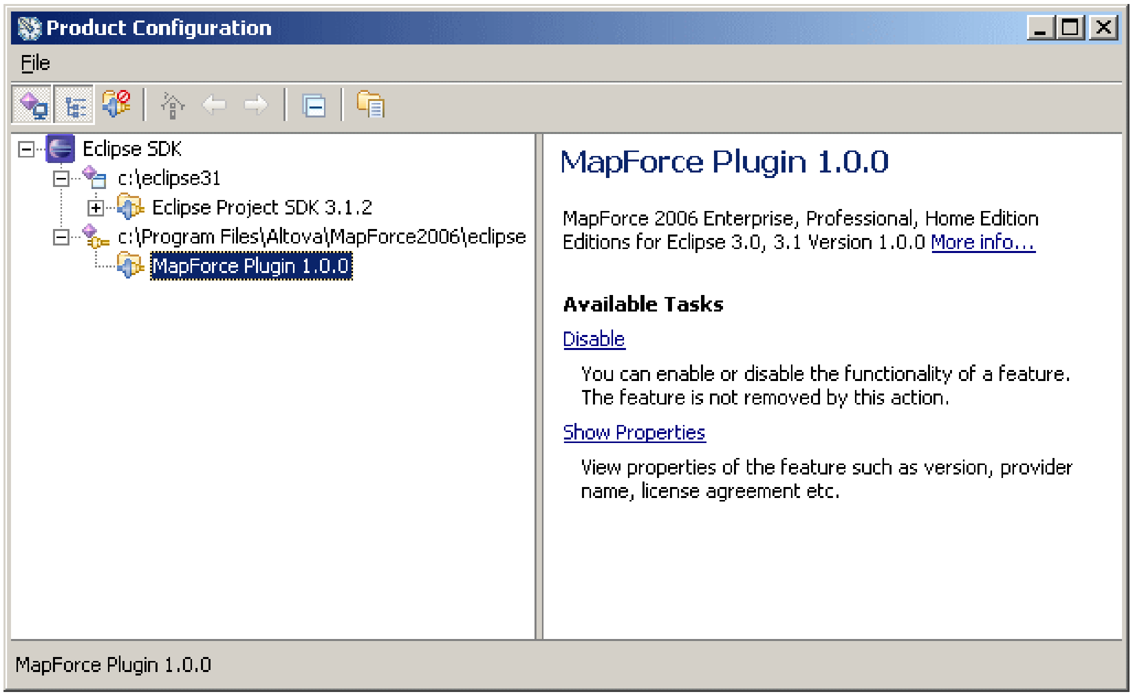
- Download and install the MapForce edition you intend to use from the Download section of the Altova.com website, i.e. Enterprise, Professional or Standard edition.
- Download and install the MapForce Plug-in for Eclipse from the Download section of the Altova.com website. You will be prompted for the installation folder of Eclipse during the installation process.

Configuring an eclipse installation to use a **previously** installed MapForce plug-in:

1. Start Eclipse and select the menu option **Help | Software Updates | Manage Configuration.**
2. Select the menu option **File | Add an extension location** and browse to the installation folder of your MapForce Eclipse plug-in e.g. C:\Program Files\Altova\MapForce2007 \eclipse.

   Follow the instructions to access a previously installed plug-in.

Clicking a plug-in or folder icon, displays various installation options in the right-hand pane.


Product Configuration
File
Eclipse SDK
c:\eclipse31
Eclipse Project SDK 3.1.2
c:\Program Files\Altova\MapForce2006\eclipse
MapForce Plugin 1.0.0

MapForce Plugin 1.0.0

MapForce 2006 Enterprise, Professional, Home Edition Editions for Eclipse 3.0, 3.1 Version 1.0.0 More info...

Available Tasks

Disable

You can enable or disable the functionality of a feature. The feature is not removed by this action.

Show Properties

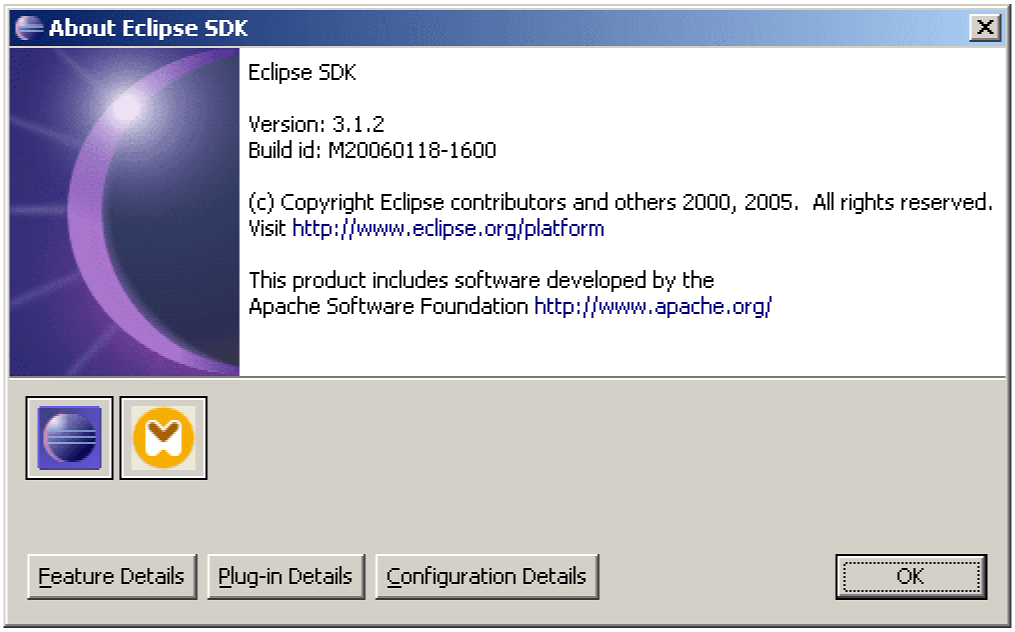
View properties of the feature such as version, provider name, license agreement etc.

MapForce Plugin 1.0.0

1. Click the "Show Properties" link displays the specific plug-in information: Copyright, General information etc.

To check the currently installed version:

1. Select the menu option **Help | About Eclipse SDK.**



Eclipse SDK

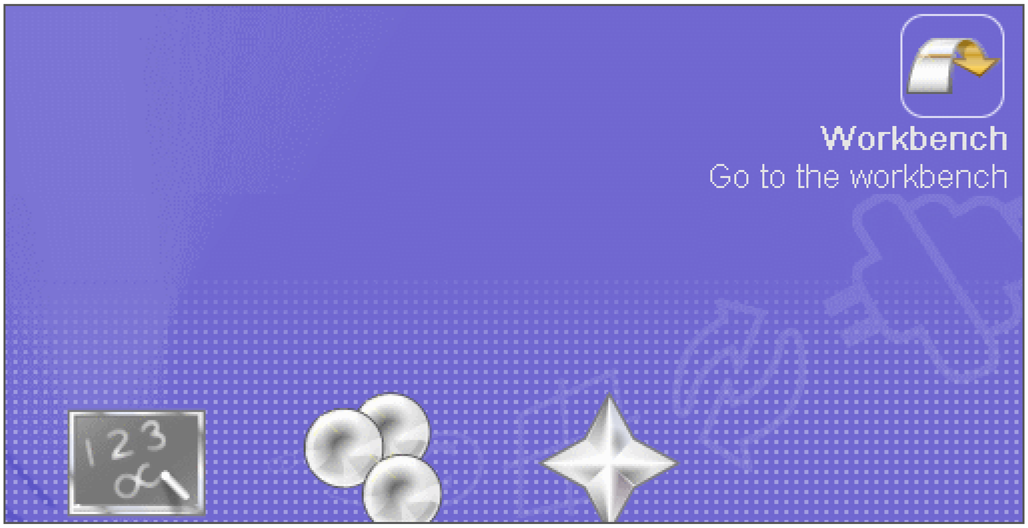
Version: 3.1.2
Build id: M20060118-1600

(c) Copyright Eclipse contributors and others 2000, 2005. All rights reserved.
Visit http://www.eclipse.org/platform

This product includes software developed by the
Apache Software Foundation http://www.apache.org/

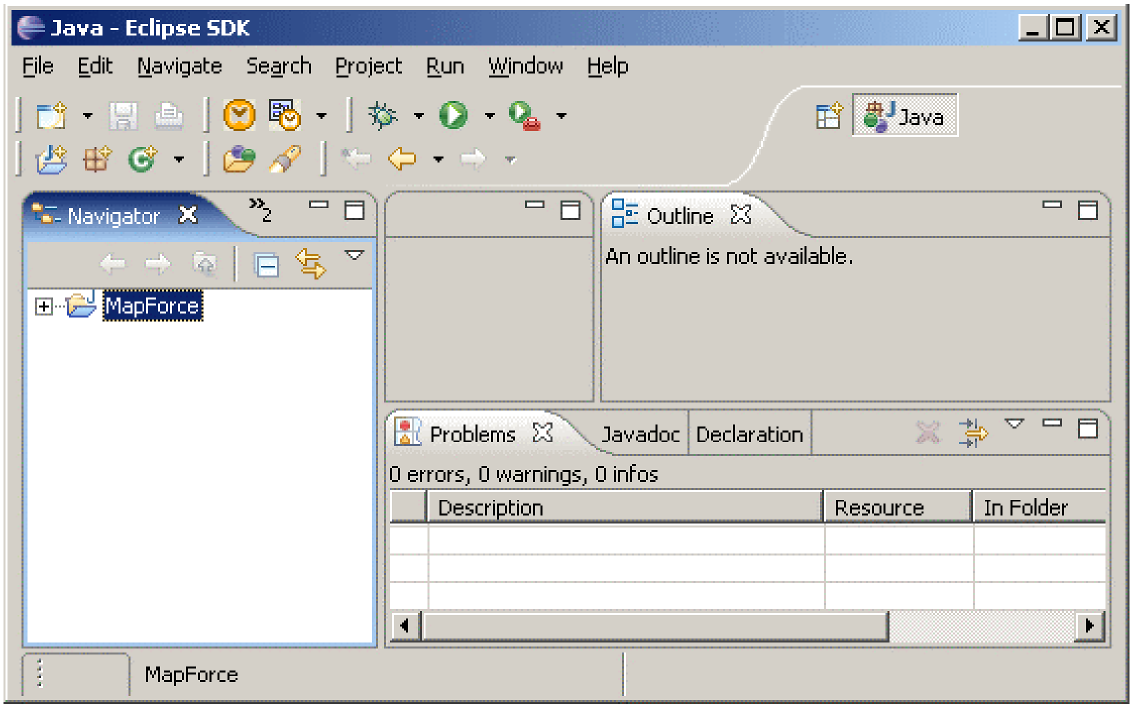
2. Click the MapForce icon, to view the version specifics.

13.2 Starting Eclipse and using MapForce plugin



Place the cursor over the arrow symbol, and click when the "Go to the workbench" text appears. This opens an empty MapForce window in Eclipse.

Starting Eclipse and Using MapForce Plug-in:
Having used the MapForce for Eclipse installer, you are presented with an empty Eclipse environment.



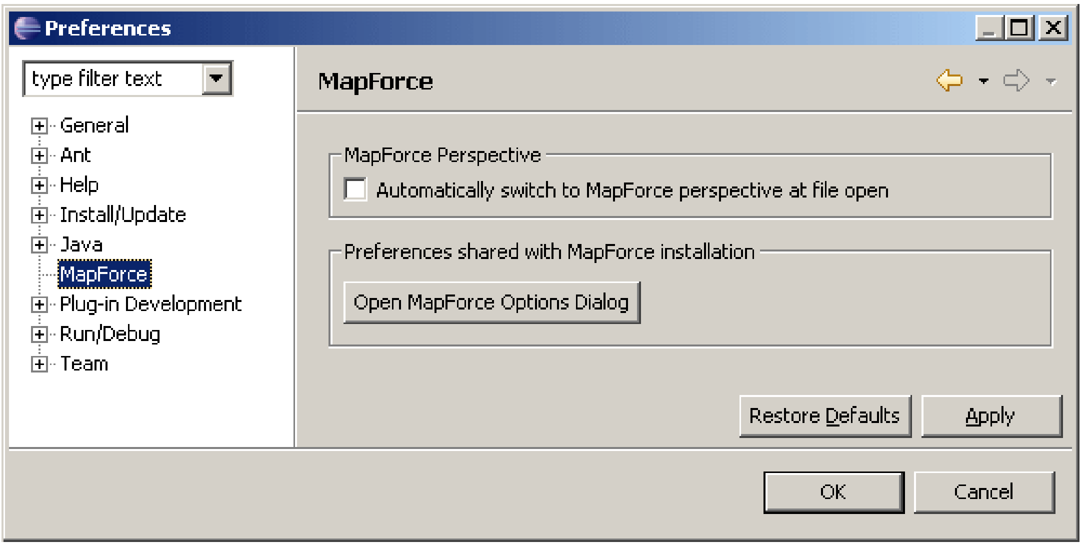
An outline is not available.

0 errors, 0 warnings, 0 infos

Description	Resource	In Folder

MapForce properties:

1. Select the menu option **Window | Preferences,** and click the MapForce entry.
2. Activate the available check box, to switch to the MapForce perspective when opening a file.



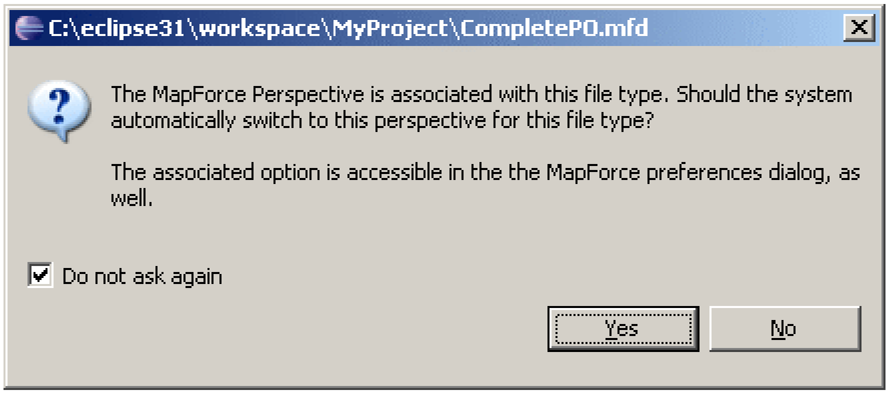
MapForce Perspective

☐ Automatically switch to MapForce perspective at file open

Preferences shared with MapForce installation

Clicking the "Open MapForce Options Dialog" button, opens the Options dialog which allows you to define the specific MapForce settings, i.e. Libraries, Code generation settings etc.

Double clicking a MapForce mapping file (*.mfd) initially opens a message box stating that a MapForce perspective is associated with this type of file, and prompts if you want Eclipse to automatically switch to the MapForce perspective in the future. These settings can be changed later through the **Window | Preferences | MapForce | MapForce Perspective** option.



The MapForce Perspective is associated with this file type. Should the system automatically switch to this perspective for this file type?

The associated option is accessible in the the MapForce preferences dialog, as well.

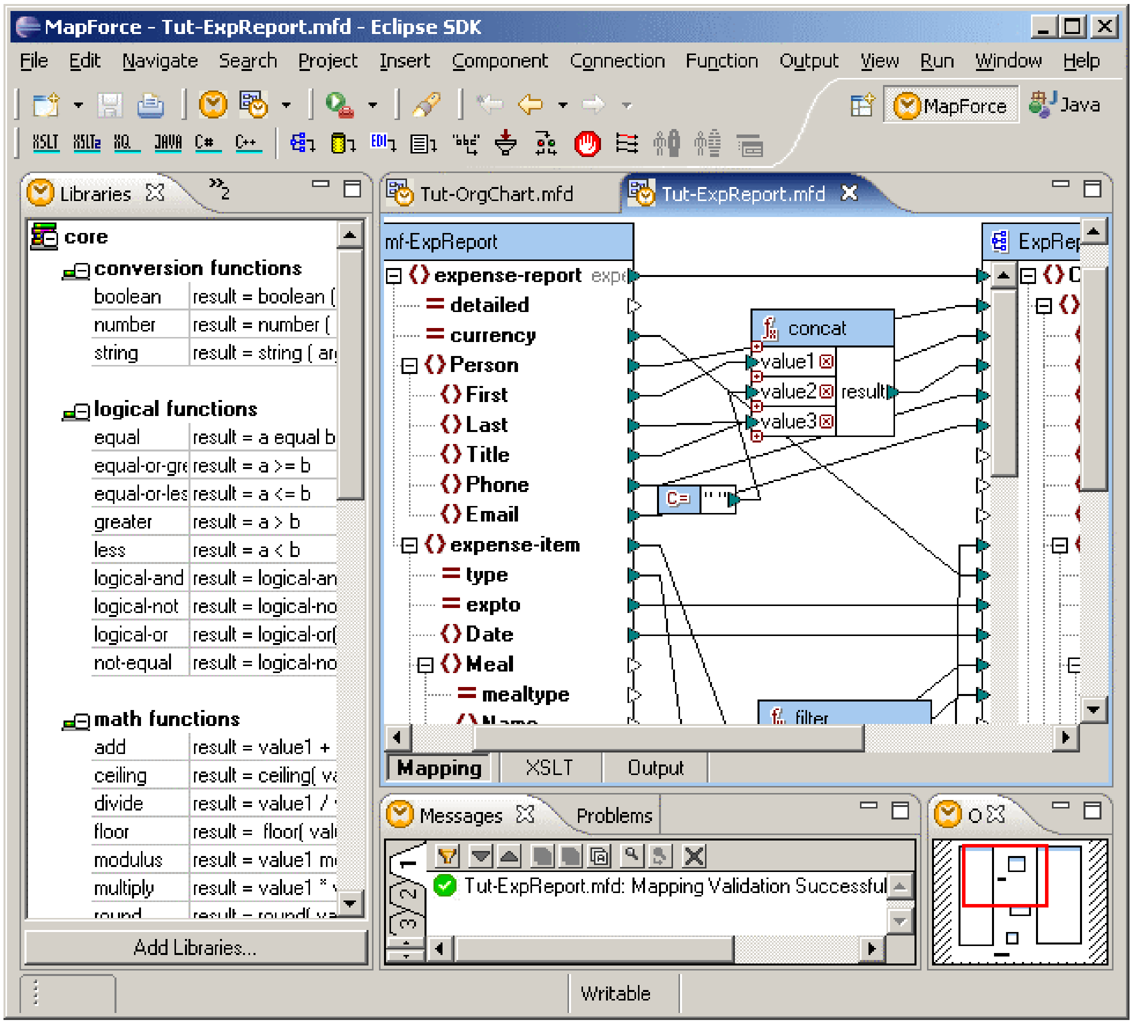
☑ Do not ask again

13.3 MapForce / Editor, View and Perspectives

The MapForce perspective can be automatically set if you activate the "Automatically switch to MapForce perspective at file open" in the **Window | Preferences** dialog box. You can also use the option described below to enable the perspective.

To enable the MapForce perspective in Eclipse:

- Select the menu option **Window | Open perspective | Other | MapForce.**



core

conversion functions

boolean	result = boolean (
number	result = number (
string	result = string (ar

logical functions

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equal-or-gre	result = a >= b
equal-or-les	result = a <= b
greater	result = a > b
less	result = a < b
logical-and	result = logical-an
logical-not	result = logical-no
logical-or	result = logical-or(
not-equal	result = logical-no

math functions

add	result = value1 +
ceiling	result = ceiling(va
divide	result = value1 /
floor	result = floor(val
modulus	result = value1 m
multiply	result = value1 *
round	result = round(va

Tut-ExpReport.mfd: Mapping Validation Successful

The individual MapForce tabs are now visible in the Eclipse Environment:

- **Libraries** tab at left, allows you to select predefined or user-defined functions.
- **Messages** tab displays validation messages, errors and warnings
- **Overview** tab displays an iconized view of the mapping file.

The editor pane is where you design your mappings and preview their output, and consists of the following tabs:

Mapping, which displays the graphical mapping design.

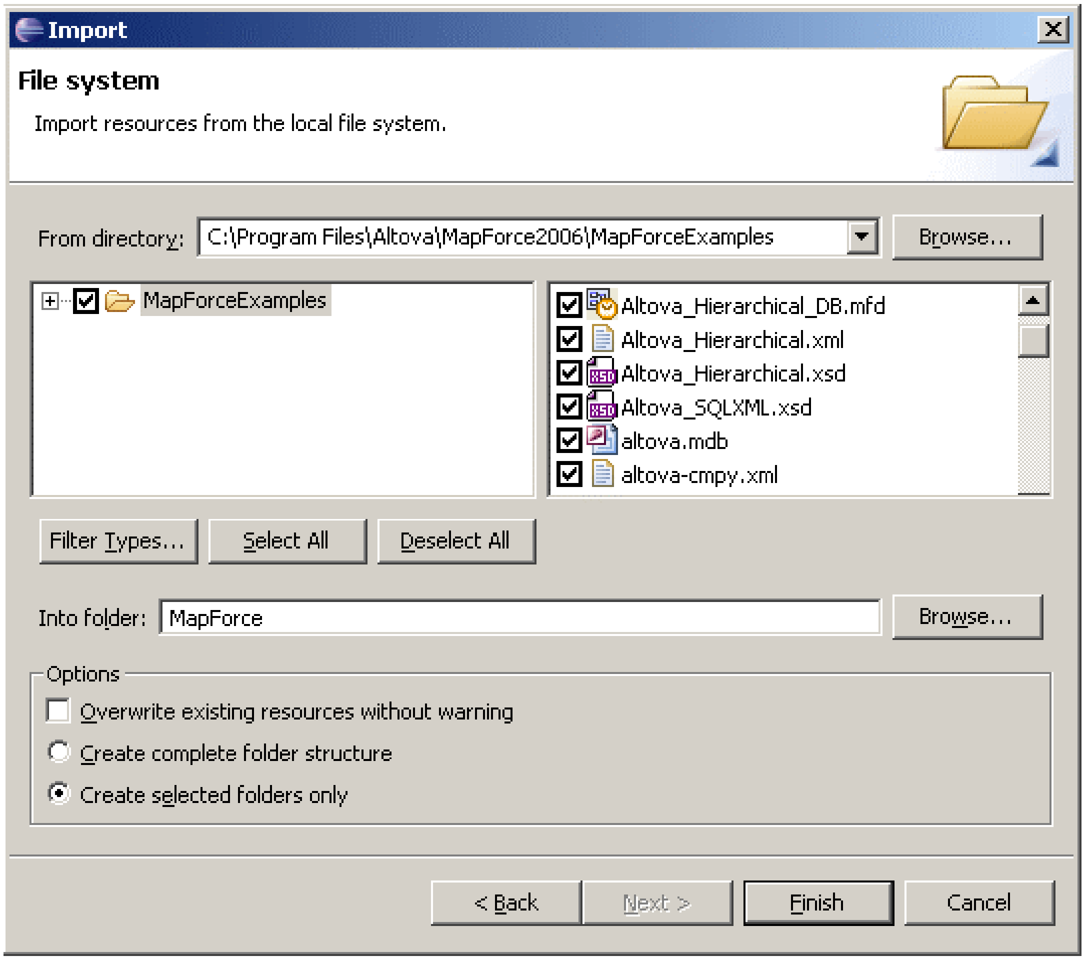
XSLT, which displays the generated XSLT code. The name of this tab reflects the programming language you have selected under Output | XSLT 1.0, Java, C# etc.

Output, which displays the Mapping output, in this case the XML data.

13.4 Importing MapForce examples folder into Navigator

To Import the MapForce Examples folder into the Navigator:

1. Right-click in the **Navigator** tab and click **Import**.
2. Select "File system", then click **Next**.
3. Click the **Browse** button to the right of the "From directory:" text box, and select the MapForceExamples directory in your MapForce folder.
4. Activate the **MapForceExamples** check box.
   This activates all files in the various subdirectories in the window at right.



Import

File system

Import resources from the local file system.

From directory: C:\Program Files\Altova\MapForce2006\MapForceExamples

☑ MapForceExamples

☑ Altova_Hierarchical_DB.mfd
☑ Altova_Hierarchical.xml
☑ Altova_Hierarchical.xsd
☑ Altova_SQLXML.xsd
☑ altova.mdb
☑ altova-cmpy.xml

Into folder: MapForce

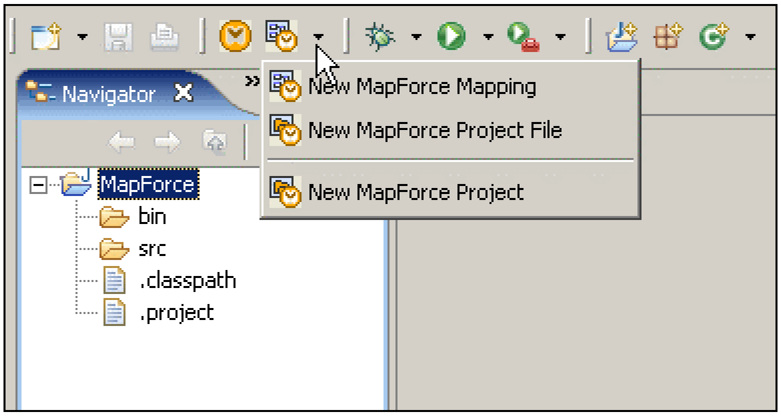
Options
☐ Overwrite existing resources without warning
○ Create complete folder structure
● Create selected folders only

5. If not automatically supplied, click the **Browse** button, next to the "Into folder:" text box, to select the target folder, then click **Finish**.
   The selected folder structure and files will be copied into the Eclipse workspace.
6. Double-click a file in Navigator to open it.

13.5 Creating new MapForce files (mapping and project file)

To create a new MapForce mapping or project files:

- Click the New MapForce... combo box and select the required option.



- New MapForce mapping, creates a single mapping file.
- New MapForce Project File, creates a MapForce project that can combine multiple mappings into one code-generation unit. You must select this option when you are creating webservices.
- New MapForce Project, creates a new MapForce/Eclipse project, adding the folder to the Navigator window. MapForce/Eclipse projects are Eclipse projects with a MapForce builder assigned to them. See Using MapForce Eclipse projects for automatic build for details.

13.6 MapForce code generation

Build Integration

MapForce mappings can be contained in any eclipse project. Generation of mapping code can be triggered manually by selecting one of the **'Generate Code...**' menu entries for the mapping or MapForce project file. Full integration into the Eclipse auto-build process is achieved by assigning the MapForce builder to an Eclipse project.

For manual code generation see Build mapping code manually

For automatic generation of mapping code please see Using MapForce Eclipse projects for automatic build and Adding MapForce nature to existing Eclipse Project.

13.6.1 Build mapping code manually

To manually build mapping code for a single mapping:

1. Open, or select the mapping, and select **File | Generate Code in**, or **File | Generate Code in Selected Language.**
   You are prompted for a target folder for the generated code.
2. Select the folder and click OK to start code generation.
   Any errors or warnings are displayed in the MapForce Messages tab.

To manually build mapping code for multiple mappings combined into a MapForce **project:**

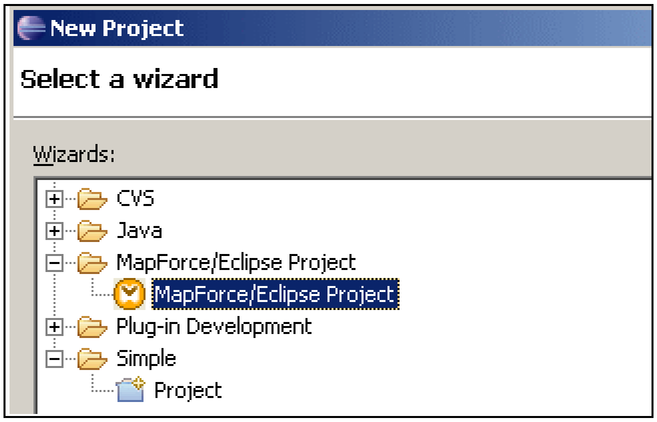
1. Open, or select the MapForce project file.
2. Select the root node or any other node in the project document.
3. Select **Generate Code**, or **Generate Code in** from the right mouse-button menu**.**
   The target folder for the generated code is determined by the properties of the selected node or properties of its parents.
4. Any errors or warnings are displayed in the MapForce Messages tab.

13.6.2 Using MapForce Eclipse projects for automatic build

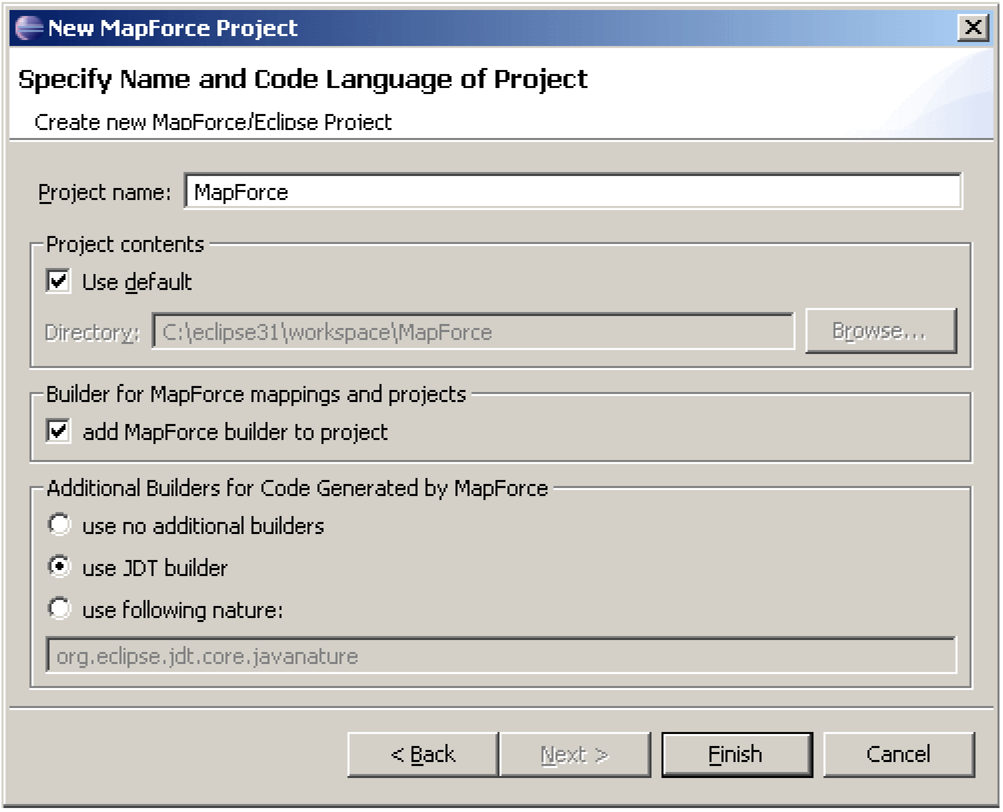
The MapForce plug-in has a built-in project builder. This builder can be identified by the project nature ID `"com.altova.mapforceeclipseplugin.MapForceNature"`. MapForce Eclipse projects have this nature automatically assigned. To use the MapForce project builder in other Eclipse projects see "Adding MapForce nature to existing Eclipse Project" for more information.

To create a new MapForce Eclipse Project:

1. Click the Navigator tab to make it active.
2. Right-click in the Navigator window, and select **New | Project.**
3. Expand the MapForce/Eclipse Project entry and select MapForce/Eclipse, then click Next.



4. Enter the project name (e.g. MapForce) and change any of the other project settings to suit your environment, then click Finish. Note the default setting in the "Additional Builders..." group, use JTD builder.



New MapForce Project

Specify Name and Code Language of Project

Create new MapForce/Eclipse Project

Project name: MapForce

Project contents

☑ Use default

Directory: C:\eclipse31\workspace\MapForce

Builder for MapForce mappings and projects

☑ add MapForce builder to project

Additional Builders for Code Generated by MapForce

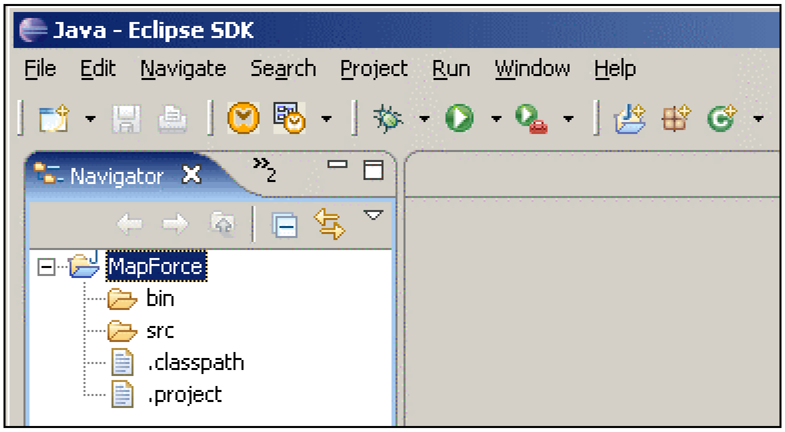
○ use no additional builders

● use JDT builder

○ use following nature:

org.eclipse.jdt.core.javanature

An Eclipse project folder and optionally some more folders and files inside this folder have been created.



You can now create MapForce mappings and MapForce project files inside this Eclipse project, or copy existing ones into it. Whenever a mapping or MapForce project file changes, the corresponding mapping code will be generated automatically. Code generation errors and warnings will be shown in the MapForce view called **Messages** and added to the **Problems** view of Eclipse.

A MapForce Eclipse project is an Eclipse project with the MapForce nature assigned to it, and therefore uses the MapForce builder.

If one or more MapForce project files are present in the Eclipse project, the code generation language and output target folders are determined by the settings in these files.

If a MapForce project file is not present in the Eclipse project:

But the Eclipse project has been assigned the JDT nature:

- Then, the mapping code generation defaults to Java language, and the project's Java source code directory is used as the mapping code output directory.

  Saving a mapping automatically generates the mapping code in Java and compilation of the Java code. Use the Java debug or run command, to test the resulting mapping application.

But the project has **not** been assigned the JDT nature:

- Then the output target folder is the project folder, and the code generation language defaults to the current setting in the MapForce Options.

To activate the Automatic Build process:

1. Make sure that the menu option **Project | Build automatically** is checked.

To temporarily deactivate automatic building of MapForce mapping code:

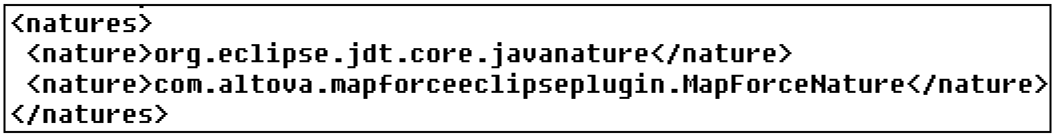
This is only available to Eclipse projects that have added the MapForce nature.

1. Right click the Eclipse project**,** in the Navigator pane.
2. Select **Properties** from the context menu.
3. Click the "Builders" entry in the left pane of the project properties dialog.
4. Un-check the **MapForce builder** check box in the right pane.
   Modifications to any mapping files or MapForce project files in this Eclipse project, will now no longer trigger automatic generation of mapping code.

13.6.3 Adding MapForce nature to existing Eclipse Project

Applying the MapForce Nature to Existing Projects:
Add the following text to the **natures** section of the **.project** file in the Eclipse project (e.g. in the c:\eclipse31\workspace\MapForce\ folder):

<nature>com.altova.mapforceeclipseplugin.MapForceNature</nature>



```
<natures>
 <nature>org.eclipse.jdt.core.javanature</nature>
 <nature>com.altova.mapforceeclipseplugin.MapForceNature</nature>
</natures>
```

Any MapForce project files and mappings contained in this project will now participate in the automatic build process. For MapForce specific details see Using MapForce Eclipse projects for automatic build.

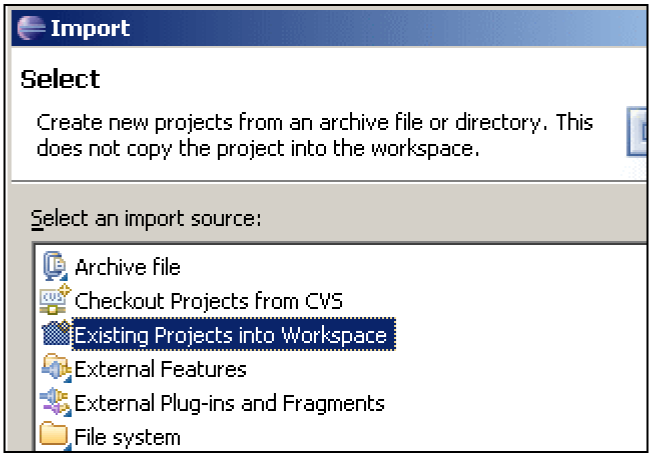
13.7 Extending MapForce plug-in

MapForce plug-in provides an Eclipse extension point with the ID "com.altova.mapforceeclipseplugin.MapForceAPI". You can use this extension point to adapt, or extend the functionality of the MapForce plug-in. The extension point gives you access to the COM-Interface of the MapForce control and the MapForceAPI.

Your MapForce Eclipse installation package contains a simple example of a plug-in that uses this extension point. It checks for any file open events of any new MapForce mappings, and sets the zoom level of the mapping view to 70%.

Installing the Sample extension plug-in:
MapForce plug-in requires the JDT (Java Development Tools) plug-in to be installed.

1. Start Eclipse.
2. Right click in **Navigator** or PackageExplorer, and select the menu item **Import**.
3. Select "Existing projects into Workspace, and click Next.



Import

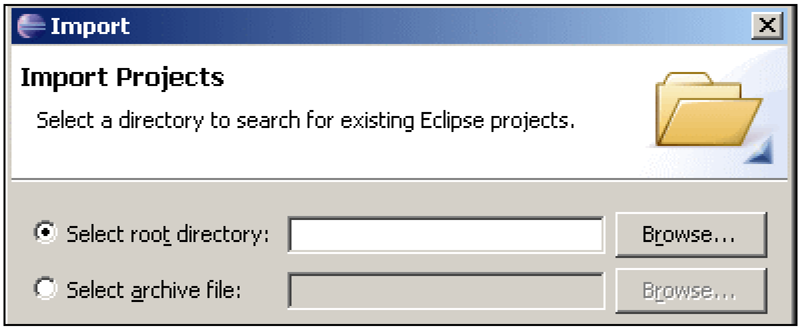
Select

Create new projects from an archive file or directory. This does not copy the project into the workspace.

Select an import source:

Archive file
Checkout Projects from CVS
Existing Projects into Workspace
External Features
External Plug-ins and Fragments
File system

4. Click the **Browse**... button next to the "'Select root directory" field and choose the sample project directory e.g. **C:\Program Files\Altova\MapForce2007\eclipse\workspace\MapForceExtension**).



Import

Import Projects

Select a directory to search for existing Eclipse projects.

● Select root directory:

○ Select archive file:

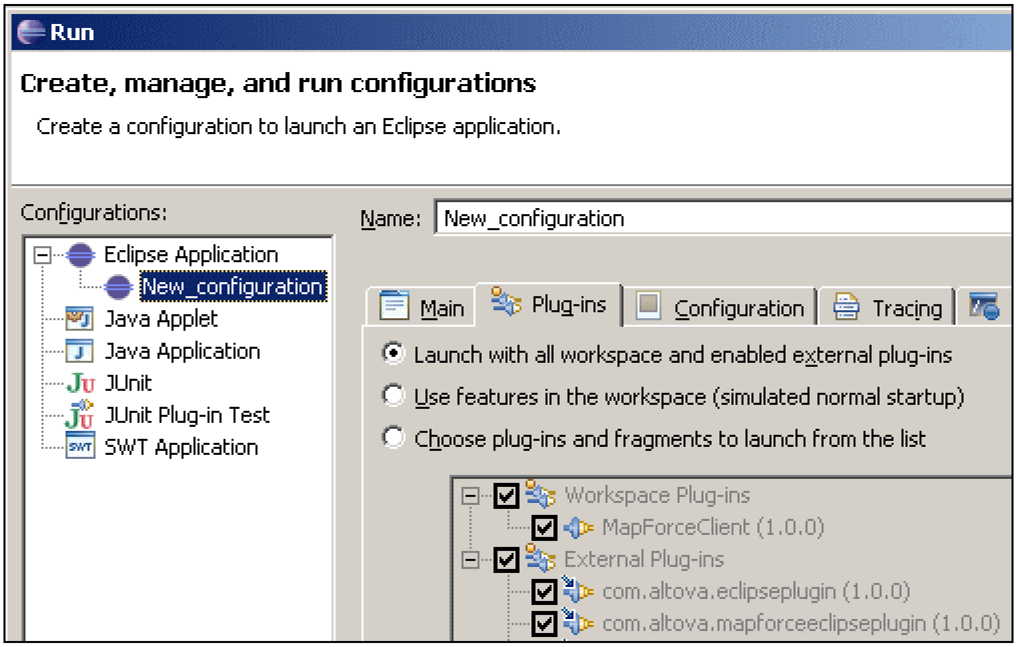
5. Click Finish.
   A new project named "MapForceExtension" has been created in your workspace.

Accessing javadoc for the extension point of MapForce plug-in:

1. Open the **index.html** in the docs folder of the plugin installation e.g. c:\Program Files\Altova\MapForce2007\eclipse\plugins\com.altova.mapforceeclipseplugin_1.0.0\docs\

Running the Sample extension plug-in:

1. Switch to the Java perspective.
2. Select the menu option **Run | Run...**
3. Select Eclipse Application and click **New_configuration**.



Run

Create, manage, and run configurations

Create a configuration to launch an Eclipse application.

Configurations:

- Eclipse Application
  - New_configuration
- Java Applet
- Java Application
- JUnit
- JUnit Plug-in Test
- SWT Application

Name: New_configuration

● Launch with all workspace and enabled external plug-ins

○ Use features in the workspace (simulated normal startup)

○ Choose plug-ins and fragments to launch from the list

- ☑ Workspace Plug-ins
  - ☑ MapForceClient (1.0.0)
- ☑ External Plug-ins
  - ☑ com.altova.eclipseplugin (1.0.0)
  - ☑ com.altova.mapforceeclipseplugin (1.0.0)

4. Check that the project MapForceClient is selected in the 'Plug-ins' tab.
5. Click the Run button.
   A new Eclipse Workbench opens.
6. Open any MapForce mapping in the new Workbench. It will now open with a zoom level of 70%.

Chapter 14

MapForce Reference

14 MapForce Reference

The following section lists all the menus and menu options in MapForce, and supplies a short description of each.

14.1 File

New

Clears the Mapping tab, if a previous mapping exists, and creates a new mapping document.

Open

Opens previously defined mapping (*.mfd) files.

Save

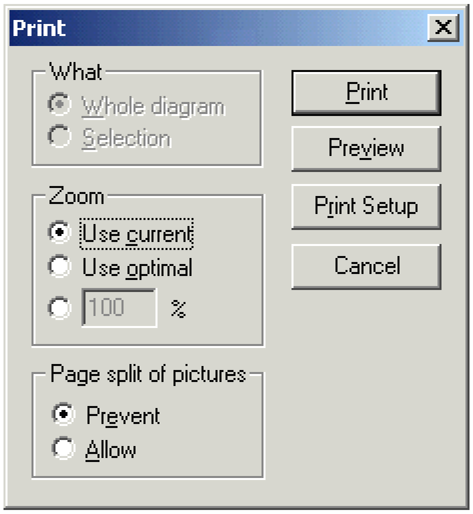
Saves the currently active mapping using the currently active file name.

Save As

Saves the currently active mapping with a different name, or allows you to supply a new name if this is the first time you save it.

Print

Opens the Print dialog box, from where you can printout your mapping as hardcopy.



Print

What

● Whole diagram

○ Selection

Zoom

● Use current

○ Use optimal

○ 100 %

Page split of pictures

● Prevent

○ Allow

"Use current", retains the currently defined zoom factor of the mapping. "Use optimal" scales the mapping to fit the page size. You can also specify the zoom factor numerically. Please note that component scrollbars are not printed. You can also specify if you want to allow the graphics to be split over several pages or not.

Print Preview

Opens the same Print dialog box with the same settings as described above.

Print Setup

Open the Print Setup dialog box in which you can define the printer you want to use and the paper settings.

Validate Mapping

Validating a Mapping validates:

- that all mappings (connectors) are valid
- please note, that the current release supports mixed content mapping.

Please see "Validating mappings" for more information

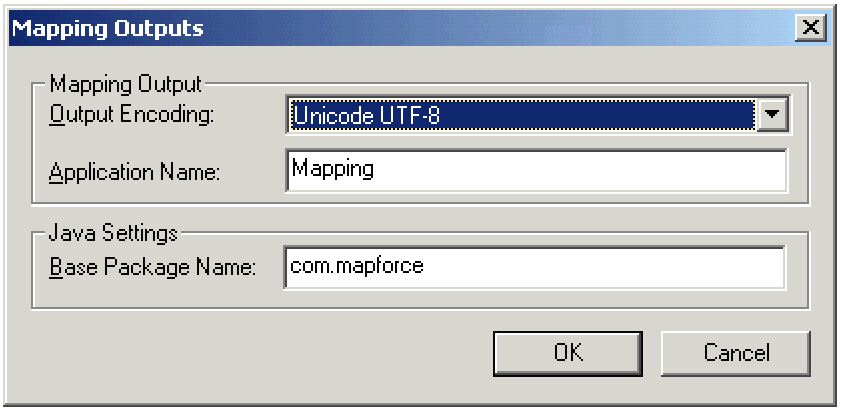
Generate code in selected language

Generates code in the currently selected language of your mapping. The currently selected language is visible as a highlighted programming language icon in the title bar XSLT, XSLT 2 .

Generate code in | XSLT (XSLT2)
This command generates the XSLT file(s) needed for the transformation from the source file(s). Selecting this option opens the Browse for Folder dialog box where you select the location of the XSLT file.

Note: the name of the generated XSLT file(s) is defined in the **Application Name** field of the Mapping Output dialog box. This dialog is opened by selecting **File | Mapping Settings** menu option. A notification appears when the process has been completed successfully.

Mapping settings


Mapping Outputs

Mapping Output
Output Encoding: Unicode UTF-8
Application Name: Mapping

Java Settings
Base Package Name: com.mapforce

The global MapForce settings are defined here.

Mapping Output
Output encoding: defines the output encoding for the files produced by the XSLT 1.0/2.0 transformation.

Application Name: defines the XSLT1.0/2.0 file name prefix for the transformation files.

14.2 Edit

Most of the commands in this menu, become active when you view the result of a mapping in the **Output** tab, or preview XSLT code in the XSLT tab.

Undo
MapForce has an unlimited number of "Undo" steps that you can use to retrace you mapping steps.

Redo
The redo command allows you to redo previously undone commands. You can step backward and forward through the undo history using both these commands.

Find
Allows you to search for specific text in either the XSLT, XSLT2, , or Output tab.

Find Next F3
Searches for the next occurrence of the same search string.

Cut/Copy/Paste/Delete
The standard windows Edit commands, allow you to cut, copy etc., any components or functions visible in the mapping window.

Select all
Selects all the text/code in the XSLT, XSLT2, or Output tab.

14.3 Insert

XML Schema / File

Inserts an XML schema file into the mapping tab. You are then prompted if you want to include an XML instance file which supplies the data for the XSLT, XSLT2, , and Output previews, as well as the for the XML target schema / document.

Text file

Inserts a flat file document, i.e. CSV, or a fixed length text file. Both types of file be used as source and target components.

Constant

Inserts a constant which is a function component that supplies fixed data to an input icon. The data is entered into a dialog box when creating the component. There is only one output icon on a constant function. You can select the following types of data: String, Number and All other.

Filter: Nodes/Rows

Inserts a component that uses two input and output parameters: **node/row** and **bool**, and **on-true**, **on-false**. If the Boolean is true, then the value of the node/row parameter is forwarded to the on-true parameter. If the Boolean is false, then the complement value is passed on to the on-false parameter. Please see the tutorial example on how to use a filter.

IF-Else Condition

A condition is a component which allows you to pass on different sets of data depending on the outcome of a preset condition. The component header displays the text **"if-else"**.

- The first input parameter is a **bool**, which contains the data you are checking against.
- The **value-true** input parameter supplies the data to be passed on, as a result, if the condition is true.
- The **value-false** supplies the data to be passed on if the condition is false.
- The **result** parameter outputs the data supplied by the value-true/false input parameters.

Exception

The exception component allows you to interrupt a mapping process when a specific condition is met. Please see MapForce Exceptions, for more information.

14.4 Component

Edit Constant

Allows you to change the entry currently defined in the Constant component. A Constant is added by clicking the **Insert Constant** icon "abc".

Align tree left

Aligns all the items along the left hand window border.

Align tree right

Aligns all the items along the right hand window border. This display is useful when creating mappings to the target schema.

Change Root element

Allows you to change the root element of the XML instance document. Useful in the target schema window, as this limits or preselects the schema data.

Edit Schema Definition in XMLSpy

Selecting this option, having previously clicked an XML-Schema/document, opens the XML Schema file in the Schema view of XMLSpy where you can edit it.

Duplicate input

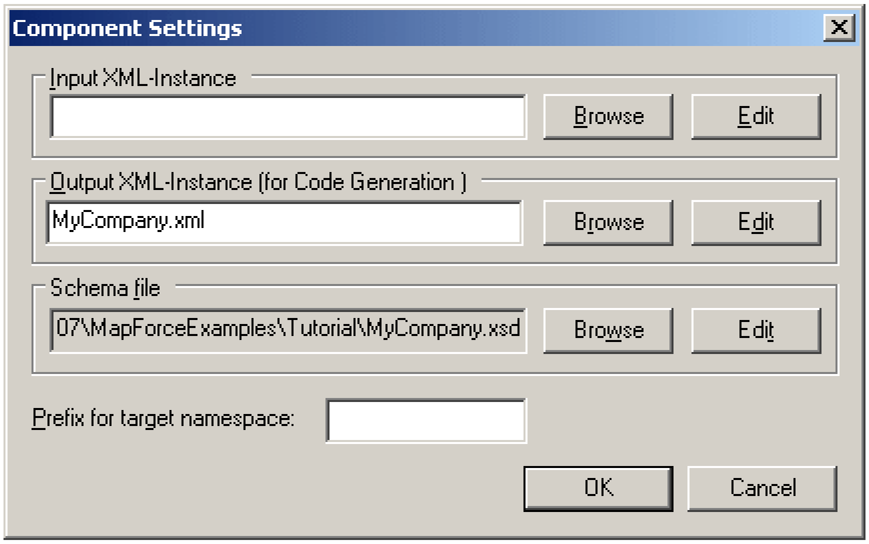
Inserts a copy/clone of the selected item, allowing you to map multiple input data to this item. Duplicate items do not have output icons, you cannot use them as data sources. Please see the Duplicating input items section in the tutorial for an example of this.

Remove duplicate

Removes a previously defined duplicate item. Please see the Duplicating input items section in the tutorial for more information.

Component Settings

Opens a dialog box which displays the currently selected component settings. If the component is an XML-Schema file then the Component Settings dialog box is opened. If the component is a Text file, then the "Text import / export" dialog box is opened.



Component Settings

Input XML-Instance:

Output XML-Instance (for Code Generation): MyCompany.xml

Schema file: 07\MapForceExamples\Tutorial\MyCompany.xsd

Prefix for target namespace:

Input XML-Instance: Allows you to select, or change the XML-Instance for the currently selected schema component. This field is filled when you first insert the schema component and assign an XML-instance file.

Output XML-Instance for code generation: This is file name and path where the XML target instance is placed, when generating and executing program code.

The entry from the Input XML-Instance field, is automatically copied to this field when you assign the XML-instance file. If you do not assign an XML-Instance file to the component, then this field contains the entry **schemafilenameandpath.xml.**

Schema file: Shows the file name and path of the target schema.

Prefix for target namespace: Allows you to enter a prefix for the Target Namespace if this is a schema / XML document. A Target namespace has to be defined in the target schema, for the prefix to be assigned here.

14.5 Connection

Auto Connect Matching Children

Activates or de-activates the "Auto connect child items" function, as well as the icon in the icon bar.

Settings for Connect Matching Children

Opens the Connect Matching Children dialog box in which you define the connection settings.

Connect Matching Children

This command allows you to create multiple connectors for items of the **same name,** in both the source and target schemas. The settings you define in this dialog box are retained, and are applied when connecting two items, if the "**Auto connect child items**" icon in the title bar is active. Clicking the icon, switches between an active and inactive state. Please see the section on Connector properties for further information.

Target Driven (Standard)

Changes the connector type to Standard mapping, please see: "Source-driven / mixed content vs. standard mapping" for more information.

Copy-all

Creates connectors for all matching child items, where each of the child connectors are displayed as a subtree of the parent connector, please see "Copy-all connections" for more information.

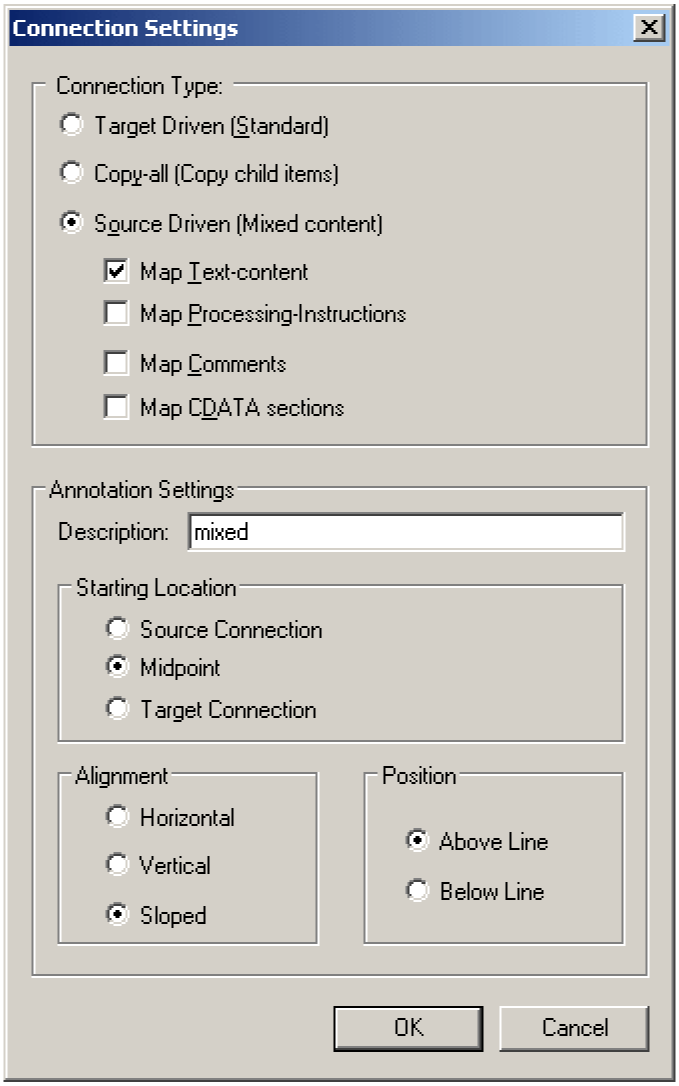
Source Driven (mixed content)

Changes the connector type to source driven / mixed content, and enables the selection of additional elements to be mapped. The additional elements have to be **child items** of the mapped item in the XML source file, to be able to be mapped. Please see Default settings: mapping mixed content for more information.

Connection settings:

Opens the Connection Settings dialog box in which you can define the specific (mixed content) settings of the current connector. Note that unavailable options are greyed out.

Please note that these settings also apply to **complexType** items which do not have any text nodes!



Connection Settings

Connection Type:

○ Target Driven (Standard)

○ Copy-all (Copy child items)

● Source Driven (Mixed content)

☑ Map Text-content

☐ Map Processing-Instructions

☐ Map Comments

☐ Map CDATA sections

Annotation Settings

Description: mixed

Starting Location

○ Source Connection

● Midpoint

○ Target Connection

Alignment

○ Horizontal

○ Vertical

● Sloped

Position

● Above Line

○ Below Line

Annotation settings:

Individual connectors can be labeled for clarity.

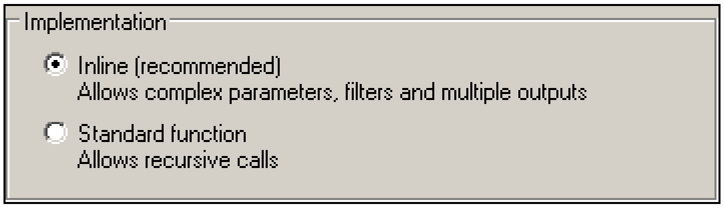
1. Double click a connector and enter the name of the connector in the Description field. This enables all the options in the Annotation Settings group.
2. Use the remaining groups to define the position and alignment of the label.

14.6 Function

Create user-defined function:
Creates a new user-defined function. Selecting this option creates and empty user-defined function, into which you insert the components you need. Please note that a single output function is automatically inserted when you define such a function, and that only one output component can be present in a user-defined function. Please see "Creating a user-defined function from scratch" for more information.

Create user-defined function based on selection:
Creates a new user-defined function based on the currently selected elements in the mapping window. Please see "Adding user-defined functions" for more information.

Function settings:
Opens the settings dialog box of the currently active user-defined function allowing you to change the current settings. Use this method to change the user-defined function type, i.e. double click the title bar of a user-defined function to see its contents, then select this menu option to change its type.



Implementation

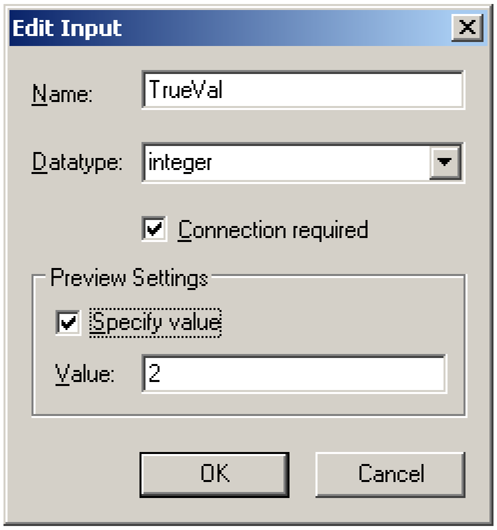
● Inline (recommended)
Allows complex parameters, filters and multiple outputs

○ Standard function
Allows recursive calls

Insert Input:
Inserts an "input" component into the mapping, or into a user-defined function.

If you are working in the main Mapping tab, the dialog box shown below is displayed. This type of input component allows you to:

- define an **override** value for the data that is being input by the current mapping input, and
- use this input component as a **parameter** in the command line execution of the compiled mapping.
  Please see "Input values, overrides and command line parameters" for more information.



Edit Input

Name: TrueVal

Datatype: integer

☑ Connection required

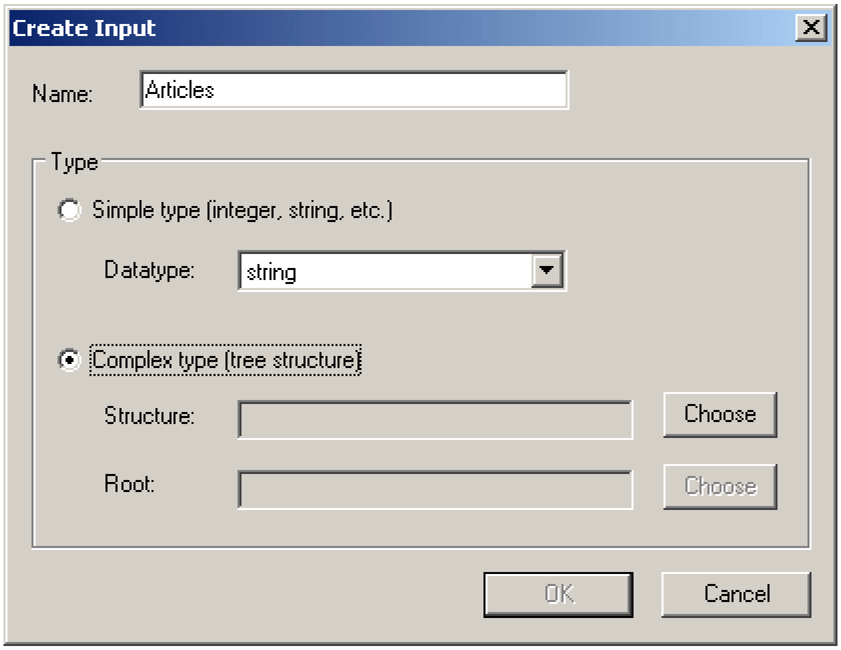
Preview Settings

☑ Specify value

Value: 2

If you are working in a user-defined function tab, the dialog box shown below is displayed. This type of input component allows you to define:

- simple inputs, if this is a Standard user-defined function
- complex inputs, e.g. schema structures, if this is an Inline user-defined function.



Create Input

Name: Articles

Type

○ Simple type (integer, string, etc.)

Datatype: string

● Complex type (tree structure)

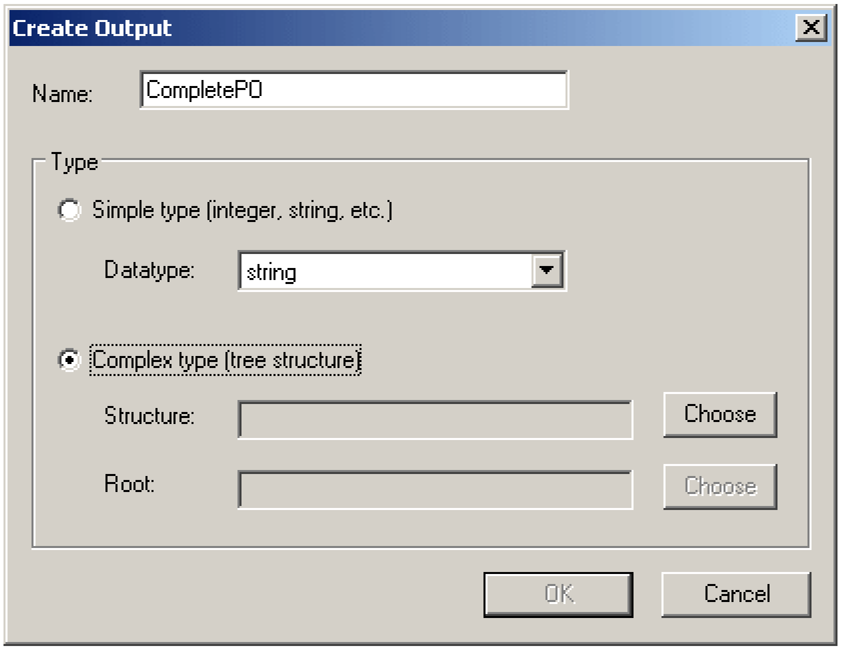
Structure:

Root:

Insert Output

Inserts an "Output" component into a user-defined function. In a user-defined function tab, the dialog box shown below is displayed. This type of input component allows you to define:

- simple outputs, if this is a Standard user-defined function
- complex outputs, e.g. schema structures, if this is an Inline user-defined function.



Create Output

Name: CompletePO

Type

○ Simple type (integer, string, etc.)

Datatype: string

● Complex type (tree structure)

Structure:

Root:

14.7 Output

The **XSLT, XSLT2,** options allow you to define the target language you want your code to be in. Note that the MapForce engine presents a preview of the mapping result, when you click the Output tab. .

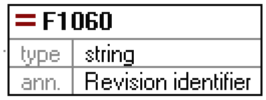
Validate Output XML file
Validates the resultant XML file against the referenced schema.

Save Output XML File
Saves the currently visible data in the Output tab.

14.8 View

Show Annotations

Displays XML schema annotations in the component window.
If the Show Types icon is also active, then both sets of info are show in grid form



= F1060	
type	string
ann.	Revision identifier

Show Types

Displays the schema datatypes for each element or attribute.
If the Show Annotations icon is also active, then both sets of info are show in grid form.

Show library in function header

Displays the library name in parenthesis in the function title.

Show Tips

Displays a tooltip containing explanatory text when the mouse pointer is placed over a function.

Show selected component connectors

Switches between showing:

- all mapping connectors, or
- those connectors relating to the currently selected components.

Show connectors from source to target

Switches between showing:

- connectors that are **directly** connected to the currently selected component, or
- connectors linked to the currently selected component, originating from source and terminating at the target components.

Zoom

Opens the Zoom dialog box. You can enter the zoom factor numerically, or drag the slider to change the zoom factor interactively.

Status Bar

Switches the Status Bar, visible below the Messages window, on or off.

Library Window

Switches the Library window, containing all library functions, on or off.

Messages

Switches the Validation output window on, or off. When generating code the Messages output window is automatically activated to show the validation result.

Overview

Switches the Overview window on, or off. Drag the rectangle to navigate your Mapping view.

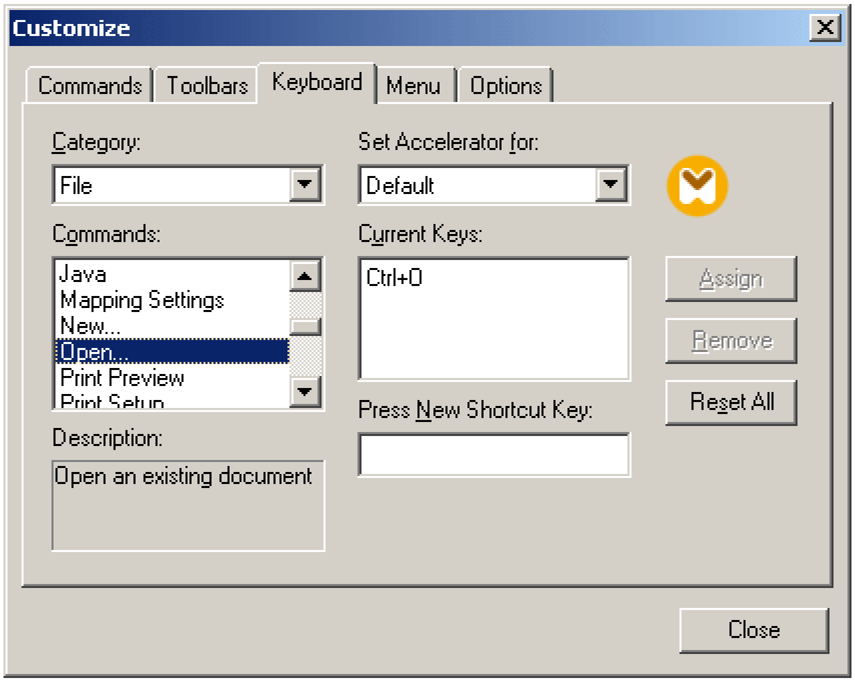
14.9 Tools

Customize
The customize command lets you customize MapForce to suit your personal needs.

The **Keyboard** tab allows you to define (or change) keyboard shortcuts for any MapForce command.

To assign a new Shortcut to a command:

1. Select the **Tools | Customize** command and click the Keyboard tab.
2. Click the **Category** combo box to select the menu name.
3. Select the **command** you want to assign a new shortcut to, in the Commands list box
4. Click in the **Press New Shortcut Key**: text box, and press the shortcut keys that are to activate the command.



Category: File

Set Accelerator for: Default

Commands:
Java
Mapping Settings
New...
Open...
Print Preview
Print Setup

Current Keys: Ctrl+O

Press New Shortcut Key:

Description: Open an existing document

The shortcuts appear immediately in the text box. If the shortcut was assigned previously, then that function is displayed below the text box.

5. Click the **Assign** button to assign the shortcut.
   The shortcut now appears in the Current Keys list box.
   (To **clear** the entry in the Press New Shrotcut Key text box, press any of the control keys, **CTRL**, **ALT** or **SHIFT**).

To de-assign or delete a shortcut:

1. Click the shortcut you want to delete in the Current Keys list box.
2. Click the **Remove** button.
3. Click the **Close** button to confirm.

Set accelerator for:
Currently no function.

Currently assigned keyboard shortcuts:

Hotkeys by key

F1	Help Menu

F2	Next bookmark (in output window)
F3	Find Next
F5	Refresh
F10	Activate menu bar
Num +	Expand current item node
Num -	Collapse item node
Num *	Expand all from current item node

CTRL + TAB	Switches between open mappings
CTRL + F6	Cycle through open windows
CTRL + F4	Closes the active mapping tab

Alt + F4	Closes MapForce
Alt + F + F, + 1	Opens the last file
Alt + F + T, + 1	Opens the last project

CTRL + N	File New
CTRL + O	File Open
CTRL + S	File Save
CTRL + P	File Print

CTRL + A	Select All
CTRL + X	Cut
CTRL + C	Copy
CTRL + V	Paste
CTRL + Z	Undo
CTRL + Y	Redo

Del	Delete component (with prompt)
Shift + Del	Delete component (no prompt)
CTRL + F	Find
F3	Find Next

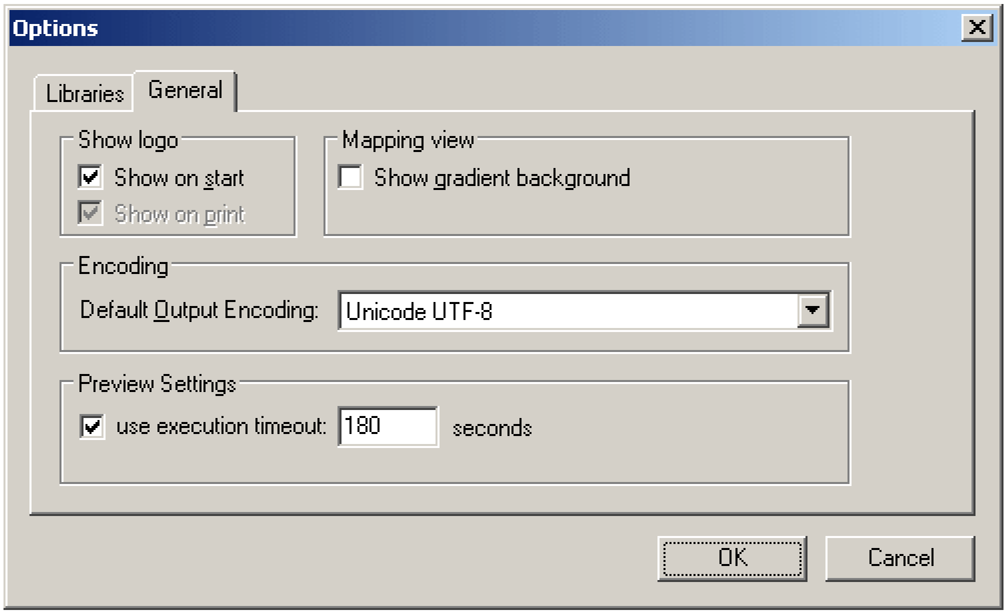
Arrow keys	
(up / down)	Select next item of component
Esc.	Abandon edits/close dialog box
Return	Confirms a selection

Output window hotkeys	
Insert Remove/Bookmark	CTRL + F2
Next Bookmark	F2
Previous Bookmark	SHIFT + F2
Remove All Bookmarks	CTRL + SHIFT + F2

Zooming hotkeys	
CTRL + mouse wheel forward	Zoom In
CTRL + mouse wheel back	Zoom Out
CTRL + 0 (Zero)	Reset Zoom

Options
Opens the Options dialog box through which you can:

- Add or delete user defined XSLT functions.
- Define **general** settings, such as the default output encoding, in the General tab.
-



Show logo

☑ Show on start

☑ Show on print

Mapping view

□ Show gradient background

Encoding

Default Output Encoding: Unicode UTF-8

Preview Settings

☑ use execution timeout: 180 seconds

14.10 Help Menu

The **Help** menu contains commands to access the onscreen help manual for MapForce, commands to provide information about MapForce, and links to support pages on the Altova web site. The Help menu also contains the Registration dialog, which lets you enter your license key-code once you have purchased the product.

The description of the Help menu commands is organized into the following sub-sections:

- Table of Contents, Index, Search
- Registration, Order Form
- Other Commands

14.10.1 Table of Contents, Index, Search

The **Table of Contents** command opens the onscreen help manual for MapForce with the Table of Contents displayed in the left-hand-side pane of the Help window. The Table of Contents provides a good overview of the entire Help document. Clicking an entry in the Table of Contents takes you to that topic.

The **Index** command opens the onscreen help manual for MapForce with the Keyword Index displayed in the left-hand-side pane of the Help window. The index lists keywords and lets you navigate to a topic by double-clicking the keyword. If a keyword is linked to more than one topic, you are presented with a list of the topics to choose from.

The **Search** command opens the onscreen help manual for MapForce with the Search dialog displayed in the left-hand-side pane of the Help window. To search for a term, enter the term in the input field, and press Return. The Help system performs a full-text search on the entire Help documentation and returns a list of hits. Double-click any item to display that item.

14.10.2 Activation, Order Form, Registration, Updates

Software Activation
After you download your Altova product software, you can activate it using either a free evaluation key or a purchased permanent license key.

- ***Free evaluation key.*** When you first start the software after downloading and installing it, the Software Activation dialog will pop up. In it is a button to request a free evaluation key-code. Enter your name, company, and e-mail address in the dialog that appears, and click Request Now! The evaluation key is sent to the e-mail address you entered and should reach you in a few minutes. Now enter the key in the key-code field of the Software Activation dialog box and click **OK** to start working with your Altova product. The software will be unlocked for a period of 30 days.
- ***Permanent license key.*** The Software Activation dialog contains a button to purchase a permanent license key. Clicking this button takes you to Altova's online shop, where you can purchase a permanent license key for your product. There are two types of permanent license: single-user and multi-user. Both will be sent to you by e-mail. A *single-user license* contains your license-data and includes your name, company, e-mail, and key-code.A *multi-user license* contains your license-data and includes your company name and key-code. Note that your license agreement does not allow you to install more than the licensed number of copies of your Altova software on the computers in your organization (per-seat license). Please make sure that you enter the data required in the registration dialog exactly as given in your license e-mail.

Note: When you enter your license information in the Software Activation dialog, ensure that you enter the data exactly as given in your license e-mail. For multi-user licenses, each user should enter his or her own name in the Name field.

The Software Activation dialog can be accessed at any time by clicking the **Help | Software Activation** command.

Order Form
When you are ready to order a licensed version of MapForce, you can use either the **Order license key** button in the Software Activation dialog (*see previous section*) or the **Help | Order Form** command to proceed to the secure Altova Online Shop.

Registration
The first time you start your Altova software after having activated it, a dialog appears asking whether you would like to register your product. There are three buttons in this dialog:

- **OK:** Takes you to the Registration Form
- **Remind Me Later:** Pops up a dialog in which you can select when you wish to be next reminded.
- **Cancel:** Closes the dialog and suppresses it in future. If you wish to register at a later time, you can use the **Help | Registration** command.

Check for Updates
Checks with the Altova server whether a newer version than yours is currently available and displays a message accordingly

14.10.3 Other Commands

The **Support Center** command is a link to the Altova Support Center on the Internet. The Support Center provides FAQs, discussion forums where problems are discussed, and access to Altova's technical support staff.

The **FAQ on the Web** command is a link to Altova's FAQ database on the Internet. The FAQ database is constantly updated as Altova support staff encounter new issues raised by customers.

The **Components Download** command is a link to Altova's Component Download Center on the Internet. From here you will be able to download a variety of companion software to use with Altova products. Such software ranges from XSLT and XSL-FO processors to Application Server Platforms. The software available at the Component Download Center is typically free of charge.

The **MapForce on the Internet** command is a link to the Altova website on the Internet. You can learn more about MapForce and related technologies and products at the Altova website.

The **MapForce Training** command is a link to the Online Training page at the Altova website. Here you can select from online courses conducted by Altova's expert trainers.

The **About MapForce** command displays the splash window and version number of your product.

Chapter 15

The MapForce API

15 The MapForce API

The COM-based API of MapForce enables clients to easily access the functionality of MapForce. As a result, it is now possible to automate a wide range of tasks.

MapForce follows the common specifications for automation servers set out by Microsoft. It is possible to access the methods and properties of the MapForce API from common development environments, such as those using C, C++ and VisualBasic, and with scripting languages like JavaScript and VBScript.

The following guidelines should be considered in your client code:

- Do not hold references to objects in memory longer than you need them. If a user interacts between two calls of your client, then there is no guarantee that these references are still valid.
- Be aware that if your client code crashes, instances of MapForce may still remain in the system.
- See Error handling for details of how to avoid annoying error messages.
- Free references explicitly, if using languages such as C or C++.

15.1 Overview

This overview of the MapForce API provides you with the object model for the API and a description of the most important API concepts. The following topics are covered:

- The object model
- Example: Code-Generation
- Example: Project Support
- Error handling

15.1.1 Object model

The starting point for every application which uses the MapForce API is the `Application` object.

To create an instance of the `Application` object, call `CreateObject("MapForce.Application")` from VisualBasic, or a similar function from your preferred development environment, to create a COM object. There is no need to create any other objects to use the complete MapForce API. All other interfaces are accessed through other objects, with the `Application` object as the starting point.

The application object consists of the following parts (each indentation level indicates a child–parent relationship with the level directly above):

```
Application
   Options
   Project
      ProjectItem
   Documents
      Document
         MapForceView
   ErrorMarkers
      ErrorMarker
```

Once you have created an `Application` object, you can start using the functionality of MapForce. You will generally either open an existing `Document`, create a new one, or generate code for or from this document.

15.1.2 Example: Code-Generation

See also

Code Generation

The following JScript example shows how to load an existing document and generate different kinds of mapping code for it.

```
// -------------------- begin JScript example ---------------------
// Generate Code for existing mapping.
// works with Windows scripting host.

// ----------------- helper function ------------------
function Exit(strErrorText)
{
      WScript.Echo(strErrorText);
      WScript.Quit(-1);
}

function ERROR(strText, objErr)
{
      if (objErr != null)
            Exit ("ERROR: (" + (objErr.number & 0xffff) + ")" +
objErr.description + " - " + strText);
      else
            Exit ("ERROR: " + strText);
}
// ---------------------------------------------------

// ----------------- MAIN ------------------

// ----- create the Shell and FileSystemObject of the windows scripting
try
{
      objWshShell = WScript.CreateObject("WScript.Shell");
      objFSO = WScript.CreateObject("Scripting.FileSystemObject");
}
catch(err)
      { Exit("Can't create WScript.Shell object"); }

// ----- open MapForce or access running instance and make it visible
try
{
      objMapForce = WScript.GetObject ("", "MapForce.Application");
      objMapForce.Visible = true;             // remove this line to perform
background processing
}
catch(err) { WScript.Echo ("Can't access or create MapForce.Application"); }

// ----- open an existing mapping. adapt this to your needs!
objMapForce.OpenDocument(objFSO.GetAbsolutePathName ("Test.mfd"));

// ----- access the mapping to have access to the code generation methods
var objDoc = objMapForce.ActiveDocument;

// ----- set the code generation output properties and call the code
generation methods.
// ----- adapt the output directories to your needs
try
{
      // ----- code generation uses some of these options
      var objOptions = objMapForce.Options;
```

```
       // ----- generate XSLT -----
       objOptions.XSLTDefaultOutputDirectory = "C:\\test\\TestCOMServer\\XSLT"
;
       objDoc.GenerateXSLT();

       // ----- generate Java Code -----
       objOptions.CodeDefaultOutputDirectory = "C:\\test\\TestCOMServer\\Java"
;
       objDoc.GenerateJavaCode();

       // ----- generate CPP Code, use same cpp code options as the last time
-----
       objOptions.CodeDefaultOutputDirectory = "C:\\test\\TestCOMServer\\CPP";
       objDoc.GenerateCppCode();

       // ----- generate C# Code, use options C# code options as the last time
-----
       objOptions.CodeDefaultOutputDirectory =
"C:\\test\\TestCOMServer\\CHash";
       objDoc.GenerateCHashCode();
}
catch (err)
       {  ERROR ("while generating XSL or program code", err); }


// hide MapForce to allow it to shut down
objMapForce.Visible = false;

// -------------------- end example ---------------------
```

15.1.3 Example: Project Support

See also

Code Generation

The following JScript example shows how you can use the MapForce project and project-item objects of the MapForce API to automated complex tasks. Depending on your installation you might need to change the value of the variable `strSamplePath` to the example folder of your MapForce installation.

To successfully run all operations in this example below, you will need the Enterprise version of MapForce. If you have the Professional version running, you should comment out the lines that insert the WebService project. Users of the Standard edition will not have access to project-related functions at all.

```
// //////////// global variables /////////////////
var objMapForce = null;
var objWshShell = null;
var objFSO = null;

// !!! adapt the following path to your needs. !!!
var strSamplePath = "C:\\Program
Files\\Altova\\MapForce2006\\MapForceExamples\\";

// /////////////////////// Helpers //////////////////////////////

function Exit(strErrorText)
{
        WScript.Echo(strErrorText);
        WScript.Quit(-1);
}

function ERROR(strText, objErr)
{
        if (objErr != null)
                Exit ("ERROR: (" + (objErr.number & 0xffff) + ")" +
objErr.description + " - " + strText);
        else
                Exit ("ERROR: " + strText);
}

function CreateGlobalObjects ()
{
        // the Shell and FileSystemObject of the windows scripting host often
always useful
        try
        {
                objWshShell = WScript.CreateObject("WScript.Shell");
                objFSO = WScript.CreateObject("Scripting.FileSystemObject");
        }
        catch(err)
                { Exit("Can't create WScript.Shell object"); }

        // create the MapForce connection
        // if there is a running instance of MapForce (that never had a
connection) - use it
        // otherwise, we automatically create a new instance
        try
        {
                objMapForce = WScript.GetObject("", "MapForce.Application");
        }
        catch(err)
        {
                { Exit("Can't access or create MapForce.Application"); }
        }
}

// ---------------------------------------------------------
// print project tree items and their properties recursively.
// ---------------------------------------------------------
function PrintProjectTree( objProjectItemIter, strTab )
{
        while ( ! objProjectItemIter.atEnd() )
        {
                // get current project item
                objItem = objProjectItemIter.item();

                try
                {
                        // ----- print common properties
                        strGlobalText += strTab + "[" + objItem.Kind + "]" +
objItem.Name + "\n";

                        // ----- print code generation properties, if available
                        try
                        {
                                if ( objItem.CodeGenSettings_UseDefault )
                                        strGlobalText += strTab + "  Use default
code generation settings\n";
                                else
                                        strGlobalText += strTab + "  code generation
language is " +

objItem.CodeGenSettings_Language +
                                                            " output folder is " +
objItem.CodeGenSettings_OutputFolder + "\n";
                        }
                        catch( err ) {}

                        // ----- print WSDL settings, if available
                        try
                        {
                                strGlobalText += strTab + "  WSDL File is " +
objItem.WSDLFile +
                                                    " Qualified Name is " +
objItem.QualifiedName + "\n";
                        }
                        catch( err ) {}
                }
                catch( ex )
                        { strGlobalText += strTab + "[" + objItem.Kind + "]\n" }

                // ---- recurse
                PrintProjectTree( new Enumerator( objItem ), strTab + '  ' );

                objProjectItemIter.moveNext();
        }
}

// ---------------------------------------------------------
// Load example project installed with MapForce.
// ---------------------------------------------------------
function LoadSampleProject()
{
        // close open project
        objProject = objMapForce.ActiveProject;
        if ( objProject != null )
                objProject.Close();
        // open sample project and iterate through it.
        // sump properties of all project items

        objProject = objMapForce.OpenProject(strSamplePath +
"MapForceExamples.mfp");
        strGlobalText = '';
        PrintProjectTree( new Enumerator (objProject), ' ' )
        WScript.Echo( strGlobalText );

        objProject.Close();
}

// ----------------------------------------------------------
// Create a new project with some folders, mappings and a
// Web service project.
// ----------------------------------------------------------
function CreateNewProject()
{
        try
        {
                // create new project and specify file to store it.
                objProject = objMapForce.NewProject(strSamplePath + "Sample.mfp"
);

                // create a simple folder structure
                objProject.CreateFolder( "New Folder 1");
                objFolder1 = objProject.Item(0);
                objFolder1.CreateFolder( "New Folder 2");
                objFolder2 = ( new Enumerator( objFolder1 ) ).item(); // an
alternative to Item(0)

                // add two different mappings to folder structure
                objFolder1.AddFile( strSamplePath + "DB_Altova_SQLXML.mfd");
                objMapForce.Documents.OpenDocument(strSamplePath +
"InspectionReport.mfd");
                objFolder2.AddActiveFile();

                // override code generation settings for this folder
                objFolder2.CodeGenSettings_UseDefault = false;
                objFolder2.CodeGenSettings_OutputFolder = strSamplePath +
"SampleOutput"
                objFolder2.CodeGenSettings_Language = 1;                //C++

                // insert Web service project based on a wsdl file from the
installed examples
                objProject.InsertWebService( strSamplePath +
"TimeService/TimeService.wsdl",

"{http://www.Nanonull.com/TimeService/}TimeService",
                                                            "TimeServiceSoap"
,
                                                            true );
                objProject.Save();
                if ( ! objProject.Saved )
                        WScript.Echo("problem occurred when saving project");

                // dump project tree
                strGlobalText = '';
                PrintProjectTree( new Enumerator (objProject), ' ' )
                WScript.Echo( strGlobalText );
        }
        catch (err)
        { ERROR("while creating new project", err ); }
}
```

```
// ---------------------------------------------------------
// Generate code for a project's sub-tree. Mix default code
// generation parameters and overloaded parameters.
// ---------------------------------------------------------
function GenerateCodeForNewProject()
{
       // since the Web service project contains only initial mappings,
       // we generate code only for our custom folder.
       // code generation parameters from project are used for Folder1,
       // whereas Folder2 provides overwritten values.
       objFolder = objProject.Item(0);
       objFolder1.GenerateCode();
}

// ////////////////////// MAIN //////////////////////////////

CreateGlobalObjects();
objMapForce.Visible = true;

LoadSampleProject();
CreateNewProject();
GenerateCodeForNewProject();

// uncomment to shut down application when script ends
// objMapForce.Visible = false;
```

15.1.4 Error handling

The MapForce API returns errors in two different ways. Every API method returns an `HRESULT`. This return value informs the caller about any malfunctions during the execution of the method. If the call was successful, the return value is equal to `S_OK`. C/C++ programmers generally use `HRESULT` to detect errors.

VisualBasic, scripting languages, and other high-level development environments do not give the programmer access to the returning `HRESULT` of a COM call. They use the second error-raising mechanism supported by the MapForce API, the `IErrorInfo` interface. If an error occurs, the API creates a new object that implements the `IErrorInfo` interface. The development environment takes this interface and fills its own error-handling mechanism with the provided information.

The following text describes how to deal with errors raised from the MapForce API in different development environments.

VisualBasic
A common way to handle errors in VisualBasic is to define an error handler. This error handler can be set with the `On Error` statement. Usually the handler displays an error message and does some cleanup to avoid spare references and any kind of resource leaks. VisualBasic fills its own `Err` object with the information from the `IErrorInfo` interface.

Example:

```
Sub Validate()
  'place variable declarations here

  'set error handler
  On Error GoTo ErrorHandler

  'if generation fails, program execution continues at ErrorHandler:
  objMapForce.ActiveDocument.GenerateXSLT()

  'additional code comes here

  'exit
  Exit Sub

  ErrorHandler:
  MsgBox("Error: " & (Err.Number - vbObjectError) & Chr(13) &
         "Description: " & Err.Description)
End Sub
```

JavaScript
The Microsoft implementation of JavaScript (JScript) provides a try-catch mechanism to deal with errors raised from COM calls. It is very similar to the VisualBasic approach, in that you also declare an error object containing the necessary information.

Example:

```
 Function Generate()
 {
  // please insert variable declarations here

  try
  {
   objMapForce.ActiveDocument.GenerateXSLT();
  }
  catch(Error)
  {
    sError = Error.description;
    nErrorCode = Error.number & 0xffff;
    return false;
  }

  return true;
 }
```

C/C++
C/C++ gives you easy access to the `HRESULT` of the COM call and to the `IErrorInterface`.

```
 HRESULThr;

// Call GenerateXSLT() from the MapForce API
If(FAILED(hr = ipDocument->GenerateXSLT()))
{
  IErrorInfo *ipErrorInfo = Null;

  If(SUCCEEDED(::GetErrorInfo(0, &ipErrorInfo)))
  {
    BSTRbstrDescr;
     ipErrorInfo->GetDescription(&bstrDescr);

    // handle Error information
       wprintf(L"Error message:\t%s\n",bstrDescr);
     ::SysFreeString(bstrDescr);

     // release Error info
     ipErrorInfo->Release();
  }
}
```

15.2 Object Reference

Object Hierarchy

```
Application
   Options
   Project
       ProjectItem
   Documents
      Document
         MapForceView

Enumerations
```

Description
This section contains the reference of the MapForce API 1.0 Type Library.

15.2.1 Application

Properties and Methods

Properties to navigate the object model:
Application
Parent
Options
Project
Documents

Application status:
Visible
Name
Quit
WindowHandle

MapForce designs:
NewDocument
OpenDocument
OpenURL
ActiveDocument

MapForce projects:
NewProject (Enterprise or Professional edition is required)
OpenProject (Enterprise or Professional edition is required)
ActiveProject (Enterprise or Professional edition is required)

MapForce code generation:
HighlightSerializedMarker

Examples

The following examples show how the automation interface of MapForce can be accessed from different programming environments in different languages.

```
' -------------------- begin VBA example ----------------------
' create a new instance of <SPY-MAP>.
Dim objMapForce As Application
Set objMapForce = CreateObject("MapForce.Application")
' --------------------- end example ----------------------

' -------------------- begin VBScript example ----------------------
' access a running, or create a new instance of MapForce.
' works with scripts running in the Windows scripting host.
Set objMapForce = GetObject("MapForce.Application");
' --------------------- end example ----------------------

// -------------------- begin JScript example ----------------------
// Access a running, or create a new instance of <MapForce
// works with scripts executed in the Windows scripting host
try
{
       objMapForce = WScript.GetObject ("", "MapForce.Application");
       // unhide application if it is a new instance
       objMapForce.Visible = true;
}
catch(err) { WScript.Echo ("Can't access or create MapForce.Application"); }
// --------------------- end example ----------------------
```

Events

This object supports the following events:

OnDocumentOpened
OnProjectOpened

OnDocumentOpened

Event: OnDocumentOpened (*i_objDocument* as Document)

Description
This event is triggered when an existing or new document is opened. The corresponding close event is Document.OnDocumentClosed.

OnProjectOpened

Event: OnProjectOpened (*i_objProject* as Project)

Description
This event is triggered when an existing or new project is loaded into the application. The corresponding close event is Project.OnProjectClosed.

ActiveDocument

Property: ActiveDocument as Document (read-only)

Description
Returns the automation object of the currently active document. This property returns the same as Documents.ActiveDocument.

Errors

1000	The application object is no longer valid.
1001	Invalid address for the return parameter was specified.

ActiveProject

Property: ActiveProject as Project (read-only)

Description
Returns the automation object of the currently active project.

Errors

1000	The application object is no longer valid.
1001	Invalid address for the return parameter was specified.

Application

Property: Application as Application (read-only)

Description
Retrieves the application's top-level object.

Errors

1000	The application object is no longer valid.

1001 Invalid address for the return parameter was specified.

Documents

Property: `Documents` as `Documents` (read-only)

Description
Returns a collection of all currently open documents.

Errors
1000 The application object is no longer valid.
1001 Invalid address for the return parameter was specified.

HighlightSerializedMarker

Method: `HighlightSerializedMarker` (*`i_strSerializedMarker`* as `String`)

Description
Use this method to highlight a location in a mapping file that has been previously serialized. If the corresponding document is not already loaded, it will be loaded first. See Document.GenerateCodeEx for a method to retrieve a serialized marker.

Errors
1000 The application object is no longer valid.
1001 Invalid address for the return parameter was specified.
1007 The string passed in *i_strSerializedMarker* is not recognized a serialized MapForce marker.
1008 The marker points to a location that is no longer valid.

Name

Property: `Name` as `String` (read-only)

Description
The name of the application.

Errors
1000 The application object is no longer valid.
1001 Invalid address for the return parameter was specified.

NewDocument

Method: `NewDocument` () as `Document`

Description
Creates a new empty document. The newly opened document becomes the `ActiveDocument` . This method is a shortened form of `Documents. NewDocument`.

Errors
1000 The application object is no longer valid.
1001 Invalid address for the return parameter was specified.

NewProject

Method: `NewProject` () as `Project`

Description
Creates a new empty project. The current project is closed. The new project is accessible under `Project`.

Errors

1000	The application object is no longer valid.
1001	Invalid address for the return parameter was specified.

OpenDocument

Method: `OpenDocument` (*`i_strFileName`* as `String`) as `Document`

Description
Loads a previously saved document file and continues working on it. The newly opened document becomes the `ActiveDocument`. This method is a shorter form of `Documents.OpenDocument`.

Errors

1000	The application object is no longer valid.
1001	Invalid address for the return parameter was specified.

OpenProject

Method: `NewProject` () as `Project`

Description
Opens an existing Mapforce project (`*.mfp`). The current project is closed. The newly opened project is accessible under `Project`.

Errors

1000	The application object is no longer valid.
1001	Invalid address for the return parameter was specified.

OpenURL

Method: `OpenURL` (*`i_strURL`* as `String`, *`i_strUser`* as `String`, *`i_strPassword`* as `String`)

Description
Loads a previously saved document file from an URL location. Allows user name and password to be supplied.

Errors

1000	The application object is no longer valid.
1001	Invalid address for the return parameter was specified.

Options

Property: `Options` as `Options` (read-only)

Description

This property gives access to options that configure the generation of code.

Errors
1000 The application object is no longer valid.
1001 Invalid address for the return parameter was specified.

Parent

Property: `Parent` as `Application` (read-only)

Description
The parent object according to the object model.

Errors
1000 The application object is no longer valid.
1001 Invalid address for the return parameter was specified.

Project

Property: `Project` as `Project` (read-only)

Description
Returns the MapForce project currently open. If no project is open, retuns `null`.

Errors
1000 The application object is no longer valid.
1001 Invalid address for the return parameter was specified.

Quit

Method: `Quit` ()

Description
Disconnects from MapForce to allow the application to shutdown. Calling this method is optional since MapForce keeps track of all external COM connections and automatically recognizes a disconnection. For more information on automatic shutdown see the `Visible` property.

Errors
1000 The application object is no longer valid.
1001 Invalid address for the return parameter was specified.

Visible

Property: `Visible` as `Boolean`

Description
`True` if MapForce is displayed on the screen (though it might be covered by other applications or be iconized). `False` if MapForce is hidden. The default value for MapForce when automatically started due to a request from the automation server `MapForce.Application` is `false`. In all other cases, the property is initialized to `true`.

An application instance that is visible is said to be controlled by the user (and possibly by clients connected via the automation interface). It will only shut down due to an explicit user request.

To shut down an application instance, set its visibility to false and clear all references to this instance within your program. The application instance will shut down automatically when no further COM clients are holding references to it.

Errors

1000	The application object is no longer valid.
1001	Invalid address for the return parameter was specified.

WindowHandle

Property: `WindowHandle` () as long (read-only)

Description

Retrieve the application's Window Handle.

Errors

1000	The application object is no longer valid.
1001	Invalid address for the return parameter was specified.

15.2.2 MapForceView

Properties and Methods

Properties to navigate the object model:
`Application`
`Parent`

View activation and view properties:
`Active`
`ShowItemTypes`
`ShowLibraryInFunctionHeader`
`HighlightMyConnections`
`HighlightMyConnectionsRecursivly`

Adding items:
`InsertXMLFile`
`InsertXMLSchema`
`InsertXMLSchemaWithSample`

Active

Property: `Active` as `Boolean`

Description
Use this property to query if the mapping view is the active view, or set this view to be the active one.

Errors
1300 The application object is no longer valid.
1301 Invalid address for the return parameter was specified.

Application

Property: `Application` as `Application` (read-only)

Description
Retrieves the application's top-level object.

Errors
1300 The application object is no longer valid.
1301 Invalid address for the return parameter was specified.

HighlightMyConnections

Property: `HighlightMyConnections` as `Boolean`

Description
This property defines whether connections from the selected item only should be highlighed.

Errors
1300 The application object is no longer valid.
1301 Invalid address for the return parameter was specified.

HighlightMyConnectionsRecursivey

Property: `HighlightMyConnectionsRecursively` as `Boolean`

Description
This property defines if only the connections coming directly or indirectly from the selected item should be highlighed.

Errors

1300 The application object is no longer valid.
1301 Invalid address for the return parameter was specified.

InsertXMLFile

Method: `InsertXMLFile` (*`i_strXMLFileName`* as `String`, *`i_strRootElement`* as `String`)

Description
Adds a new item to the mapping. The item's internal structure is determined by the schema defined in the specified XML file. The second parameter defines the root element of this schema, if there is more than one candidate. The specified XML file is used as the input sample to evaluate the mapping.

Errors

1300 The application object is no longer valid.
1301 Invalid address for the return parameter was specified.

InsertXMLSchema

Method: `InsertXMLSchema` (*`i_strSchemaFileName`* as `String`, *`i_strRootElement`* as `String`)

Description
Adds a new item to the mapping. The item's internal structure is determined by the specified schema file. The second parameter defines the root element of this schema if there is more then one candidate. No XML input sample is assigned to this item.

Errors

1300 The application object is no longer valid.
1301 Invalid address for the return parameter was specified.

InsertXMLSchemaWithSample

Method: `InsertXMLSchemaWithSample` (*`i_strSchemaFileName`* as `String`, *`i_strXMLSampleName`* as `String`, *`i_strRootElement`* as `String`)

Description
Adds a new item to the mapping. The item's internal structure is determined by the specified schema file. The second parameter is stored as the XML input sample for mapping evaluation.The third parameter defines the root element of this schema if there is more then one candidate.

Errors

1300 The application object is no longer valid.
1301 Invalid address for the return parameter was specified.

Parent

Property: `Parent` as `Document` (read-only)

Description
The parent object according to the object model.

Errors

1300	The application object is no longer valid.
1301	Invalid address for the return parameter was specified.

ShowItemTypes

Property: `ShowItemTypes` as `Boolean`

Description
This property defines if types of items should be shown in the mapping diagram.

Errors

1300	The application object is no longer valid.
1301	Invalid address for the return parameter was specified.

ShowLibraryInFunctionHeader

Property: `ShowLibraryInFunctionHeader` as `Boolean`

Description
This property defines whether the name of the function library should be part of function names.

Errors

1300	The application object is no longer valid.
1301	Invalid address for the return parameter was specified.

15.2.3 Document

Properties and Methods

Properties to navigate the object model:
`Application`
`Parent`

File handling:
`FullName`
`Name`
`Path`
`Saved`
`Save`
`SaveAs`
`Close`

Code generation:
`OutputSettings_ApplicationName`
`OutputSettings_Encoding`
`JavaSettings_BasePackageName`

`GenerateXSLT`
`GenerateCppCode`
`GenerateJavaCode`
`GenerateCHashCode`
`GenerateCodeEx`
`HighlightSerializedMarker`

View access:
`MapForceView`

Events

This object supports the following events:

`OnDocumentClosed`
`OnModifiedFlagChanged`

OnDocumentClosed

Event: `OnDocumentClosed` (*`i_objDocument`* as `Document`)

Description

This event is triggered when a document is closed. The document object passed into the event handler should not be accessed. The corresponding open event is `Application.OnDocumentOpened`.

OnModifiedFlagChanged

Event: `OnModifiedFlagChanged` (*`i_bIsModified`* as Boolean)

Description

This event is triggered when a document's modification status changes.

Activate

Method: `Activate` ()

Description
Makes this document the active document.

Errors
1200 The application object is no longer valid.

Application

Property: `Application` as `Application` (read-only)

Description
Retrieves the application's top-level object.

Errors
1200 The application object is no longer valid.
1201 Invalid address for the return parameter was specified.

Close

Method: `Close` ()

Description
Closes the document without saving.

Errors
1200 The application object is no longer valid.
1201 Invalid address for the return parameter was specified.

FullName

Property: `FullName` as `String`

Description
Path and name of the document file.

Errors
1200 The application object is no longer valid.
1201 Invalid address for the return parameter was specified.

GenerateCHashCode

Method: `GenerateCHashCode` ()

Description
Generate C# code that will perform the mapping. Uses the properties defined in `Application.Options` to configure code generation.

Errors
1200 The application object is no longer valid.

1201 Invalid address for the return parameter was specified.
1205 Error during code generation.

See also
`Code Generation`

GenerateCppCode

Method: `GenerateCppCode` ()

Description
Generates C++ code that will perform the mapping. Uses the properties defined in Application.Options to configure code generation.

Errors
1200 The application object is no longer valid.
1201 Invalid address for the return parameter was specified.
1205 Error during code generation.

See also
`Code Generation`

GenerateCodeEx

Method: `GenerateCodeEx ( i_nLanguage as ENUMProgrammingLanguage) as ErrorMarkers`

Description
Generates C++ code that will perform the mapping. The parameter *i_nLanguage* specifies the target language. The method returns an object that can be used to enumerate all messages created the code generator. These are the same messages that get displayed in the Messages window of MapForce.

Errors
1200 The application object is no longer valid.
1201 Invalid address for the return parameter was specified.
1205 Error during code generation.

See also
`Code Generation`

GenerateJavaCode

Method: `GenerateJavaCode` ()

Description
Generates Java code that will perform the mapping. Uses the properties defined in Application.Options to configure code generation.

Errors
1200 The application object is no longer valid.
1201 Invalid address for the return parameter was specified.
1205 Error during code generation.

See also

Code Generation

GenerateOutput

Method: `GenerateOutput` ()

Description
Generates all output files defined in the mapping using a MapForce internal mapping language. The names of the output files are defined as properties of the output items in the mapping.

Errors

1200	The application object is no longer valid.
1201	Invalid address for the return parameter was specified.
1206	Error during execution of mapping algorithm.

See also
Code Generation

GenerateXQuery

Method: `GenerateXQuery` ()

Description
Generates mapping code as XQuery. Uses the properties defined in Application.Options to configure code generation.

Errors

1200	The application object is no longer valid.
1201	Invalid address for the return parameter was specified.
1204	Error during XSLT/XSLT2/XQuery code generation.

See also
Code Generation

GenerateXSLT

Method: `GenerateXSLT` ()

Description
Generates mapping code as XSLT. Uses the properties defined in Application.Options to configure code generation.

Errors

1200	The application object is no longer valid.
1201	Invalid address for the return parameter was specified.
1204	Error during XSLT/XSLT2/XQuery code generation.

See also
Code Generation

GenerateXSLT2

Method: `GenerateXSLT2` ()

Description
Generates mapping code as XSLT2. Uses the properties defined in Application.Options to

configure code generation.

Errors

1200 The application object is no longer valid.
1201 Invalid address for the return parameter was specified.
1204 Error during XSLT/XSLT2/XQuery code generation.

See also

`Code Generation`

HighlightSerializedMarker

Method: `HighlightSerializedMarker` (*`i_strSerializedMarker`* as `String`)

Description

Use this method to highlight a location in a mapping file that has been previously serialized. If the corresponding document is not already loaded, it will be loaded first. See GenerateCodeEx for a method to retrieve a serialized marker.

Errors

1000 The application object is no longer valid.
1001 Invalid address for the return parameter was specified.
1007 The string passed in *i_strSerializedMarker* is not recognized a serialized MapForce marker.
1008 The marker points to a location that is no longer valid.

JavaSettings_BasePackageName

Property: `JavaSettings_BasePackageName` as `String`

Description

Sets or retrieves the base package name used when generating Java code. This property is available in UI-dialog for the Document Settings.

Errors

1200 The application object is no longer valid.
1201 Invalid address for the return parameter was specified.

See also

`Code Generation`

MapForceView

Property: `MapForceView` as `Document` (read-only)

Description

This property gives access to functionality specific to the MapForce view.

Errors

1200 The application object is no longer valid.
1201 Invalid address for the return parameter was specified.

Name

Property: `Name` as `String`

Description
Name of the document file without file path.

Errors

1200	The application object is no longer valid.
1201	Invalid address for the return parameter was specified.

OutputSettings_ApplicationName

Property: `OutpuSettings_ApplicationName` as `String`

Description
Sets or retrieves the application name available in the Document Settings dialog.

Errors

1200	The application object is no longer valid.
1201	Invalid address for the return parameter was specified.

See also
`Code Generation`

OutputSettings_Encoding

Property: `OutputSettings_Encoding` as `String`

Description
Sets or retrieves the output encoding available in the Document Settings dialog.

Errors

1200	The application object is no longer valid.
1201	Invalid address for the return parameter was specified.

See also
`Code Generation`

Parent

Property: `Parent` as Application (read-only)

Description
The parent object according to the object model.

Errors

1200	The application object is no longer valid.
1201	Invalid address for the return parameter was specified.

Path

Property: `Path` as `String`

Description
Path of the document file without name.

Errors
1200 The application object is no longer valid.
1201 Invalid address for the return parameter was specified.

Save

Method: `Save` ()

Description
Save the document to the file defined by `Document.FullName`.

Errors
1200 The application object is no longer valid.
1201 Invalid address for the return parameter was specified.

SaveAs

Method: `SaveAs` (*`i_strFileName`* as `String`)

Description
Save document to specified file name, and set `Document.FullName` to this value if save operation was successful.

Errors
1200 The application object is no longer valid.
1201 Invalid address for the return parameter was specified.

Saved

Property: `Saved` as Boolean (read-only)

Description
`True` if the document was not modified since the last save operation, `false` otherwise.

Errors
1200 The application object is no longer valid.
1201 Invalid address for the return parameter was specified.

15.2.4 Documents

Properties and Methods
Properties to navigate the object model:
Application
Parent

Open and create mappings:
OpenDocument
NewDocument

Iterating through the collection:
Count
Item
ActiveDocument

Application

Property: Application as Application (read-only)

Description
Retrieves the application's top-level object.

Errors

1600	The object is no longer valid.
1601	Invalid address for the return parameter was specified.

Parent

Property: Parent as Application (read-only)

Description
Retrieves the application's top-level object.

Errors

1600	The object is no longer valid.
1601	Invalid address for the return parameter was specified.

Count

Property: Count as Integer (read-only)

Description
Retrieves the number of documents in the collection.

Errors

1600	The object is no longer valid.
1601	Invalid address for the return parameter was specified.

Item

Property: Item (*nIndex* as Integer) as Document (read-only)

Description
Retrieves the document at nIndex from the collection. Indices start with 1.

Errors

1600 The object is no longer valid.
1601 Invalid address for the return parameter was specified.

NewDocument

Method: `NewDocument` () as `Document`

Description

Creates a new document, adds it to the end of the collection, and makes it the active document.

Errors

1600 The object is no longer valid.
1601 Invalid address for the return parameter was specified.

OpenDocument

Method: `OpenDocument` (*`strFilePath`* as `String`) as `Document`

Description

Opens an existing mapping document (`*.mfd`). Adds the newly opened document to the end of the collection and makes it the active document.

Errors

1600 The object is no longer valid.
1601 Invalid address for the return parameter was specified.

ActiveDocument

Property: `ActiveDocument` as Document (read-only)

Description

Retrieves the active document. If no document is open, `null` is returned.

Errors

1600 The object is no longer valid.
1601 Invalid address for the return parameter was specified.

15.2.5 ErrorMarkers

Properties and Methods
Properties to navigate the object model:
Application
Parent

Iterating through the collection:
`Count`
`Item`

Application

Property: `Application` as `Application` (read-only)

Description
Retrieves the application's top-level object.

Errors

1800	The object is no longer valid.
1801	Invalid address for the return parameter was specified.

Count

Property: `Count` as `Integer` (read-only)

Description
Retrieves the number of error markers in the collection.

Errors

1800	The object is no longer valid.
1801	Invalid address for the return parameter was specified.

Item

Property: `Item` (*`nIndex`* as `Integer`) as `ErrorMarker` (read-only)

Description
Retrieves the error marker at `nIndex` from the collection. Indices start with 1.

Errors

1800	The object is no longer valid.
1801	Invalid address for the return parameter was specified.

Parent

Property: `Parent` as `Application` (read-only)

Description
Retrieves the application's top-level object.

Errors

1800	The object is no longer valid.
1801	Invalid address for the return parameter was specified.

15.2.6 ErrorMarker

Properties and Methods
Properties to navigate the object model:
Application
Parent

Access to message information:

Application

Property: `Application` as `Application` (read-only)

Description
Retrieves the application's top-level object.

Errors

1900	The object is no longer valid.
1901	Invalid address for the return parameter was specified.

DocumentFileName

Property: `DocumentFileName` as `String` (read-only)

Description
Retrieves the name of the mapping file that the error marker is associated with.

Errors

1900	The object is no longer valid.
1901	Invalid address for the return parameter was specified.

ErrorLevel

Property: `ErrorLevel` as `ENUMCodeGenErrorLevel` (read-only)

Description
Retrieves the severity of the error.

Errors

1900	The object is no longer valid.
1901	Invalid address for the return parameter was specified.

Highlight

Method: `Highlight()`

Description
Highlights the item that the error marker is associated with. If the corresponding document is not open, it will be opened.

Errors

1900	The object is no longer valid.
1901	Invalid address for the return parameter was specified.
1008	The marker points to a location that is no longer valid.

Serialization

Property: `Serialization` as `String` (read-only)

Description
Serialize error marker into a string. Use this string in calls to Application.HighlightSerializedMarker or Document.HighlightSerializedMarker to highlight the marked item in the mapping. The string can be persisted and used in other instantiations of MapForce or its Control.

Errors

1900	The object is no longer valid.
1901	Invalid address for the return parameter was specified.

Text

Property: `Text` as `String` (read-only)

Description
Retrieves the message text.

Errors

1900	The object is no longer valid.
1901	Invalid address for the return parameter was specified.

Parent

Property: `Parent` as `Application` (read-only)

Description
Retrieves the application's top-level object.

Errors

1900	The object is no longer valid.
1901	Invalid address for the return parameter was specified.

15.2.7 Options

This object gives access to all MapForce options available in the **Tools | Options** dialog.

Properties and Methods
Properties to navigate the object model:
Application
Parent

General options:
ShowLogoOnPrint
ShowLogoOnStartup
UseGradientBackground

Options for code generation:
CompatibilityMode
DefaultOutputEncoding
XSLTDefaultOutputDirectory
CodeDefaultOutputDirectory
CppSettings_DOMType
CppSettings_LibraryType
CppSettings_UseMFC
CppSettings_GenerateVC6ProjectFile
CppSettings_GenerateVSProjectFile
CSharpSettings_ProjectType

Application

Property: `Application` as `Application` (read-only)

Description
Retrieves the application's top-level object.

Errors

1400	The application object is no longer valid.
1401	Invalid address for the return parameter was specified.

CodeDefaultOutputDirectory

Property: `CodeDefaultOutputDirectory` as `String`

Description
Specifies the target directory where files generated by `Document.GenerateCppCode`, `Document.GenerateJavaCode` and `Document.GenerateCHashCode`, are placed.

Errors

1400	The application object is no longer valid.
1401	Invalid address for the return parameter was specified.

See also
`Code Generation`

CompatibilityMode

Property: `CompatibilityMode` as `Boolean`

Description
Set to true to generate code compatible with Version 2005R3. Set to false to use newly added code generation features in `Document.GenerateCppCode`, `Document.GenerateCHashCode`, `Document.GenerateJavaCode` and `Document.GenerateXSLT`

Errors

1400	The application object is no longer valid.
1401	Invalid address for the return parameter was specified.

See also
`Code Generation`

CppSettings_DOMType

Property: `CppSettings_DOMType` as `ENUMDOMType`

Description
Specifies the DOM type used by `Document.GenerateCppCode`.

Errors

1400	The application object is no longer valid.
1401	Invalid address for the return parameter was specified.

See also
`Code Generation`

CppSettings_GenerateVC6ProjectFile

Property: `CppSettings_GenerateVC6ProjectFile` as `Boolean`

Description
Specifies if VisualC++ 6.0 project files should be generated by `Document.GenerateCppCode`.

Errors

1400	The application object is no longer valid.
1401	Invalid address for the return parameter was specified.

See also
`Code Generation`

CppSettings_GenerateVSProjectFile

Property: `CSharpSettings_GenerateVSProjectFile` as `ENUMProjectType`

Description
Specifies which version of VisualStudio project files should be generated by `Document.GenerateCppCode`.
Only `eVisualStudio2003Project` and `eVisualStudio2005Project` are valid selections.

Errors

1400	The application object is no longer valid.
1401	Invalid address for the return parameter was specified.

See also
Code Generation

CppSettings_LibraryType

Property: CppSettings_LibraryType as ENUMLibType

Description
Specifies the library type used by Document.GenerateCppCode.

Errors

1400	The application object is no longer valid.
1401	Invalid address for the return parameter was specified.

See also
Code Generation

CppSettings_UseMFC

Property: CppSettings_UseMFC as Boolean

Description
Specifies if MFC support should be used by C++ code generated by Document.GenerateCppCode.

Errors

1400	The application object is no longer valid.
1401	Invalid address for the return parameter was specified.

See also
Code Generation

CSharpSettings_ProjectType

Property: CSharpSettings_ProjectType as ENUMProjectType

Description
Specifies the type of C# project used by Document.GenerateCHashCode.

Errors

1400	The application object is no longer valid.
1401	Invalid address for the return parameter was specified.

See also
Code Generation

DefaultOutputEncoding

Property: DefaultOutputEncoding as Boolean

Description
File encoding used for output files.

Errors

1400	The application object is no longer valid.
1401	Invalid address for the return parameter was specified.

See also

`Code Generation`

Parent

Property: `Parent` as Application (read-only)

Description

The parent object according to the object model.

Errors

1400	The application object is no longer valid.
1401	Invalid address for the return parameter was specified.

ShowLogoOnPrint

Property: `ShowLogoOnPrint` as `Boolean`

Description

Show or hide the MapForce logo on printed outputs.

Errors

1400	The application object is no longer valid.
1401	Invalid address for the return parameter was specified.

ShowLogoOnStartup

Property: `ShowLogoOnStartup` as `Boolean`

Description

Show or hide the MapForce logo on application startup.

Errors

1400	The application object is no longer valid.
1401	Invalid address for the return parameter was specified.

UseGradientBackground

Property: `UseGradientBackground` as `Boolean`

Description

Set or retrieve the background color mode for a mapping window.

Errors

1400	The application object is no longer valid.
1401	Invalid address for the return parameter was specified.

XSLTDefaultOutputDirectory

Property: `XSLTDefaultOutputDirectory` as `String`

Description
Specifies the target directory where files generated by `Document.GenerateXSLT` are placed.

Errors

1400	The application object is no longer valid.
1401	Invalid address for the return parameter was specified.

See also
`Code Generation`

15.2.8 Project (Enterprise or Professional Edition)

Properties and Methods
Properties to navigate the object model:
Application
Parent

File handling:
FullName
Name
Path
Saved
Save
Close

Project tree navigation:
Count
Item
_NewEnum

Project tree manipulation:
AddActiveFile
AddFile
InsertWebService (Enterprise edition only)
CreateFolder

Code-generation:
Output_Folder
Output_Language
Output_TextEncoding
Java_BasePackageName
GenerateCode
GenerateCodeEx
GenerateCodeIn
GenerateCodeInEx

For examples of how to use the properties and methods listed above, see Example: Project Support. Note that, in order to use these properties and methods, you will need to have the Enterprise or Professional edition of MapForce installed on your computer. For operations with Web services, the Enterprise edition is required.

_NewEnum

Property: _NewEnum () as IUnknown (read-only)

Description
This property supports language-specific standard enumeration.

Errors
1500 The object is no longer valid.

Examples

```
// ---------------------------------------------------------
// JScript sample - enumeration of a project's project items.
function AllChildrenOfProjectRoot()
{
    objProject = objMapForce.ActiveProject;
    if ( objProject != null )
    {
        for ( objProjectIter = new Enumerator(objProject); !
objProjectIter.atEnd(); objProjectIter.moveNext() )
        {
            objProjectItem = objProjectIter.item();

            // do something with project item here
        }
    }
}

// ------------------------------------------------------------
// JScript sample - iterate all project items, depth first.
function IterateProjectItemsRec(objProjectItemIter)
{
    while ( ! objProjectItemIter.atEnd() )
    {
        objProjectItem = objProjectItemIter.item();
        // do something with project item here

        IterateProjectItemsRec( new Enumerator(objProjectItem) );

        objProjectItemIter.moveNext();
    }
}
function IterateAllProjectItems()
{
    objProject = objMapForce.ActiveProject;
    if ( objProject != null )
    {
        IterateProjectItemsRec( new Enumerator(objProject) );
    }
}
```

Events

This object supports the following events:

OnProjectClosed

OnProjectClosed

Event: OnProjectClosed (*i_obj*Project as Project)

Description
This event is triggered when the project is closed. The project object passed into the event handler should not be accessed. The corresponding open event is Application.OnProjectOpened.

AddActiveFile

Method: AddActiveFile () as ProjectItem

Description
Adds the currently open document to the mapping folder of the project's root.

Errors
1500 The object is no longer valid.
1501 Invalid address for the return parameter was specified.

1503 No active document is available.
1504 Active documents needs to be given a path name before it can be added to the project.
1705 Mapping could not be assigned to project. Maybe it is already contained in the target folder.

AddFile

Method: `AddFile` (*`i_strFileName`* as `String`) as [`ProjectItem`]

Description
Adds the specified document to the mapping folder of the project's root.

Errors
1500 The object is no longer valid.
1501 The file name is empty.
Invalid address for the return parameter was specified.
1705 Mapping could not be assigned to project.
The file does not exist or is not a MapForce mapping.
Maybe the file is already assigned to the target folder.

Application

Property: `Application` as [`Application`] (read-only)

Description
Retrieves the top-level application object.

Errors
1500 The object is no longer valid.
1501 Invalid address for the return parameter was specified.

Close

Method: `Close` ()

Description
Closes the project without saving.

Errors
1500 The object is no longer valid.

Count

Property: `Count` as `Integer` (read-only)

Description
Retrieves number of children of the project's root item.

Errors
1500 The object is no longer valid.

Examples
See [`Item`] or [`_NewEnum`].

CreateFolder

Method: CreateFolder (*i_strFolderName* as String) as ProjectItem

Description
Creates a new folder as a child of the project's root item.

Errors

1500	The object is no longer valid.
1501	Invalid folder name or invalid address for the return parameter was specified.

FullName

Property: FullName as String (read-only)

Description
Path and name of the project file.

Errors

1500	The object is no longer valid.
1501	Invalid address for the return parameter was specified.

GenerateCode

Method: GenerateCode ()

Description
Generates code for all project items of the project. The code language and output location is determined by properties of the project and project items.

Errors

1500	The object is no longer valid.
1706	Error during code generation

GenerateCodeEx

Method: GenerateCode () as ErrorMarkers

Description
Generates code for all project items of the project. The code language and output location are determined by properties of the project and project items. An object that can be used to iterate through all messages issued by the code generation process is returned. These messages are the same as those shown in the *Messages* window of MapForce.

Errors

1500	The object is no longer valid.
1501	Invalid address for the return parameter was specified.
1706	Error during code generation

GenerateCodeIn

Method: GenerateCodeIn (*i_nLanguage* as ENUMProgrammingLanguage)

Description
Generates code for all project items of the project in the specified language. The output location is determined by properties of the project and project items.

Errors

1500	The object is no longer valid.
1706	Error during code generation

GenerateCodeInEx

Method: `GenerateCodeIn (i_nLanguage` as `ENUMProgrammingLanguage) as ErrorMarkers`

Description
Generates code for all project items of the project in the specified language. The output location is determined by properties of the project and project items. An object that can be used to iterate through all messages issued by the code generation process is returned. These messages are the same as those shown in the *Messages* window of MapForce.

Errors

1500	The object is no longer valid.
1501	Invalid address for the return parameter was specified.
1706	Error during code generation

InsertWebService

Method: `InsertWebService (i_strWSDLFile` as `String, i_strService` as `String, i_strPort` as `String, i_bGenerateMappings` as `Boolean) as ProjectItem`

Description
Inserts a new Web service project into the project's Web service folder. If `i_bGenerateMappings` is true, initial mapping documents for all ports get generated automatically.

Errors

1500	The object is no longer valid.
1501	WSDL file can not be found or is invalid. Service or port names are invalid. Invalid address for the return parameter was specified.
1503	Operation not supported by current edition.

Item

Property: `Item( i_nItemIndex` as `Integer) as ProjectItem` (read-only)

Description
Returns the child at `i_nItemIndex` position of the project's root. The index is zero-based. The largest valid index is `Count-1`. For an alternative to visit all children see `_NewEnum`.

Errors

1500	The object is no longer valid.

Examples

```
// ----------------------------------------------------------
// JScript code snippet - enumerate children using Count and Item.
for( nItemIndex = 0; nItemIndex < objProject.Count; nItemIndex++ )
{
    objProjectItem = objProject.Item( nItemIndex);
    // do something with project item here
}
```

Java_BasePackageName

Property: `Java_BasePackageName` as `String`

Description
Sets or gets the base package name of the Java packages that will be generated. This property is used only when generating Java code.

Errors
1500 The object is no longer valid.
1501 Invalid package name specified.
Invalid address for the return parameter was specified.

Name

Property: `Name` as `String` (read-only)

Description
Name of the project file without file path.

Errors
1500 The object is no longer valid.
1501 Invalid address for the return parameter was specified.

Output_Folder

Property: `Output_Folder` as `String`

Description
Sets or gets the default output folder used with `GenerateCode` and `GenerateCodeIn`. Project items can overwrite this value in their `CodeGenSettings_OutputFolder` property, when `CodeGenSettings_UseDefault` is set to false.

Errors
1500 The object is no longer valid.
1501 Invalid folder name specified.
Invalid address for the return parameter was specified.

Output_Language

Property: `OutputLanguage` as `ENUMProgrammingLanguage`

Description
Sets or gets the default language for code generation when using `GenerateCode`. Project items can overwrite this value in their `CodeGenSettings_OutputLanguage` property, when `CodeGenSettings_UseDefault` is set to false.

Errors

1500 The object is no longer valid.
1501 Invalid language specified.
Invalid address for the return parameter was specified.

Output_TextEncoding

Property: `Output_TextEncoding` as `String`

Description
Sets or gets the text encoding used when generating XML-based code.

Errors
1500 The object is no longer valid.
1501 Invalid text encoding specified.
Invalid address for the return parameter was specified.

Parent

Property: `Parent` as `Application` (read-only)

Description
Retrieves the top-level application object.

Errors
1500 The is no longer valid.
1501 Invalid address for the return parameter was specified.

Path

Property: `Path` as `String` (read-only)

Description
Path of the project file without name.

Errors
1500 The object is no longer valid.
1501 Invalid address for the return parameter was specified.

Save

Method: `Save` ()

Description
Saves the project to the file defined by `FullName`.

Errors
1500 The object is no longer valid.
1502 Can't save to file.

Saved

Property: `Saved` as Boolean (read-only)

Description

True if the project was not modified since the last Save operation, False otherwise.

Errors

1500 The object is no longer valid.
1501 Invalid address for the return parameter was specified.

15.2.9 ProjectItem (Enterprise or Professional Edition)

Properties and Methods
Properties to navigate the object model:
Application
Parent

Project tree navigation:
Count
Item
_NewEnum

Project item properties:
Kind
Name
WSDLFile (only available to Web service project items)
QualifiedName (only available to Web service project items)

Project tree manipulation:
AddActiveFile (only available to folder items)
AddFile (only available to folder items)
CreateFolder (only available to folder items)
CreateMappingForProject (only available to Web service operations)
Remove

Document access:
Open (only available to mapping items and Web service operations)

Code-generation:
CodeGenSettings_UseDefault
CodeGenSettings_OutputFolder
CodeGenSettings_Language
GenerateCode
GenerateCodeEx
GenerateCodeIn
GenerateCodeInEx

For examples of how to use the properties and methods listed above, see Example: Project Support. Note that, in order to use these properties and methods, you will need to have the Enterprise or Professional edition of MapForce installed on your computer. For operations with Web services, the Enterprise edition is required.

_NewEnum

Property: `_NewEnum` () as `IUnknown` (read-only)

Description
This property supports language specific standard enumeration.

Errors

1700	The object is no longer valid.

Examples
See `Project.Item` or `Project._NewEnum`.

AddActiveFile

Method: AddActiveFile () as ProjectItem

Description
Adds the currently active document to this project item if it is a valid child. Otherwise, the document is added to the Mapping Folder of the project's root.

Errors

1700 The object is no longer valid.
1701 The file name is empty.
Invalid address for the return parameter was specified.
1703 No active document is available.
1704 Active documents needs to be given a path name before it can be added to the project.
1705 Mapping could not be assigned to project.
The file does not exist or is not a MapForce mapping.
Maybe the file is already assigned to the target folder.

AddFile

Method: AddFile (*i_strFileName* as String) as ProjectItem

Description
Adds the specified document to this project item if it is a valid child. Otherwise, the document is added to the Mapping Folder of the project's root.

Errors

1700 The object is no longer valid.
1701 The file name is empty.
Invalid address for the return parameter was specified.
1705 Mapping could not be assigned to project.
The file does not exist or is not a MapForce mapping.
Maybe the file is already assigned to the target folder.

Application

Property: Application as Application (read-only)

Description
Retrieves the top-level application object.

Errors

1700 The object is no longer valid.
1701 Invalid address for the return parameter was specified.

CodeGenSettings_Language

Property: CodeGenSettings_Language as ENUMProgrammingLanguage

Description
Gets or sets the language to be used with GenerateCode or Project.GenerateCode. This property is consulted only if CodeGenSettings_UseDefault is set to false.

Errors

1700 The object is no longer valid.
1701 Invalid language or invalid address for the return parameter was specified.

CodeGenSettings_OutputFolder

Property: `CodeGenSettings_OutputFolder` as `String`

Description
Gets or sets the output directory to be used with `GenerateCode`, `GenerateCodeIn`, `Project.GenerateCode` or `Project.GenerateCodeIn`. This property is consulted only if `CodeGenSettings_UseDefault` is set to false.

Errors
1700 The object is no longer valid.
1701 An invalid output folder or an invalid address for the return parameter was specified.

CodeGenSettings_UseDefault

Property: `CodeGenSettings_UseDefault` as `Boolean`

Description
Gets or sets whether output directory and code language are used as defined by either (a) the parent folders, or (b) the project root. This property is used with calls to `GenerateCode`, `GenerateCodeIn`, `Project.GenerateCode` and Project.GenerateCodeIn. If this property is set to false, the values of `CodeGenSettings_OutputFolder` and `CodeGenSettings_Language` are used to generate code for this project item..

Errors
1700 The object is no longer valid.
1701 Invalid address for the return parameter was specified.

Count

Property: `Count` as `Integer` (read-only)

Description
Retrieves number of children of this project item. Also see `Item`.

Errors
1700 The object is no longer valid.

Examples
See `Project.Item` or `Project._NewEnum`.

CreateFolder

Method: `CreateFolder` (*`i_strFolderName`* as `String`) as `ProjectItem`

Description
Creates a new folder as a child of this project item.

Errors

1700 The object is no longer valid.
1701 Invalid folder name or invalid address for the return parameter was specified.
1702 The project item does not support children.

CreateMappingForProject

Method: `CreateMappingForProject` (*`i_strFileName`* as `String`) as `ProjectItem`

Description
Creates an initial mapping document for a Web service operation and saves it to `i_strFileName`. When using `Project.InsertWebService` you can use the `i_bGenerateMappings` flag to let MapForce automatically generate initial mappings for all ports.

Errors
1700 The object is no longer valid.
1701 Invalid address for the return parameter was specified.
1707 Cannot create new mapping.
The project item does not support auto-creation of initial mappings or a mapping already exists.
1708 Operation not supported in current edition.

GenerateCode

Method: `GenerateCode` ()

Description
Generates code for this project item and its children. The code language and output location is determined by `CodeGenSettings_UseDefault`, `CodeGenSettings_Language` and `CodeGenSettings_OutputFolder`. Children of this project item can have their own property settings related to code-generation.

Errors
1700 The object is no longer valid.
1706 Error during code generation.

GenerateCodeEx

Method: `GenerateCode` () `as` `ErrorMarkers`

Description
Generates code for this project item and its children. The code language and output location are determined by `CodeGenSettings_UseDefault`, `CodeGenSettings_Language` and `CodeGenSettings_OutputFolder`. Children of this project item can have their own property settings related to code-generation.

An object that can be used to iterate through all messages issued by the code generation process is returned. These messages are the same as those shown in the *Messages* window of MapForce.

Errors
1700 The object is no longer valid.
1701 Invalid address for the return parameter was specified.
1706 Error during code generation.

GenerateCodeIn

Method: `GenerateCodeIn` (*`i_nLanguage`* as `ENUMProgrammingLanguage`)

Description
Generates code for the project item and its children in the specified language. The output location is determined by `CodeGenSettings_UseDefault` and `CodeGenSettings_OutputFolder`. Children of this project item can have their own property settings related to code-generation.

Errors

1700 The object is no longer valid.
1701 Invalid language specified.
1706 Error during code generation.

GenerateCodeInEx

Method: `GenerateCodeIn` (*`i_nLanguage`* as `ENUMProgrammingLanguage`) `as ErrorMarkers`

Description
Generates code for the project item and its children in the specified language. The output location is determined by `CodeGenSettings_UseDefault` and `CodeGenSettings_OutputFolder`. Children of this project item can have their own property settings related to code-generation.

An object that can be used to iterate through all messages issued by the code generation process is returned. These messages are the same as those shown in the *Messages* window of MapForce.

Errors

1700 The object is no longer valid.
1701 Invalid language specified or invalid address for the return parameter was specified.
1706 Error during code generation.

Item

Property: `Item(` *`i_nItemIndex`* as `Integer)` as `ProjectItem` (read-only)

Description
Returns the child at `i_nItemIndex` position of this project item. The index is zero-based. The largest valid index is `Count` - 1.
For an alternative to visit all children see `_NewEnum`.

Errors

1700 The object is no longer valid.

Examples
See `Project.Item` or `Project._NewEnum`.

Kind

Property: `Kind` as `ENUMProjectItemType` (read-only)

Description

Retrieves the kind of the project item. Availability of some properties and the applicability of certain methods is restricted to specific kinds of project items. The description of all methods and properties contains information about these restrictions.

Errors

1700 The object is no longer valid.
1701 Invalid address for the return parameter was specified.

Name

Property: `Name` as `String`

Description

Retrieves or sets the name of a project item. The name of most items is read-only. Exceptions are user-created folders, the names of which can be altered after creation.

Errors

1700 The object is no longer valid.
1701 Invalid address for the return parameter was specified.
1702 Project item does not allow to alter its name.

Open

Method: `Open` () as Document

Description

Opens the project item as a document or makes the corresponding document the active one, if it is already open. The project item must be a MapForce mapping or, for Enterprise edition only, Web service operation.

Errors

1700 The object is no longer valid.
1701 Invalid address for the return parameter was specified.
1702 The project item does not refer to a MapForce mapping file.
1708 Operation not supported in current edition.

Parent

Property: `Parent` as Project (read-only)

Description

Retrieves the project that this item is a child of. Has the same effect as `Application. ActiveProject`.

Errors

1700 The object is no longer valid.
1701 Invalid address for the return parameter was specified.

QualifiedName

Property: `QualifiedName` as `String` (read-only)

Description

Retrieves the qualified name of a Web service item.

Errors

1700	The object is no longer valid.
1701	Invalid address for the return parameter was specified.
1702	The project item is not a part of a Web service.

Remove

Method: `Remove` ()

Description

Remove this project item and all its children from the project tree.

Errors

1700	The object is no longer valid.

WSDLFile

Property: `WSDLFile` as `String` (read-only)

Description

Retrieves the file name of the WSDL file defining the Web service that hosts the current project item.

Errors

1700	The object is no longer valid.
1701	Invalid address for the return parameter was specified.
1702	The project item is not a part of a Web service.

15.3 Enumerations

This is a list of all enumerations used by the MapForce API. If your scripting environment does not support enumerations, use the number-values instead.

15.3.1 ENUMCodeGenErrorLevel

Description
Enumeration values to identify severity of code generation messages.

Possible values:

```
eCodeGenErrorLevel_Information = 0
eCodeGenErrorLevel_Warning     = 1
eCodeGenErrorLevel_Error       = 2
eCodeGenErrorLevel_Undefined   = 3
```

15.3.2 ENUMDOMType

Description

Enumeration values to specify the DOM type used by generated C++ mapping code.

Possible values:

eDOMType_msxml4	= 0
eDOMType_xerces	= 1

See also

`Code Generation`

15.3.3 ENUMLibType

Description
Enumeration values to specify the library type used by the generated C++ mapping code.

Possible values:

eLibType_static	= 0
eLibType_dll	= 1

See also
`Code Generation`

15.3.4 ENUMProgrammingLanguage

Description
Enumeration values to select a programming language.

Possible values:

eUndefinedLanguage	= -1
eJava	= 0
eCpp	= 1
eCSharp	= 2
eXSLT	= 3
eXSLT2	= 4
eXQuery	= 5

15.3.5 ENUMProjectItemType

WDescription
Enumeration the different kinds of project items that can be children of Project or folder-like ProjectItems.

Possible values:

eProjectItemType_Invalid	= -1
eProjectItemType_MappingFolder	= 0
eProjectItemType_Mapping	= 1
eProjectItemType_WebServiceFolder	= 2
eProjectItemType_WebServiceRoot	= 3
eProjectItemType_WebServiceService	= 4
eProjectItemType_WebServicePort	= 5
eProjectItemType_WebServiceOperation	= 6
eProjectItemType_ExternalFolder	= 7
eProjectItemType_LibrarzFolder	= 8
eProjectItemType_ResourceFolder	= 9
eProjectItemType_VirtualFolder	= 10

See also
`ProjectItem.Kind`

15.3.6 ENUMProjectType

Description

Enumeration values to select a project type for generated C# mapping code.

Possible values:

eVisualStudioProject	= 0
eVisualStudio2003Project	= 1
eBorlandProject	= 2
eMonoMakefile	= 3
eVisualStudio2005Project	= 4

See also

`Code Generation`

15.3.7 ENUMViewMode

Description
Enumeration values to select a MapForce view.

Possible values:

eMapForceView	= 0
eXSLView	= 1
eOutputView	= 2

Chapter 16

MapForceControl

16 MapForceControl

MapForceControl is a control that provides a means of integration of the MapForce user interface and the functionality described in this section into most kinds of applications. ActiveX technology was chosen so as to allow integration using any of a wide variety of languages; this enables C++, C#, VisualBasic, or HTML to be used for integration. All components are full OLE Controls, which makes integration as simple as possible. Two different levels of integration are provided, thus enabling the integration to be adapted to a wide range of needs.

For a successful integration you have to consider the following main design factors:

- What technology or programming language can the hosting application use to integrate the MapForceControl?
- Should the integrated UI look exactly like MapForce with all its menus, toolbars, and windows, or will a subset of these elements—like allowing only one document and a restricted set of commands—be more effective?
- How deep will the integration be? Should the MapForce user interface be used as is? Are user interface extensions and/or restrictions required? Can some frequently used tasks be automated?

The sections, Integration at the Application Level and Integration at Document Level, both of which have examples in various programming languages, will help you to make the right decisions quickly. The section, Object Reference, describes all COM objects that can be used for integration, together with their properties and methods.

For automation tasks, the MapForce Automation Interface is accessible from the MapForceControl as well.

16.1 Integration at the Application Level

Integration at application level is simple and straightforward. It allows you to embed the complete interface of MapForce into a window of your application. Since you get the whole user interface of MapForce, you get all menus, toolbars, the status bar, document windows, and helper windows. Customization of the application's user interface is restricted to what MapForce provides. This includes rearrangement and resizing of helper windows and customization of menus and toolbars.

The only ActiveX control you need to integrate is `MapForceControl`. Its property `IntegrationLevel` defaults to application-level. You may use `Appearance` and `BorderStyle` to configure the appearance of the control's wrapper window. Do not instantiate or access `MapForceControlDocument` or `MapForceControlPlaceHolder` ActiveX controls when integrating at application-level.

If you have any initialization to do or if you want to automate some behaviour of MapForce, use the properties, methods, and events described for `MapForceControl`. Consider using `MapForceControl.Application` for more complex access to MapForce functionality.

In this section is an example (Example: HTML) showing how the MapForce application can be embedded in an HTML page. For usage with other programming languages, or more sophisticated access, see the Examples of integration at document-level.

16.1.1 Example: HTML

This example shows a simple integration of the MapForce control at application-level into a HTML page. The integration is described in the following sections:

- Instantiate a MapForceControl in HTML code.
- Implement buttons to load documents and automate code-generation tasks.
- Define actions for some application events.

The code for this example is available at the following location in your MapForce installation: `MapForceExamples\ActiveX\HTML\MapForceActiveX_ApplicationLevel.htm`.

Instantiate the Control

The HTML `Object` tag is used to create an instance of the MapForceControl. The `Classid` is that of MapForceControl. Width and height specify the window size. No additional parameters are necessary, since application-level is the default.

```
<OBJECT id="objMapForceControl"
        Classid="clsid:A38637E9-5759-4456-A167-F01160CC22C1"
        width="800"
        height="500"
        VIEWASTEXT>
</OBJECT>
```

Add Button to Open Default Document

As a simple example of how to automate some tasks, we add a button to the page:

```
<input type="button" value="Open Marketing Expenses"
onclick="BtnOpenMEFile()">
```

When clicked, a predefined document will be opened in the MapForceControl. We use a method to locate the file relative to the MapForceControl so the example can run on different installations.

```
<SCRIPT ID=Javahandlers LANGUAGE=javascript>
// ---------------------------------
// open a pre-defined document
function BtnOpenMEFile()
{
 var pos = objMapForceControl.BaseHref.indexOf("ActiveX");

 if(pos > 7)
 {
  path = objMapForceControl.BaseHref.substr(7, pos - 7);          // remove
file protocol

  objMapForceControl.Open(path + "MarketingExpenses.mfd");
 }
 else
 {
  alert("Unable to locate MarketingExpenses.mfd at: " +
objMapForceControl.BaseHref);
 }
}
</SCRIPT>
```

Add Buttons for Code Generation

Although code-generation for the active document is available via menus, we want to have buttons that will generate code without asking the user for the location of the output. The method is similar to that used in the previous section.

First come the buttons:

```
<input type="button" value="Generate XSLT" onclick="BtnGenerate( 0 )">
<input type="button" value="Generate Java" onclick="BtnGenerate( 1 )">
<input type="button" value="Generate C++" onclick="BtnGenerate( 2 )">
<input type="button" value="Generate C#" onclick="BtnGenerate( 3 )">
```

Then we provide the script that will generate the code into sub-folders of the currently defined default output folders.

```
<SCRIPT ID=Javahandlers LANGUAGE=javascript>
// ---------------------------------------------------------------------
// generate code for active document into language-specific sub folders of
// the current default output directory. No user interaction necessary.
function BtnGenerate(languageID)
{
      // get top-level object of automation interface
      var objApp = objMapForceControl.Application;

      // get the active document
      var objDocument = objApp.ActiveDocument;

      // retrieve object to set the generation output path
      var objOptions = objApp.Options;

      if ( objDocument == null )
            alert( "no active document found" );
      else
      {
            if (languageID == 0)
            {
                  objOptions.XSLTDefaultOutputDirectory =
objOptions.XSLTDefaultOutputDirectory + "\\XSLTGen";
                  objDocument .GenerateXSLT();
            }
            else if (languageID == 1)
            {
                  objOptions.CodeDefaultOutputDirectory =
objOptions.CodeDefaultOutputDirectory + "/JavaCode";
                  objDocument .GenerateJavaCode();
            }
            else if (languageID == 2)
            {
                  objOptions.CodeDefaultOutputDirectory =
objOptions.CodeDefaultOutputDirectory + "/CPPCode";
                  objDocument .GenerateCppCode();
            }
            else if (languageID == 3)
            {
                  objOptions.CodeDefaultOutputDirectory =
objOptions.CodeDefaultOutputDirectory + "/CSharpCode";
                  objDocument .GenerateCHashCode();
            }
      }
}
</SCRIPT>
```

Connect to Custom Events

The example implements two event callbacks for MapForceControl custom events to show the principle:

```
<!-- ----------------------------------------------------------- -->
<!--  custom event 'OnDocumentOpened" of MapForceControl object  -->
<SCRIPT FOR="objMapForceControl" event="OnDocumentOpened( objDocument )"
LANGUAGE="javascript">
       // alert("Document '" + objDocument.Name + "' opened!");
</SCRIPT>

<!-- ----------------------------------------------------------- -->
<!--  custom event 'OnDocumentClosed" of MapForceControl object  -->
<SCRIPT FOR="objMapForceControl" event="OnDocumentClosed( objDocument )"
LANGUAGE="javascript">
       // alert("Document '" + objDocument.Name + "' closed!");
</SCRIPT>
```

16.2 Integration at Document Level

Integration at document level gives you freedom over instantiation and placement of the following parts of the MapForce user interface:

- Editing windows for MapForce mappings
- MapForce overview window
- MapForce library window
- MapForce validation window
- MapForce project window

If necessary, a replacement for the menus and toolbars of MapForce must be provided by your application.

You will need to instantiate and access multiple ActiveX controls, depending on which user interface parts you want to re-use. All these controls are contained in the MapForceControl OCX.

- Use MapForceControl to set the integration level and access application wide functionality.
- Use MapForceControlDocument to create any number of editor windows. It may be sufficient to create only one window and re-use it for different mapping files, depending on your needs.
- Optionally Use MapForceControlPlaceholder to embed MapForce overview, library, validation and project windows.
- Access run-time information about commands, menus, and toolbars available in MapForceControl to seamlessly integrate these commands into your application's menus and toolbars. See Use MapForceCommands for more information.

If you want to automate some behaviour of MapForce use the properties, methods, and events described for the MapForceControl, MapForceControlDocument and MapForceControlPlaceHolder. Consider using MapForceControl.Application, MapForceControlDocument.Document and MapForceControlPlaceHolder.Project for more complex access to MapForce functionality. However, to open a document always use MapForceControlDocument.OpenDocument or MapForceControlDocument.NewDocument on the appropriate document control. To open a project always use MapForceControlPlaceHolder.OpenProject on a placeholder control embedding a MapForce project window.

See Examples on how to instantiate and access the necessary controls in different programming environments.

16.2.1 Use MapForceControl

To integrate at document level, instantiate a `MapForceControl` first. Set the property `IntegrationLevel` to `ICActiveXIntegrationOnDocumentLevel(=1)`. Set the window size of the embedding window to `0x0` to hide any user interface behind the control. You may use `Appearance` and `BorderStyle` to configure the appearance of the control's wrapper window.

Avoid using the method `Open` since this might lead to unexpected results. Use the corresponding open methods of `MapForceControlDocument` and `MapForceControlPlaceHolder`, instead.

See Query MapForce Commands for a description of how to integrate MapForce commands into your application. Send commands to MapForce via the method `Exec`. Query if a command is currently enabled or disabled using the method `QueryStatus`.

16.2.2 Use MapForceControlDocument

An instance of the `MapForceControlDocument` ActiveX control allows you to embed one MapForce mapping editing window into your application. You can use any number of instances you need. Each instance will have one mapping loaded. New instances contain a new mapping at creation. Use the method `OpenDocument` to load any other existing mapping file.

The control supports a read-only mode via the property `ReadOnly`.

Use `Path` and `SaveDocument` or methods and properties accessible via the property `Document` to access document functionality.

16.2.3 Use MapForceControlPlaceHolder

Instances of MapForceControlPlaceHolder ActiveX controls allow you to selectively embed the additional helper windows of MapForce into your application. The property `PlaceholderWindowID` selects the MapForce helper window to be embedded. Use only one MapForceControlPlaceHolder for each window identifier. See `Enumerations.MapForceControlPlaceholderWindow` for valid window identifiers.

For placeholder controls that select the MapForce project window, additional methods are available. Use `OpenProject` to load a MapForce project. Use the property `Project` and the methods and properties from the MapForce automation interface to perform any other project related operations.

16.2.4 Query MapForce Commands

When integrating at document-level, no menu or toolbar from MapForce is available to your application. Instead, you can query all the commands and the structure of the application menu at runtime. Use the property `MapForceControl.CommandsStructure` to access this information. Professional applications will need to integrate this menu in a sophisticated manner into their own menu structure. Your installation of MapForce even provides you with command label images used within MapForce. See the folder `MapForceExamples\ActiveX\Images` of your MapForce installation for icons in GIF format. The file names correspond to the `labels` of commands.

See the C# Example for details of how to use the command structure information to create a menu at runtime.

16.2.5 Examples

This section contains examples of MapForce document-level integration using different container environments and programming languages. Source code for all examples is available in the folder `MapForceExamples\ActiveX` of your MapForce installation.

C#

The C# example shows how to integrate the MapForceControl in a common desktop application created with C# using Visual Studio .NET 2003. The following topics are covered:

- Building a dynamic menu bar based on information the MapForceControl API provides.
- Usage of MapForce Placeholder controls in a standard frame window.
- Usage of a MapForce Placeholder control in a sizeable Tool Window.
- How to handle an event raised by the MapForceControl API.

Please note that the example application is already complete. There is no need to change anything if you want to run and see it working. The following steps describe what general actions and considerations must be taken in order to create a project such as this.

Introduction

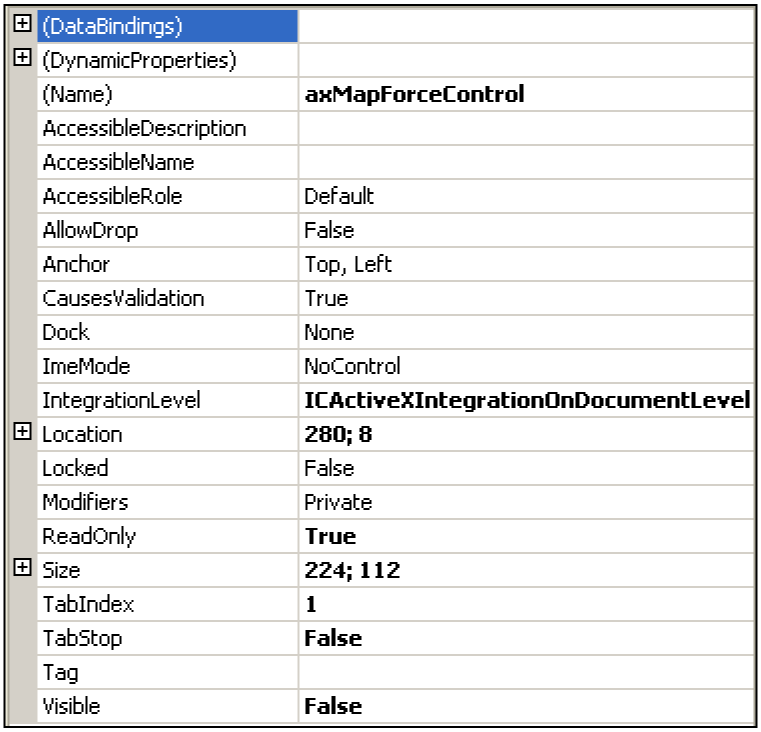
Adding the MapForce components to the Toolbox
Before you take a look at the sample project please add the assemblies to the .NET IDE Toolbox. The MapForce Installer will have already installed the assemblies in the .NET Global Assembly Cache (GAC). If you open the Toolbox dialog under **Tools | Add/Remove Toolbox Items** the controls will appear as `AxMapForceControl`, `AxMapForceControlDocument` and `AxMapForceControlPlaceholder` on the .NET Framework Components tab. Check all to make them available to the IDE.

Now you can open the `MapForceApplication.sln` file in the `ActiveX\C#\MapForceApplication` folder to load the project.

Placing the MapForceControl

It is necessary to have one MapForceControl instance to set the integration level and to manage the Document and Placeholder controls of the MapForce library. The control is accessible via the General section of the Toolbox helper window in the IDE. To add it you need to select the component in the Toolbox window and drag a rectangle wherever you want to have it in the destination window. If you have an application which does not open a window on startup you can use a simple invisible Form with the control on it which is created manually in the code.

The example project adds this instance to the main MdiContainer MDIMain. If you open MDIMain in the Design View from the Solution Explorer you will see a light blue rectangle at the top-left side in the client area of the Frame window. Selecting this rectangle will show you the properties of the MapForceControl. It is important to set the `IntegrationLevel` property to **`ICActiveXIntegrationOnDocumentLevel`** in order to turn on the Document and Placeholder support of the MapForce library. Properties of the MapForceControl component placed in the MDIFrame Window of the example application are shown below:



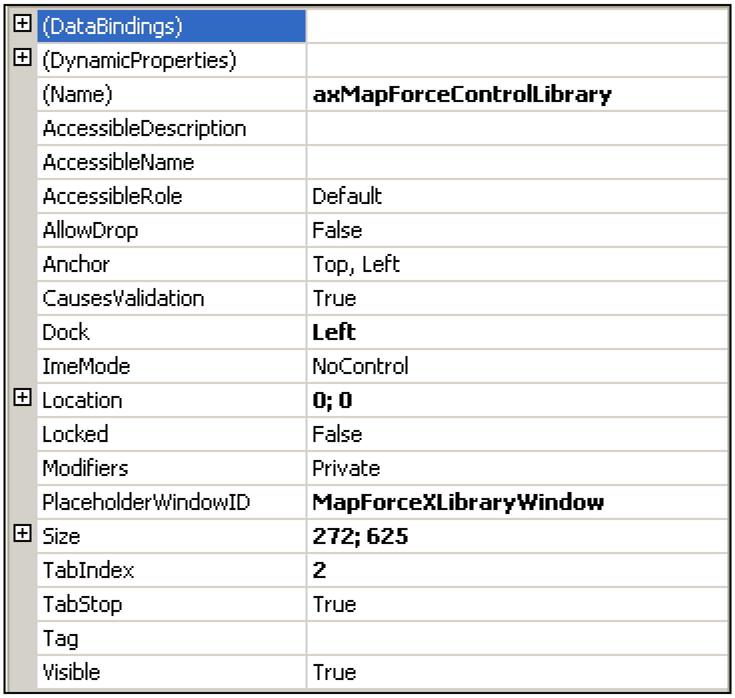
⊞ (DataBindings)	
⊞ (DynamicProperties)	
(Name)	**axMapForceControl**
AccessibleDescription	
AccessibleName	
AccessibleRole	Default
AllowDrop	False
Anchor	Top, Left
CausesValidation	True
Dock	None
ImeMode	NoControl
IntegrationLevel	**ICActiveXIntegrationOnDocumentLevel**
⊞ Location	**280; 8**
Locked	False
Modifiers	Private
ReadOnly	**True**
⊞ Size	**224; 112**
TabIndex	**1**
TabStop	**False**
Tag	
Visible	**False**

Set the Visible flag to False to avoid any confusion about the control for the user.

Adding the Placeholder Controls

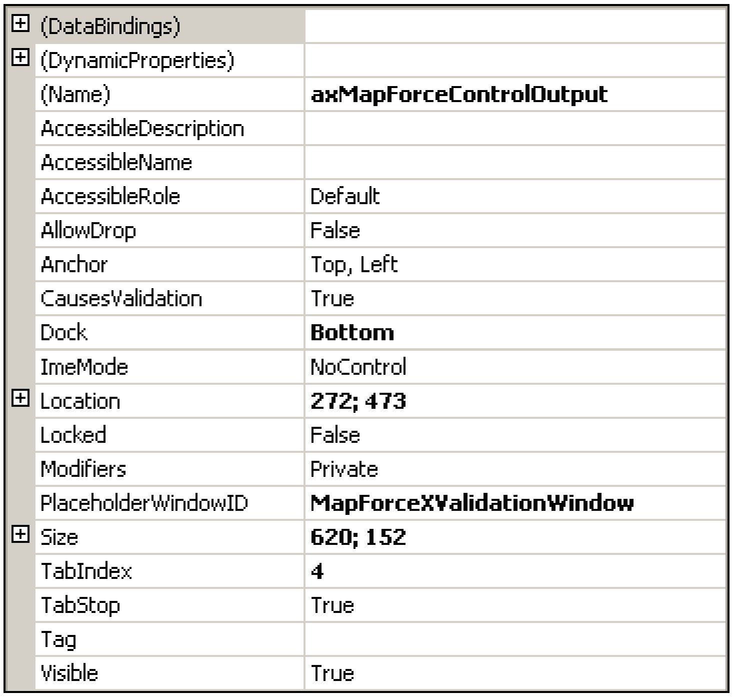
Placeholders on the MDI Frame
The example project has to place Placeholder controls on the main MDI Frame. They are also added via the Toolbox window by dragging a rectangle on the destination Form. To set the type of the Placeholder which should be displayed one has to set the `PlaceholderWindowID` property. This property can also be changed during runtime in the code of the application. The Placeholder control would change its content immediately.

Properties of the Library window on the left side of the MDIMain Frame window are shown below:



⊞ (DataBindings)	
⊞ (DynamicProperties)	
(Name)	**axMapForceControlLibrary**
AccessibleDescription	
AccessibleName	
AccessibleRole	Default
AllowDrop	False
Anchor	Top, Left
CausesValidation	True
Dock	**Left**
ImeMode	NoControl
⊞ Location	**0; 0**
Locked	False
Modifiers	Private
PlaceholderWindowID	**MapForceXLibraryWindow**
⊞ Size	**272; 625**
TabIndex	**2**
TabStop	True
Tag	
Visible	True

Properties of the Output window at the bottom:



⊞ (DataBindings)	
⊞ (DynamicProperties)	
(Name)	**axMapForceControlOutput**
AccessibleDescription	
AccessibleName	
AccessibleRole	Default
AllowDrop	False
Anchor	Top, Left
CausesValidation	True
Dock	**Bottom**
ImeMode	NoControl
⊞ Location	**272; 473**
Locked	False
Modifiers	Private
PlaceholderWindowID	**MapForceXValidationWindow**
⊞ Size	**620; 152**
TabIndex	**4**
TabStop	True
Tag	
Visible	True

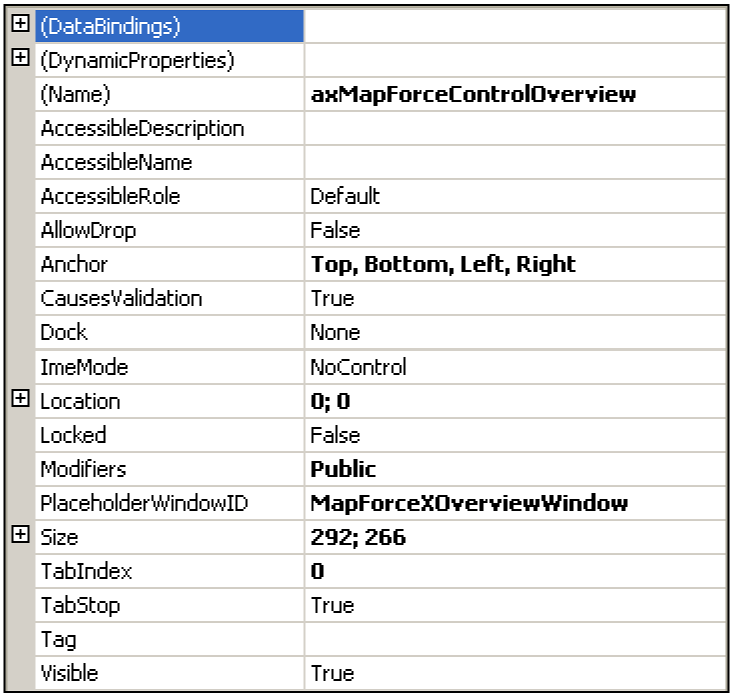
The Placeholders also have the Anchor and Dock properties set in order to react on resizing of the Frame window.

Placeholder on a separate Toolwindow

It is also possible to place a Placeholder control on a separate floating Toolwindow. To do this, create a new Form as a Toolwindow and add the control as shown above. The

MapForceOverviewWnd in the sample project contains the Overview window of MapForce.

Properties of the Overview Toolwindow:



⊞ (DataBindings)	
⊞ (DynamicProperties)	
(Name)	**axMapForceControlOverview**
AccessibleDescription	
AccessibleName	
AccessibleRole	Default
AllowDrop	False
Anchor	**Top, Bottom, Left, Right**
CausesValidation	True
Dock	None
ImeMode	NoControl
⊞ Location	**0; 0**
Locked	False
Modifiers	**Public**
PlaceholderWindowID	**MapForceXOverviewWindow**
⊞ Size	**292; 266**
TabIndex	**0**
TabStop	True
Tag	
Visible	True

However, all Placeholder controls need a connection to the main MapForceControl. Normally this connection can be established automatically and there is nothing more to do. The two placeholders on the MDI Frame work like this. In the case of the Placeholder control in the Toolwindow, we need to add some code to the `public MDIMain()` method in `MDIMain.cs`:

```
m_MapForceOverview = new MapForceOverviewWnd();

MapForceControlLib.MapForceControlPlaceHolderClass type =
(MapForceControlLib.MapForceControlPlaceHolderClass)m_MapForceOverview.axM
apForceControlOverview.GetOcx();
type.AssignMultiDocCtrl((MapForceControlLib.MapForceControlClass)axMapForc
eControl.GetOcx());

m_MapForceOverview.Show();
```

The MapForceOverviewWnd is created and shown here. In addition, a special method of the Placeholder control is called in order to connect the MapForcecontrol to it. `AssignMultiDocCtrl()` takes the MapForceControl as parameter and registers a reference to it in the Placeholder control.

Retrieving Command Information

The MapForceControl gives access to all commands of MapForce through its `CommandsStructure` property. The example project uses the `MapForceCommands` and `MapForceCommand` interfaces to dynamically build a menu in the MDI Frame window which contains most of the MapForce commands.

The code to add the commands is placed in the `MDIMain` method of the `MapForceApplication` class in the file `MDIMain.cs`:

```
public MDIMain()
```

```
{
    .
    .
    .
    MFLib.MapForceCommands objCommands;
    objCommands = axMapForceControl.CommandsStructure;

    long nCount = objCommands.Count;

    for( long idx = 0;idx < nCount;idx++)
    {
        MFLib.MapForceCommandobjCommand;
        objCommand = objCommands[(int)idx];

        // We are looking for the Menu with the name IDR_MAPFORCE. This menu
        contains
        // the complete main menu of MapForce.

        if( objCommand.Label == "IDR_MAPFORCE")
        {
            InsertMenuStructure( mainMenu.MenuItems, 1, objCommand, 0, 0,
            false);
        }
    }
    .
    .
    .
}
```

mainMenu is the name of the menu object of the MDI Frame window created in the Visual Studio IDE. InsertMenuStructure takes the MapForce menu from the IDR_MAPFORCE command object and adds the MapForce menu structure to the already existing menu of the sample project. No commands from the **File**, **Project**, or **Window** menu are added.

The new commands are instances of the class CustomMenuItem, which is defined in CustomMenuItem.cs. This class has an additional member to save the MapForce command ID, which is taken to execute the command using Exec on selecting the menu item. This code from InsertMenuStructure creates the new command:

```
CustomMenuItem  newMenuItem = new CustomMenuItem();

if( objCommand.IsSeparator)
    newMenuItem.Text = "-";
else
{
    newMenuItem.Text = strLabel;
    newMenuItem.m_MapForceCmdID = (int)objCommand.ID;
    newMenuItem.Click += new EventHandler( AltovaMenuItem_Click);
}
```

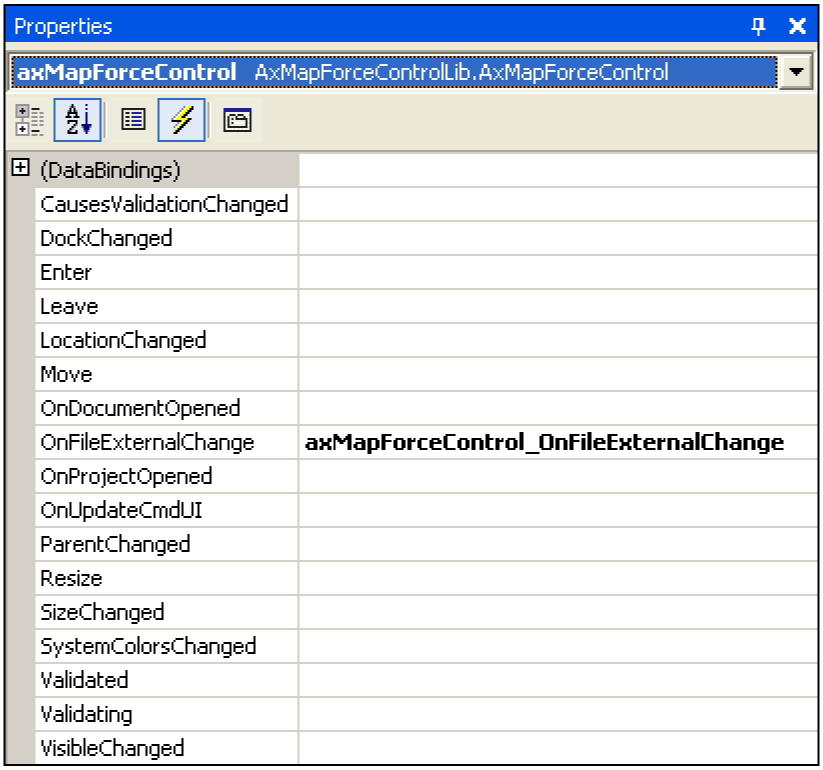
You can see that all commands get the same event handler AltovaMenuItem_Click which does the processing of the command:

```
private void AltovaMenuItem_Click(object sender, EventArgs e)
{
    if( sender.GetType()  ==
    System.Type.GetType("MapForceApplication.CustomMenuItem"))
    {
        CustomMenuItemcustomItem = (CustomMenuItem)sender;

        ProcessCommand( customItem.m_MapForceCmdID);
    }
}

private void ProcessCommand(int nID)
{
    MapForceDoc docMapForce = GetCurrentMapForceDoc();

    if(docMapForce != null)
        docMapForce.axMapForceControlDoc.Exec(nID);
    else
        axMapForceControl.Exec(nID);
}
```

`ProcessCommand` delegates the execution either to the MapForceControl itself or to any active MapForce document loaded in a `MapForceControlDocument` control. This is necessary because the MapForceControl has no way to know which document is currently active in the hosting application.

Handling Events

Because all events in the MapForce library are based on connection points, you can use the C# delegate mechanism to provide the custom event handlers. You will always find a complete list of events on the property page of each control of the MapForce library. The picture below shows the events of the main MapForceControl:



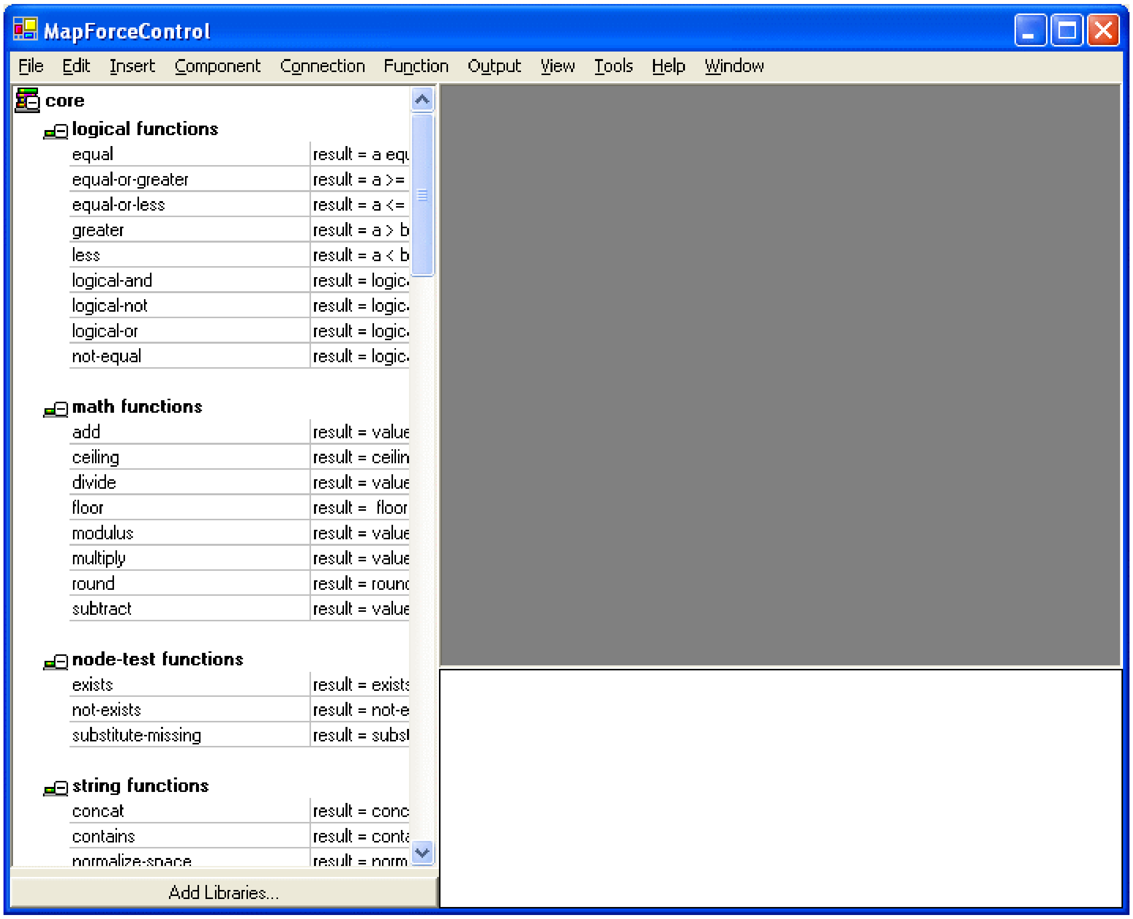
⊞ (DataBindings)	
CausesValidationChanged	
DockChanged	
Enter	
Leave	
LocationChanged	
Move	
OnDocumentOpened	
OnFileExternalChange	**axMapForceControl_OnFileExternalChange**
OnProjectOpened	
OnUpdateCmdUI	
ParentChanged	
Resize	
SizeChanged	
SystemColorsChanged	
Validated	
Validating	
VisibleChanged	

As you can see, the example project only overrides the `OnFileExternalChange` event. The creation of the C# delegate is done for you by the C# Framework. All you need to do is to fill the empty event handler. The handler implementation turns off any file reloading and displays a message box to inform the user that a file loaded by the MapForceControl has been changed from outside:

```
private void axMapForceControl_OnFileExternalChange(object sender,
AxMapForceControlLib._DMapForceControlEvents_OnFileExternalChangeEvent e)
{
    MessageBox.Show("Attention: The file " + e.strPath + " has been changed
from outside\nbut reloading is turned off in the sample application!");

    // This turns off any file reloading:
    e.varRet = false;
}
```

Testing the Example

After adding the assemblies to the Toolbox (see Introduction), you can run the sample project with F5 without the need to change anything in the code. The main MDI Frame window is created together with a floating Toolwindow containing the Overview window of MapForce. The application looks something like the screenshot below:


MapForceControl
File Edit Insert Component Connection Function Output View Tools Help Window
Add Libraries...

core

logical functions

equal	result = a equ
equal-or-greater	result = a >=
equal-or-less	result = a <=
greater	result = a > b
less	result = a < b
logical-and	result = logic
logical-not	result = logic
logical-or	result = logic
not-equal	result = logic

math functions

add	result = value
ceiling	result = ceilin
divide	result = value
floor	result = floor
modulus	result = value
multiply	result = value
round	result = round
subtract	result = value

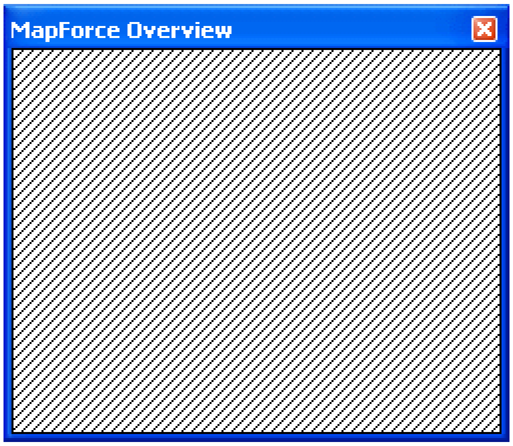
node-test functions

exists	result = exists
not-exists	result = not-e
substitute-missing	result = subst

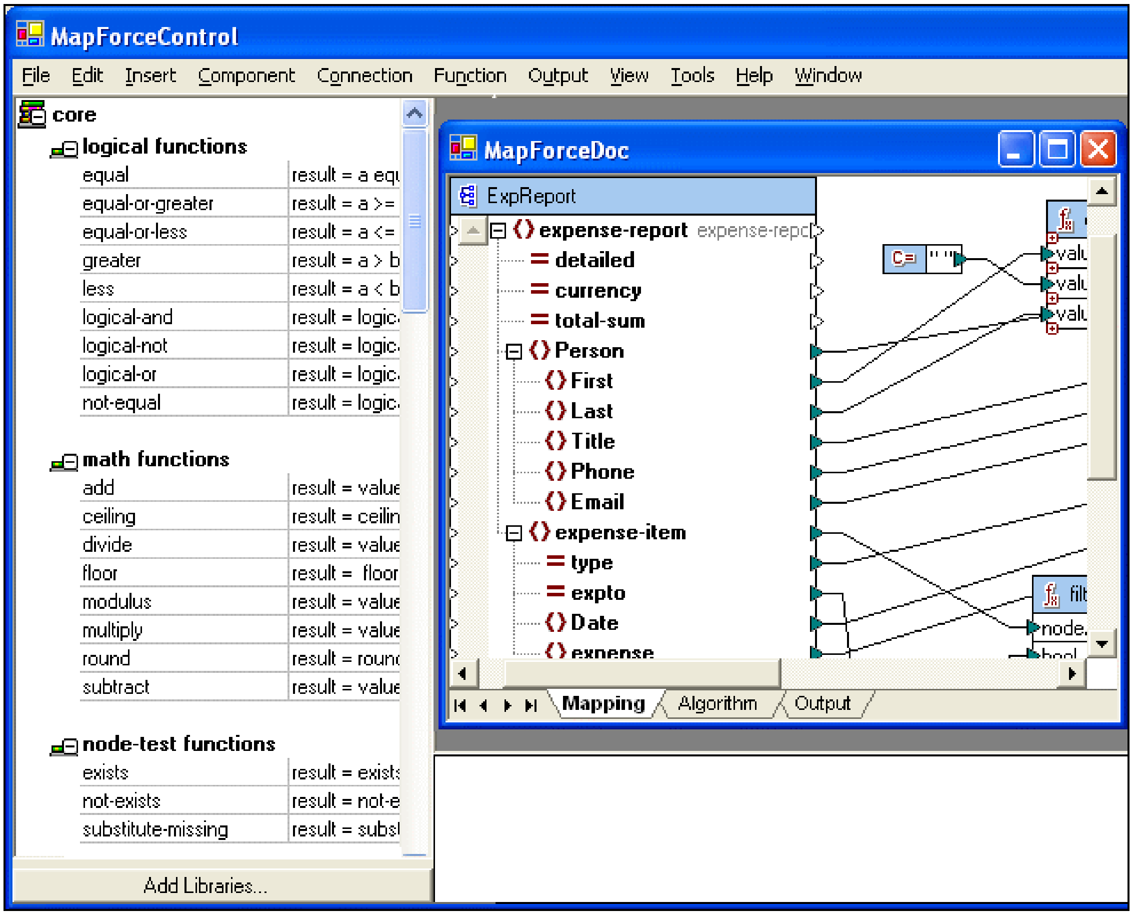
string functions

concat	result = conc
contains	result = conta
normalize-space	result = norm

The floating Overview Toolwindow is also created:



Use **File | Open** to open the file `MarketingExpenses.mfd`, which is in the MapForce examples folder. The file is loaded and displayed in an own document child window:



logical functions

equal	result = a equ
equal-or-greater	result = a >=
equal-or-less	result = a <=
greater	result = a > b
less	result = a < b
logical-and	result = logic
logical-not	result = logic
logical-or	result = logic
not-equal	result = logic

math functions

add	result = value
ceiling	result = ceilin
divide	result = value
floor	result = floor
modulus	result = value
multiply	result = value
round	result = rounc
subtract	result = value

node-test functions

exists	result = exists
not-exists	result = not-e
substitute-missing	result = subsl

After you load the document, you can try using menu commands. Note that context menus are also available. If you like, you can also load additional documents. Save any modifications using the **File | Save** command.

HTML

This example shows an integration of the MapForce control at document-level into a HTML page. The following topics are covered:

- Instantiate a MapForceControl ActiveX control object in HTML code
- Instantiate a MapForceControlDocument ActiveX control to allow editing a MapForce mapping
- Instantiate one MapForceControlPlaceHolder for a MapForce project window
- Instantiate one MapForceControlPlaceHolder ActiveX control to alternatively host one of the MapForce helper windows
- Create a customer toolbar for some heavy-used MapForce commands
- Add some more buttons and sample automation code
- Use event handlers to update command buttons

This example is available in its entirety in the file `MapForceActiveX_ApplicationLevel.htm` within the `MapForceExamples\ActiveX\HTML\` folder of your MapForce installation.

Instantiate the MapForceControl

The HTML `OBJECT` tag is used to create an instance of the MapForceControl. The Classid is that of MapForceControl. Width and height are set to 0 since we use this control as manager control without use for its user interface. The integration level is specified as a parameter within the `OBJECT` tag.

```
<OBJECT id="objMapForceX"
        Classid="clsid:A38637E9-5759-4456-A167-F01160CC22C1"
        width="0"
        height="0"
        VIEWASTEXT>
   <PARAM NAME="IntegrationLevel" VALUE="1">
</OBJECT>
```

Create Editor window

The HTML `OBJECT` tag is used to embed a document editing window. The additional custom parameter specifies that the control is to be initialized with a new empty mapping.

```
<OBJECT id="objDoc1"
        Classid="clsid:DFBB0871-DAFE-4502-BB66-08CEB7DF5255"
        width="600"
        height="500"
        VIEWASTEXT>
    <PARAM NAME="NewDocument">
</OBJECT>
```

Create Project Window

The HTML `OBJECT` tag is used to create a MapForceControlPlaceHolder window. The first additional custom parameter defines the placeholder to show the MapForce project window. The second parameter loads one of the example projects delivered coming with your MapForce installation.

```
<OBJECT id="objProjectWindow"
        Classid="clsid:FDEC3B04-05F2-427d-988C-F03A85DE53C2"
        width="200"
        height="200"
        VIEWASTEXT>
```

```
    <PARAM name="PlaceholderWindowID" value="3">
    <PARAM name="FileName" value="MapForceExamples/MapForceExamples.mfp">
</OBJECT>
```

Create Placeholder for MapForce Helper Windows

The HTML `OBJECT` tag is used to instantiate a MapForceControlPlaceHolder ActiveX control that can host the different MapForce helper window. Initially, no helper window is shown.

```
<OBJECT id="objPlaceholderWindow"
        Classid="clsid:FDEC3B04-05F2-427d-988C-F03A85DE53C2"
        width="200"
        height="200"
        VIEWASTEXT>
   <PARAM name="PlaceholderWindowID" value="0">
</OBJECT>
```

Three buttons allow us to switch the actual window that will be shown. The JavaScript execute on-button-click sets the property `PlaceHolderWindowID` to the corresponding value defined in MapForceControlPlaceholderWindow.

```
<input type="button" value="Library Window" onclick="BtnHelperWindow(0)">
<input type="button" value="Overview Window" onclick="BtnHelperWindow(1)">
<input type="button" value="Validation Window" onclick="BtnHelperWindow(2)">

<SCRIPT ID="Javahandlers" LANGUAGE="javascript">
//
-----------------------------------------------------------------------------
// specify which of the helper windows shall be shown in the placeholder
control.
function BtnHelperWindow(i_ePlaceholderWindowID)
{
      objPlaceholderWindow.PlaceholderWindowID = i_ePlaceholderWindowID;
}
</SCRIPT>
```

Create a Custom Toolbar

The custom toolbar consists of buttons with images of MapForce commands.

```
<button id="btnInsertXML" title="Insert XML Schema/File"
onclick="BtnDoCommand(13635)">
    <img src="..\Images\ID_INSERT_XSD.gif" width="16" height="16" />
</button>
<button id="btnInsertDB" title="Insert Database"
onclick="BtnDoCommand(13590)">
    <img src="..\Images\ID_INSERT_DATABASE.gif" width="16" height="16" />
</button>
<button id="btnInsertEDI" title="Insert EDI" onclick="BtnDoCommand(13591)">
    <img src="..\Images\ID_INSERT_EDI.gif" width="16" height="16" />
</button>
...
...
```

On clicking one of these buttons the corresponding command Id is sent to the manager control.

```
<SCRIPT ID="Javahandlers" LANGUAGE="javascript">
// -----------------------------------------------------------------
// perform any command specified by cmdID.
// command routing includes application, active document and view.
function BtnDoCommand(cmdID)
{
        objMapForceX.Exec( cmdID );
        msgtext.innerText = "Command " + cmdID + " performed.";
}
</SCRIPT>
```

Create More Buttons

In the example, we add some more buttons to show some automation code.

```
<p>
    <input type="button" value="New File" onclick="BtnNewFile(objDoc1)">
    <input type="button" value="Save File" onclick="BtnSaveFile(objDoc1)">
    <input type="text" title="Path" id="strPath" width="150">
    <input type="button" value="Open MarketingExpenses"
onclick="BtnOpenMEFile(objDoc1)">
</p>
<p>
    <input type="button" id="GenerateXSLT"   value="Generate XSLT"
onclick="BtnGenerate( objDoc1, 0 )">
    <input type="button" id="GenerateJava"   value="Generate Java"
onclick="BtnGenerate( objDoc1, 1 )">
    <input type="button" id="GenerateCpp"    value="Generate C++"
onclick="BtnGenerate( objDoc1, 2 )">
    <input type="button" id="GenerateCSharp" value="Generate C#"
onclick="BtnGenerate( objDoc1, 3 )">
</p>
```

The corresponding JavaScript looks like this:

```
<SCRIPT ID="Javahandlers" LANGUAGE="javascript">
// ---------------------------------------------------------
// open a document in the specified document control window.
function BtnOpenMEFile(objDocCtrl)
{
        // do not use MapForceX.Application.OpenDocument(...) to open a
document,
        // since then MapForceControl wouldn't know a control window to show
        // the document in. Instead:

        var pos = objMapForceX.BaseHref.indexOf("ActiveX");

        if(pos > 7)
        {
                path = objMapForceX.BaseHref.substr(7, pos - 7);            //
remove file protocol

                objDocCtrl.OpenDocument(path + "MarketingExpenses.mfd");
                objDocCtrl.setActive();
        }
        else
        {
                alert("Unable to locate MarketingExpenses.mfd at: " +
objMapForceX.BaseHref);
        }
}

// -------------------------------------------------------------------
// open a new empty document in the specified document control window.
function BtnNewFile(objDocCtrl)
{
        objDocCtrl.OpenDocument("");
        objDocCtrl.setActive();
}
```

```
// -----------------------------------------------------------------
// Saves the current file in the specified document control window.
function BtnSaveFile(objDocCtrl)
{
        if(objDocCtrl.Path.length > 0)
                objDocCtrl.SaveDocument();
        else
        {
                if(strPath.value.length > 0)
                {
                        objDocCtrl.Path = strPath.value;
                        objDocCtrl.SaveDocument();
                }
                else
                {
                        alert("Please set path for the document first!");
                        strPath.focus();
                }
        }

        objDocCtrl.setActive();
}
</SCRIPT>
```

Create Event Handler to Update Button Status

Availability of a command may vary with every mouseclick or keystroke. The custom event `OnUpdateCmdUI` of MapForceControl gives us an opportunity to update the enabled/disabled state of buttons associated with MapForce commands. The method [`MapForceControl.QueryStatus`] is used to query whether a command is enabled or not.

```
<SCRIPT FOR="objMapForceX" event="OnUpdateCmdUI()" LANGUAGE="javascript">
        if ( document.readyState == "complete" )                // 'complete'
        {
                // update status of buttons
                GenerateXSLT.disabled =  ! (objDoc1.QueryStatus(13617) & 0x02);
        // not enabled
                GenerateJava.disabled =  ! (objDoc1.QueryStatus(13587) & 0x02);
        // not enabled
                GenerateCpp.disabled =   ! (objDoc1.QueryStatus(13589) & 0x02);
        // not enabled
                GenerateCSharp.disabled = ! (objDoc1.QueryStatus(13588) & 0x02);
        // not enabled

                btnFuncUserDef.disabled = ! (objDoc1.QueryStatus(13633) & 0x02);
                btnFuncUserDefSel.disabled = ! (objDoc1.QueryStatus(13634) &
0x02);
                btnFuncSettings.disabled = ! (objDoc1.QueryStatus(13632) & 0x02
);
                btnInsertInput.disabled = ! (objDoc1.QueryStatus(13491) & 0x02);

                btnGenXSLT.disabled = ! (objDoc1.QueryStatus(13617) & 0x02);
                btnGenXSLT2.disabled = ! (objDoc1.QueryStatus(13618) & 0x02);
                btnGenXQuery.disabled = ! (objDoc1.QueryStatus(13586) & 0x02);
                btnGenCPP.disabled = ! (objDoc1.QueryStatus(13589) & 0x02);
                btnGenCSharp.disabled = ! (objDoc1.QueryStatus(13588) & 0x02);
                btnGenJava.disabled = ! (objDoc1.QueryStatus(13587) & 0x02);
        }

        // set activity status of simulated toolbar
</SCRIPT>
```

Visual Basic

Source code for an integration of MapForceControl into a VisualBasic program can be found in the folder `MapForceExamples\ActiveX\VisualBasic6` relative to your MapForce installation.

16.3 Command Table

Tables in this section list the names and identifiers of all commands that are available within MapForce. Every sub-section lists the commands from the corresponding top-level menu of MapForce. The left-most column shows the command's menu text to make it easier for you to identify the functionality behind the command. The last sub-section is a collection of those commands that are not accessible via the main menu.

Depending on the edition of MapForce you have installed, some of these commands might not be supported. See Query MapForce Commands on how to query the current resource structure and command availability. The same topics shows how to use the same command icons that are used by MapForce if you are not already integrating on application-level.

Use the command identifiers with MapForceControl.QueryStatus or MapForceControlDocument.QueryStatus to check the current status of a command. Use MapForceControl.Exec or MapForceControlDocument.Exec to execute a command.

16.3.1 File Menu

Commands from the File menu:

Menu Text	Command Name	ID
New...	ID_FILE_NEW	57600
Open...	ID_FILE_OPEN	57601
Save	ID_FILE_SAVE	57603
Save As...	ID_FILE_SAVE_AS	57604
Save All	ID_FILE_SAVEALL	32377
Close	ID_WINDOW_CLOSE	32453
Close All	ID_WINDOW_CLOSEALL	32454
Save Project	ID_FILE_SAVEPROJECT	32378
Close Project	ID_FILE_CLOSEPROJECT	32355
Print...	IDC_FILE_PRINT	57607
Print Preview	IDC_FILE_PRINT_PREVIEW	57609
Print Setup...	ID_FILE_PRINT_SETUP	57606
Generate code in selected language	ID_FILE_GENERATE_SELECTED_CODE	32362
Generate code in/XSLT 1.0	ID_FILE_GENERATEXSLT	32360
Generate code in/XSLT 2.0	ID_FILE_GENERATEXSLT2	32361
Generate code in/XQuery	ID_FILE_GENERATEXQUERY	32359
Generate code in/Java	ID_FILE_GENERATEJAVACODE	32358
Generate code in/C# (Sharp)	ID_FILE_GENERATECSCODE	32357
Generate code in/C++	ID_FILE_GENERATECPPCODE	32356
Mapping Settings...	ID_MAPPING_SETTINGS	32396
Recent Files/Recent File	ID_FILE_MRU_FILE1	57616
Recent Projects/Recent Project	ID_FILE_MRU_PROJECT1	32364
Exit	ID_APP_EXIT	57665

16.3.2 Edit Menu

Commands from the Edit menu:

Menu Text	Command Name	ID
Undo	ID_EDIT_UNDO	57643
Redo	ID_EDIT_REDO	57644
Find...	ID_EDIT_FIND	57636
Find next	ID_EDIT_FINDNEXT	32349
Cut	ID_EDIT_CUT	57635
Copy	ID_EDIT_COPY	57634
Paste	ID_EDIT_PASTE	57637
Delete	ID_EDIT_CLEAR	57632
Select All	ID_EDIT_SELECT_ALL	57642

16.3.3 Insert Menu

Commands from the Insert menu:

Menu Text	Command Name	ID
XML Schema/File	ID_INSERT_XSD	32393
Database	ID_INSERT_DATABASE	32389
EDI	ID_INSERT_EDI	32390
Text file	ID_INSERT_TXT	32392
Constant	ID_INSERT_CONSTANT	32388
Filter: Nodes/Rows	ID_INSERT_FILTER	32391
IF-Else Condition	ID_INSRT_CONDITION	32394
Exception	ID_INSERT_EXCEPTION	32311

16.3.4 Project Menu

Commands from the Project menu:

Menu Text	Command Name	ID
Add Files to Project...	ID_PROJECT_ADDFILESTOPROJECT	32420
Add Active File to Project...	ID_PROJECT_ADDACTIVEFILETOPROJECT	32419
Create Folder	ID_POPUP_PROJECT_CREATE_FOLDER	32310
Open Mapping for Operation	ID_POPUP_OPENOPERATIONSMAPPING	13692
Create Mapping for Operation...	ID_POPUP_CREATEMAPPINGFOROPERATION	32399
Add Mapping File for Operation...	ID_POPUP_PROJECT_ADD_MAPPING	32309
Remove Item	ID_PROJECT_REMOVE_ITEM	32415
Insert Web Service...	ID_POPUP_PROJECT_INSERT_WEBSERVICE	32306
Open WSDL file In XMLSpy	ID_POPUP_PROJECT_OPENINXMLSPY	32305
Generate Code for Entire Project	ID_POPUP_PROJECT_GENERATE_PROJECT	32304
Generate code in/XSLT 1.0	ID_PROJECT_GENERATEXSLT	32425
Generate code in/XSLT 2.0	ID_PROJECT_GENERATEXSLT2	32426
Generate code in/XQuery	ID_PROJECT_GENERATEXQUERY	32424
Generate code in/Java	ID_PROJECT_GENERATEJAVACODE	32423
Generate code in/C# (Sharp)	ID_PROJECT_GENERATECSCODE	32422
Generate code in/C++	ID_PROJECT_GENERATECPPCODE	32421
Project Settings...	ID_PROJECT_PROPERTIES	32404

16.3.5 Component Menu

Commands from the Component menu:

Menu Text	Command Name	ID
Edit Constant	ID_COMPONENT_EDIT_CONSTANT	32336
Align Tree Left	ID_COMPONENT_LEFTALIGNTREE	32338
Align Tree Right	ID_COMPONENT_RIGHTALIGNTREE	32340
Change Root Element	ID_COMPONENT_CHANGEROOTELEMENT	32334
Edit Schema Definition in XMLSpy	ID_COMPONENT_EDIT_SCHEMA	32337
Duplicate Input	ID_COMPONENT_CREATE_DUPLICATE_ICON	32335
Remove Duplicate	ID_COMPONENT_REMOVE_DUPLICATE_ICON	32339
Database Table Actions	ID_POPUP_DATABASETABLEACTIONS	32400
Database Key Settings	ID_POPUP_VALUEKEYSETTINGS	32417
Component Settings...	ID_COMPONENT_SETTINGS	32341

16.3.6 Connection Menu

Commands from the Connection menu:

Menu Text	Menu Text	ID
Auto Connect Matching Children	ID_CONNECTION_AUTOCONNECTCHILDREN	32342
Settings for Connect Matching Children...	ID_CONNECTION_SETTINGS	32344
Connect Matching Children	ID_CONNECTION_MAPCHILDELEMENTS	32343
Standard Mapping (target driven)	ID_POPUP_NORMALCONNECTION	32401
Source-driven Mapping (mixed-content)	ID_POPUP_ORDERBYSOURCECONNECTION	32403
Connection Settings...	ID_POPUP_CONNECTION_SETTINGS	32398

16.3.7 Function Menu

Commands from the Function menu:

Menu Text	Command Name	ID
Create User-Defined Function...	ID_FUNCTION_CREATE_EMPTY	32380
Create User-Defined Function From Selection...	ID_FUNCTION_CREATE_FROM_SELECTION	32381
Function Settings...	ID_FUNCTION_SETTINGS	32387
Insert Input	ID_FUNCTION_INSERT_INPUT	32383
Insert Output...	ID_FUNCTION_INSERT_OUTPUT	32402

16.3.8 Output Menu

Commands from the Output menu:

Menu Text	Command Name	ID
XSLT 1.0	ID_SELECT_LANGUAGE_XSLT	32433
XSLT 2.0	ID_SELECT_LANGUAGE_XSLT2	32434
XQuery	ID_SELECT_LANGUAGE_XQUERY	32432
Java	ID_SELECT_LANGUAGE_JAVA	32431
C# (Sharp)	ID_SELECT_LANGUAGE_CSHARP	32430
C++	ID_SELECT_LANGUAGE_CPP	32429
Validate output XML file	ID_XML_VALIDATE	32458
Save Output File...	IDC_FILE_SAVEGENERATEDOUTPUT	32321
Run SQL-script	ID_TRANSFORM_RUN_SQL	32442
Insert/Remove Bookmark	ID_TOGGLE_BOOKMARK	32317
Next Bookmark	ID_GOTONEXTBOOKMARK	32315
Previous Bookmark	ID_GOTOPREVBOOKMARK	32314
Remove All Bookmarks	ID_REMOVEALLBOOKMARKS	32313

16.3.9 View Menu

Commands from the View menu:

Menu Text	Command Name	ID
Show Annotations	ID_SHOW_ANNOTATION	32435
Show Types	ID_SHOW_TYPES	32437
Show Library In Function Header	ID_VIEW_SHOWLIBRARYINFUNCTIONHEADER	32448
Show Tips	ID_SHOW_TIPS	32436
Show selected component connectors	ID_VIEW_AUTOHIGHLIGHTCOMPONENTCONNECTIONS	32443
Show connectors from source to target	ID_VIEW_RECURSIVEAUTOHIGHLIGHT	32447
Zoom	ID_VIEW_ZOOM	32451
Status Bar	ID_VIEW_STATUS_BAR	32449
Library Window	ID_VIEW_LIBRARY_WINDOW	32445
Validation Output	ID_VIEW_VALIDATION_OUTPUT	32450
Overview	ID_VIEW_OVERVIEW_WINDOW	32446
Project Window	ID_VIEW_PROJECT_WINDOW	32302

16.3.10 Tools Menu

Commands from the Tools menu:

Menu Text	Command Name	ID
Customize...	ID_VIEW_CUSTOMIZE	32444
Options...	ID_TOOLS_OPTIONS	32441

16.3.11 Window Menu

Commands from the Window menu:

Menu Text	Command Name	ID
Close	ID_WINDOW_CLOSE	32453
Close All	ID_WINDOW_CLOSEALL	32454
Cascade	ID_WINDOW_CASCADE	57650
Tile Horizontal	ID_WINDOW_TILE_HORZ	57651
Tile Vertical	ID_WINDOW_TILE_VERT	57652

16.3.12 Help Menu

Commands from the Help menu:

Menu Text	Command Name	ID
Table of Contents...	IDC_HELP_CONTENTS	32322
Index..	IDC_HELP_INDEX	32323
Search...	IDC_HELP_SEARCH	32324
Software Activation...	IDC_ACTIVATION	32701
Registration...	IDC_REGISTRATION	32330
Check for Updates...	IDC_CHECK_FOR_UPDATES	32700
Order Form...	IDC_OPEN_ORDER_PAGE	32326
Support Center...	IDC_OPEN_SUPPORT_PAGE	32327
FAQ on the Web...	IDC_SHOW_FAQ	32331
Components Download...	IDC_OPEN_COMPONENTS_PAGE	32325
MapForce on the Internet..	IDC_OPEN_XML_SPY_HOME	32328
MapForce Training...	IDC_OPEN_MAPFORCE_TRAINING_PAGE	32300
About MapForce...	ID_APP_ABOUT	57664

16.3.13 Commands not in Main Menu

Commands not in the main menu:

Menu Text	Command Name	ID
	IDC_QUICK_HELP	32329
Edit FlexText Configuration	ID_COMPONENT_EDIT_MFT	32301
Priority Context	ID_COMPONENT_PRIORITYCONTEXT	32318
	ID_EDIT_FINDPREV	32350
	ID_FUNCTION_GOTO_MAIN	32382
Insert Input	ID_FUNCTION_INSERT_INPUT_AT_POINT	32384
	ID_FUNCTION_REMOVE	32385
Replace component with internal function structure	ID_FUNCTION_REPLACE_WITH_COMPONENTS	32386
	ID_MAPFORCEVIEW_ZOOM	32395
	ID_NEXT_PANE	32397
Add Active File to Project	ID_POPUP_PROJECT_ADDACTIVEFILETOPROJECT	32405
Add Files to Project...	ID_POPUP_PROJECT_ADDFILESTOPROJECT	32406
C++	ID_POPUP_PROJECT_GENERATECPPCODE	32408
C# (Sharp)	ID_POPUP_PROJECT_GENERATECSCODE	32409
Java	ID_POPUP_PROJECT_GENERATEJAVACODE	32410
XQuery	ID_POPUP_PROJECT_GENERATEXQUERY	32411
XSLT 1.0	ID_POPUP_PROJECT_GENERATEXSLT	32412
XSLT 2.0	ID_POPUP_PROJECT_GENERATEXSLT2	32413
Generate All	ID_POPUP_PROJECT_GENERATE_ALL	32303
Generate code in default language	ID_POPUP_PROJECT_GENERATE_CODE	32414
Open	ID_POPUP_PROJECT_OPEN_MAPPING	32307
Properties...	ID_POPUP_PROJECT_PROJECTPROPERTIES	32428
Remove	ID_POPUP_PROJECT_REMOVE	32308
	ID_PREV_PANE	32418
	ID_TOGGLE_FOLDINGMARGIN	32438
	ID_TOGGLE_INDENTGUIDES	32439
	ID_TOGGLE_NUMLINEMARGIN	32440
	ID_WORD_WRAP	32457

16.4 Accessing MapForce API

The focus of this documentation is the ActiveX controls and interfaces required to integrate the MapForce user interface into your application. To allow you to automate or control the functionality of the integrated components, the following properties give you access to the MapForce automation interface (MapForce API):

```
MapForceControl.Application
MapForceControlDocument.Document
MapForceControlPlaceHolder.Project
```

Some restrictions apply to the usage of the MapForce automation interface when integrating MapForceControl at document-level. See Integration at document level for details.

16.5 Object Reference

Objects:
MapForceCommand
MapForceCommands
MapForceControl
MapForceControlDocument
MapForceControlPlaceHolder

To give access to standard MapForce functionality, objects of the **MapForce automation interface** can be accessed as well. See MapForceControl.Application, MapForceControlDocument.Document and MapForceControlPlaceHolder.Project for more information.

16.5.1 MapForceCommand

Properties:
ID
Label
IsSeparator
ToolTip
StatusText
Accelerator
SubCommands

Description:
Each MapForceCommand object can be one of three possible types:

- **Command**: ID is set to a value greater 0 and Label is set to the command name. IsSeparator is false and the SubCommands collection is empty.
- **Separator**: IsSeparator is true. ID is 0 and Label is not set. The SubCommands collection is empty.
- (**Sub**) **Menu**: The SubCommands collection contains MapForceCommand objects and Label is the name of the menu. ID is set to 0 and IsSeparator is false.

Accelerator

Property: Label as string

Description:
For command objects that are children of the ALL_COMMANDS collection, this is the accelerator key defined for the command. If the command has no accelerator key assigned, this property returns the empty string.

The string representation of the accelerator key has the following format:

```
[ALT+][CTRL+][SHIFT+]key
```

Where key is converted using the Windows Platform SDK function GetKeyNameText.

ID

Property: ID as long

Description:
ID is 0 for separators and menus.
For commands, this is the ID which can be used with Exec and QueryStatus.

IsSeparator

Property: IsSeparator as boolean

Description:
True if the command is a separator.

Label

Property: Label as string

Description:
Label is empty for separators.
For command objects that are children of the ALL_COMMANDS collection, this is a unique name. Command icons are stored in files with this name. See Query MapForceCommands for more information.
For command objects that are children of menus, the label property holds the command's menu text.
For sub-menus, this property holds the menu text.

StatusText

Property: `Label` as string

Description:
For command objects that are children of the ALL_COMMANDS collection, this is the text shown in the status bar when the command is selected.

SubCommands

Property: `SubCommands` as `MapForceCommands`

Description:
The `SubCommands` collection holds any sub-commands if this command is actually a menu or submenu.

ToolTip

Property: `ToolTip` as string

Description:
For command objects that are children of the ALL_COMMANDS collection, this is the text shown as tool-tip.

16.5.2 MapForceCommands

Properties:
Count
Item

Description:
Collection of MapForceCommand objects to get access to command labels and IDs of the MapForceControl. Those commands can be executed with the Exec method and their status can be queried with QueryStatus.

Count

Property: `Count` as long

Description:
Number of MapForceCommand objects on this level of the collection.

Item

Property: `Item` (`n` as long) as MapForceCommand

Description:
Gets the command with the index `n` in this collection. Index is 1-based.

16.5.3 MapForceControl

Properties:
IntegrationLevel
Appearance
Application
BorderStyle
CommandsList
CommandsStructure (deprecated)
EnableUserPrompts
MainMenu
ReadOnly
Toolbars

Methods:
Open
Exec
QueryStatus

Events:
OnCloseEditingWindow
OnContextChanged
OnDocumentOpened
OnFileChangedAlert
OnLicenseProblem
OnOpenedOrFocused
OnUpdateCmdUI
OnProjectOpened

This object is a complete ActiveX control and should only be visible if the MapForce library is used in the Application Level mode.

```
CLSID:  A38637E9-5759-4456-A167-F01160CC22C1
ProgID:  Altova.MapForceControl
```

Properties

The following properties are defined:

IntegrationLevel
ReadOnly
EnableUserPrompts
Appearance
BorderStyle

Command related properties:
CommandsList
MainMenu
Toolbars
CommandsStructure (deprecated)

Access to MapForceAPI:
Application

Appearance

Property: `Appearance` as short

Dispatch Id: *-520*

Description:
A value not equal to `0` displays a client edge around the control. Default value is `0`.

Application

Property: `Application` as Application

Dispatch Id: *4*

Description:
The `Application` property gives access to the `Application` object of the complete MapForce automation server API. The property is read-only.

BorderStyle

Property: `BorderStyle` as short

Dispatch Id: *-504*

Description:
A value of `1` displays the control with a thin border. Default value is `0`.

CommandsList

Property: `CommandList` as `MapForceCommands` (read-only)

Dispatch Id: *1004*

Description:
This property returns a flat list of all commands defined available with MapForceControl. For more information see C# Sample.

CommandsStructure (deprecated)

Property: `CommandsStructure` as `MapForceCommands` (deprecated)

Dispatch Id: *3*

Remark:
This property is deprecated. Instead, use `CommandsList`, `MainMenu`, `Toolbars`.

Description:
The `CommandsStructure` collection contains all commands of the MapForceControl as `MapForceCommand` objects. At the first level of the collection two special `MapForceCommand` objects with the following labels are accessible:

- `IDR_MAPFORCE`: This object holds all commands as hierarchical menu structure.
- `ALL_COMMANDS`: This object holds all commands in a flat list.

Sample:
C# code to access the first level of the collection.

```
MapForceCommands  objCommands;
objCommands = axMapForceControl.CommandsStructure;
```

```
long nCount = objCommands.Count;

for(long idx = 0;idx < nCount;idx++)
{
    MapForceCommand objCommand;
    objCommand = objCommands[(int)idx];

    // We are looking for the Menu with the name IDR_MAPFORCE. This
    menu should contain
    // the complete main menu of MapForce.

    if(objCommand.Label == "IDR_MAPFORCE")
    {
        // read menu structure here...
    }

    if(objCommand.Label == "ALL_COMMANDS")
    {
        // read all commands here...
    }
}
```

EnableUserPrompts

Property: `EnableUserPrompts` as boolean

Dispatch Id: *1006*

Description:
Setting this property to *false*, disables user prompts in the control. The default value is *true*.

IntegrationLevel

Property: `IntegrationLevel` as `ICActiveXIntegrationLevel`

Dispatch Id: *1000*

Description:
The `IntegrationLevel` property determines the operation mode of the control. See also Integration at the application level and Integration at document level for more information.

Note: It is important to set this property immediately after the creation of the `MapForceControl` object.

MainMenu

Property: `MainMenu as MapForceCommand` (read-only)

Dispatch Id: *1003*

Description:
This property gives access to the description of the MapForceControl main menu. For more information see C# Sample.

ReadOnly

Property: `ReadOnly` as boolean

Dispatch Id: *2*

Description:
Using this property you can turn on and off the read-only mode of the control. If ReadOnly is true it is not possible to modify any document loaded. This property is only used in the Application-level integration mode.

Toolbars

Property: `Toolbars` as `MapForceCommands` (read-only)

Dispatch Id: *1005*

Description:
This property returns a list of all toolbar descriptions that describe all toolbars available with MapForceControl. For more information see C# Sample.

Methods

The following methods are defined:

`Open`
`Exec`
`QueryStatus`

Exec

Method: `Exec` (`nCmdID` as long) as boolean

Dispatch Id: *6*

Description:
`Exec` calls the `MapForce` command with the ID `nCmdID`. If the command can be executed, the method returns `true`. See also `CommandsStructure` to get a list of all available commands and `QueryStatus` to retrieve the status of any command.

Open

Method: `Open` (`strFilePath` as string) as boolean

Dispatch Id: *5*

Description:
The result of the method depends on the extension passed in the argument `strFilePath`. If the file extension is `.mfd`, a new document is opened. If the file extension is `.mfp`, the corresponding project is opened. If a different file extension is passed into the method, the control tries to load the file as a new component into the active document.

Do not use this method to load documents or projects when using the control in document-level integration mode. Instead, use `MapForceControlDocument.OpenDocument` and `MapForceControlPlaceHolder.OpenProject`.

QueryStatus

Method: `QueryStatus` (`nCmdID` as long) as long

Dispatch Id: *7*

Description:
`QueryStatus` returns the enabled/disabled and checked/unchecked status of the command specified by `nCmdID`. The status is returned as a bit mask.

Bit	Value	Name	Meaning
0	1	Supported	Set if the command is supported.
1	2	Enabled	Set if the command is enabled (can be executed).
2	4	Checked	Set if the command is checked.

This means that if `QueryStatus` returns `0` the command ID is not recognized as a valid MapForce command. If `QueryStatus` returns a value of `1` or `5`, the command is disabled.

Events

The MapForceControl ActiveX control provides the following connection point events:

OnCloseEditingWindow
OnContextChanged
OnDocumentOpened
OnFileChangedAlert
OnLicenseProblem
OnOpenedOrFocused
OnUpdateCmdUI
OnProjectOpened

OnCloseEditingWindow

Event: `OnCloseEditingWindow` (i_strFilePath as String) as boolean

Dispatch Id: *1002*

Description:
This event gets triggered when MapForce needs to close an already open document. As an answer to this event, clients should close the editor window associated with *i_strFilePath*. Returning *true* from this event indicates that the client has closed the document. Clients can return *false* if no specific handling is required and MapForceControl should try to close the editor and destroy the associated document control.

OnContextChanged

Event: `OnContextChanged` (`i_strContextName` as String, `i_bActive` as bool) as bool

Dispatch Id: *1004*

Description:
This event is not used in MapForce.

OnDocumentOpened

Event: `OnDocumentOpened` (`objDocument` as Document)

Dispatch Id: *3*

Description:
This event gets triggered whenever a document gets opened. The argument `objDocument` is a `Document` object from the MapForce automation interface and can be used to query more details on the document or perform additional operations. When integrating on document-level it is often better to use the event `MapForceControlDocument.OnDocumentOpened` instead.

OnFileChangedAlert

Event: `OnFileChangedAlert` (`i_strFilePath` as String) as bool

Dispatch Id: *1001*

Description:
This event is triggered when a file loaded with MapForce, is changed on the harddisk by another application. Clients should return true, if they handled the event, or false, if MapForce should handle it in its customary way, i.e. prompting the user for reload.

OnLicenseProblem

Event: `OnLicenseProblem` (`i_strLicenseProblemText` as String)

Dispatch Id: *1005*

Description:
This event is triggered when MapForce detects that no valid license is available for this control. In case of restricted user licenses this can happen some time after the control has been initialized. Integrators should use this event to disable access to this control's functionality. After returning from this event, the control will block access to its functionality (e.g. show empty windows in its controls and return errors on requests).

OnOpenedOrFocused

Event: `OnOpenedOrFocused` (`i_strFilePath` as String, `i_bOpenWithThisControl` as bool)

Dispatch Id: *1000*

Description:
When integrating at application level, this event informs clients that a document has been opened, or made active by MapForce.

When integrating at document level, this event instructs the client to open the file `i_strFilePath` in a document window. If the file is already open, the corresponding document window should be made the active window.

if `i_bOpenWithThisControl` is `true`, the document must be opened withMapForceControl, since internal access is required. Otherwise, the file can be opened with different editors.

OnProjectOpened

Event: `OnProjectOpened` (`objProject` as Project)

Dispatch Id: *2*

Description:
This event gets triggered whenever a project is opened. The argument `objProjectDocument` is a `Project` object from the MapForce automation interface and can be used to query more details on the project or perform additional operations.

OnUpdateCmdUI

Event: `OnUpdateCmdUI ()`

Dispatch Id: *1003*

Description:
Called frequently to give integrators a good opportunity to check status of MapForce commands using `MapForceControl.QueryStatus`. Do not perform long operations in this callback.

16.5.4 MapForceControlDocument

Properties:
Appearance
BorderStyle
Document
IsModified
Path
ReadOnly
ZoomLevel

Methods:
Exec
New
Open
QueryStatus
Reload
Save
SaveAs

Events:
OnActivate
OnClosed
OnContextChanged
OnDocumentSaveAs
OnFileChangedAlert
OnModifiedFlagChanged
OnOpened
OnSetEditorTitle

If the MapForceControl is integrated in the Document Level mode each document is displayed in an own object of type `MapForceControlDocument`. The `MapForceControlDocument` contains only one document at the time but can be reused to display different files one after another.

This object is a complete ActiveX control.

```
CLSID:  DFBB0871-DAFE-4502-BB66-08CEB7DF5255
ProgID:  Altova.MapForceControlDocument
```

Properties

The following properties are defined:

ReadOnly
IsModified
ZoomLevel
Path
Appearance
BorderStyle

Access to MapForceAPI:
Document

Appearance

Property: `Appearance` as short

Dispatch Id: *-520*

Description:
A value not equal to `0` displays a client edge around the document control. Default value is `0`.

BorderStyle

Property: `BorderStyle` as short

Dispatch Id: *-504*

Description:
A value of `1` displays the control with a thin border. Default value is `0`.

Document

Property: `Document` as Document

Dispatch Id: *3*

Description:
The `Document` property gives access to the `Document` object of the MapForce automation server API. This interface provides additional functionalities which can be used with the document loaded in the control. The property is read-only.

IsModified

Property: `IsModified` as boolean (read-only)

Dispatch Id: *1006*

Description:
`IsModified` is *true* if the document content has changed since the last open, reload or save operation. It is *false*, otherwise.

Path

Property: `Path` as String

Dispatch Id: *1005*

Description:
Sets or gets the full path name of the document loaded into the control.

ReadOnly

Property: `ReadOnly` as boolean

Dispatch Id: *1007*

Description:
Using this property you can turn on and off the read-only mode of the document. If `ReadOnly` is `true` it is not possible to do any modifications.

ZoomLevel

Property: `ZoomLevel` as long

Dispatch Id: *2*

Description:
The `ZoomLevel` property allows to set the Mapping view magnification in a range from 1 to 100. A `ZoomLevel` of 50 is the default and shows the view content at normal size.

Methods

The following methods are defined:

Document handling:
New
Open
Reload
Save
SaveAs

OpenDocument (deprecated)
NewDocument (deprecated)
SaveDocument (deprecated)

Command Handling:
`Exec`
`QueryStatus`

Exec

Method: `Exec` (`nCmdID` as long) as boolean

Dispatch Id: *8*

Description:
`Exec` calls the MapForce command with the ID `nCmdID`. If the command can be executed, the method returns `true`. The client should call the `Exec` method of the document control if there is currently an active document available in the application.

See also `CommandsStructure` to get a list of all available commands and `QueryStatus` to retrieve the status of any command.

New

Method: `New` () as boolean

Dispatch Id: *1000*

Description:
This method initializes a new mapping inside the control..

NewDocument (deprecated)

Method: `NewDocument ()` as boolean (deprecated)

Description:
The method resets the content of the `MapForceControlDocument` object to a new empty document. Please use the `Path` property to set path and filename. Otherwise the control can't save the document using `SaveDocument`.

Open

Method: `Open` (`strFileName` as string) as boolean

Dispatch Id: *1001*

Description:
`Open` loads the file `strFileName` as the new document into the control.

OpenDocument (deprecated)

Method: `OpenDocument` (`strFileName` as string) as boolean (deprecated)

Description:
`OpenDocument` loads the file `strFileName` as the new document into the control.

QueryStatus

Method: `QueryStatus` (`nCmdID` as long) as long

Dispatch Id: *9*

Description:
`QueryStatus` returns the enabled/disabled and checked/unchecked status of the command specified by `nCmdID`. The status is returned as a bit mask.

Bit	Value	Name	Meaning
0	1	Supported	Set if the command is supported.
1	2	Enabled	Set if the command is enabled (can be executed).
2	4	Checked	Set if the command is checked.

This means that if `QueryStatus` returns `0` the command ID is not recognized as a valid MapForce command. If `QueryStatus` returns a value of `1` or `5` the command is disabled. The client should call the `QueryStatus` method of the document control if there is currently an active document available in the application.

Reload

Method: `Reload` () as boolean

Dispatch Id: *1002*

Description:
`Reload` updates the document content from the file system.

Save

Method: `Save` () as boolean

Dispatch Id: *1003*

Description:
`Save` saves the current document at the location `Path`.

SaveAs

Method: `OpenDocument` (`strFileName` as string) as boolean

Dispatch Id: *1004*

Description:
`SaveAs` sets `Path` to *strFileName* and then saves the document to this location.

SaveDocument (deprecated)

Method: `SaveDocument ()` as boolean (deprecated)

Description:
`SaveDocument` saves the current document at the location `Path`.

Events

The MapForceControlDocument ActiveX control provides following connection point events:

`OnActivate`
`OnClosed`
`OnContextChanged`
`OnDocumentSaveAs`
`OnFileChangedAlert`
`OnModifiedFlagChanged`
`OnOpened`
`OnSetEditorTitle`

`OnDocumentClosed (deprecated)`
`OnDocumentOpened (deprecated)`

OnActivate

Event: `OnActivate` ()

Dispatch Id: *1005*

Description:
This event is triggered when the document control is activated, has the focus, and is ready for user input.

OnClosed

Event: `OnClosed` ()

Dispatch Id: *1001*

Description:

This event gets triggered whenever the document loaded into this control gets closed. The property Document gives you access to this document, but it should be used with care.

OnContextChanged

Event: `OnContextChanged` (`i_strContextName` as String, `i_bActive` as bool) as bool

Dispatch Id: *1004*

Description:
This event is triggered when this document is shown in a different MapForce view. The following values are passed:

- Mapping view - "`View_0`" is passed as the context name
- Algorithm view - "`View_1`" is passed as the context name
- DB Query view - "`View_2`" is passed as the context name
- Output view - "`View_3`" is passed as the context name

OnDocumentClosed (deprecated)

Event: `OnDocumentClosed` (`objDocument` as Document) (deprecated)

Dispatch Id: *2*

Remark:
This property is deprecated. Instead, use OnClosed.

Description:
This event gets triggered whenever the document loaded into this control gets closed. The argument `objDocument` is a `Document` object from the MapForce automation interface and should be used with care.

OnDocumentOpened (deprecated)

Event: `OnDocumentOpened` (`objDocument` as Document) (deprecated)

Dispatch Id: *1*

Remark:
This property is deprecated. Instead, use OnOpened.

Description:
This event gets triggered whenever a document gets opened in this control. The argument `objDocument` is a `Document` object from the MapForce automation interface and can be used to query more details about the document or perform additional operations.

OnDocumentSaveAs

Event: `OnContextDocumentSaveAs` (`i_strFileName` as String)

Dispatch Id: *1007*

Description:
This event is triggered when this document gets internally saved under a new name.

OnFileChangedAlert

Event: `OnFileChangedAlert` () as bool

Dispatch Id: *1003*

Description:
This event is triggered when the file loaded into this document control, is changed on the harddisk by another application. Clients should return true, if they handled the event, or false, if MapForce should handle it in its customary way, i.e. prompting the user for reload.

OnModifiedFlagChanged

Event: `OnModifiedFlagChanged` (`i_bIsModified` as boolean)

Dispatch Id: *3*

Description:
This event gets triggered whenever the document changes between modified and unmodified state. The parameter *i_bIsModifed* is *true* if the document contents differs from the original content, and *false*, otherwise.

OnOpened

Event: `OnOpened` ()

Dispatch Id: *1000*

Description:
This event gets triggered whenever a document gets opened in this control. The property Document gives you access to this document.

OnSetEditorTitle

Event: OnSetEditorTitle ()

Dispatch Id: *1006*

Description:
This event is being raised when the contained document is being internally renamed.

16.5.5 MapForceControlPlaceHolder

Properties available for all kinds of placeholder windows:
PlaceholderWindowID

Properties for project placeholder window:
Project

Methods for project placeholder window:
OpenProject

Events for project placeholder window:
OnModifiedFlagChanged
OnSetLabel

The `MapForceControlPlaceHolder` control is used to show the additional MapForce windows like Overview, Library or Project window. It is used like any other ActiveX control and can be placed anywhere in the client application.

```
CLSID:  FDEC3B04-05F2-427d-988C-F03A85DE53C2
ProgID:  Altova.MapForceControlPlaceHolder
```

Properties

The following properties are defined:

PlaceholderWindowID

Access to MapForceAPI:
Project

Label

Property: `Label` as String (read-only)

Dispatch Id: *1001*

Description:
This property gives access to the title of the placeholder. The property is read-only.

PlaceholderWindowID

Property: `PlaceholderWindowID` as MapForceControlPlaceholderWindow

Dispatch Id: *1000*

Description:
Using this property the object knows which MapForce window should be displayed in the client area of the control. The `PlaceholderWindowID` can be set at any time to any valid value of the MapForceControlPlaceholderWindow enumeration. The control changes its state immediately and shows the new MapForce window.

Project

Property: `Project` as Project (read-only)

Dispatch Id: *2*

Description:
The `Project` property gives access to the `Project` object of the MapForce automation server API. This interface provides additional functionalities which can be used with the project loaded into the control. The property will return a valid project interface only if the placeholder window has `PlaceholderWindowID` with a value of `MapForceXProjectWindow (=3)`. The property is read-only.

Methods

The following method is defined:

`OpenProject`

OpenProject

Method: `OpenProject` (`strFileName` as string) as boolean

Dispatch Id: *3*

Description:
`OpenProject` loads the file `strFileName` as the new project into the control. The method will fail if the placeholder window has a `PlaceholderWindowID` different to `MapForceXProjectWindow (=3)`.

Events

The MapForceControlPlaceholder ActiveX control provides following connection point events:

`OnModifiedFlagChanged`
`OnSetLabel`

OnModifiedFlagChanged

Event: `OnModifiedFlagChanged` (`i_bIsModified` as boolean)

Dispatch Id: *1*

Description:
This event gets triggered only for placeholder controls with a `PlaceholderWindowID` of `MapForceXProjectWindow (=3)`. Th event is fired whenever the project content changes between modified and unmodified state. The parameter *i_bIsModifed* is *true* if the project contents differs from the original content, and *false*, otherwise.

OnSetLabel

Event: `OnSetLabel` (i_strLabel as String)

Dispatch Id: *1000*

Description:
This event gets triggered whenever the label on a placeholder control window should be changed.

16.5.6 Enumerations

The following enumerations are defined:

`ICActiveXIntegrationLevel`
`MapForceControlPlaceholderWindow`

ICActiveXIntegrationLevel

Possible values for the IntegrationLevel property of the MapForceControl.

```
ICActiveXIntegrationOnApplicationLevel    = 0
ICActiveXIntegrationOnDocumentLevel       = 1
```

MapForceControlPlaceholderWindow

This enumeration contains the list of the supported additional MapForce windows.

```
MapForceXNoWindow             = -1
MapForceXLibraryWindow        = 0
MapForceXOverviewWindow       = 1
MapForceXValidationWindow     = 2
MapForceXProjectWindow        = 3
```

Chapter 17

Appendices

17 Appendices

These appendices contain technical information about MapForce and important licensing information. Each appendix contains sub-sections as given below:

Technical Data

- OS and memory requirements
- Altova XML Parser
- Altova XSLT and XQuery Engines
- Unicode support
- Internet usage
- License metering

License Information

- Electronic software distribution
- Copyrights
- End User License Agreement

17.1 Engine information

This section contains information about implementation-specific features of the Altova XML Validator, Altova XSLT 1.0 Engine, Altova XSLT 2.0 Engine, and Altova XQuery Engine.

17.1.1 XSLT 1.0 Engine: Implementation Information

The Altova XSLT 1.0 Engine is built into Altova's XMLSpy, StyleVision, Authentic, and MapForce XML products. It is also available in the free AltovaXML package. The Altova XSLT 1.0 Engine implements and conforms to the World Wide Web Consortium's XSLT 1.0 Recommendation of 16 November 1999 and XPath 1.0 Recommendation of 16 November 1999 . Limitations and implementation-specific behavior are listed below.

Limitations

- The **`xsl:preserve-space`** and **`xsl:strip-space`** elements are not supported.
- When the `method` attribute of `xsl:output` is set to HTML, or if HTML output is selected by default, then special characters in the XML or XSLT file are inserted in the HTML document directly as special characters; they are not inserted as HTML character references in the output. For instance, the character `&#160;` (the decimal character reference for a non-breaking space) is not inserted as `&nbsp;` in the HTML code, but directly as a non-breaking space.

Implementation's handling of whitespace-only nodes in source XML document

The XML data (and, consequently, the XML Infoset) that is passed to the Altova XSLT 1.0 Engine is stripped of boundary-whitespace-only text nodes. (A boundary-whitespace-only text node is a child whitespace-only text node that occurs between two elements within an element of mixed content.) This stripping may have an effect on the value returned by the `fn:position()`, `fn:last()`, and `fn:count()` functions.

For any node selection that selects text nodes also, boundary-whitespace-only text nodes would typically also be included in the selection. However, since the XML Infoset used by the Altova engines has boundary-whitespace-only text nodes stripped from it, these nodes are not present in the XML Infoset. As a result, the size of the selection and the numbering of nodes in the selection will be different than that for a selection which included these text nodes. The `fn:position()`, `fn:last()`, and `fn:count()` functions, therefore, could produce results that are different from those produced by some other processors.

A situation in which boundary-whitespace-only text nodes are evaluated as siblings of other elements arises most commonly when `xsl:apply-templates` is used to apply templates. When the `fn:position()`, `fn:last()`, and `fn:count()` functions are used in patterns with a name test (for example, `para[3]`, which is short for `para[position()=3]`), boundary-whitespace-only nodes are irrelevant since only the named elements (`para` in the above example) are selected. (Note, however, that boundary-whitespace-only nodes **are** relevant in patterns that use the wildcard, for example, `*[10]`.)

Note: If a boundary-whitespace-only text node is required in the output, then insert the required whitespace within one of the two adjoining child elements. For example, the XML fragment:

```
<para>This is <b>bold</b> <i>italic</>.</para>
```

when processed with the XSLT template

```
<xsl:template match="para">
   <xsl:apply-templates/>
</xsl:template>
```

will produce:

```
This is bolditalic.
```

To get a space between `bold` and `italic` in the output, insert a space character within either the `<b>` or `<i>` elements in the XML source. For example:

```
<para>This is <b>bold</b> <i> italic</>.</para> or
<para>This is <b>bold&#x20;</b> <i>italic</>.</para> or
<para>This is <b>bold</b><i>&#x20;italic</>.</para>
```

When such an XML fragment is processed with the same XSLT template given above, it will produce:

```
This is bold italic.
```

17.1.2 XSLT 2.0 Engine: Implementation Information

The Altova XSLT 2.0 Engine is built into Altova's XMLSpy, StyleVision, Authentic, and MapForce XML products. It is also available in the free AltovaXML package. This section describes the engine's implementation-specific aspects of behavior. It starts with a section giving general information about the engine, and then goes on to list the implementation-specific behavior of XSLT 2.0 functions.

For information about implementation-specific behavior of XPath 2.0 functions, see the section, XPath 2.0 and XQuery 1.0 Functions.

General Information

The Altova XSLT 2.0 Engine conforms to the World Wide Web Consortium's (W3C's) XSLT 2.0 Recommendation of 23 January 2007. Note the following general information about the engine.

Backwards Compatibility

The Altova XSLT 2.0 Engine is backwards compatible. The only time the backwards compatibility of the XSLT 2.0 Engine comes into play is when using the XSLT 2.0 Engine of Altova XML to process an XSLT 1.0 stylesheet. Note that there could be differences in the outputs produced by the XSLT 1.0 Engine and the backwards-compatible XSLT 2.0 Engine.

In all other Altova products, the backwards-compatibility issue never arises. This is because these products automatically select the appropriate engine for the transformation. For example, consider that in XMLSpy you specify that a certain XML document be processed with an XSLT 1.0 stylesheet. When the transformation command is invoked, XMLSpy automatically selects the XSLT 1.0 Engine of XMLSpy to carry out the transformation.

Note: The stylesheet version is specified in the `version` attribute of the `stylesheet` or `transform` element of the stylesheet.

Namespaces

Your XSLT 2.0 stylesheet should declare the following namespaces in order for you to be able to use the type constructors and functions available in XSLT 2.0. The prefixes given below are conventionally used; you could use alternative prefixes if you wish.

Namespace Name	Prefix	Namespace URI
XML Schema types	`xs:`	`http://www.w3.org/2001/XMLSchema`
XPath 2.0 functions	`fn:`	`http://www.w3.org/2005/xpath-functions`

Typically, these namespaces will be declared on the `xsl:stylesheet` or `xsl:transform` element, as shown in the following listing:

```
<xsl:stylesheet version="2.0"
   xmlns:xsl="http://www.w3.org/1999/XSL/Transform"
   xmlns:xs="http://www.w3.org/2001/XMLSchema"
   xmlns:fn="http://www.w3.org/2005/xpath-functions"
   ...
</xsl:stylesheet>
```

The following points should be noted:

- The Altova XSLT 2.0 Engine uses the XPath 2.0 and XQuery 1.0 Functions namespace

(listed in the table above) as its **default functions namespace**. So you can use XPath 2.0 and XSLT 2.0 functions in your stylesheet without any prefix. If you declare the XPath 2.0 Functions namespace in your stylesheet with a prefix, then you can additionally use the prefix assigned in the declaration.
- When using type constructors and types from the XML Schema namespace, the prefix used in the namespace declaration must be used when calling the type constructor (for example, `xs:date`).
- With the CRs of 23 January 2007, the `untypedAtomic` and duration datatypes (`dayTimeDuration` and `yearMonthDuration`), which were formerly in the XPath Datatypes namespace (typically prefixed `xdt:`) have been moved to the XML Schema namespace.
- Some XPath 2.0 functions have the same name as XML Schema datatypes. For example, for the XPath functions `fn:string` and `fn:boolean` there exist XML Schema datatypes with the same local names: `xs:string` and `xs:boolean`. So if you were to use the XPath expression `string('Hello')`, the expression evaluates as `fn:string('Hello')`—not as `xs:string('Hello')`.

Schema-awareness
The Altova XSLT 2.0 Engine is schema-aware.

Whitespace in XML document
By default, the Altova XSLT 2.0 Engine strips all boundary whitespace from boundary-whitespace-only nodes in the source XML document. The removal of this whitespace affects the values that the `fn:position()`, `fn:last()`, `fn:count()`, and `fn:deep-equal()` functions return. For more details, see Whitespace-only Nodes in XML Document in the XPath 2.0 and XQuery 1.0 Functions section.

Note: If a boundary-whitespace-only text node is required in the output, then insert the required whitespace within one of the two adjoining child elements. For example, the XML fragment:

```
<para>This is <b>bold</b> <i>italic</>.</para>
```

when processed with the XSLT template

```
<xsl:template match="para">
   <xsl:apply-templates/>
</xsl:template>
```

will produce:

```
This is bolditalic.
```

To get a space between `bold` and `italic` in the output, insert a space character within either the `<b>` or `<i>` elements in the XML source. For example:

```
<para>This is <b>bold</b> <i> italic</>.</para> or
<para>This is <b>bold&#x20;</b> <i>italic</>.</para> or
<para>This is <b>bold</b><i>&#x20;italic</>.</para>
```

When such an XML fragment is processed with the same XSLT template given above, it will produce:

```
This is bold italic.
```

XSLT 2.0 elements and functions
Limitations and implementation-specific behavior of XSLT 2.0 elements and functions are listed

in the section XSLT 2.0 Elements and Functions.

XPath 2.0 functions

Implementation-specific behavior of XPath 2.0 functions is listed in the section XPath 2.0 and XQuery 1.0 Functions.

XSLT 2.0 Elements and Functions

Limitations

The **`xsl:preserve-space`** and **`xsl:strip-space`** elements are not supported.

Implementation-specific behavior

Given below is a description of how the Altova XSLT 2.0 Engine handles implementation-specific aspects of the behavior of certain XSLT 2.0 functions.

`function-available`
The function tests for the availability of XSLT 2.0 functions, not for the availability of XPath 2.0 functions.

`unparsed-text`
The `href` attribute accepts (i) relative paths for files in the base-uri folder, and (ii) absolute paths with or without the `file://` protocol.

17.2 Technical Data

This section contains useful background information on the technical aspects of your software. It is organized into the following sections:

- OS and Memory Requirements
- Altova XML Parser
- Altova XSLT and XQuery Engines
- Unicode Support
- Internet Usage

17.2.1 OS and Memory Requirements

Operating System
This software application is a 32-bit Windows application that runs on Windows 2000 and Windows XP.

Memory
Since the software is written in C++ it does not require the overhead of a Java Runtime Environment and typically requires less memory than comparable Java-based applications. However, each document is loaded fully into memory so as to parse it completely and to improve viewing and editing speed. The memory requirement increases with the size of the document.

Memory requirements are also influenced by the unlimited Undo history. When repeatedly cutting and pasting large selections in large documents, available memory can rapidly be depleted.

17.2.2 Altova XML Parser

When opening any XML document, the application uses its built-in validating parser (the Altova XML Parser) to check for well-formedness, validate the document against a schema (if specified), and build trees and Infosets. The Altova XML Parser is also used to provide intelligent editing help while you edit documents and to dynamically display any validation error that may occur.

The built-in Altova XML Parser implements the Final Recommendation of the W3C's XML Schema specification. New developments recommended by the W3C's XML Schema Working Group are continuously being incorporated in the Altova Parser, so that Altova products give you a state-of-the-art development environment.

17.2.3 Altova XSLT and XQuery Engines

Altova products use the Altova XSLT 1.0 Engine, Altova XSLT 2.0 Engine, and Altova XQuery 1.0 Engines. Documentation about implementation-specific behavior for each engine is in the section Engine Information, in Appendix 1 of the product documentation, should that engine be used in the product.

These three engines are also available in the AltovaXML package, which can be downloaded from the Altova website free of charge. Documentation for using the engines is available with the AltovaXML package.

17.2.4 Unicode Support

Unicode is the new 16-bit character-set standard defined by the Unicode Consortium that provides a unique number for every character,

- no matter what the platform,
- no matter what the program,
- no matter what the language.

Fundamentally, computers just deal with numbers. They store letters and other characters by assigning a number for each one. Before Unicode was invented, there were hundreds of different encoding systems for assigning these numbers. No single encoding could contain enough characters: for example, the European Union alone requires several different encodings to cover all its languages. Even for a single language like English, no single encoding was adequate for all the letters, punctuation, and technical symbols in common use.

These encoding systems used to conflict with one another. That is, two encodings used the same number for two different characters, or different numbers for the same character. Any given computer (especially servers) needs to support many different encodings; yet whenever data is passed between different encodings or platforms, that data always runs the risk of corruption.

Unicode is changing all that!
Unicode provides a unique number for every character, no matter what the platform, no matter what the program, and no matter what the language. The Unicode Standard has been adopted by such industry leaders as Apple, HP, IBM, JustSystem, Microsoft, Oracle, SAP, Sun, Base and many others.

Unicode is required by modern standards such as XML, Java, ECMAScript (JavaScript), LDAP, CORBA 3.0, WML, etc., and is the official way to implement ISO/IEC 10646. It is supported in many operating systems, all modern browsers, and many other products. The emergence of the Unicode Standard, and the availability of tools supporting it, are among the most significant recent global software technology trends.

Incorporating Unicode into client-server or multi-tiered applications and web sites offers significant cost savings over the use of legacy character sets. Unicode enables a single software product or a single web site to be targeted across multiple platforms, languages and countries without re-engineering. It allows data to be transported through many different systems without corruption.

Windows 2000 and Windows XP

Altova's XML products provide full Unicode support. To edit an XML document, you will also need a font that supports the Unicode characters being used by that document.

Please note that most fonts only contain a very specific subset of the entire Unicode range and are therefore typically targeted at the corresponding writing system. Consequently you may encounter XML documents that contain "unprintable" characters, because the font you have selected does not contain the required glyphs. Therefore it can sometimes be very useful to have a font that covers the entire Unicode range - especially when editing XML documents from all over the world.

The most universal font we have encountered is a typeface called Arial Unicode MS that has been created by Agfa Monotype for Microsoft. This font contains over 50,000 glyphs and covers the entire set of characters specified by the Unicode 2.1 standard. It needs 23MB and is included with Microsoft Office 2000.

We highly recommend that you install this font on your system and use it with the application if you are often editing documents in different writing systems. This font is not installed with the "Typical" setting of the Microsoft Office setup program, but you can choose the Custom Setup option to install this font.

In the `/Examples` folder in your application folder you will also find a new XHTML file called `Unicode-UTF8.html` that contains the sentence "When the world wants to talk, it speaks Unicode" in many different languages ("Wenn die Welt miteinander spricht, spricht sie Unicode") and writing-systems (世界的に話すなら、Unicode です。) - this line has been adopted from the 10th Unicode conference in 1997 and is a beautiful illustration of the importance of Unicode for the XML standard. Opening this file will give you a quick impression on what is possible with Unicode and what writing systems are supported by the fonts available on your PC installation.

Right-to-Left Writing Systems

Please note that even under Windows NT 4.0 any text from a right-to-left writing-system (such as Hebrew or Arabic) is not rendered correctly except in those countries that actually use right-to-left writing-systems. This is due to the fact that only the Hebrew and Arabic versions of Windows NT contains support for rendering and editing right-to-left text on the operating system layer.

17.2.5 Internet Usage

Altova applications will initiate Internet connections on your behalf in the following situations:

- If you click the "Request evaluation key-code" in the Registration dialog (**Help | Software Activation**), the three fields in the registration dialog box are transferred to our web server by means of a regular http (port 80) connection and the free evaluation key-code is sent back to the customer via regular SMTP e-mail.
- If you use the Open URL... dialog box to open a document directly from a URL (**File | Open URL**), that document is retrieved through a http (port 80) connection. (*This functionality is available in XMLSpy and Authentic Desktop.*)
- If you open an XML document that refers to an XML Schema or DTD and the document is specified through a URL, it is also retrieved through a http (port 80) connection once you validate the XML document. This may also happen automatically upon opening a document if you have instructed the application to automatically validate files upon opening in the File tab of the Options dialog (**Tools | Options**). (*This functionality is available in XMLSpy and Authentic Desktop.*)
- If you are using the Send by Mail... command (**File | Send by Mail**) in XMLSpy, the current selection or file is sent by means of any MAPI-compliant mail program installed on the user's PC.

17.3 License Information

This section contains:

- Information about the distribution of this software product
- Information about the copyrights related to this software product
- The End User License Agreement governing the use of this software product

Please read this information carefully. It is binding upon you since you agreed to these terms when you installed this software product.

17.3.1 Electronic Software Distribution

This product is available through electronic software distribution, a distribution method that provides the following unique benefits:

- You can evaluate the software free-of-charge before making a purchasing decision.
- Once you decide to buy the software, you can place your order online at the Altova website and immediately get a fully licensed product within minutes.
- When you place an online order, you always get the latest version of our software.
- The product package includes a comprehensive integrated onscreen help system. The latest version of the user manual is available at www.altova.com (i) in HTML format for online browsing, and (ii) in PDF format for download (and to print if you prefer to have the documentation on paper).

30-day evaluation period
After downloading this product, you can evaluate it for a period of up to 30 days free of charge. About 20 days into this evaluation period, the software will start to remind you that it has not yet been licensed. The reminder message will be displayed once each time you start the application. If you would like to continue using the program after the 30-day evaluation period, you have to purchase an End User License Agreement, which is delivered in the form of a key-code that you enter into the Software Activation dialog to unlock the product. You can purchase your license at the online shop at the Altova website.

Distributing the product
If you wish to share the product with others, please make sure that you distribute only the installation program, which is a convenient package that will install the application together with all sample files and the onscreen help. Any person that receives the product from you is also automatically entitled to a 30-day evaluation period. After the expiration of this period, any other user must also purchase a license in order to be able to continue using the product.

For further details, please refer to the End User License Agreement at the end of this section.

17.3.2 License Metering

Your Altova product has a built-in license metering module that helps you avoid any unintentional violation of the End User License Agreement. Your product is licensed either as a single-user or multi-user installation, and the license-metering module makes sure that no more than the licensed number of users use the application concurrently.

This license-metering technology uses your local area network (LAN) to communicate between instances of the application running on different computers.

Single license
When the application starts up, it sends a short broadcast datagram to find any other instance of the product running on another computer in the same network segment. If it doesn't get any response, it will open a port for listening to other instances of the application. Other than that, it will not attempt to communicate over a network. If you are not connected to a LAN, or are using dial-up connections to connect to the Internet, the application will not generate any network traffic at all.

Multi license
If more than one instance of the application is used within the same LAN, these instances will briefly communicate with each other on startup. These instances exchange key-codes in order to ensure that the number of concurrent licenses purchased is not accidentally violated. This is the same kind of license metering technology that is common in the Unix world and with a number of database development tools. It allows Altova customers to purchase reasonably-priced concurrent-use multi-user licenses.

Please note that your Altova product at no time attempts to send any information out of your LAN or over the Internet. We have also designed the applications so that they send few and small network packets so as to not put a burden on your network. The TCP/IP ports (2799) used by your Altova product are officially registered with the IANA (*see* http://www.isi.edu/in-notes/iana/assignments/port-numbers *for details*) and our license-metering module is tested and proven technology.

If you are using a firewall, you may notice communications on port 2799 between the computers that are running Altova products. You are, of course, free to block such traffic between different groups in your organization, as long as you can ensure by other means, that your license agreement is not violated.

You will also notice that, if you are online, your Altova product contains many useful functions; these are unrelated to the license-metering technology.

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