User and Reference Manual

ALTOVA®

Altova SchemaAgent User Manual

Published: 2006

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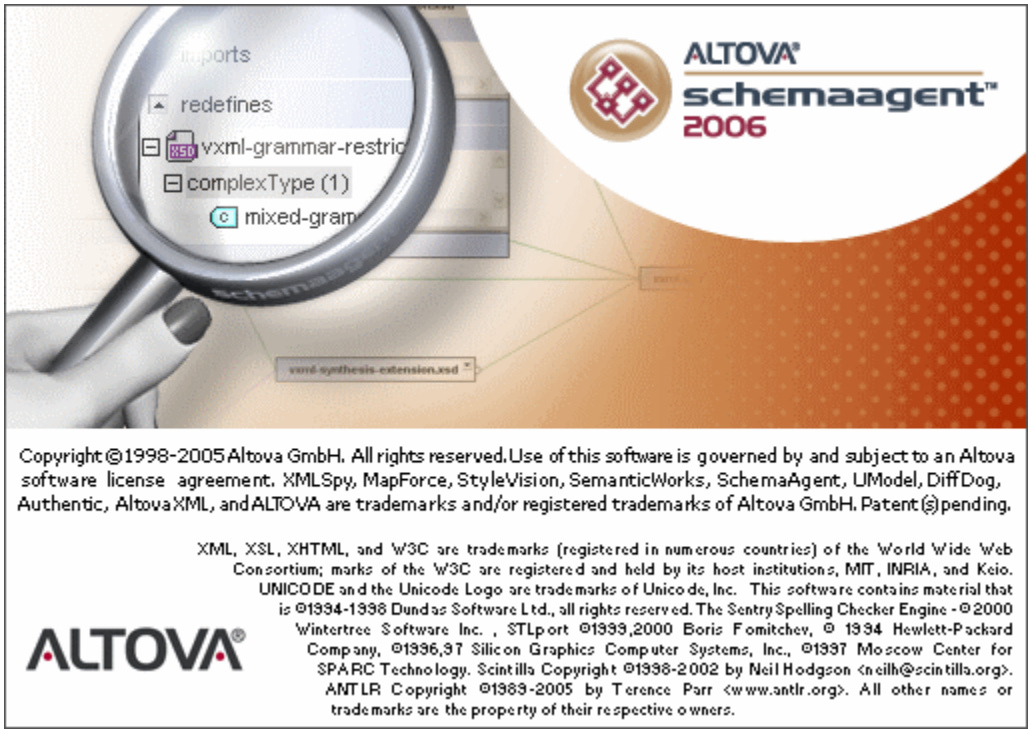
Chapter 1

SchemaAgent 2006

1 SchemaAgent 2006

SchemaAgent™ 2006 is an Altova technology that enables you to manage multiple schemas and build relationships between schemas from within a GUI. SchemaAgent also provides a display of relationships between Altova MapForce Design (MFD) files and their associated schemas.

Altova's SchemaAgent technology consists of two components: a SchemaAgent server (local or network-based) and a SchemaAgent Client. A SchemaAgent server serves W3C XML schemas and MFD files to one or more SchemaAgent Clients on the network. The SchemaAgent Client is an application with a GUI that provides access to the schemas served by a SchemaAgent server. Using standard GUI mechanisms, such as copy-and-paste and drag-and-drop, SchemaAgent Client users are able to easily build relationships between the served schemas and to make large-scale changes—such as in path references—across multiple schemas.



Chapter 2

About this Documentation

2 About this Documentation

This document provides an overview of how SchemaAgent technology works, and describes how to use the SchemaAgent server and SchemaAgent Client together. It also provides an overview of how Altova's XMLSpy application (Enterprise and Professional Editions) can utilize SchemaAgent technology to provide powerful schema editing and management capabilities.

This document is divided into the following parts:

- An introduction to SchemaAgent and its mechanism.
- A SchemaAgent tutorial.
- A description of the installation, configuration, and use of **SchemaAgent Server** .
- A description of the installation, configuration, and use of **SchemaAgent**.
- An overview of the usage of **XMLSpy** Enterprise and Professional Editions as SchemaAgent clients.

Chapter 3

Introduction

3 Introduction

Altova's SchemaAgent technology consists of two components: a SchemaAgent server and a SchemaAgent Client. A SchemaAgent server is installed either:

- on the same machine as a SchemaAgent Client, where it serves that client (LocalServer version, installed with SchemaAgent); or
- on a network, from where it can serve multiple clients (SchemaAgent Server, separate installation from SchemaAgent).

SchemaAgent terminology
The product names and the naming conventions used in this documentation are as follows:

- There are two (separately downloadable) products: (i) **Altova SchemaAgent™ 2006** (SchemaAgent for short), and (ii) **Altova SchemaAgent Server™ 2006** (SchemaAgent Server for short).
- The SchemaAgent product comprises a SchemaAgent LocalServer (LocalServer for short) and a SchemaAgent Client. The LocalServer serves the SchemaAgent Client on that machine.
- SchemaAgent Client connects to a server, which can be either (i) LocalServer (installed with SchemaAgent Client as part of the Altova SchemaAgent product), or (ii) SchemaAgent Server (installed separately from Altova SchemaAgent).
- SchemaAgent Server can be installed on a network and can serve multiple SchemaAgent Clients.
- SchemaAgent technology can also be used in Altova's **XMLSpy® 2006** product (Enterprise and Professional Editions). XMLSpy communicates via SchemaAgent Client with either LocalServer or SchemaAgent Server.

3.1 SchemaAgent in the Altova Product Range

Please note the following important product-related information.

- Both SchemaAgent Server and SchemaAgent are to be downloaded separately from the SchemaAgent download page at the Altova website and installed separately.
- SchemaAgent Server is available free of charge.
- SchemaAgent requires a license that must be purchased from Altova.
- In order to use SchemaAgent with XMLSpy, SchemaAgent must be installed on the same machine as XMLSpy. SchemaAgent Server can be installed anywhere on the network. Once SchemaAgent Server and SchemaAgent are correctly installed, XMLSpy will automatically make the necessary associations.
- Altova's Enterprise XML Suite and Professional XML Suite products include the SchemaAgent product and a license key for it. The SchemaAgent Server application, however, is not included as part of the Altova XML Suite packages, and must be downloaded from the SchemaAgent download page at the Altova website.
- XMLSpy Enterprise Edition and XMLSpy Professional Edition (when purchased independently of Altova's XML Suite applications) can both use SchemaAgent. To do this, you must (i) download and install SchemaAgent with a valid license on the same machine as XMLSpy, and (ii) optionally, download and install the free SchemaAgent Server application anywhere on your network.

Important: Any SchemaAgent or SchemaAgent-related product from Altova (including XMLSpy) starting with Version 2005 release 3 is **not compatible** with versions of SchemaAgent or SchemaAgent-related products previous to it.

3.2 Working with SchemaAgent

The basic mechanism for working with SchemaAgent is as follows:

1. In a SchemaAgent server, you define one or more search paths. A search path is the path to a folder on the network. Once search paths have been defined, the server builds an internal map of the relationships between all schemas and Altova MapForce Design (MFD) files in the defined search paths. It is these schemas and MFD files that are served to SchemaAgent Clients.
2. A SchemaAgent Client displays served schemas and MFD files in its Explorer pane in a hierarchical tree view and as a list of schemas and MFD files organized by folder. You can use commands available in this pane to manage schemas (rename, move, delete, etc). The advantage is that multiple schemas can be managed from within the SchemaAgent Client GUI, thus obviating the need to edit individual schemas separately.
3. In the Design Pane of SchemaAgent Client, you can create designs of schemas (SchemaAgent Designs) that enable you to build relationships between various schemas in the search paths defined for the connected SchemaAgent server. These designs can be saved as SchemaAgent Design files for subsequent editing. Once a relationship is created or modified in a SchemaAgent Design, that relationship is physically written into the relevant schema (`.xsd`) file/s and any related schema file. To undo a modification to a relationship, you must edit the SchemaAgent Design accordingly.
4. In the Design Pane, you can obtain a graphical view of the relationships between an MFD file, its source and target schemas, and all schemas associated with the source and target schemas.
5. If Altova's XMLSpy has been set up to use SchemaAgent technology, the components of other schemas in the search path can be accessed and reused within the schema currently being edited in XMLSpy.

3.3 Features of SchemaAgent

The features of SchemaAgent technology are listed below under three headings: SchemaAgent Server, SchemaAgent Client, and XMLSpy and SchemaAgent. The main SchemaAgent technology features are in the *SchemaAgent Client* section and in the *XMLSpy and SchemaAgent* section. In addition to listing the features of the technology as a whole, each section lists features that are specific to that product. Note, however, that SchemaAgent Server and SchemaAgent Client work together, and that, in order for XMLSpy to use SchemaAgent, both SchemaAgent Server and SchemaAgent Client must be installed.

SchemaAgent Server
The following list of SchemaAgent Server-specific features relates mostly to SchemaAgent Server communications and GUI functionality.

- SchemaAgent Server can be installed as a standalone application with a GUI, or as an interactive or non-interactive service.
- SchemaAgent Server processes client requests to create, update, or delete schema IIRs (Includes, Imports, and Redefines) and manages client–server communication. It also processes all file-based manipulations: create, delete, move, and rename.
- GUI provides full environment information, including lists of currently connected clients and all defined search paths.
- GUI has a window pane displaying all defined search paths as hierarchical tree structures and all schemas and MFD files within these search paths.
- GUI has a log window in the GUI that displays detailed communications activity.
- Log reports can be configured and written to files.
- Easy-to-use search path selection using Explorer-type browse functionality.
- Enables access to schemas located in WebDAV folders on (secure) WebDAV servers with UNC paths and drive letters.

SchemaAgent Client
SchemaAgent Client provides a GUI that enables you to build schema relationships and manage large numbers of schemas, as well as view relationships between MFD files and their associated schemas. These are the core features of SchemaAgent technology. In addition, SchemaAgent Client provides user-friendly GUI features. With SchemaAgent Client you can do the following:

- Manage single or multiple schemas as schema components in a graphical workspace.
- Create schema designs that help to manage and organize schema collections intuitively.
- Create, update, or delete IIRs (Includes, Imports, and Redefines) between schemas by direct manipulation in a SchemaAgent Design using drag-and-drop. IIR changes are passed on to all related schemas.
- If a schema is renamed or moved, the change is passed to all other files in the workspace that reference the changed schema.
- In a SchemaAgent Design, view IIRs immediately and in greater detail in the schema component itself.
- In a SchemaAgent Design, view the detailed structure of schema components, such as elements and complex types.
- Select or insert schemas that reference other schemas in the workspace.
- View the relationships between MFD files and their associated schemas.

XMLSpy and SchemaAgent
If set up to work with SchemaAgent, Altova's XMLSpy provides powerful schema editing

capabilities.

- While a schema is being edited in the Schema/WSDL View of XMLSpy, components of all schemas in SchemaAgent Server's search paths are listed in the Entry Helpers and can be modified and reused in the schema being edited.
- Information about IIRs created or modified in Schema/WSDL View is written to related schemas.

Chapter 4

SchemaAgent Tutorial

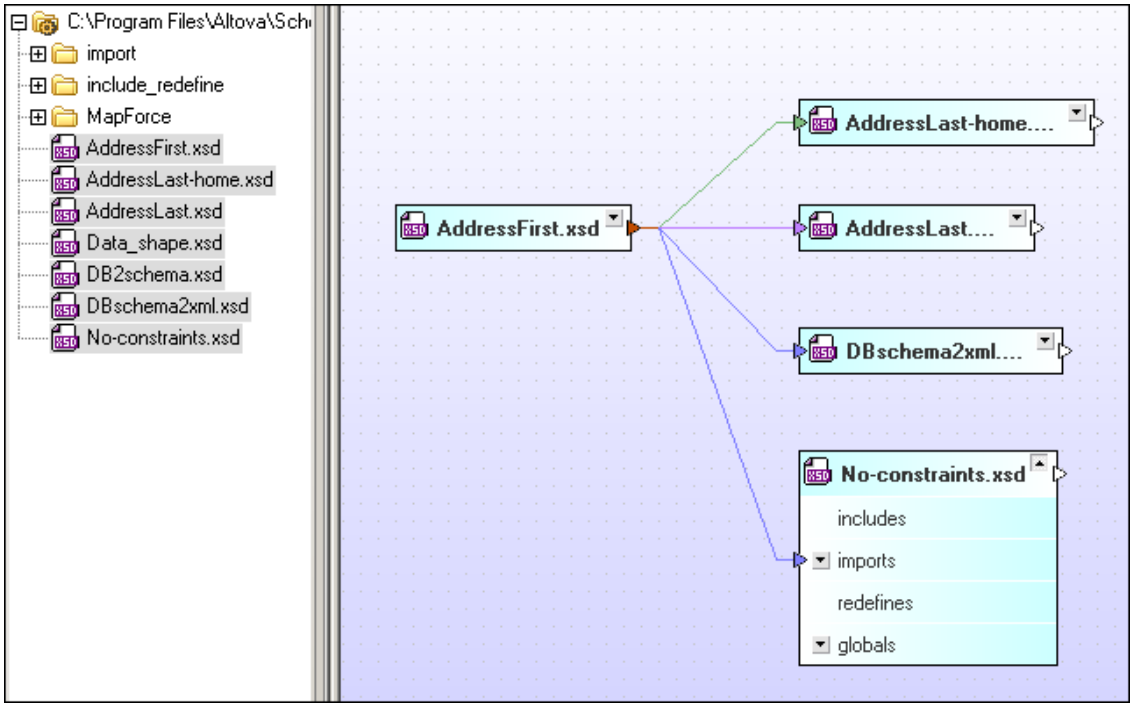
4 SchemaAgent Tutorial

This document explains, step-by-step using examples, how to set up and use SchemaAgent to create include, import and redefine relationships between XML schemas.

4.1 Introduction

This tutorial does the following:

- Describes installation of SchemaAgent Client
- Explains how to connect to the SchemaAgent local server
- Explains how to configure a path to the Examples folder, which contains the examples used in the tutorial
- Shows you how to create include, import and redefine relationships between XML schemas using SchemaAgent Client
- Shows you how to include, import and redefine types from one XML schema in another XML schema using XMLSpy
- Shows you how to view relationships between XML schemas, and how to view MapForce files



4.2 Setting Up SchemaAgent Client

In this part of the tutorial you will install SchemaAgent Client, connect to the SchemaAgent local server, and configure a path to the folder that contains the examples for this tutorial.

Installing SchemaAgent Client
When you install SchemaAgent Client, both the client and the LocalServer are installed.

Please note: To use the network server instead of LocalServer, download and install SchemaAgent Server.

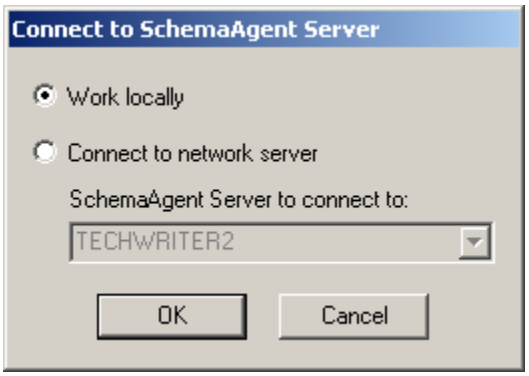
To install SchemaAgent Client (the Altova product **SchemaAgent™ 2006**):

1. Download the SchemaAgent 2006 installation package from the SchemaAgent download page at the Altova website. If you have purchased Altova's Enterprise XML Suite or Professional XML Suite, the SchemaAgent 2006 product is included in the package.
2. Double-click the installer file to run the installation process. Note that a local SchemaAgent server (called LocalServer in this document) will be installed as part of the SchemaAgent Client installation process. During the installation process, you will be asked whether you wish to use SchemaAgent locally (that is via the LocalServer) or via SchemaAgent Server. Your selection determines the default setting for which server the client will connect to on startup. This can always be changed using the **Extras | Connect to Server** command.
3. Enter and save the licensing information to activate the product license. The SchemaAgent Client license must be purchased at the Altova Shop at the Altova Website. If you have purchased Altova's Enterprise XML Suite or Professional XML Suite, the license for SchemaAgent Client is included in that package.

Starting SchemaAgent Client and Connecting to the Local Server
In this tutorial, we will work with the local server that is automatically installed with SchemaAgent Client. You must connect SchemaAgent Client to the local server before you can use it to create relationships between XML schemas.

To start SchemaAgent Client and connect to the local server:

1. Click the SchemaAgent Client  icon on the Quick Launch toolbar to start SchemaAgent Client. The Connect to SchemaAgent Server dialog appears.



2. Select **Work locally**.
3. Click **OK** to confirm.

Configuring a Path to the Examples Folder
In order to work with SchemaAgent, you must configure at least one path to a folder. Paths you

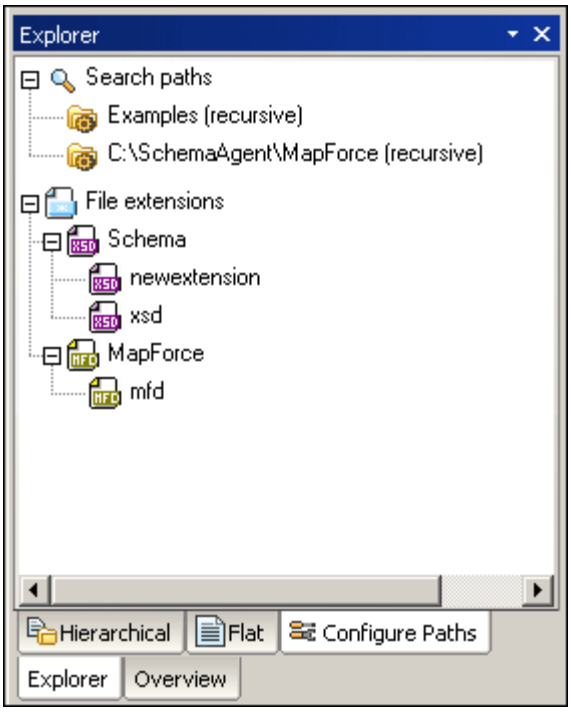
configure are stored on the SchemaAgent server (in this case, the LocalServer). Using SchemaAgent Client, you create relationships between existing schemas in these paths. You can also create new skeleton XML schemas, which can be completed later using XMLSpy.

Because the paths are stored on a server, you can always see the current version of XML schemas you have edited using SchemaAgent Client in XMLSpy. If you edit a schema file using SchemaAgent Client and XMLSpy is currently connected to the SchemaAgent server, XMLSpy prompts you to reload the schema file, if you currently have that file open.

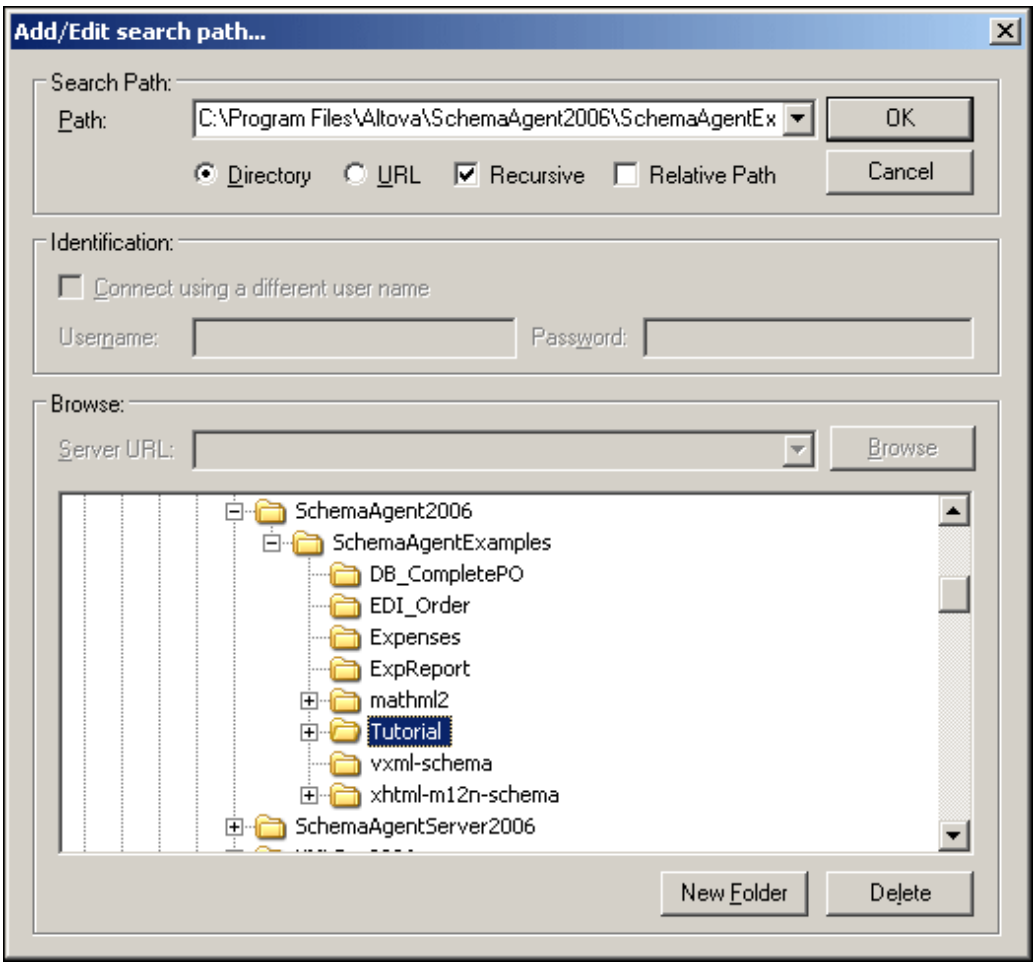
We will configure a path to the folder that contains the files that are used in this tutorial.

To configure a search path to the SchemaAgent2006\SchemaAgentExamples\Tutorial folder:

1. In the Explorer Pane of SchemaAgent Client, click the **Configure Paths** tab.



2. Right-click in the Explorer Pane. A context menu appears.
3. Select Add **search path**. The Add/Edit search path dialog opens.



4. In the Browse pane, navigate to the install folder for SchemaAgent Client. Select the **SchemaAgentExamples\Tutorial** folder in that folder.
5. Click **OK**.

4.3 Tutorial Example

The example in this tutorial shows you how to create include, import, and redefine relationships between example XML schemas, as well as how to view MapForce files.

The example is structured as follows:

- In the first part, you use SchemaAgent Client to create relationships between XML schemas. You create include, redefine, and import relationships.
- In the second part, you use XMLSpy to redefine an element, and to use redefined, included and imported elements as types in an XML schema.
- In the third part, you create an include relationship between two schemas using XMLSpy.
- In the fourth part, you view the relationships that you created between the XML schemas.
- In the last part, you view a MapForce file.

4.3.1 Creating Relationships Between XML Schemas

In this section, you will use SchemaAgent Client to create include, redefine, and import relationships between schemas.

The include/redefine example uses the following schemas:

- `event_registration.xsd`: This schema is structured to contain information about a participant who registers for a sporting event. Because these events have fees, a type for containing credit card information is also defined in this schema.
- `dvd_order.xsd`: This schema is structured to contain order details for mail order DVDs, and customer shipping details. In the course of this example, it will include types from `event_registration.xsd`, specifically those that store customer and credit card data.
- `book_order.xsd`: This schema is structured to contain order details for mail order books. In the course of this example, it will include and redefine types from `event_registration.xsd`, specifically the types for storing customer and credit card data.

The import example uses the following schemas, which have different namespaces:

- `book_store.xsd`: This schema is structured to contain the address of the book store, and details for each book in the inventory. A type from this schema will be imported to `library.xsd`.
- `library.xsd`: This schema is structured to contain the address of the library, and details (card catalog number and whether the book is currently being borrowed) for each book in the library. A type containing other book information will be imported to this schema from `book_store.xsd`.

The second include example uses the following schemas:

- `company1.xsd`: This schema is structured to contain information about a company and its employees.
- `company2.xsd`: This schema is structured to contain information about the products of a company. In the example, the address and employee components from `company1.xsd` will be included in this file.

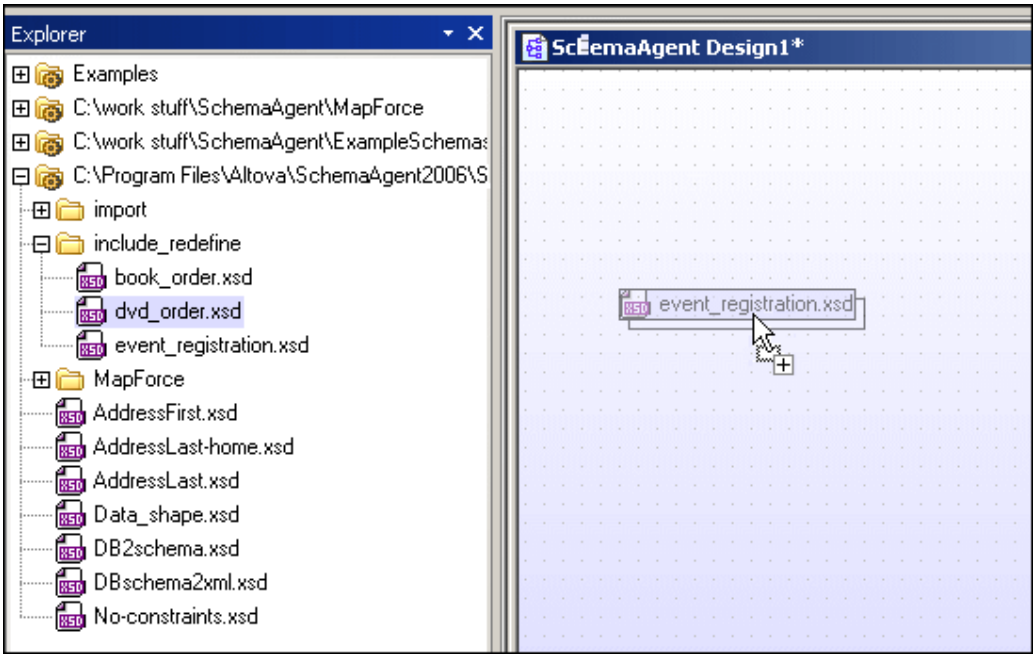
Creating an Include Relationship

In this step we will create an include relationship that includes the schema `event_registration.xsd` in the schema `dvd_order.xsd`.

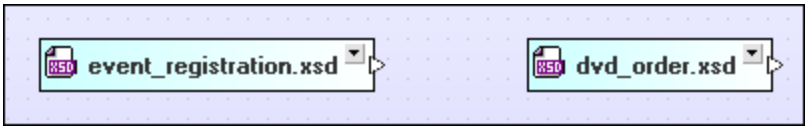
Do the following in SchemaAgent Client:

1. Select **File** | **New**. A new Design tab appears.
2. Drag and drop the `event_registration.xsd` and `dvd_order.xsd` schemas from the SchemaAgent2006\SchemaAgentExamples\Tutorial\include_redefine folder in the Explorer pane to the Design tab.

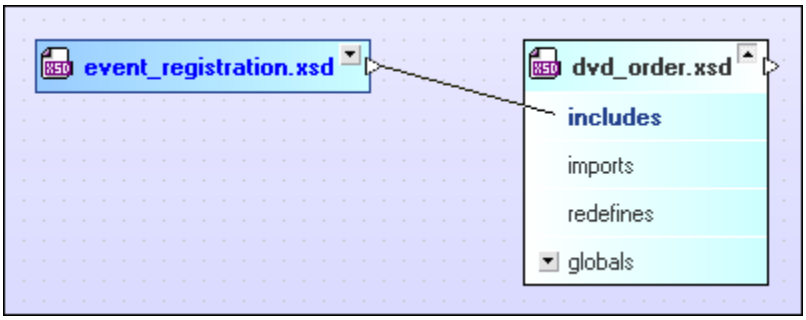
   Please note: To drag and drop more than one file at the same time, select the files first by clicking on the files while holding down the **CTRL** key. Drag and drop a folder to put all the files it contains in the Design tab.



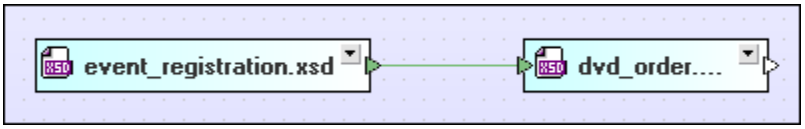
3. Click on the small white triangle on the right side of the file box of `event_registration.xsd`.



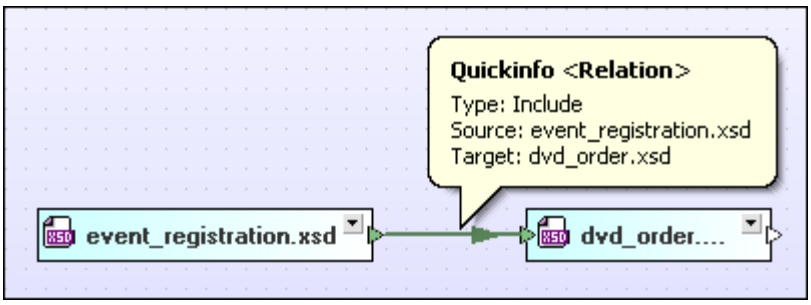
4. Drag the connector line to the file box of `dvd_order.xsd`. Release the mouse over the word "includes".



A green arrow that points from `event_registration.xsd` to `dvd_order.xsd` appears. This arrow shows that an include relationship has been made between these schemas.



Position the cursor over the arrow to display a Quickinfo bubble that contains information about the relationship.



You can also position the cursor over a file box to display a Quickinfo bubble that contains information about the imports, includes and redefines associated with the corresponding schema.

Creating a Redefine Relationship

We will now create a redefine relationship that allows redefinition of components from the schema `event_registration.xsd` in the schema `book_order.xsd`.

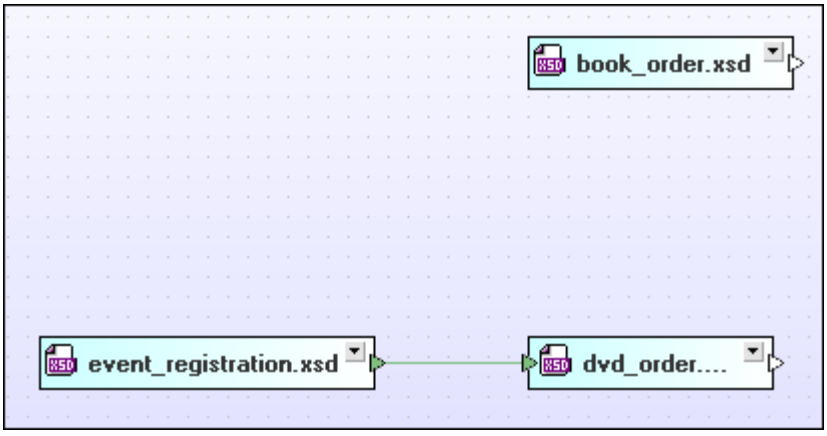
Redefinition of schemas works as follows:

- it creates an implicit "include" relationship between the schemas and enables access to all elements in the referenced schema
- it allows you to redefine (i.e., restrict or extend) zero or more components of the referenced schema

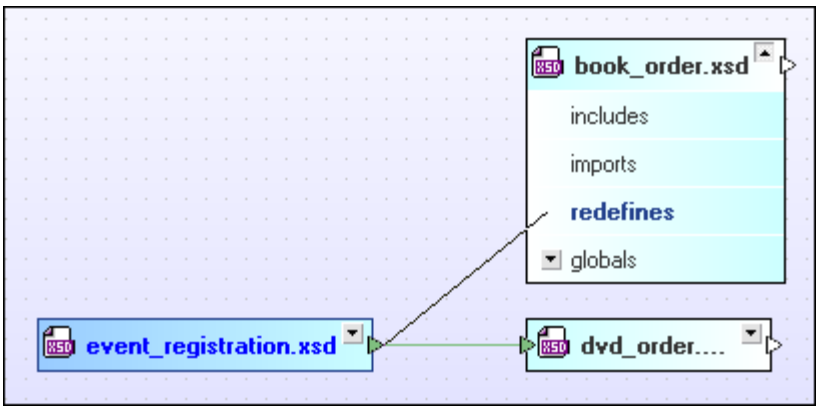
Please note: In SchemaAgent Client, only the redefine relationship is created between the schemas. The actual redefinition of individual components can be done in XMLSpy.

Do the following in SchemaAgent Client:

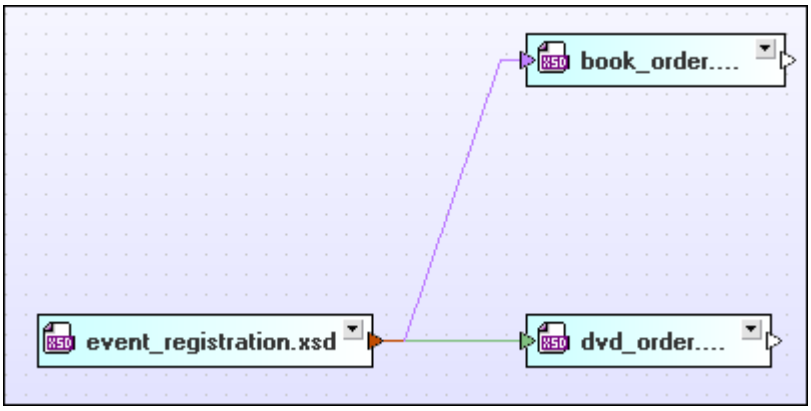
1. Drag and drop the file `book_order.xsd` from the Explorer pane to the new Design tab.



2. In the Design tab, click on the small triangle on the right side of the file box of `event_registration.xsd`.
3. Drag the connector line to the file box of `book_order.xsd`. Release the mouse over the word "redefines".



A purple arrow that points from `event_registration.xsd` to `book_order.xsd` appears. This arrow shows that a redefine relationship has now been made between these schemas.



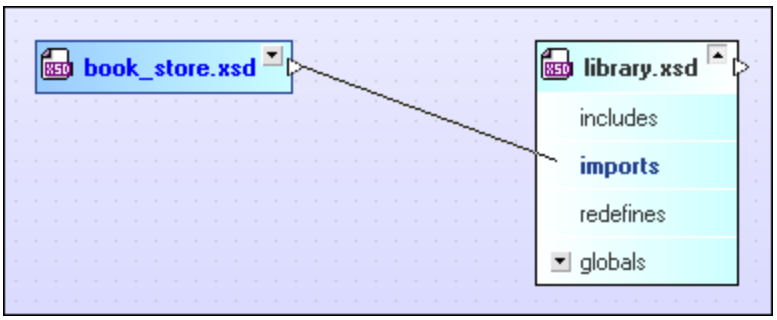
Creating an Import Relationship

In this step we will create an import relationship between the schemas `book_store.xsd` and `library.xsd`. The import relationship is used when you want to reuse components from one schema in a schema with a different namespace.

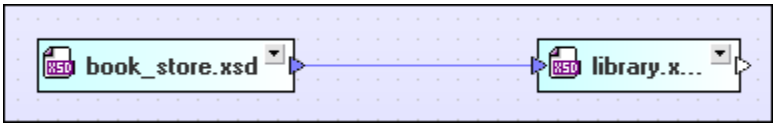
Do the following in SchemaAgent Client:

1. Select **File** | **New**. A new Design tab appears.
2. Drag and drop the files `book_store.xsd` and `library.xsd` from SchemaAgent2006 \SchemaAgentExamples\Tutorial\import to the new Design tab.

3. Click on the small white triangle on the right side of the file box of `book_store.xsd`.
4. Drag the connector line to the file `library.xsd`. Release the mouse over the word "imports".



A blue arrow that points from `book_store.xsd` to `library.xsd` appears. This arrow shows that an import relationship has been made between these schemas.



4.3.2 Using XMLSpy as a SchemaAgent Client

You have now created include, import and redefine relationships between schemas using SchemaAgent Client. When you create a relationship using SchemaAgent Client, the corresponding include, import or redefine statement is automatically added to the XML schema.

The next step in this tutorial is to use XMLSpy to do the actual including, importing and redefining of individual components of the schemas.

In this section, we will do the following:

- include a type from one schema in another schema
- redefine a type and use it as the type of an element in the redefining schema
- import a type from one schema to a schema with a different namespace

Including a Type

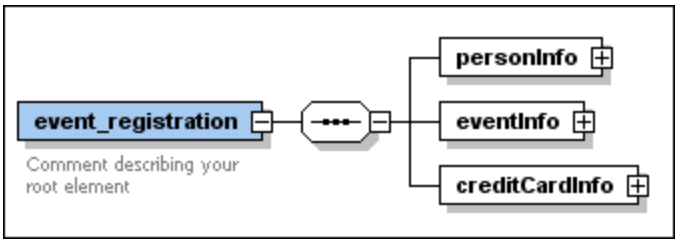
Using XMLSpy as a client to the SchemaAgent local server, we will include types from `event_registration.xsd` in `dvd_order.xsd`. We will include a type for storing information about a customer making a DVD order, and a type for storing credit card information.

To do this, we first have to make the types we want to include in `dvd_order.xsd` into global complex types.

To make the components personInfo and creditCardInfo into global complex types:

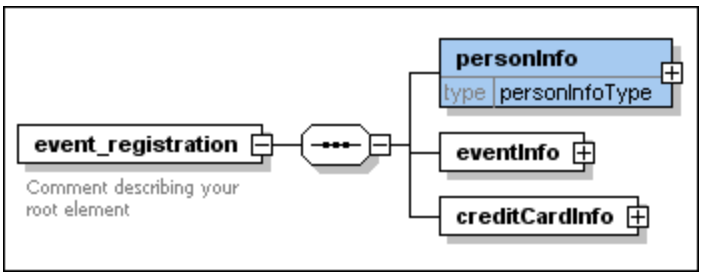
1. Open the schema `event_registration.xsd` in XMLSpy. To do this, from SchemaAgent Client, right-click on the file box of `event_registration.xsd` and select **Edit in XMLSpy** from the context menu. The file is opened in XMLSpy.
2. Connect XMLSpy to the SchemaAgent local server:
   a. Select **Schema design** | **Connect to SchemaAgent Server**. The Connect to SchemaAgent Server dialog appears.
   b. Select **Work locally** and click **OK**. XMLSpy is now connected to the SchemaAgent local server.

3. Click on the Display Diagram icon for the element event_registration to display its content model.



4. Right-click on the personInfo element and select **Make Global** | **Complex type** from the context menu. There is now a global complex type called personInfoType.

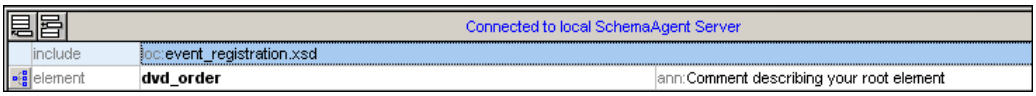
   Please note: If "type" does not appear as shown in the screenshot, select **Schema design** | **Configure view**. In the Schema display configuration dialog, click the **Predefined** button, then click **OK** to confirm.



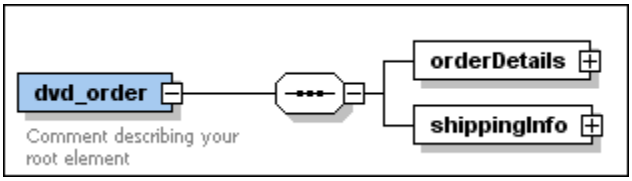
5. In the same way, make the creditCardInfo element into a global complex type. This results in a type called creditCardInfoType.
6. Save the file.

To include personInfoType and creditCardInfoType in `dvd_order.xsd`:

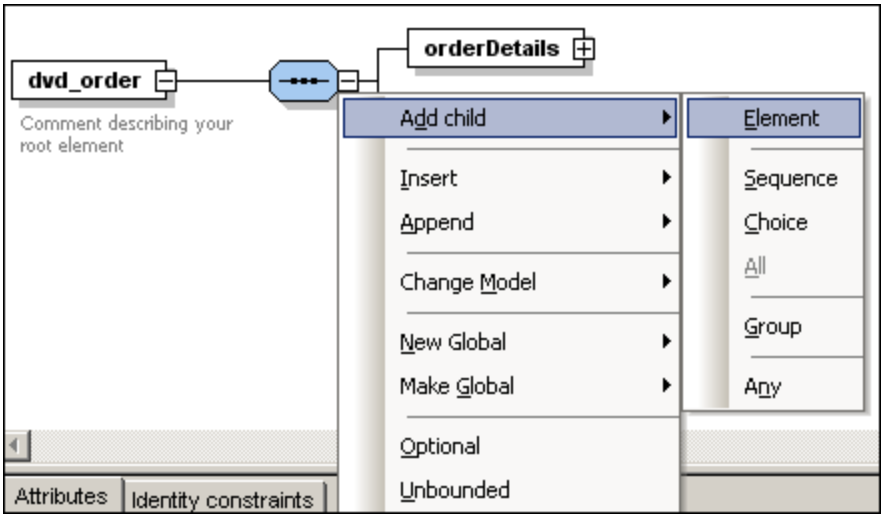
1. Open the schema `dvd_order.xsd` in XMLSpy. Notice that the schema contains an include statement, which was automatically added when you connected the two schemas in the Include section discussed previously.



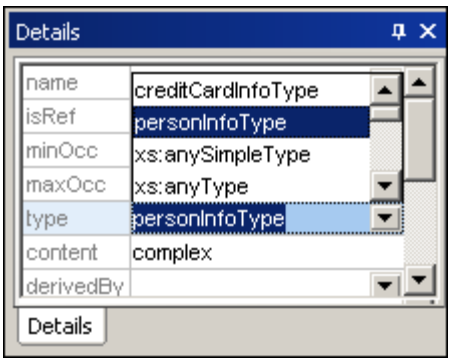
2. Click on the Display Diagram icon for dvd_order.



3. Right-click on the sequence element and select **Add child** | **Element**. Enter the name `customerInfo` for this element.

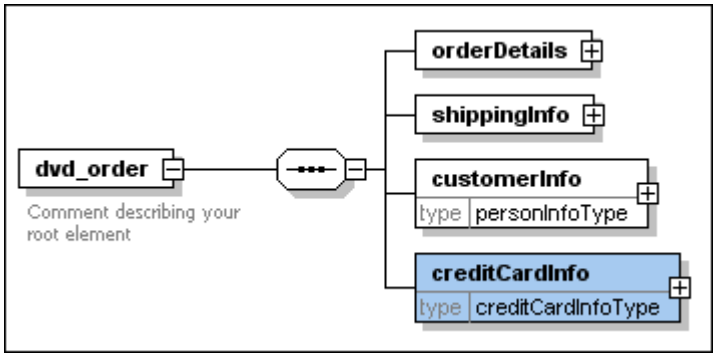


4. With this element still selected, in the Details entry helper, select personInfoType from the **type** drop-down list. Components from both schemas are in black, all others are in blue.



5. Right-click on the sequence element and select **Add child** | **Element**. Enter the name `creditCardInfo` for this element.
6. With this element still selected, in the Details entry helper, select creditCardInfoType from the **type** drop-down list.
7. Save the file.

We have now included two types from the schema `event_registration.xsd` in the schema `dvd_order.xsd`.

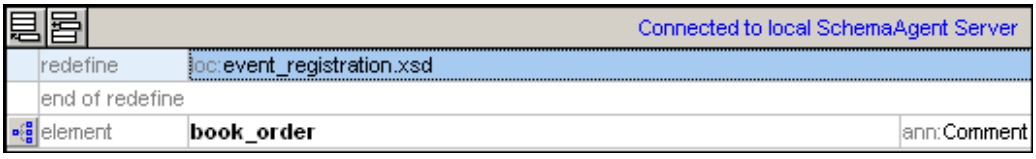


Redefining a Type

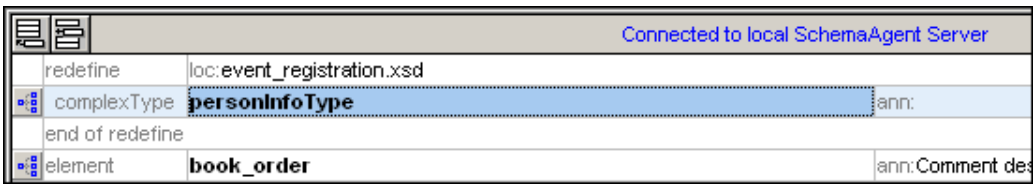
We will redefine the type personInfoType from the schema `event_registration.xsd` in the schema `book_order.xsd`. We will add a customer number to personInfoType.

To redefine this type:

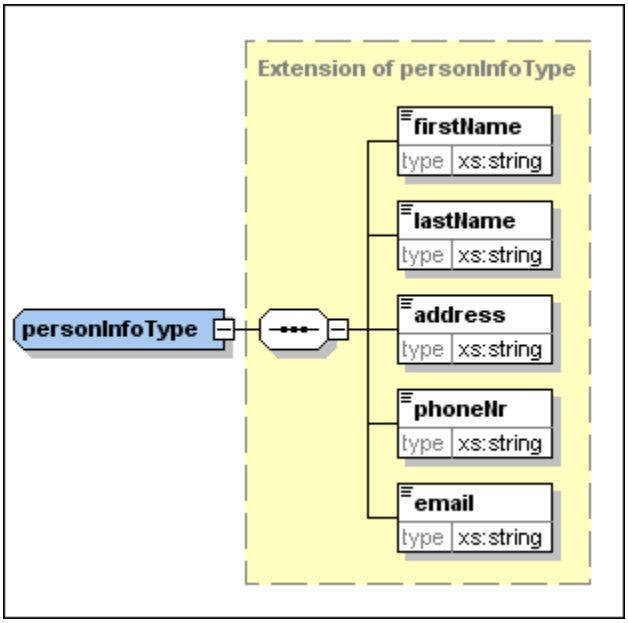
1. Open the `book_order.xsd` schema in XMLSpy. Notice that the schema contains a redefine statement, which was automatically added when you connected the two schemas in the Redefine section discussed previously.



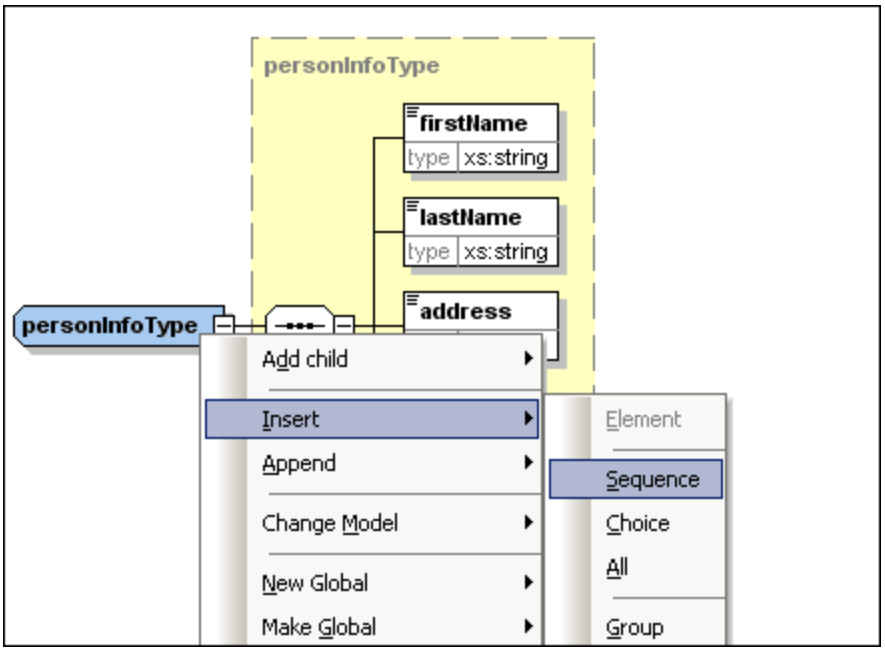
2. Select the line that says "end of redefine". Click the Insert icon and select **ComplexType**. Enter the name `personInfoType` for this type.



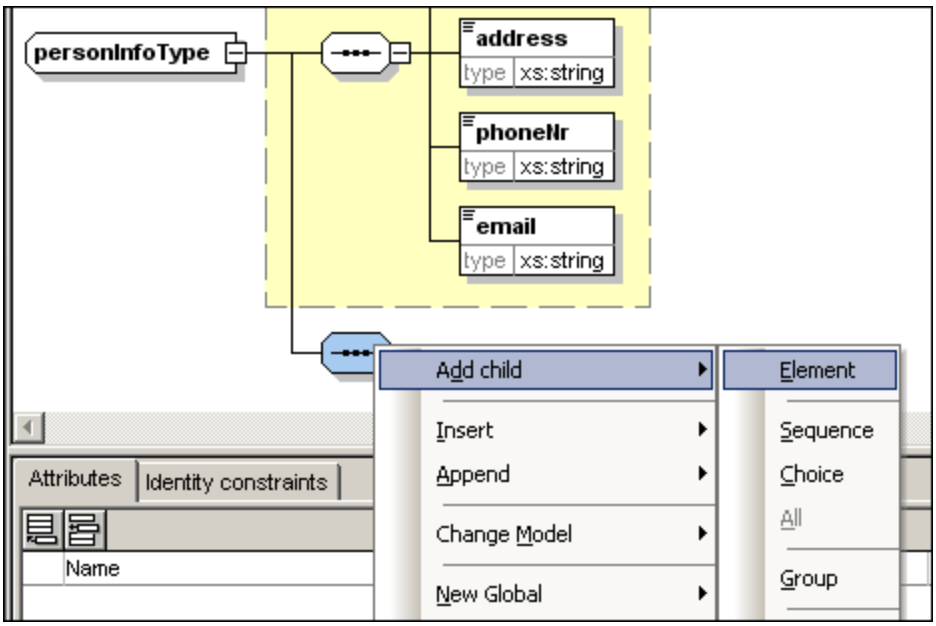
3. Click the Display Diagram icon for personInfoType. The content model of personInfoType, as defined in `event_registration.xsd`, appears.



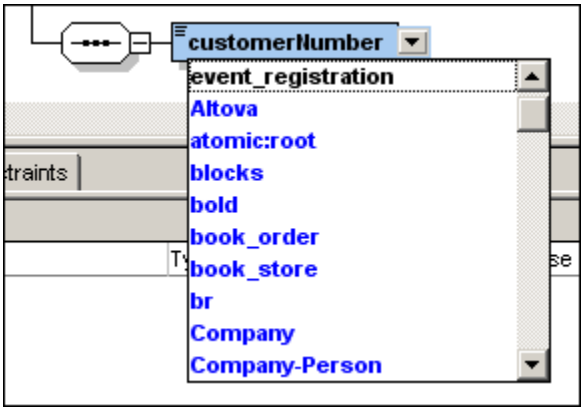
4. Right-click the  complexType, and select **Insert** | **Sequence**.



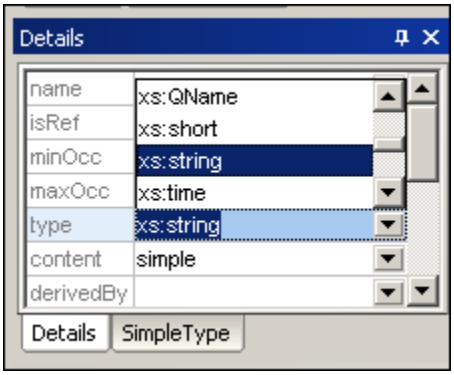
5. Right-click on the new sequence icon and select **Add Child** | **Element**.



6. Type in the name `customerNumber` for the element.

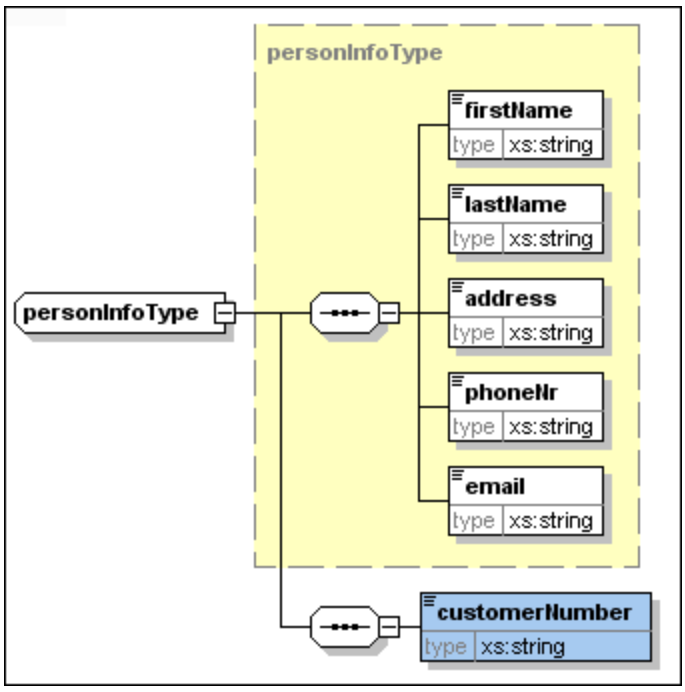


7. In the Details entry helper, select `xs:string` from the **type** drop-down list.



8. Save the file.

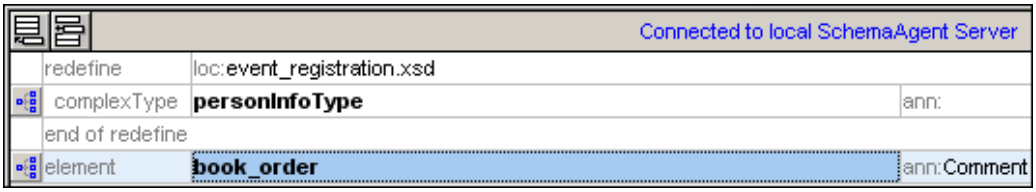
We have now redefined personInfoType to be used as a type in the XML schema `book_order.xsd`.



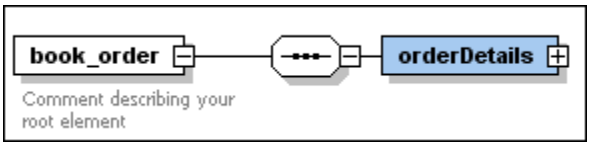
Using a Redefined Type

To use the type that you redefined in the last step as a type in the `book_order.xsd` schema:

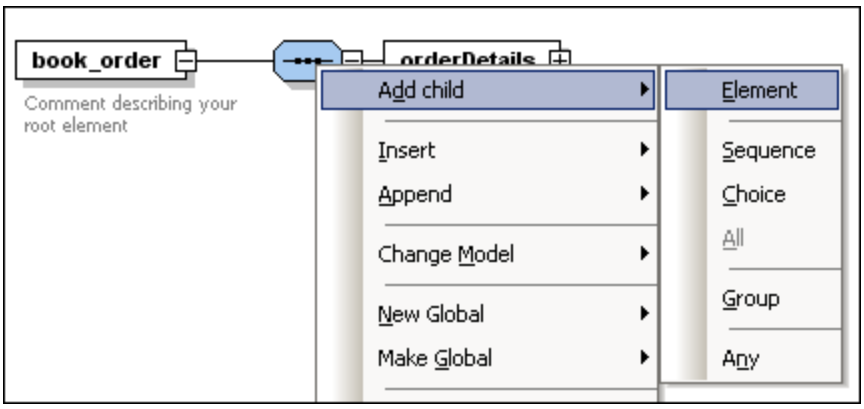
1. Click the schema overview icon for `book_order.xsd`.



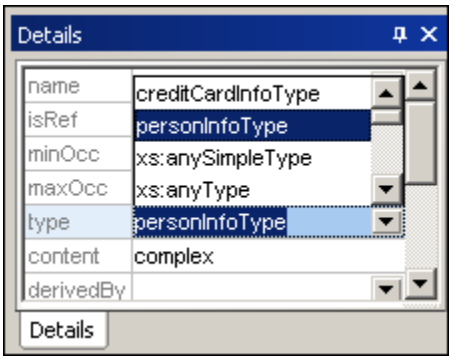
2. Click the Display Diagram icon of the root element book_order.



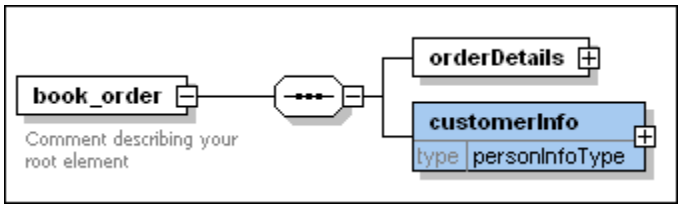
3. Right-click on the sequence element and select **Add child** | **Element**. Enter the name `customerInfo` for this element.



4. Make sure the customerInfo element is still selected and select the type personInfoType from the **type** drop-down list in the Details entry helper. Components from both schemas are in black, all others are in blue.

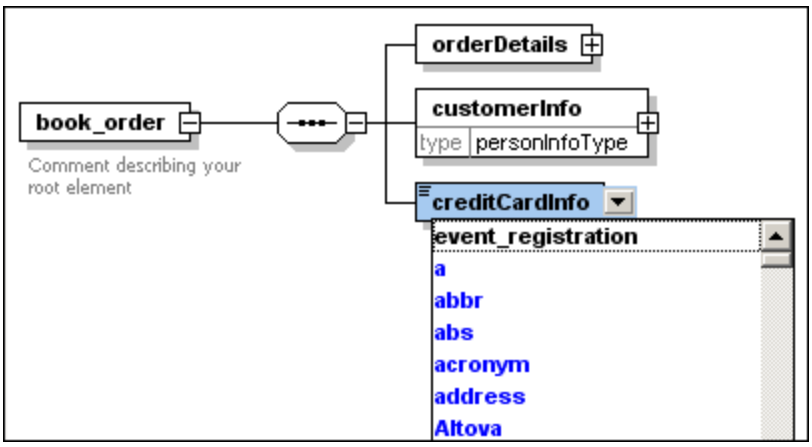


The redefined type is now being used as the type of an element in `book_order.xsd`.



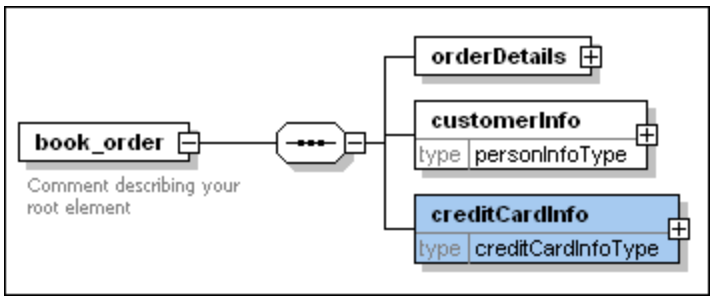
Lastly, we will use another type from `event_registration.xsd` in `book_order.xsd` without redefining the type:

1. Right-click on the sequence element and select **Add child** | **Element** from the context menu. Enter the name `creditCardInfo` for this element.



2. Make sure the creditCardInfo element is still selected and select the type creditCardInfoType from the **type** drop-down list in the Details entry helper.
3. Save the file.

The type creditCardInfoType is now being used as the type of an element in `book_order.xsd`.



Importing a Type

We will now import a type that stores information about books from `book_store.xsd` to `library.xsd`.

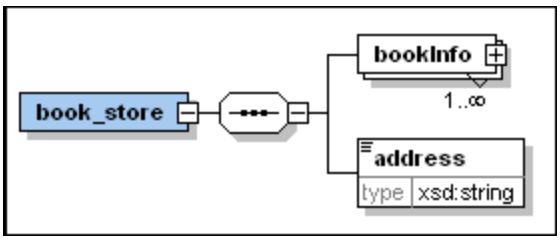
The schema `book_store.xsd` has a different namespace from the schema `library.xsd`. Therefore, to use elements from `book_store.xsd` in `library.xsd`, these elements must be imported.

The import relationship has already been created using SchemaAgent Client, so here we will use a type from the imported schema in the importing schema.

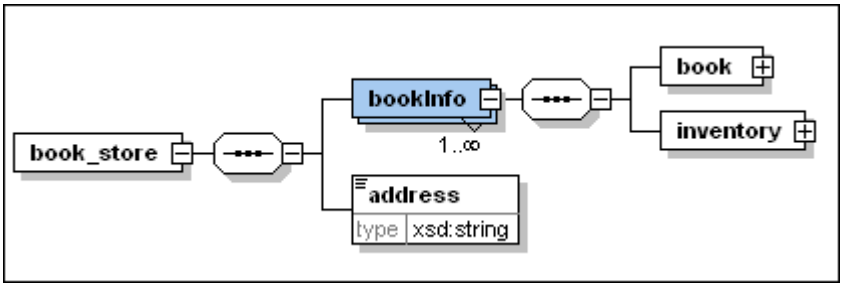
To make the component book into a global complex type:

1. Open the `book_store.xsd` schema in XMLSpy.

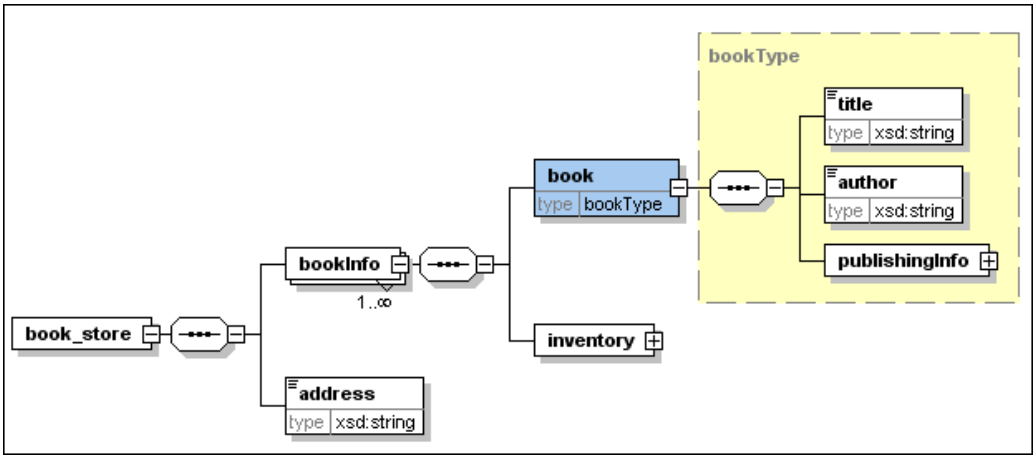
2. Click on the Display Diagram icon of the book_store element to show its content model.



3. Click on the "+" icon to expand the bookInfo element.



4. Right-click on the book element and select **Make Global** | **Complex type**. Click on the "+" icon to expand the book element. The schema `book_store.xsd` now includes the global type bookType.

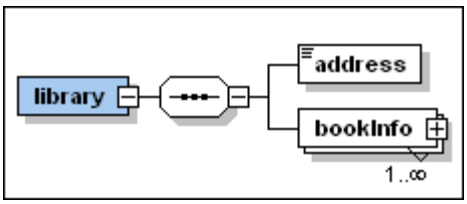


5. Save the file.

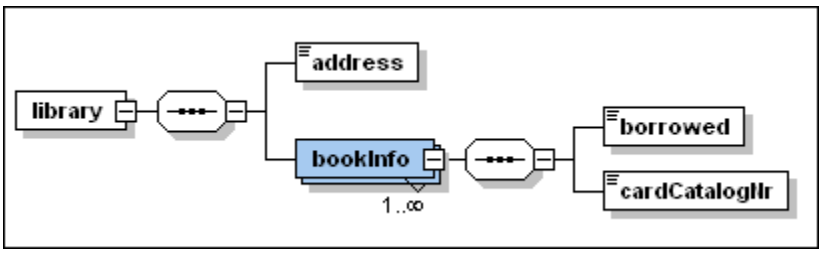
To import bookType to `library.xsd`:

1. Open the `library.xsd` schema in XMLSpy. Notice that the schema contains an import statement, which was automatically added when you connected the two schemas in the Import section discussed previously.

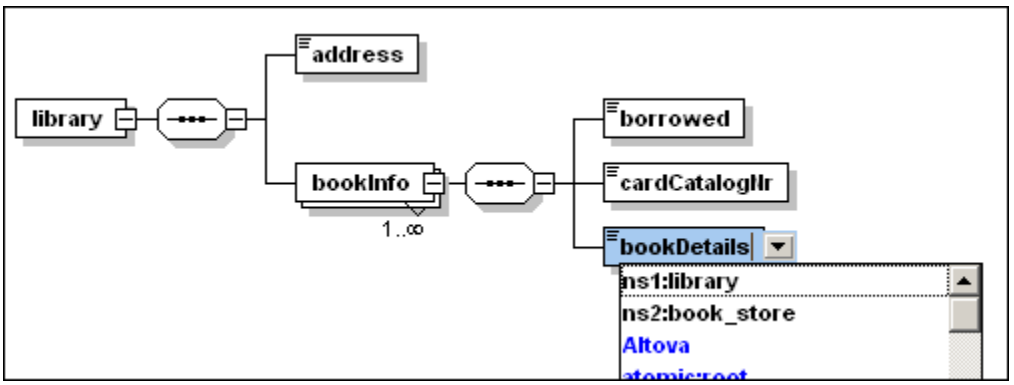
2. Click on the Display Diagram icon of the library element to show its content model.



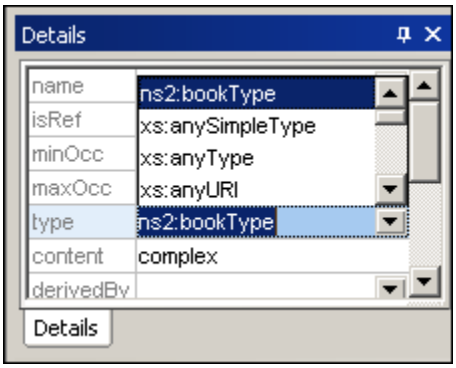
3. Click on the "+" icon to expand the bookInfo element.



4. Right-click on the sequence icon after the bookInfo element and select **Add child** | **element**. Enter the name `bookDetails` for the element.

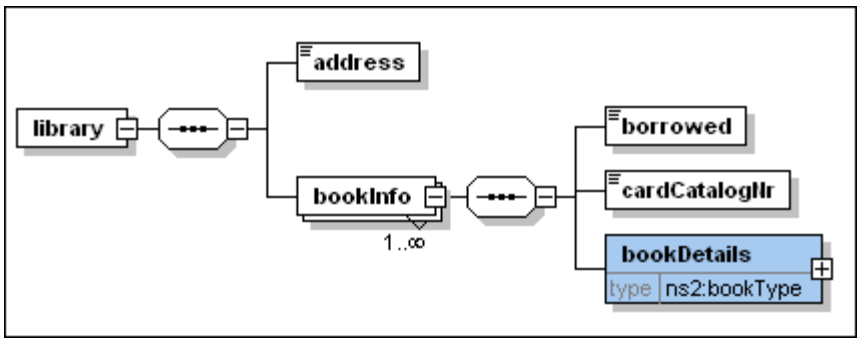


5. With the bookDetails element still selected, in the Details entry helper, select the type ns2:bookType from the **type** drop-down list. The element now has "ns2:bookType" as its type.



6. Save and close all files that are currently open in XMLSpy.

We have now imported a type from the schema `book_store.xsd` to the schema `library.xsd`.



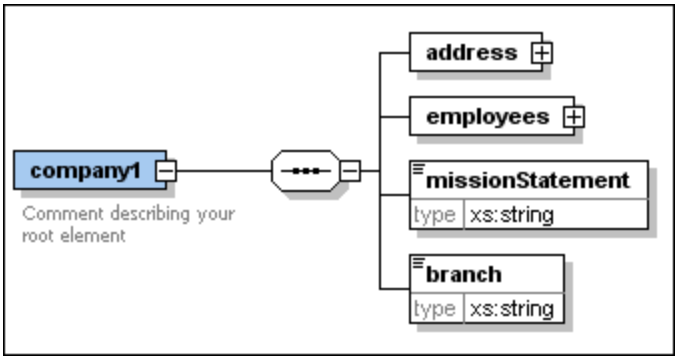
Including a Type Using Only XMLSpy

This section shows how to include types from one schema in another using only XMLSpy as a client connected to the SchemaAgent local server.

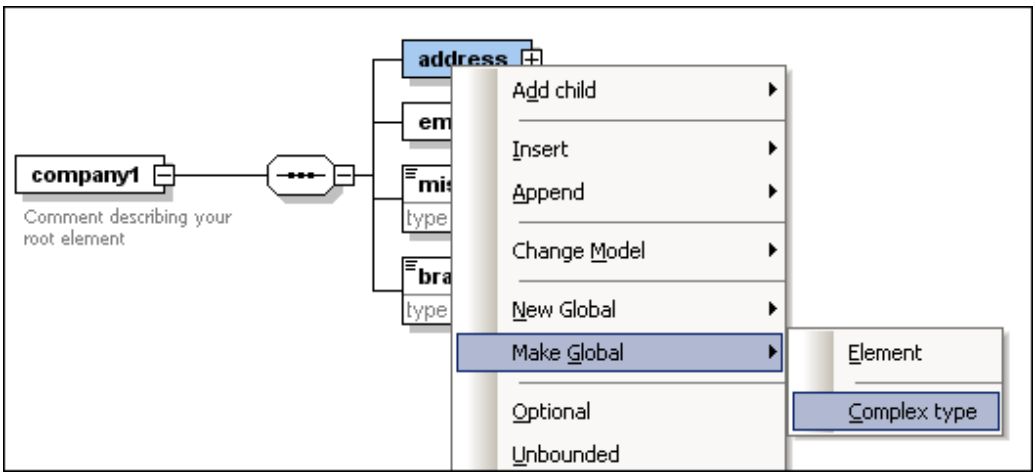
We will include the types addressType and employeeDataType from the schema `company1.xsd` in the schema `company2.xsd`.

To make the address and the employeeData components in `company1.xsd` into global complex types:

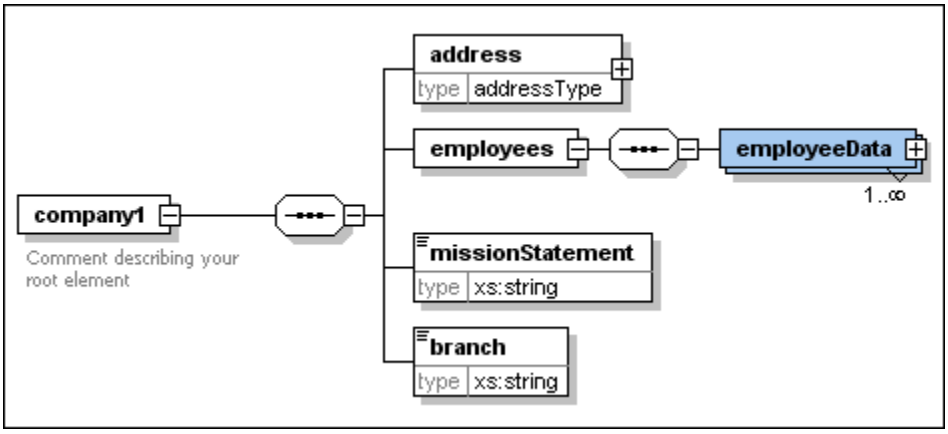
1. Open the schema `SchemaAgent2006\SchemaAgentExamples\Tutorial\include2\company1.xsd` in XMLSpy.
2. Click on the Display Diagram icon for the element company1 to display its content model.



3. Right-click on the address element and select **Make Global** | **Complex type** from the context menu. There is now a global complex type called addressType.



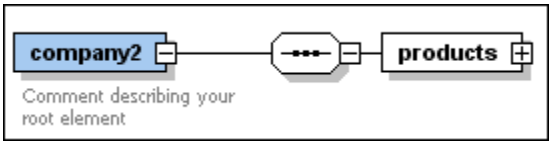
4. Click the "+" icon to expand the employees element. Now the employeeData element is visible.



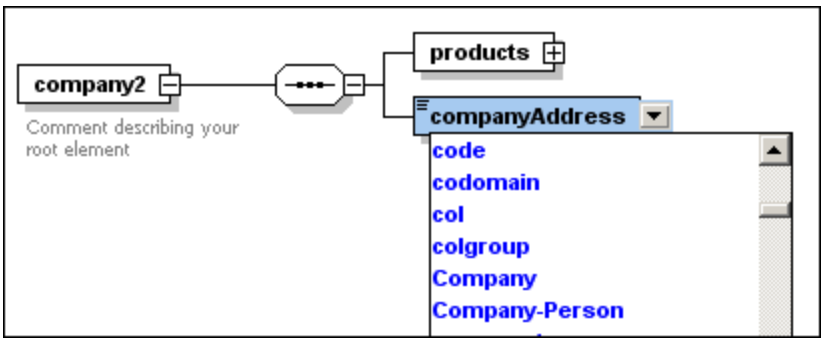
5. Make the employeeData element into a global complex type. This results in a type called employeeDataType.
6. Save the file.

To include the global complex types in the schema `company2.xsd`:

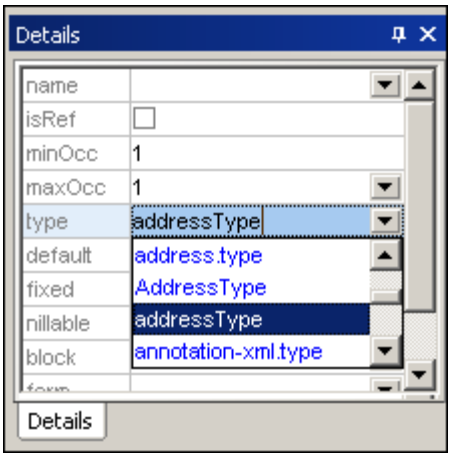
1. Open the schema `company2.xsd` in XMLSpy.
2. Click on the Display Diagram icon for the element company2 to display its content model.



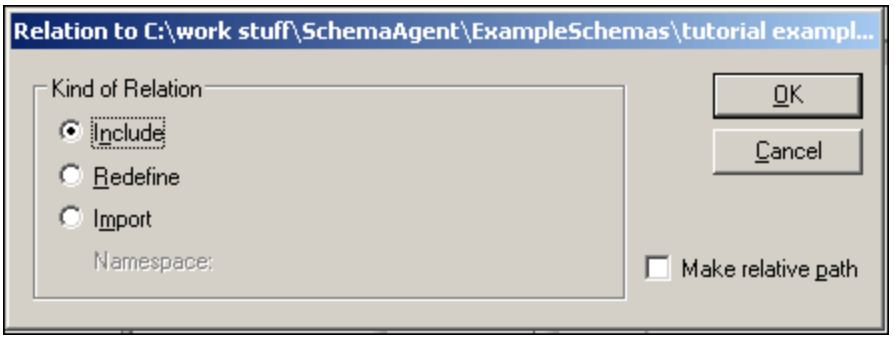
3. Right-click on the sequence element and select **Add child** | **Element**. Enter the name `companyAddress` for this element.



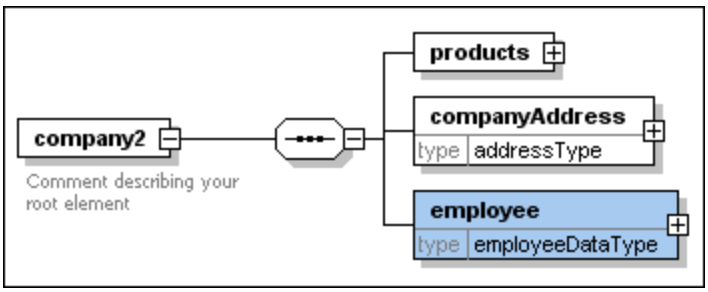
4. Make sure the companyAddress element is still selected and select the type addressType from the **type** drop-down list in the Details entry helper. The word "addressType" is in blue because there is no include, import or redefine relationship between the schemas.



5. A dialog opens where you can select which type of relationship you want to have between the two schemas. Select **Include** and confirm with **OK**. This inserts an include statement into the `company2.xsd` schema.



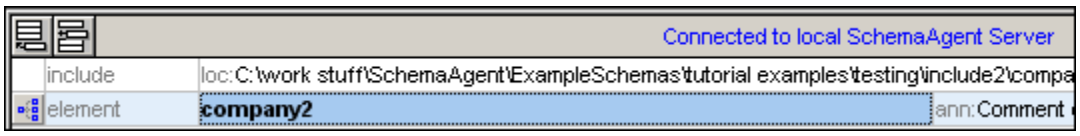
6. Create a further element with the name employee and type employeeDataType. Notice that when you select employeeDataType in the **type** drop-down list, it is in black, because there is now an include relationship between the schemas.



7. Save the file.

We have now included two types from the schema `company1.xsd` in the schema `company2.xsd`.

Click the schema overview icon to see the include statement that has been inserted into the `company2.xsd` schema.



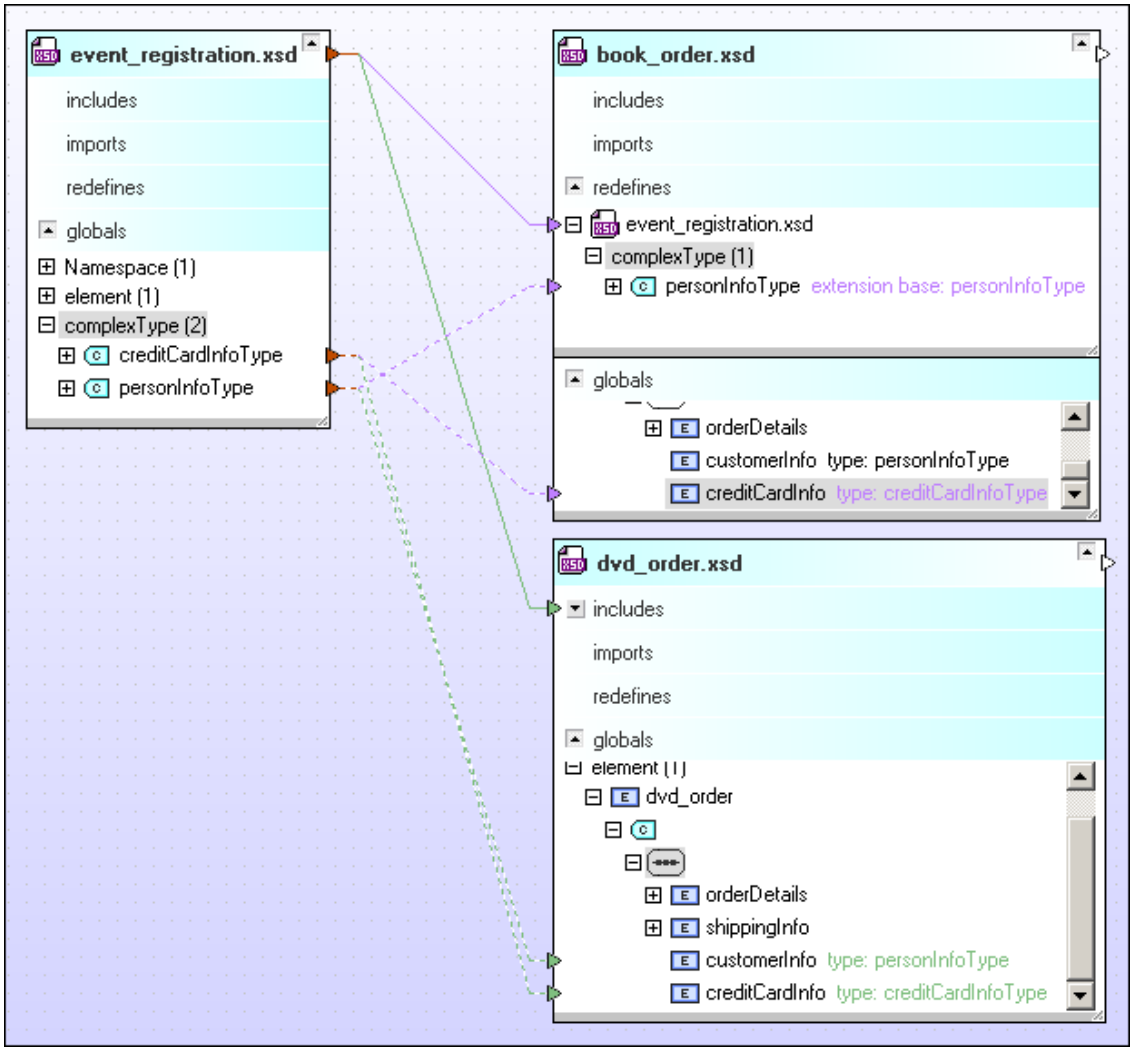
4.3.3 Viewing the Updated Relationships

In this section, you will use SchemaAgent Client to view the include and redefine relationships that you created between schemas in the course of this tutorial.

Do the following:

1. In SchemaAgent Client, make the Design tab active that contains the files `event_registration.xsd`, `dvd_order.xsd` and `book_order.xsd`.
2. Click the arrow icon in each of the file boxes to expand it.
3. Click the "globals" arrow icon in each of the file boxes.
4. In `event_registration.xsd`, expand "complexType".
5. In `dvd_order.xsd`, click "element" and continue to expand its subelements until you see "customerInfo" and "creditCardInfo".
6. In `book_order.xsd`, expand "redefines" and continue to expand its subelements until you see "personInfoType".

Now you can see exactly what elements were included or redefined in other schemas.



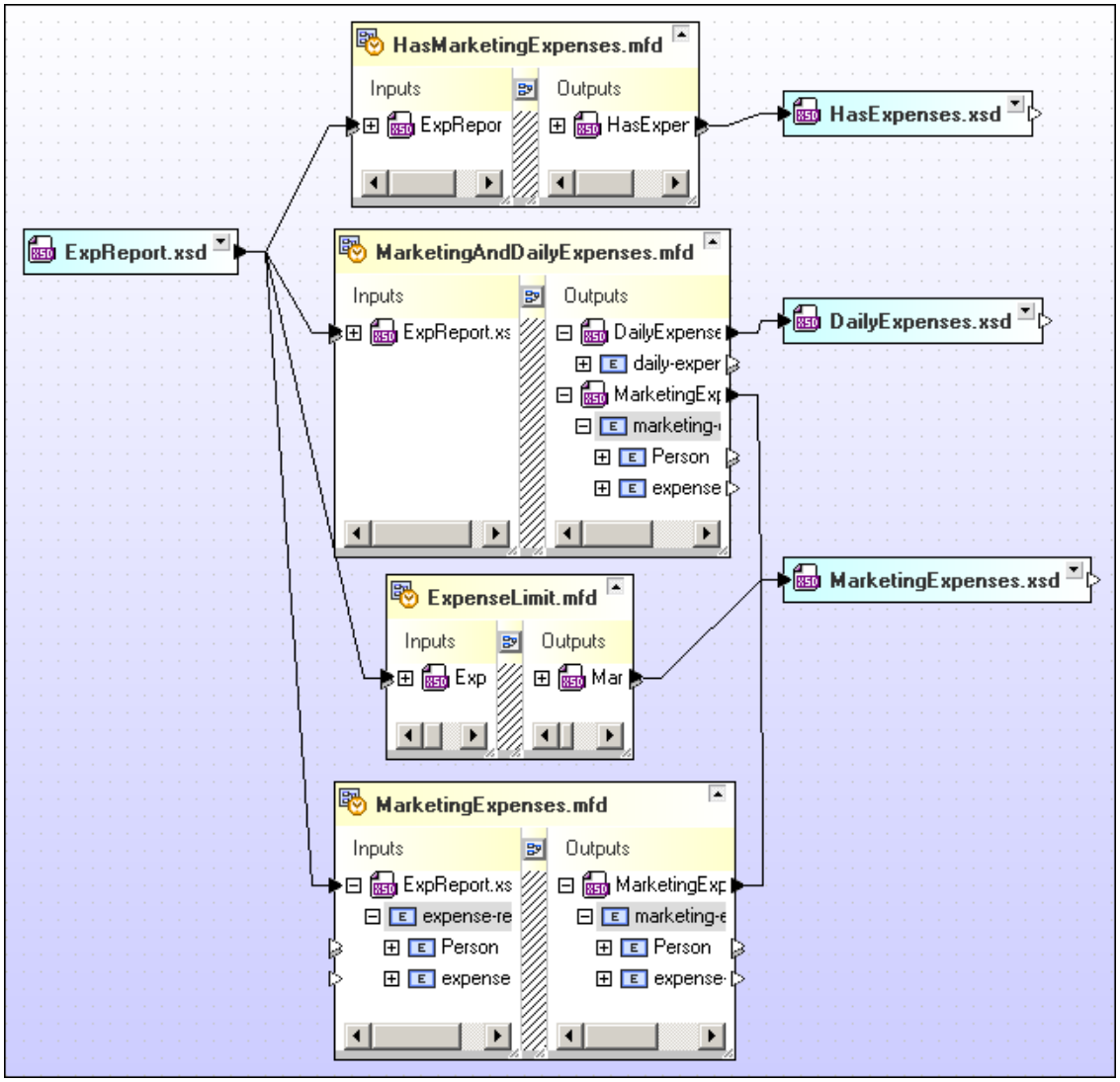
4.3.4 Viewing MapForce (MFD) Files

SchemaAgent Client allows you to view the components of MapForce files.

To view a MapForce file:

1. In SchemaAgent Client, select **File** | **New**. A new Design tab appears.
2. Drag and drop the files `ExpenseLimit.mfd`, `HasMarketingExpenses.mfd`, `MarketingAndDailyExpenses.mfd` and `MarketingExpenses.mfd` from SchemaAgent2006\SchemaAgentExamples\Tutorial\MapForce to the new Design tab.
3. Right-click on the files and select **Insert** | **All directly referenced files** from the context menu. The related XML schemas and their relationships appear in the Design tab.
4. Click the arrow icon to expand the file box of each of the MFD files.

Now you can see the MapForce design files and their related XML schemas. Position the cursor over the title bar of a MapForce file box to get a Quickinfo bubble that displays information about that file.



Chapter 5

SchemaAgent Server

5 SchemaAgent Server

SchemaAgent Server maintains an internal map of relationships between schemas and Altova MapForce Design (MFD) files within a given folder (including, optionally, sub-folders in that folder), and serves these schemas and MFD files, together with their inter-relationships, to SchemaAgent clients. The relationships between schemas can be modified using SchemaAgent clients, and the modified relationships are propagated through the affected schemas via SchemaAgent Server. SchemaAgent Server processes client requests to create, update, or delete schema IIRs (Includes, Imports, and Redefines) and references between schemas and MFD files, and manages the communication between SchemaAgent Server and its clients.

Please note: SchemaAgent Server and its clients transfer data using UDP and TCP over **port 2799**.

Overview
This documentation for SchemaAgent Server is organized into the following sections:

- SchemaAgent Server Installation
- Using SchemaAgent Server

5.1 SchemaAgent Server Installation

Installation Options

It is possible to install SchemaAgent Server in the following ways:

- **Install and start SchemaAgent Server as a standalone server:** When installed as a standalone server, SchemaAgent Server can be started from the **Start** | **All Programs** menu or from a desktop icon. The application opens in a GUI, and, when started, an application icon appears in the system tray. SchemaAgent Server can be configured (that is, have search paths defined for it) directly in the GUI. This installation is well suited for installation on a local machine.
- **Install SchemaAgent Server as an interactive service:** Installing SchemaAgent Server as an interactive service causes SchemaAgent Server to be started automatically on every system start. The SchemaAgent Server application icon is available in the system tray, and the application can be started and stopped using the system tray icon. SchemaAgent Server can also be started and stopped using operating system tools (in Windows XP, **Administrative Tools** | **Services**). Installing SchemaAgent Server as an interactive service saves you the task of starting and stopping the service manually. Clicking the application icon in the system tray enables you to show/hide the GUI, change the configuration settings, and shutdown SchemaAgent Server. This type of installation is best if SchemaAgent Server is to act as a network server for multiple clients.
- **Install SchemaAgent Server as a (non-interactive) service:** Installing SchemaAgent Server as a non-interactive service completely hides it from users. The operating system starts SchemaAgent Server automatically on every system start. No system tray icon is available when SchemaAgent Server is installed as a (non-interactive) service. In order to configure SchemaAgent Server (that is, define search paths), you must first install SchemaAgent Server as an interactive service, configure it, and then run it as a non-interactive service.

Installing SchemaAgent Server

1. Download the SchemaAgent Server installation package free of charge from the SchemaAgent download page.
2. Double-click on the SchemaAgent Server installer file.
3. Follow the onscreen instructions. During the installation process, you will be given a choice of whether you wish to install SchemaAgent Server as a standalone server, an interactive service, or a (non-interactive) service. These options determine the level of user interactivity required to start SchemaAgent Server on your computer.

Installing SchemaAgent Server Using the Command Line

The commands listed below are available when calling SchemaAgent Server. The EXE always returns a return code when run in command-line mode. If an error is encountered using the install and remove parameters, then the returned error code is identical to the code supplied by the operating system.

`SchemaAgentServer.exe`

No command line parameters	Start as GUI application.
`/install` or `-install`	Install as a (non-interactive) service (creates an entry in the SCM Database*).
`/install:interactive` or `-install:interactive`	Install as an interactive service (creates an entry in SCM Database*).

`/remove` or `-remove`	De-installs the service (deletes entry from the SCM-Database*).
`/quiet` or `-quiet`	Suppresses message boxes that appear when an error occurs using the `Install` or `Remove` commands.

* The Service Control Manager (SCM) maintains a database of installed services and driver services, and provides a unified and secure means of controlling them. The database includes information on how each service or driver service should be started. It also enables system administrators to customize security requirements for each service and thereby control access to the service. *(Source: MSDN Library)*

5.2 Using SchemaAgent Server

SchemaAgent Server works as follows:

- SchemaAgent Server reads information about the schemas or MapForce Design (MFD) files in a folder you identify (and optionally in that folder's subfolders). This folder is called the **search path** in SchemaAgent terminology. SchemaAgent Server determines the relationships between these schemas and MFD files, and creates an internal map of these files and their components. You can define multiple search paths. Once multiple search paths have been defined in SchemaAgent Server, you can administer the relationships between one or more schemas in the defined search paths from within the SchemaAgent Client GUI.
- Information about the schemas and MFD files in the search path/s and the relationships between these files is then served to SchemaAgent clients that connect to SchemaAgent Server.
- IIR (Include, Import, and Redefine) relationships between schemas can be modified and schemas and MFD files can be deleted in SchemaAgent clients. These modifications and deletions are implemented in the actual schemas via SchemaAgent Server. SchemaAgent Server processes client requests to create, update, or delete schema IIRs (Includes, Imports, and Redefines) and to manipulate files, and it manages the communication between SchemaAgent Server and its clients.

You will, therefore, use SchemaAgent Server to do the following:

- Define the search paths that SchemaAgent Server reads and manages. This is described in Configuring Search Paths. More than one search path can be defined for a server. All the schemas and MFD files in all the defined search paths then become available for use in designing IIR relationships in SchemaAgent clients.
- Maintain an overview of schemas and MFD files in the search paths and of the interaction between SchemaAgent Server and the various SchemaAgent clients that connect to the server. This overview is available through the various panes of the GUI, and is described in the SchemaAgent Server GUI section of this documentation.

This is the extent of your interaction with SchemaAgent Server. Creating SchemaAgent Designs and manipulating schema files is done in the SchemaAgent Client application.

Please note: SchemaAgent clients use the internal map that is created in SchemaAgent Server . This map is created or updated when: (i) a new search path is created, or (ii) an existing search path is modified within SchemaAgent Server; or (iii) SchemaAgent Server is started with search paths already defined. If the contents of a folder are physically modified (for example, if a schema file is physically deleted from the repository—and not from within a SchemaAgent client) after SchemaAgent Server has been started, then SchemaAgent Server's internal schema map is **not** automatically updated, and SchemaAgent clients will continue to use the original map.

This section contains the following:

- how to start, shut down and hide SchemaAgent Server
- how to view and configure search paths
- how to configure file extensions
- how to view connections to SchemaAgent Server
- how to configure SchemaAgent Server
- how to view log information
- how to access online help

5.2.1 Starting and Shutting Down SchemaAgent Server

This section explains how to do the following:

- start SchemaAgent Server
- shut down SchemaAgent Server
- show/hide SchemaAgent Server

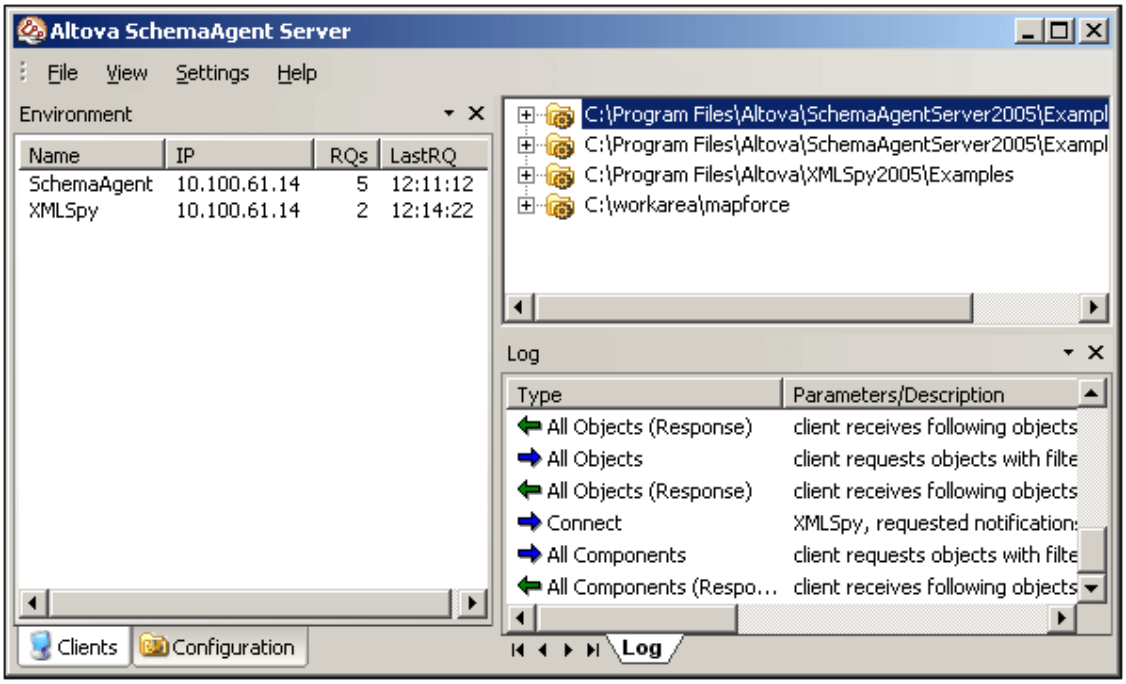
Starting SchemaAgent Server

To start SchemaAgent Server:

- In the Windows Start menu, select **Programs** | **Altova SchemaAgent Server 2006** | **Altova SchemaAgent Server**. The SchemaAgent Server GUI appears (*see screenshot*)

The GUI is available if you have installed SchemaAgent Server as a standalone server or as an interactive service. If you have installed and started SchemaAgent Server as a non-interactive service, no GUI will be available.

Please note: When SchemaAgent Server is running, the SchemaAgent Server application icon  appears in the system tray at the bottom right of the screen.



GUI Layout

The following general layout options are available:

- Right-clicking in the Environment pane or Log pane pops up a context menu with commands that enable you to toggle on and off the display of the Environment and Log panes.
- The Environment and Log panes can be closed by clicking the Close button at the top-right of the respective panes.
- Double-clicking the title bar of the Environment and Log panes enables you to dock or undock these two panes in the application window.

- When you drag the title bar of a pane, you can position that pane freely anywhere in your workspace.
- When you drag the title bar of a pane, blue placement arrows appear in the SchemaAgent Server application window. Dragging the pane over one of these placement arrows docks the pane at the location indicated by that placement arrow. The four outer placement arrows dock the pane along each of the four edges, respectively. The four inner placement arrows dock the pane relative to the panes located along the edges.

Shutting Down SchemaAgent Server

To shut down SchemaAgent Server:

- Right-click on the SchemaAgent Server application icon  in the system tray and select **Shutdown**. If clients are connected to SchemaAgent Server, before shutdown a prompt opens, displaying the number of currently connected clients and asking if shutdown should be continued. If you shut down SchemaAgent Server while clients are still connected, these clients will lose their connection to SchemaAgent Server. This means that these clients will not be able to process commands that depend on a connection to SchemaAgent Server (for example, commands such as creating or modifying an IIR relationship in a SchemaAgent Design).

Showing/Hiding SchemaAgent Server

To toggle showing and hiding of SchemaAgent Server:

- Right-click on the SchemaAgent Server application icon  in the system tray and select **Hide**, or double-click the application icon.

5.2.2 Managing Search Paths

This section explains how to do the following:

- view search paths
- configure search paths

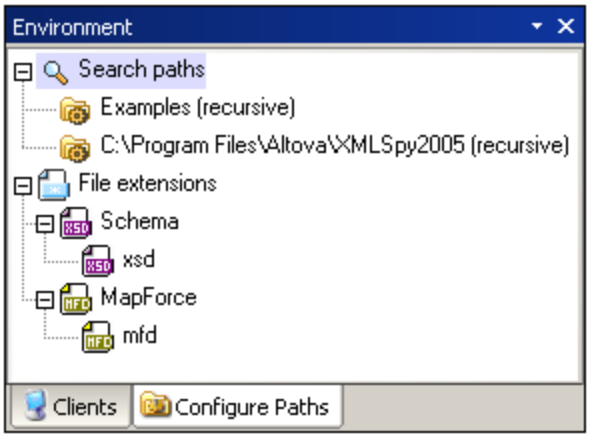
Viewing Search Paths

To view search paths:

- In the Environment Pane, click the **Configure Paths** tab.

Configure Paths Tab

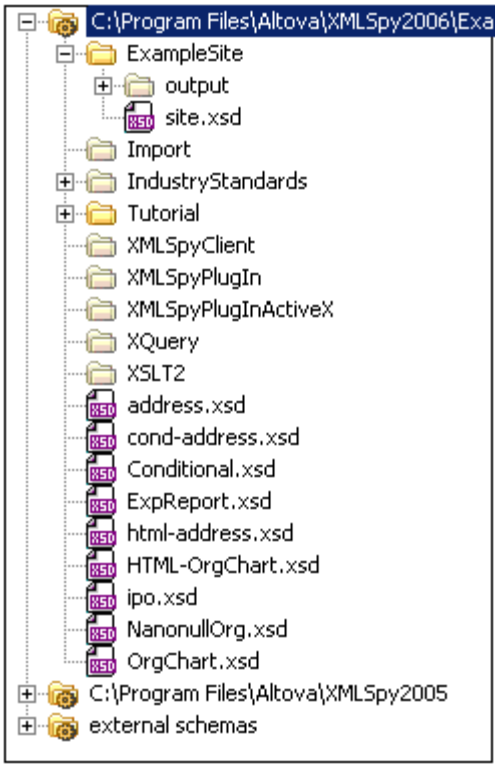
The **Configure Paths** tab of the Environment Pane (*see screenshot*) displays the currently defined search paths, and the status of the Recursive setting (active/inactive) for each search path.



The screenshot indicates that this SchemaAgent Server currently has two search paths defined for it (`Examples` and `XMLSpy2005` under the **Search Paths** entry), both of which have their Recursive setting enabled. (When the Recursive setting is enabled, sub-folders are also included in the search path.)

The **File Extensions** entry shows the file extensions that SchemaAgent Server recognizes as XML Schema and MapForce Design (MFD) files.

Subfolders in a search path are shown only if the Recursive option has been selected in the definition of the search path. Subfolders that contain W3C XML Schemas or Altova MapForce Design (MFD) files are shown in dark yellow, while subfolders that contain no W3C XML Schema or MFD file are shown in light yellow (*see screenshot*). Among files, only W3C XML Schema files and MFD files are shown in the tree.



Configuring Search Paths

Search paths are the paths or folders that are scanned for XML Schemas and MapForce Design (MFD) files. You can configure (add, edit, or delete) search paths.

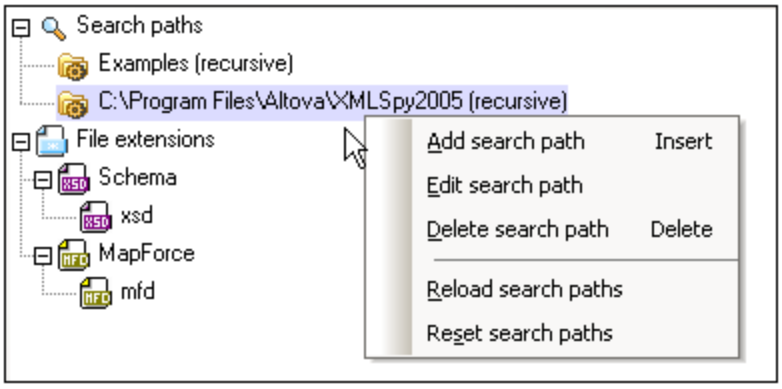
Search Path considerations
Depending on the installation location of SchemaAgent Server, certain file access and path restrictions may apply. If you access schemas on a network share, make sure that the SchemaAgent Server application has the correct access permissions.

File system support is as listed below:

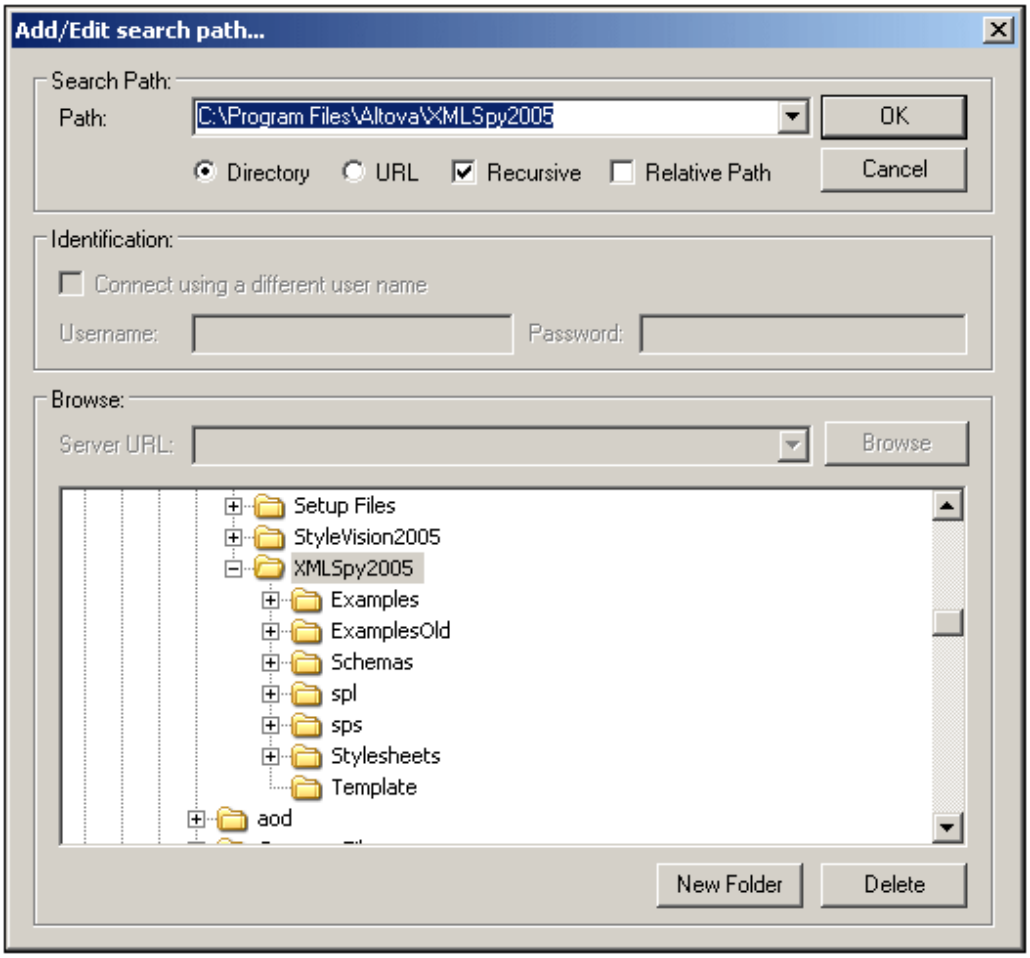
- UNC paths are supported. Note that schema paths can be, or references within schemas can contain, UNC paths or relative paths.
- WebDAV folders are supported. Location paths can be, or references within schemas can contain, WebDAV folders or relative paths.
- FTP connections are supported. Files can be directly accessed using FTP.
- Mapped drives are supported. If drive letters are used in search paths, then machines hosting SchemaAgent clients must have the identical drive letter mapped to the same shared folder.
- Local drives/directories are **not directly** supported. Access to local directories or resources, however, is possible if the local directories are shared to the network and search paths on SchemaAgent Server are configured to use the network shares.

Adding or Editing Search Paths
To add or edit search paths:

1. In the **Configure Paths** tab of the Environment Pane, right-click on the Search Paths entry, or on an entry for any individual search path. This displays the context menu shown below.



2. Click either the **Add Search Path** or **Edit Search Path** command to open the Add/Edit Search Path dialog (*see screenshot*), which you use to browse for and configure individual search paths.



3. Select either the **Directory** or **URL** radio button according to whether your search path is, respectively, a directory or a URL. Continue by following the appropriate procedure below.

Search Path is a directory

If the search path is a directory (**Directory** radio button selected), do the following:

1. Enter the search path directly in the Path text box. Alternatively, browse for the required

directory in the Browse pane; the selected directory is entered in the Path text box.
2. Select the **Recursive** check box if you wish sub-directories of the selected directory to be searched. If this check box is not selected, no sub-directories will be searched.
3. Select the **Relative Path** check box to make the search path entry in the Configure Paths pane relative; leave the check box unchecked to use an absolute path.

Search Path is a URL
If the search path is a URL (URL radio button selected), do the following:

1. Enter the server URL in the Server URL text box of the Browse pane.
2. If authorization is required, select the Connect Using a Different User Name check box (in the Identification pane), and enter the username and password.
3. In the Browse pane, click the Browse button to browse for the required directory; the selected directory is entered in the Path text box.
4. Select the **Recursive** check box if you wish sub-directories of the selected directory to be searched. If this check box is not selected, no sub-directories will be searched.

Deleting Search Paths
To delete a search path:

- In the Environment Pane on the Configure Paths tab, right-click on the path you want to delete and select **Delete search paths**.

The configuration file
The set of schemas and MFD files managed by SchemaAgent Server is defined in an XML file called `SchemaAgentServerCfg.xml`, which is stored in the SchemaAgent Server application folder. This file defines the **search paths**, and what paths or folders are scanned for schema files. The `SchemaAgentServerCfg.xml` file looks something like this:

```
<?xml version="1.0" encoding="UTF-8"?>
<SearchPaths>
   <Path recursive="true">s:\schemas-mydir\</Path>
   <Path recursive="true">X:\schemas\</Path>
   <Path recursive="true">http://test.webdav.org/dav</Path>
   <Path recursive="true">\\Server1\Share1\Dir1\Schemadata</Path>
   <Path recursive="true">ftp://myftpserver</Path>
</SearchPaths>
```

Note that any number of search paths can be defined, and search paths include paths on a local machine, network paths (mapped drive letters and UNC paths), as well as folders on WebDAV servers and FTP access.

After search paths have been defined, SchemaAgent Server retrieves all schemas and MFD files in individual search paths and builds an internal map of the relationships between the schemas and MFD files in a search path. It is this mapping of relationships that enables SchemaAgent clients to present data about schema and MFD file relationships graphically. Further, if an IIR or file manipulation change is made in a SchemaAgent client, it is this mapping that enables the automatic updating of such changes in related files in the search path.

Please note: It is possible to have multiple SchemaAgent Servers running simultaneously in a network environment; SchemaAgent Clients on the network can be connected to any server on the network.

5.2.3 Configuring File Extensions

To add, edit or delete file extensions for XML schema and MFD files:

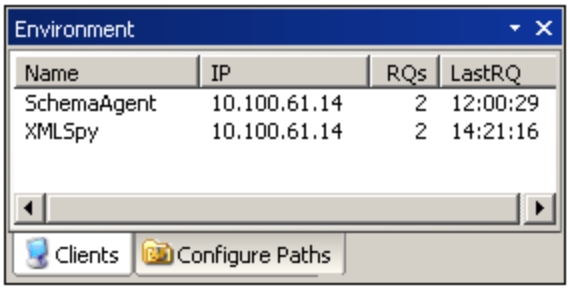
- Right-click the `Schema` or `MapForce` entries, or the individual file extensions, and select the required command.

5.2.4 Viewing Connections to SchemaAgent Server

To view connections to SchemaAgent Server:

- In the Environment Pane, click the **Clients** tab

The Clients tab (*see screenshot*) displays details about the clients that are currently connected to SchemaAgent Server. Connections to SchemaAgent Server are initiated by a request from the client, and must be made from the client.



The screenshot shows that two clients, SchemaAgent Client and XMLSpy, are currently connected to this SchemaAgent Server. The IP addresses of the connected clients are also listed. The number of requests made by a client is shown in the RQs column, and the time of the last request made by each client is shown in the LastRQ column.

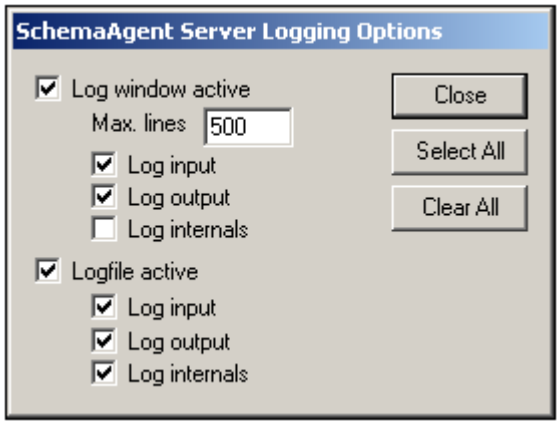
5.2.5 Configuring SchemaAgent Server

Configuring the Display of Panes in SchemaAgent Server

- Select **View** | **Toolbars**. Select a pane from the submenu. Display of the pane is toggled or or off.
  or
- Right-click inside the **Clients** tab to display a context menu that enables you to toggle the display of the Environment and Log panes.

Configuring Logging Options

- Select **Settings** | **Logging Options**. The Logging Options dialog opens (*see screenshot*).

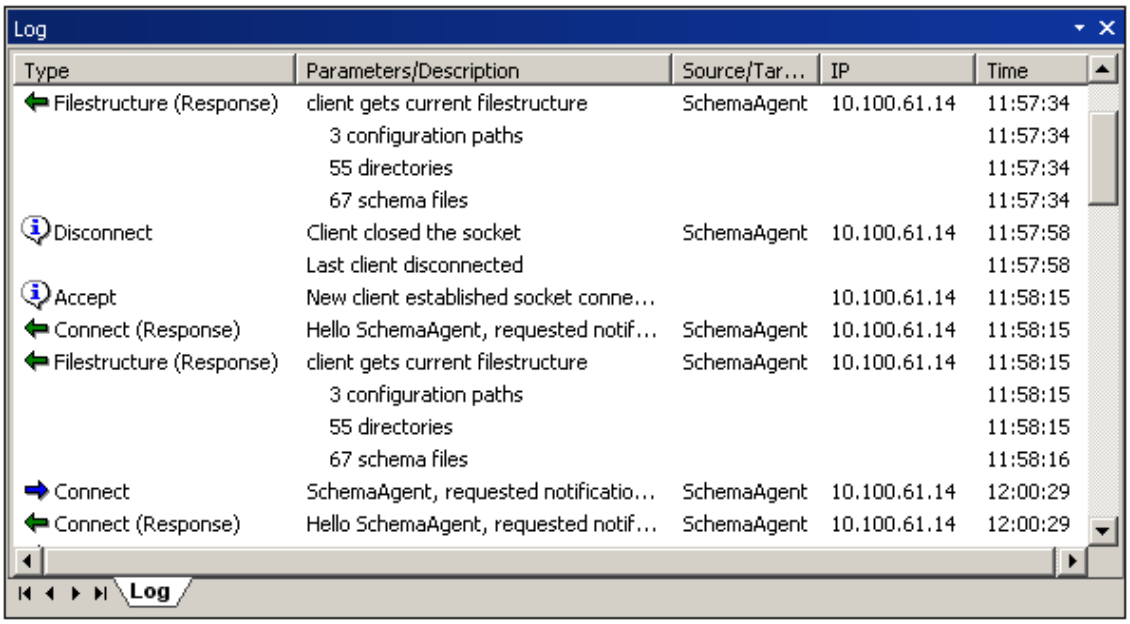


Selecting the **Log window active** check box causes SchemaAgent Server actions to be displayed in the Log pane. The Log Input option enables/disables the display of incoming requests. The Log Output option enables/disables the display of outgoing responses. The Log Internals option enables/disables the display of internal SchemaAgent Server information.

Selecting the **Logfile active** check box causes SchemaAgent Server actions to be written to a log file. The log file is a Comma Separated Values (`.csv`) file called `SchemaAgentServerLog.csv`. The log file is created in the same folder as SchemaAgent Server each time you start a SchemaAgent Server session and if the Log File Active check box is selected.

5.2.6 Viewing Log Information

The Log pane (*see screenshot*) shows client requests, server responses, and other server-related data. This data is presented as a description, together with the time of execution (in the case of actions) or the time of data transfer (in the case of notifications). When the information involves a client, the client is listed together with its IP address.



Requests from the client are indicated with a blue, right-pointing arrow. Responses from the server are indicated with a green, left-pointing arrow. The source client (of requests) and target client (for responses) are indicated in the Source/Target column. The Description column shows the kind of action, while the Time column gives the time of the action.

Note the following:

- Each time a search path is modified in SchemaAgent Server (for example, if the **Recursive** option is disabled for a search path), the modified file structure is sent by SchemaAgent Server to all connected clients.
- If a folder that is in a search path has its structure modified outside SchemaAgent Server (for example, if a subfolder is deleted from the repository), then this information is not updated in SchemaAgent Server until search paths are reloaded.
- The `Failed to read schema` message appears when a schema file includes or imports other schemas which cannot be found at the location specified.

5.2.7 Getting Help

Help Menu

The **Help** menu contains commands that provide access to the onscreen help files, and that are links to useful resources on the Altova website.

Chapter 6

SchemaAgent Client

6 SchemaAgent Client

SchemaAgent Client Overview
SchemaAgent™ 2006—called SchemaAgent Client in this documentation—enables you to build a SchemaAgent Design, in which you create or modify IIR relationships (Imports, Includes, and Redefines) between schemas.

In a SchemaAgent Design, you can also view relationships between schemas and between a schema-based MapForce (`.mfd`) file and its associated schemas. A SchemaAgent Design is saved as a SchemaAgent Design (`.sad`) file, which can subsequently be opened in SchemaAgent Client and edited. SchemaAgent Client has a simple, easy-to-use GUI, in which schemas can easily be linked to each other using standard GUI techniques, such as drag-and-drop. Additionally, SchemaAgent Client enables you to manage schemas (rename them, move them, delete them, etc.) so that references to schemas that have been modified in this way are globally updated in related files. This functionality makes SchemaAgent Client a powerful workspace from which to manage large numbers of complex, related schemas, and edit relationships between these schemas.

How SchemaAgent Client Works
SchemaAgent Client connects to a SchemaAgent server. It can either connect to the LocalServer that is installed with the SchemaAgent product, or connect to Altova's free SchemaAgent Server product. The main difference between these two servers is that LocalServer is installed on the local machine and serves clients on the same computer, while SchemaAgent Server can be installed on a network machine, serves multiple clients, and provides detailed logging information.
After connecting to the server, SchemaAgent Client retrieves information about the schemas and MapForce Design (MFD) files in SchemaAgent Server's search paths, and displays the folders in the search paths as a tree structure (hierarchical and flat) in SchemaAgent Client. In SchemaAgent Client, you then drag schemas/MFD files from the tree (in the Explorer pane of the GUI) and drop them into the SchemaAgent Design in the Design pane. In the Design pane, you can view the composition of schemas and MFD files, and build relationships between the schemas in the SchemaAgent Design. When you build or modify a relationship between two schemas, not only are the actual schema files updated with the new information, but all other linked schemas affected by the relationship are also updated. Additionally, in the Explorer pane of SchemaAgent Client (which shows the folders in a tree structure), you can manage schemas at a high level (rename them, move them, delete them, etc.).

6.1 Installing and Starting SchemaAgent Client

This section describes how to do the following:

- install SchemaAgent Client
- start and exit SchemaAgent Client

The SchemaAgent Client GUI is also described.

6.1.1 Installing SchemaAgent Client

To install SchemaAgent Client (the Altova product **SchemaAgent™ 2006**):

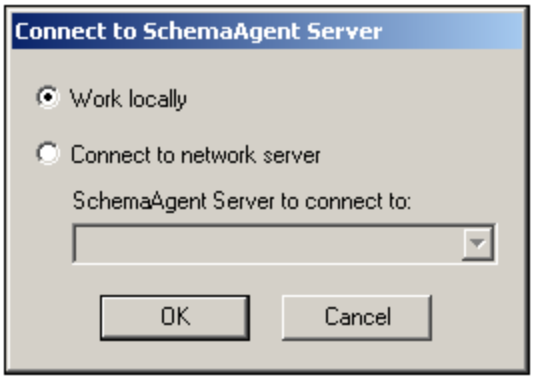
1. Download the SchemaAgent 2006 installation package from the SchemaAgent download page at the Altova website. If you have purchased Altova's Enterprise XML Suite or Professional XML Suite, the SchemaAgent 2006 product is included in the package.
2. Double-click the installer file to run the installation process. Note that a local SchemaAgent server (called LocalServer in this document) will be installed as part of the SchemaAgent Client installation process. During the installation process, you will be asked whether you wish to use SchemaAgent locally (that is via the LocalServer) or via SchemaAgent Server. Your selection determines the default setting for which server the client will connect to on startup. This can always be changed using the **Extras | Connect to Server** command.
3. Enter and save the licensing information so as to activate the product license. The SchemaAgent Client license must be purchased at the Altova Shop at the Altova Website. If you have purchased Altova's Enterprise XML Suite or Professional XML Suite, the license for SchemaAgent Client is included in that package.

6.1.2 Starting and Exiting SchemaAgent Client

Starting SchemaAgent Client
After you have successfully installed SchemaAgent Client, the application appears in your program list (**Start | All Programs**).

To start SchemaAgent Client:

1. Click the SchemaAgent entry in the **All Programs** list or the SchemaAgent icon  in the Quick Launch tray. If your license information has not yet been registered with SchemaAgent, you will be prompted for it when you try to start SchemaAgent. If you have registered a valid license, the following dialog will appear:



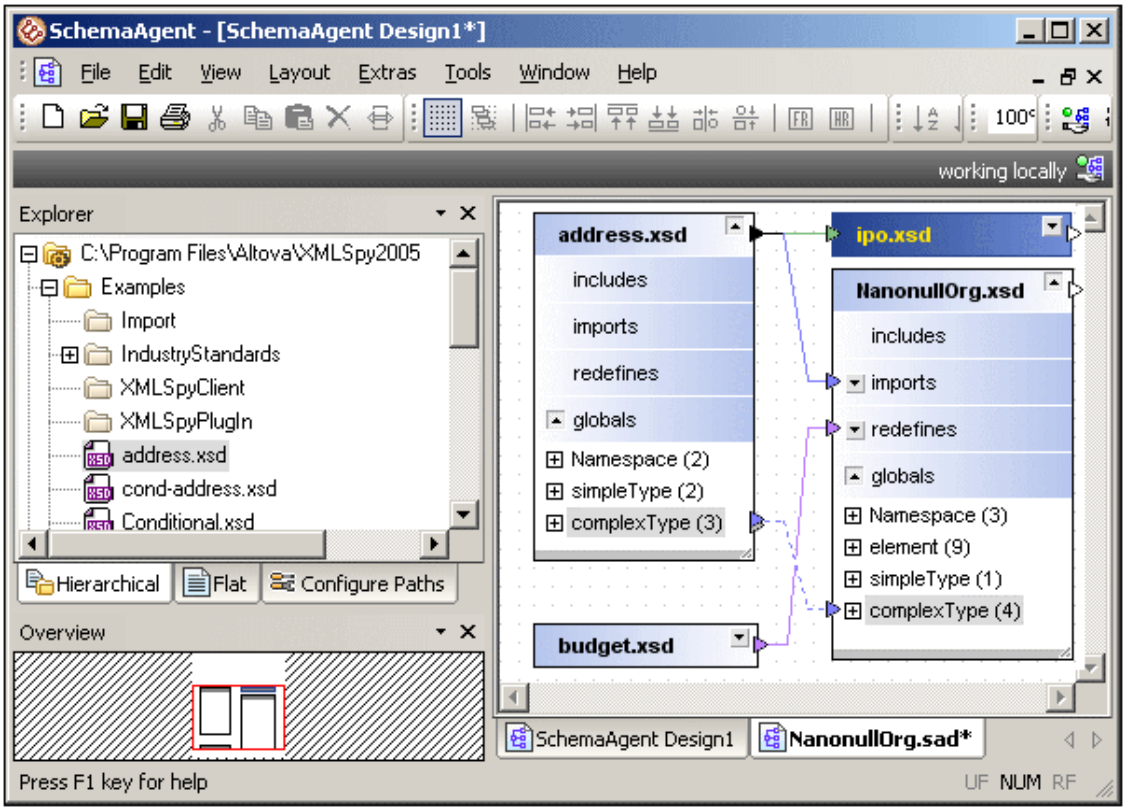
2. Select **Work Locally** to connect to LocalServer. Select **Connect to Network Server** to select a currently running SchemaAgent Server (on the network) from the drop-down list.
3. Confirm with **OK**.

Exiting SchemaAgent Client
To exit SchemaAgent Client:

- Select **File** | **Exit**.

6.1.3 SchemaAgent Client GUI

The SchemaAgent Client GUI has two main areas: the **Explorer pane** at left, and the **Design pane** at right (in which one or more SchemaAgent Designs can be open at a time). In addition, there is an **Overview pane** and standard Windows GUI features such as a Menu Bar, Toolbars, and a Status Bar.



Overview Pane
The Overview pane shows what part of the currently active design is currently in view in the Design Pane. The red rectangle in the Overview pane represents the current viewport, and it can be dragged so that another part of the design is brought into view in the Design pane.

Design Pane
The Design pane contains one or more SchemaAgent Design tabs (Design tabs, for short). Each Design tab graphically displays schemas and MFD files dragged onto the tab from the Explorer pane and shows existing IIRs (Includes, Imports, Redefines) between these schemas and between MFD files and schemas with customizable colored lines. You can additionally create your own IIR relationships between schemas using drag-and-drop. SchemaAgent Design s created in the Design tab can be saved individually, thus enabling you to manage large groups or collections of schemas. SchemaAgent Designs can be saved as `.sad` files, which can subsequently be re-opened and edited.

In the Design tab, you can do the following:

- create IIR relationships between schemas using drag-and-drop
- correct IIR references
- align and sort schemas in the graphical Design representation

- delete schemas from the SchemaAgent Design
- recreate ghost schemas
- view schema information

Moving and arranging GUI panes
The Overview and Explorer panes can be docked in the GUI, be made to float, or be hidden. To do any of these, right-click the title bar of the relevant pane and select the required option. Double-clicking the title bar of these panes toggles them between the docked and the floating position.

You can also drag a pane to a desired docking location. When you drag a pane (by its title bar), two sets of positioning arrows appear. The outer set docks the dragged pane within and relative to the application window. The inner set docks the dragged pane relative to the pane in which the inner set of arrows appears. To dock the dragged pane in one of these positions, drag the pane over one of the positioning arrows and release it.

When a pane is docked over another pane, the panes become tabbed panes and the required tab can be selected by clicking its tab. To separate two such tabbed panes, drag the tab (not the title bar) and release it at the required location.

You can resize panes by dragging their borders.

6.2 Connecting to a Server

In order to use SchemaAgent Client, you must start one of the following servers:

- the local server
- SchemaAgent Server

and connect to it.

6.2.1 Starting and Shutting Down LocalServer

Starting LocalServer
When SchemaAgent Client is started, LocalServer is started automatically.

To start LocalServer automatically when the user logs in (i.e. from the Startup folder):

- Go to **Tools** | **Options** | **Miscellaneous** and select **Startup during user login (Add to Startup folder)**.

Shutting down LocalServer
To shut down the LocalServer:

- Click the LocalServer's icon  in the system tray (at bottom right of your screen), and then select **Shutdown SchemaAgent LocalServer**.

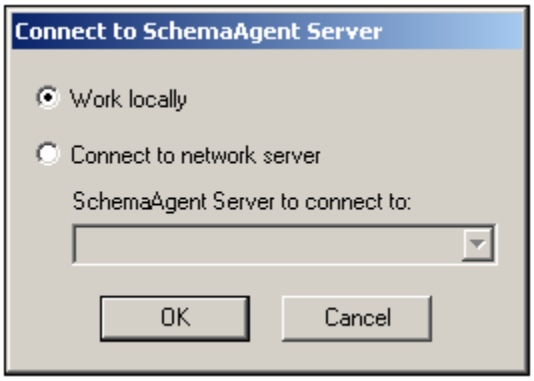
6.2.2 Installing and Starting SchemaAgent Server

See SchemaAgent Server Installation.

6.2.3 Making a Connection

This command can be used to connect to a SchemaAgent server (LocalServer or SchemaAgent Server) other than that to which SchemaAgent Client is currently connected or to a SchemaAgent server with which SchemaAgent Client has lost connection.

1. Select **Extras** | **Connect to server**. The Connect to SchemaAgent Server dialog opens.



2. Select whether you want to work locally (using LocalServer) or use a network-based SchemaAgent Server. If a SchemaAgent server connection already exists, you have to close this connection before making a new connection.
   - Select **Work Locally** to start and connect to LocalServer.
   - Select **Connect to network server** to connect to a network-based SchemaAgent Server that is already running.
3. Click **OK**.

To close a connection:

- Right-click the server's icon  in the system tray (at bottom right of your screen), and select the **Shutdown** command.

6.3 Managing Search Paths

This section describes how to do the following:

- view search paths
- configure search paths
- reload search paths
- reset search paths

This section also describes the SchemaAgent configuration file.

Search Path considerations
Depending on the installation location of SchemaAgent Client, certain file access and path restrictions may apply. If you access schemas on a network share, make sure that the SchemaAgent Client application has the correct access permissions.

File system support is as follows:

- UNC paths are supported. Note that schema paths can be, or references within schemas can contain, UNC paths or relative paths.
- WebDAV folders are supported. Location paths can be, or references within schemas can contain, WebDAV folders or relative paths.
- FTP connections are supported. Files can be directly accessed using FTP.
- Mapped drives are supported. If drive letters are used in search paths, then machines hosting SchemaAgent clients must have the identical drive letter mapped to the same shared folder.
- Local drives/directories are **not directly** supported. Access to local directories or resources, however, is possible if the local directories are shared to the network and search paths on LocalServer are configured to use the network shares.

6.3.1 Viewing Search Paths

To view search paths:

- In the Explorer Pane, select the **Configure Paths** tab. The currently defined search paths and file extensions are displayed.

Please note: The **Configure Paths** tab is available only when SchemaAgent Client is connected to LocalServer, and **not** available when SchemaAgent Client is connected to a network-based SchemaAgent Server.

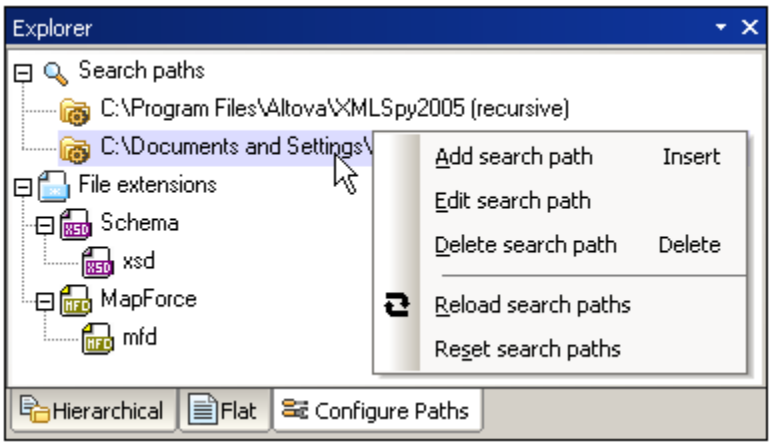
6.3.2 Configuring Search Paths

Search paths are the paths or folders that are scanned for XML Schemas and MapForce Design (MFD) files. You can configure (add, edit, or delete) search paths.

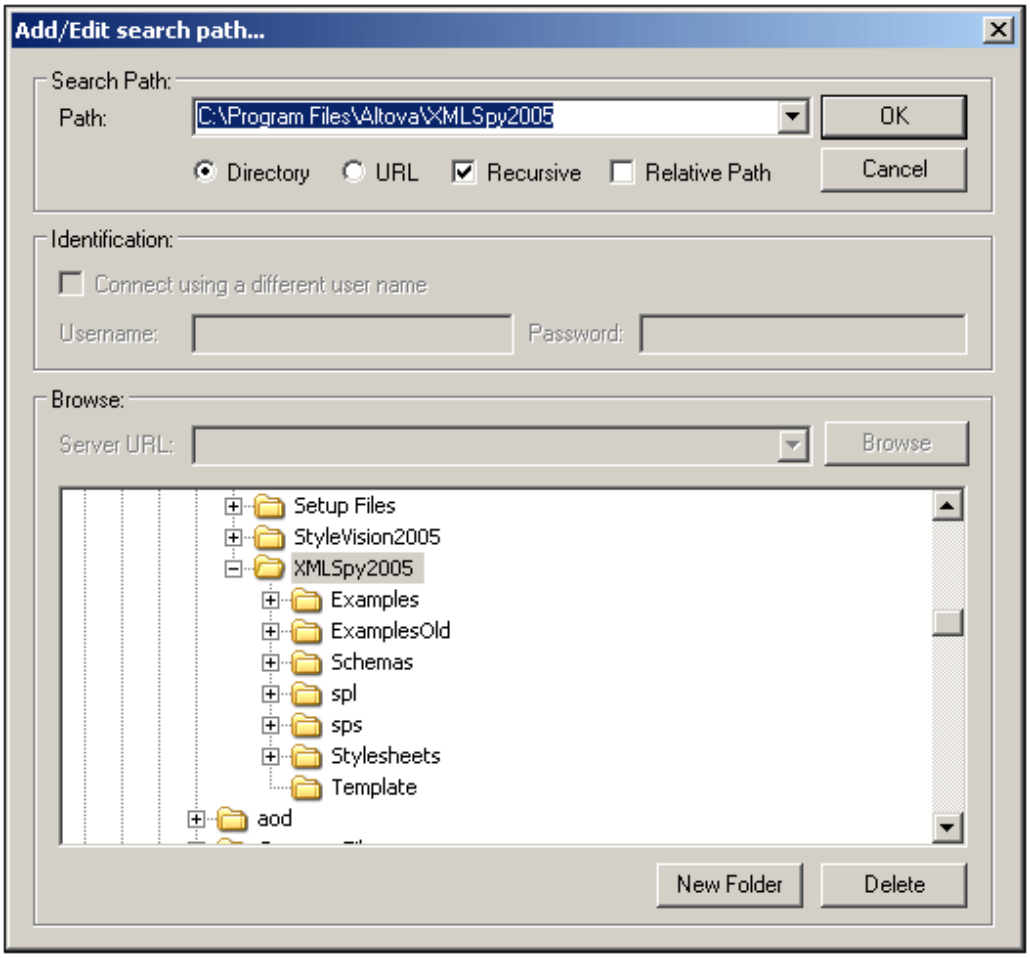
Please note: You can only use this procedure when connecting to the local SchemaAgent server. If you are using SchemaAgent Server, you must configure paths in that application. See Configuring Search Paths.

To configure (add, edit, or delete) search paths:

1. In the Explorer Pane on the **Configure Paths** tab, right-click on the Search Paths entry, or an entry for any individual search path. A context menu appears (*see screenshot*).



2. Click **Add Search Path** or **Edit Search Path**. The Add/Edit search path dialog opens (*see screenshot*). You can use this dialog to browse for and configure individual search paths.



3. Select either the Directory or URL radio button according to whether your search path is, respectively, a directory or a URL.

Search Path is a directory

If the search path is a directory (Directory radio button selected), do the following:

1. Enter the search path directly in the Path text box. Alternatively, browse for the required directory in the Browse pane; the selected directory is entered in the Path text box.
2. Select the Recursive check box if you wish sub-directories of the selected directory to be searched. If this check box is not selected, no sub-directory will be searched.
3. Select the Relative Path check box to make the search path entry in the Configure Paths pane relative; leave the check box unchecked to use an absolute path.

Search Path is a URL

If the search path is a URL (URL radio button selected), do the following:

1. Enter the server URL in the Server URL text box of the Browse pane.
2. If authorization is required, select the Connect Using a Different User Name check box (in the Identification pane), and enter the username and password.
3. In the Browse pane, click the Browse button to browse for the required directory; the selected directory is entered in the Path text box.
4. Select the Recursive check box if you wish sub-directories of the selected directory to be searched. If this check box is not selected, no sub-directory will be searched.

6.3.3 Reloading Search Paths

This command updates the search paths. It is useful if files have been changed outside SchemaAgent Client, for example, in XMLSpy. Also, after a search path or file extension has been added, edited, or deleted, an asterisk appears at the right of the search path or file extension. This indicates that the currently loaded search paths need to be updated.

To reload search paths:

- In the Explorer pane on the **Configure Paths** tab, right-click and select **Reload search paths** from the context menu.

6.3.4 Resetting Search Paths

The **Reset Search Paths** resets search paths to the original settings with which they were saved.

To reset search paths:

- In the Explorer pane on the Configure Paths tab, right-click and select **Reset search paths** from the context menu.

6.3.5 Configuration File

The set of schemas and MFD files managed by LocalServer is defined in an XML file called `SchemaAgentServerCfg.xml`, which is stored in the SchemaAgent Client application folder. This file defines the **search paths**, and what paths or folders are scanned for schema files. The `SchemaAgentServerCfg.xml` file looks something like this:

```
<?xml version="1.0" encoding="UTF-8"?>
<SearchPaths>
   <Path recursive="true">s:\schemas-mydir\</Path>
   <Path recursive="true">X:\schemas\</Path>
   <Path recursive="true">http://test.webdav.org/dav</Path>
   <Path recursive="true">\\Server1\Share1\Dir1\Schemadata</Path>
   <Path recursive="true">ftp://myftpserver</Path>
</SearchPaths>
```

Note that any number of search paths can be defined, and search paths include paths on a local machine, network paths (mapped drive letters and UNC paths), as well as folders on WebDAV servers and FTP access.

After search paths have been defined, LocalServer retrieves all schemas and MFD files in individual search paths and builds an internal map of the relationships between the schemas and MFD files in a search path. It is this mapping of relationships that enables SchemaAgent clients to present data about schema and MFD file relationships graphically. Further, if an IIR or file manipulation change is made in a SchemaAgent client, it is this mapping that enables the automatic updating of such changes in related files in the search path.

6.4 Managing Folders and XML Schemas

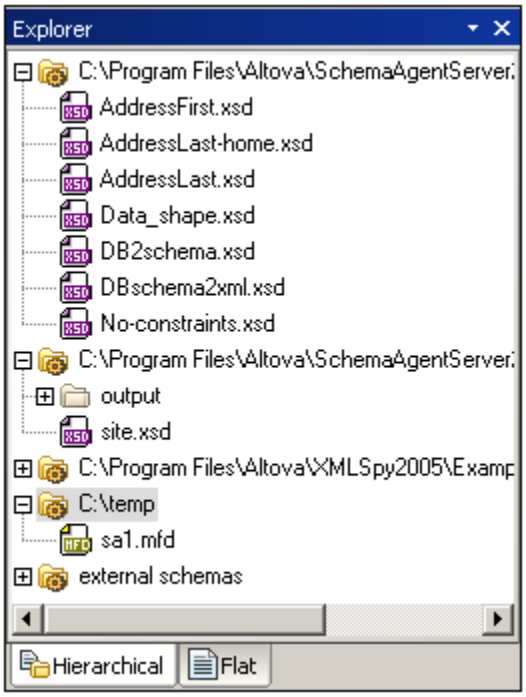
The Explorer pane displays all schemas and MapForce Design (MFD) files available in all search paths defined for the selected SchemaAgent Server.
In the **Hierarchical** and **Flat** tabs, you can create a new schema, MapForce Design (MFD) file, or folder; rename schemas, MFD files, and folders; delete schemas, MFD files, and folders; move schemas, MFD files, and folders to other positions under each path entry; and recreate schemas.

If an action, such as renaming or deleting, or IIR changes (Includes, Imports, Redefines), that affects any schema referencing the changed schema
is carried out on a schema or MFD file, all relationships of any schemas referencing the modified file or folder are **immediately** and automatically updated, and, in some cases, the changes are propagated through the search paths.

Warning: Any change made in the **Hierarchical** and **Flat** tabs automatically affects any schema referencing the changed schema. Since there is no Undo command available for these actions, it is highly recommended that you have a working backup system or use source control software when working with SchemaAgent Client.

Hierarchical Tab

The **Hierarchical** tab shows all the schemas and MFD files in all the search paths defined in the selected SchemaAgent Server in a tree structure (*see screenshot*). Folders that contain a W3C XML Schema or a MFD file are colored yellow. Folders that contain no W3C XML Schema or MFD file or no subfolder containing a W3C XML Schema or MFD File are grayed out. The option to show empty folders (accessed in the context menu by right-clicking an entry) can be toggled off.

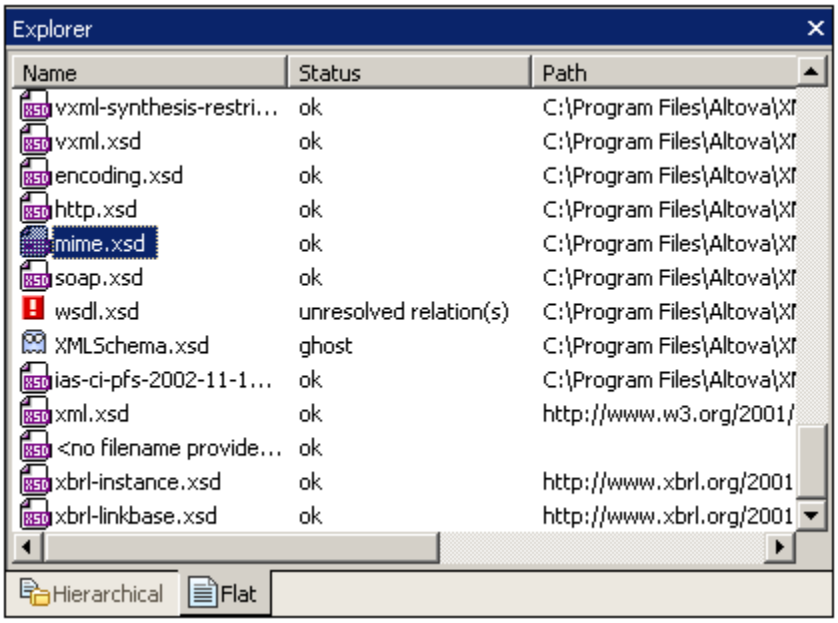


In addition to the search paths defined in the selected SchemaAgent Server, the Hierarchical tab may display a folder called `External schemas`. The schemas contained in this folder are schemas which are referenced by schemas in the defined search paths but which are not

themselves in any of the defined search paths.

Flat Tab

The Flat tab (*see screenshot*) displays a flat list of all W3C XML Schemas and MFD files in all search paths defined in the selected SchemaAgent Server, as well as all schemas in the `External schemas` folder (i.e. schemas referenced by schemas in the search paths, but which are not themselves in any search path), if such schemas exist. Each schema and MFD file entry is displayed with its location and its status.



In the screenshot, note the different icons used to indicate ghost schemas and schemas with unresolved relations.

6.4.1 Creating Folders and XML Schemas

To create a folder or XML schema:

- In the Explorer Pane on the **Hierarchical** tab, right-click on the folder where you want to create the file or folder. A submenu appears containing commands to create either a new schema, new MFD file, or new folder.

When a new schema is created, the following things happen:

- A rudimentary schema file called `untitled.xsd` is physically created in the folder that currently has the focus in the **Hierarchical** tab. The file will have an empty schema declaration, and will look like this:

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema elementFormDefault="qualified"
attributeFormDefault="unqualified"
xmlns:xs="http://www.w3.org/2001/XMLSchema"/>
```

- In the **Hierarchical** tab, an entry for a schema called `untitled.xsd` is created in the folder that currently has the focus in the Hierarchical tab. You can now change the filename. If you add a different file extension than `.xsd`, a warning prompt appears.

When a new MFD file is created, a rudimentary MFD file called `untitled.mfd` is created in the selected folder.

When a new folder is created, an empty folder called `new folder` is physically created in the folder that currently has the focus in the Hierarchical tab and an entry for this folder is created in the Hierarchical tab.

Please note: If the Show Empty Folders option is unselected, the new folder, because it contains no schemas, will not be displayed in the Hierarchical tab.

6.4.2 Renaming Folders and XML Schemas

To rename a folder or file:

- In the Explorer Pane, right-click on the folder or file and select **Rename** or press **F2**. Change the name as desired. Any references to the changed name in schemas are automatically updated.

6.4.3 Deleting Folders and XML Schemas

Deletes the folder or file physically from the hard disk.

Please note: Deleted schemas are not placed in the Windows Recycle Bin, and this step cannot be undone.

To delete a folder or file:

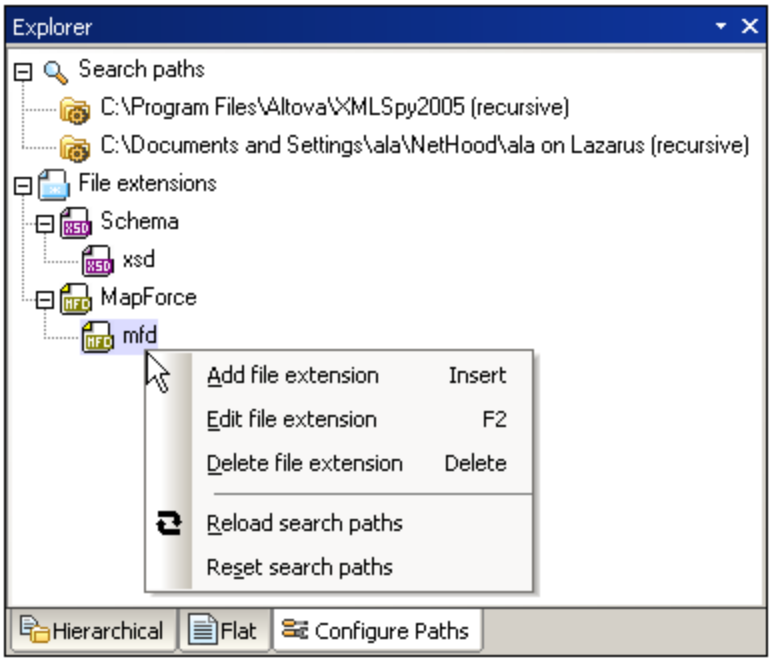
- In the Explorer Pane, right-click on the folder or file and select **Delete**.

If the deleted schema is present in a Design tab, then it is represented as an **unknown schema** (*see screenshot*); since the schema is physically deleted, SchemaAgent Server has no more knowledge of it. SchemaAgent Client, however, still has an entry for it in the Design tab, where it receives a yellow alert icon.

6.4.4 Configuring File Extensions

To configure file extensions:

- In the Explorer Pane on the **Configure Paths** tab, right-click a file extension in the File Extensions tree (click in the Schema or MapForce entry depending on which category you want to add the file extension to). A context menu appears (*see screenshot*), offering options to add a file extension for the selected category, or to edit or delete the selected file extension.



If a search path or file extension has been added, edited, or deleted, an asterisk appears at the right of the search path or file extension. This indicates that the currently loaded search paths need to be updated.

6.4.5 Showing Empty Folders

In the Explorer pane, it is possible to turn off the display of folders that contain no XML schemas.

To toggle on and off the display of folders that contain no schemas:

- In the Explorer pane, right-click on the **Hierarchical** tab and select **Show Empty Folders**.

6.4.6 Editing Files in XMLSpy

To edit a document in XMLSpy:

- In the Design Tab or in the Explorer Pane, right-click on the schema you want to edit and select **Edit in XMLSpy** or press **Ctrl+Y**. The selected schema is opened in XMLSpy if XMLSpy is installed.

6.4.7 Displaying Files in MapForce

To show a file in MapForce:

- In the Design Tab, right-click on the MFD file you want to open and select **Edit in MapForce** or press **Ctrl+M**. The select MFD file is opened in MapForce if MapForce 2006 is installed.

6.5 Viewing MFD Files, XML Schemas, and their Relationships

This section describes the following:

- how to view MFD file information
- how to view XML schema information, and relationships between schemas

6.5.1 Viewing MFD Files

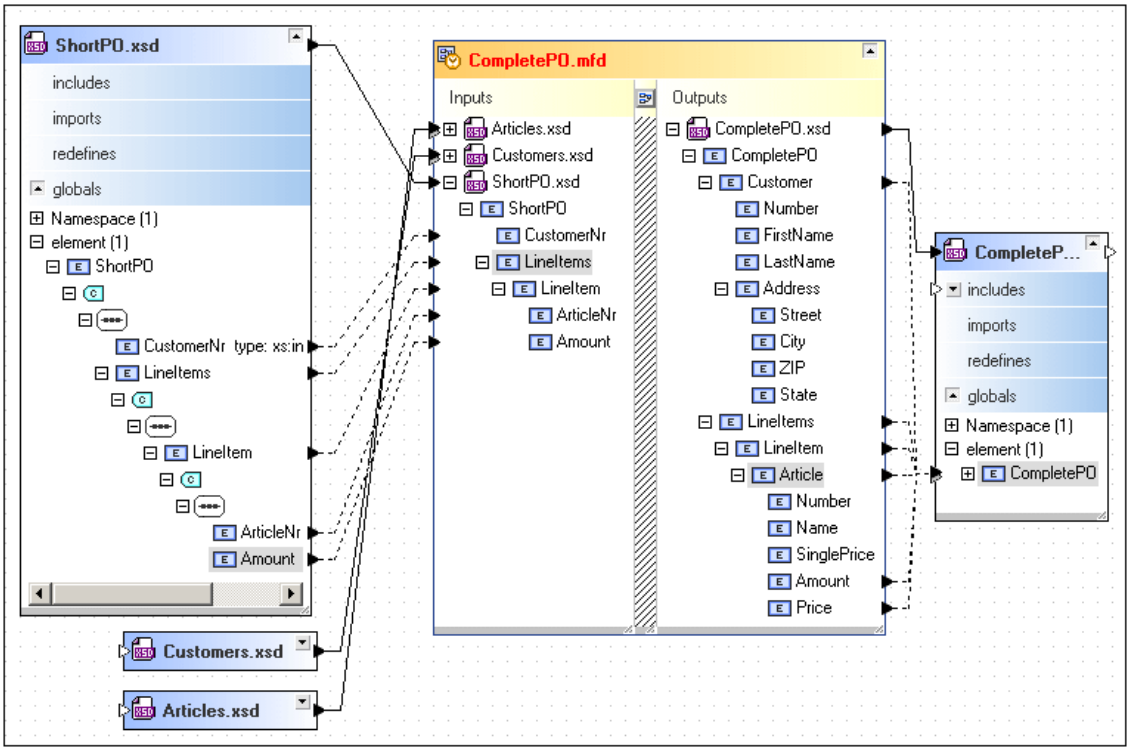
To view a MapForce Design (MFD) file:

- Drag and drop the file you want to view from the Explorer pane to a Design pane.

To insert all related underlying files (not just the input and output schema files) in the Design:

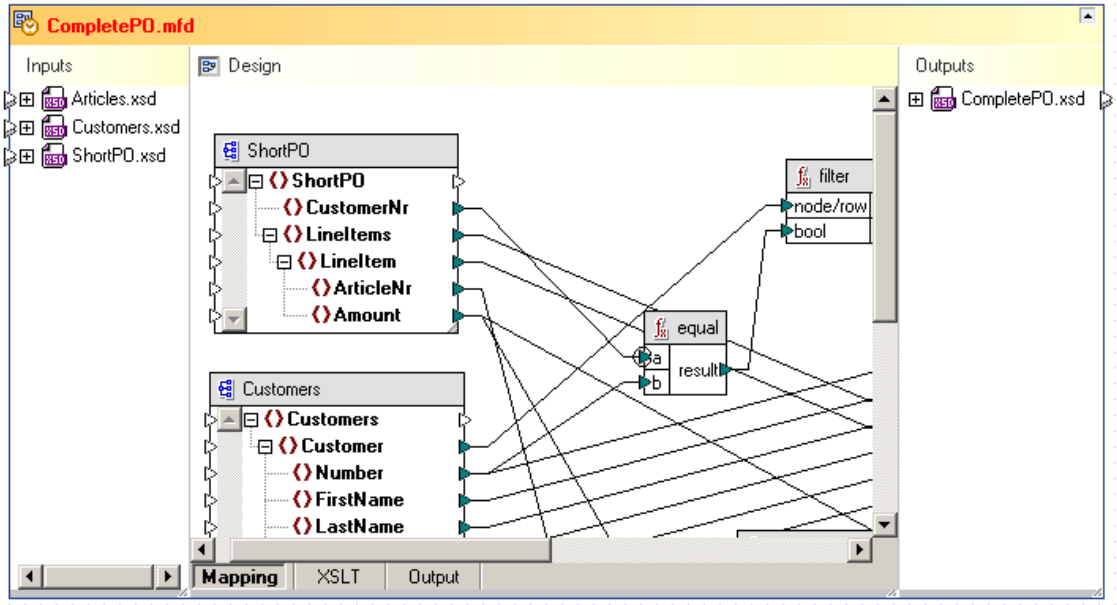
- Right-click the MFD file's title bar and select **Insert | All linked files** from the context menu.

The following information about MapForce Design files is available in Design tabs *(see screenshot)*:



- The MFD file in the above screenshot (yellow title bar) shows the source schema/s (Inputs) and target schema (Outputs) of the MFD file. Mapped nodes and their ancestors in both schemas are shown.
- The relationships between the schemas on which the MFD file is based are displayed when the required schemas are present in the Design pane.

To view the mappings between nodes in the input and output schemas, click the MapForce Design icon in the column between the Inputs and Outputs panes. The mapping opens up in a separate MapForce Design pane between the Inputs and Outputs panes (*see screenshot*).



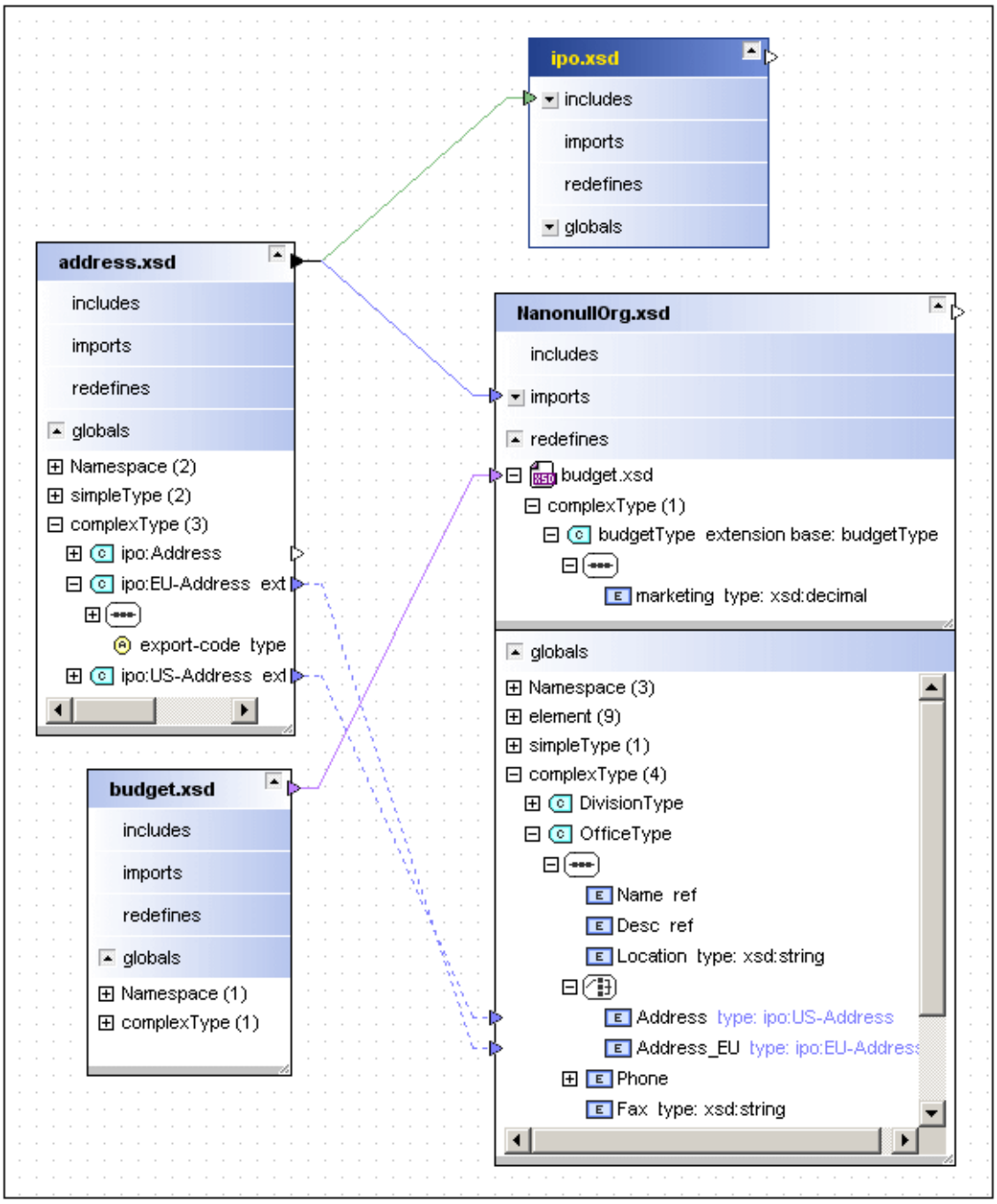
You can also view the XSLT file of the MapForce mapping and the XSLT output by clicking the respective tabs at the bottom of the MapForce Design pane. To close the pane, click the MapForce Design icon.

Please note:

- In order for the MapForce Design pane to be displayed, MapForce 2006 must be installed on your computer.
- You cannot modify a MapForce Design from within SchemaAgent. All modifications of the MapForce design must be done in MapForce.

6.5.2 Viewing Schemas and Their Relationships

The following information about schemas is available in Design tabs *(see screenshot)*:



- The *structure* of individual schemas is indicated within the individual schema boxes. Each schema box has a section each for Includes, Imports, Redefines, and Globals. Each of these sections contains a detailed sub-structure of that section's components.
- The *relationship between two schemas* is indicated by solid line connectors leading from the title bar of a schema box to either the title bar of another schema box when the schema box is minimized, or to an Include, Import, or Redefine section within a schema box when the schema box is expanded.

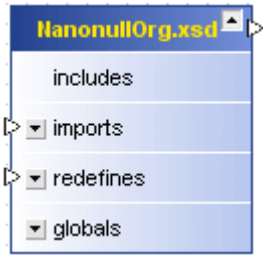
- The *relationship between components in two schemas* is indicated by connectors leading from a global component in one schema box to a global component in another schema box.

Please note: To display relationships between the components of two schemas, the Globals sections of both schemas must be expanded.

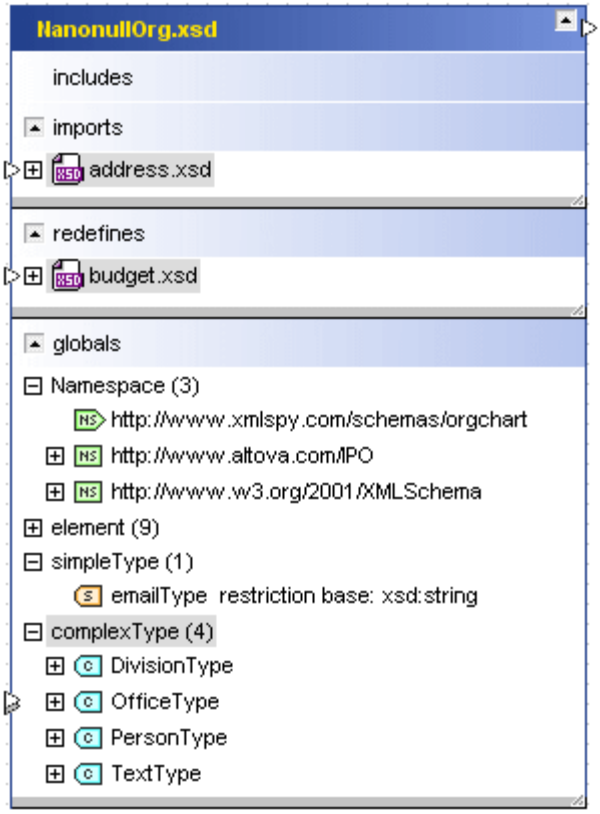
Schema box and schema structure
Each schema is displayed as a box, which can be expanded and minimized. When schemas are inserted into a Design, they are inserted as minimized schema boxes.

In the above schema, note that there are two arrowheads. The arrowhead on the left indicates that this schema either includes, imports, or redefines other schemas or schema components. You can determine exactly what kind of relationship/s and with which other schemas or schema components by expanding the schema box (which is explained below). The arrowhead on the right is used to create an IIR that includes, imports, or redefines this schema or its schema component/s in other schemas (see Creating Includes, Imports and Redefines for details).

Minimized schema boxes can be expanded *(see screenshot)* by clicking the button in the title bar. They expand into four sections: Includes, Imports, Redefines, and Globals. In the screenshot below, the arrowheads at the left of the Imports and Redefines sections indicate that this schema imports at least one schema and at least one schema component from an external schema.

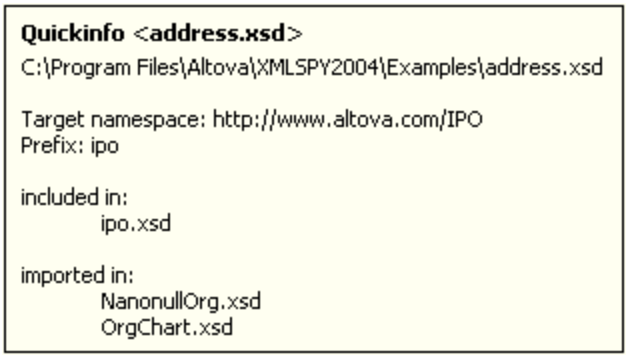


Each section of the schema box can be further expanded if a sub-structure is present, and this sub-structure is displayed as a freely expandable tree structure of IIRs and global components.



Quick Information
When you mouseover the title bar of a schema box, a Quick-Info Box containing the following information is displayed:

- Location of the schema
- Target namespace
- IIR information about the schema, for example, what schemas are included in, or by, that schema



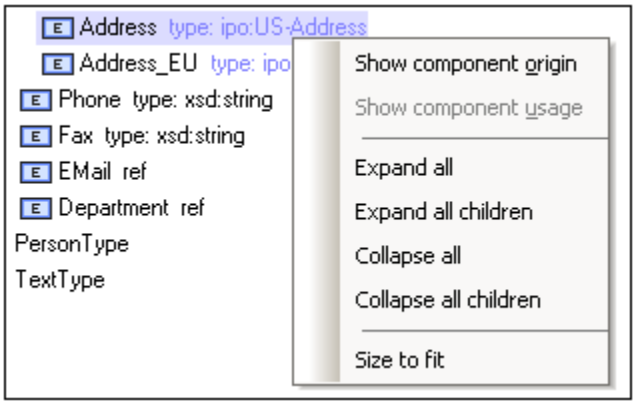
Please note:

- The Quick-Info Box displays IIR information as determined in the SchemaAgent Server search path.
- Placing the text cursor over an **alert** icon, if visible in the schema box, opens the relevant error message in the Quick-Info Box.

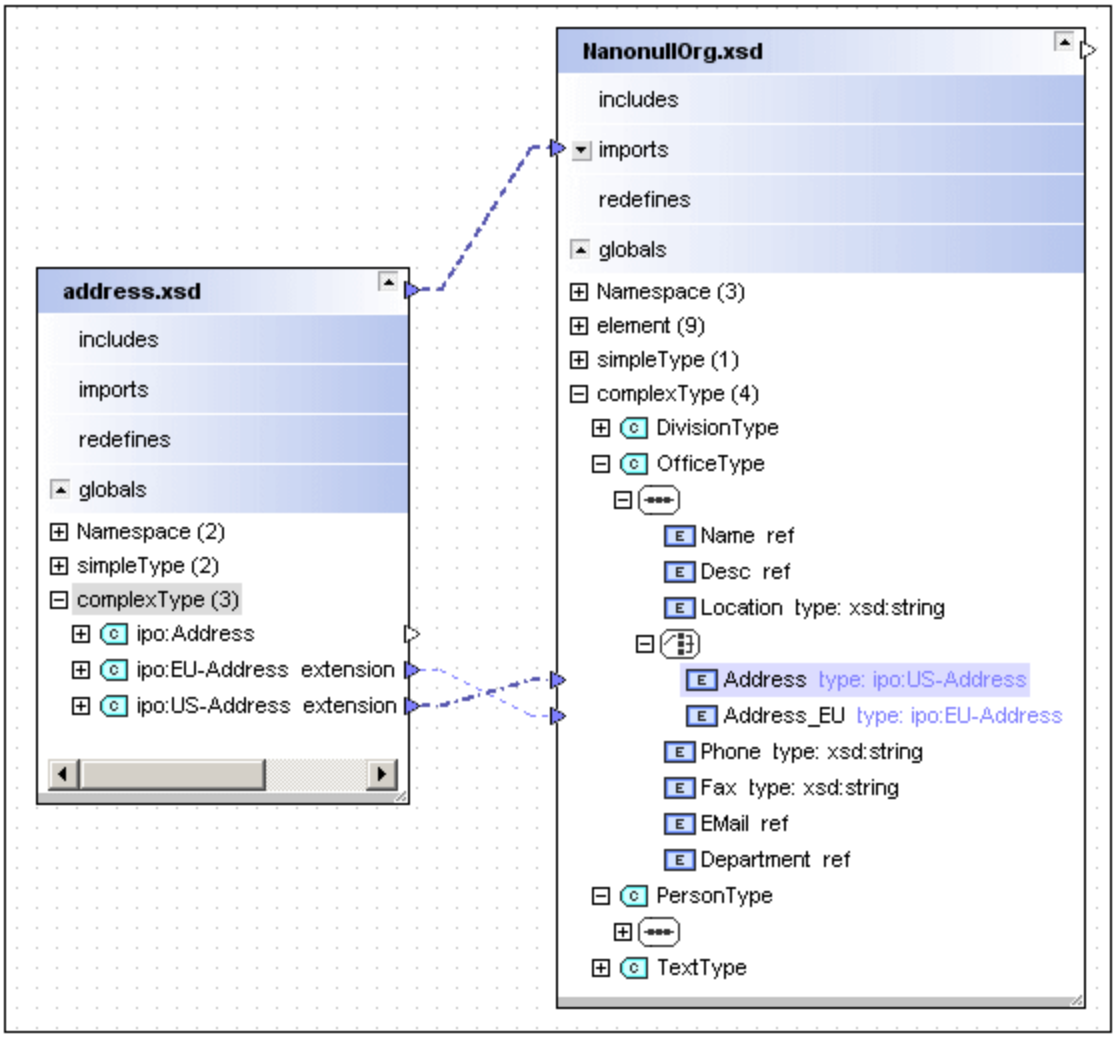
The display of IIRs in the Design tab
IIRs (Includes, Imports, Redefines) between schemas in a Design tab are graphically displayed by means of connector lines between schema boxes (*see first screenshot* in this section). Two types of connectors exist: (i) those that show IIRs between two schemas, and (ii) those that show relationships between global components in two schemas. Lines to show relationships between schemas go from the title bar of one schema box to the Includes, Imports, and/or Redefines section/s of the second schema box. Lines to show relationships between global components in two schemas go from the respective component in the Globals section to the related component in the Globals section of the second schema.

The appearance of the connector lines can be customized in the Relations tab of the Options dialog (**Tools | Options**). The default settings show Imports in blue; Includes in green; and Redefines in purple-violet. When you place the cursor over a connector line, the line is highlighted (the appearance of highlighted connector lines can also be configured in the **Relations** tab of the Options dialog (**Tools | Options**)). An arrowhead appears that indicates the "direction" of the relationship and a Quick Information box with details of the relationship is displayed. The appearance of a selected line (different from a highlighted line in that you must click the line to select it, whereas you mouseover a line to highlight it) can also be configured separately.

If a component or its type is defined in another schema (indicated by the presence of arrowheads on the left-hand-side of the component), right-clicking that component enables you to click **Show Component Origin** (*see screenshot*). If, when you select this command, the schema with the definition is already present in the design, selecting this command causes the connector line to the relevant definition in the "source" schema to be selected, together with the connector line showing the relation between both schemas (that is, whether it is an Include, Import, or Redefine). If the schema box containing the definition is not present in the Design, a message to that effect is displayed and you are asked whether this schema box should be inserted into the Design (*see screenshots below*). If it is inserted, the connector line to the relevant definition is selected, together with the connector line showing the relation between both schemas.



In the screenshot above, the element `Address` has a complex type of `ipo:US-Address`. The color of the complex type text (blue) indicates that this complex type is (according to the default color scheme) an import. The two arrowheads to the left of the elements `Address` and `Address_EU` indicate that the two complex types are defined in another schema. Clicking the Show Component Origin command and choosing to insert the schema with the missing component inserts the schema and highlights the relevant relationships (*see screenshot below*).



Conversely, if in the schema box of `address.xsd`, you right-click the component `ipo:US-Address` (a complex type), and select **Show Component Usage**, then the link to the `Address` element in `NanonullOrg.xsd` will be highlighted.

6.6 Designing Relationships Between Schemas

SchemaAgent Client enables you to:

- Manage schemas at a high level, for example, rename, move, or delete them.
- Graphically modify the relationships between schemas and components in different schemas. This is done through SchemaAgent Designs, which are graphical representations of IIR (Import, Include, and Redefine) relationships between schemas. When a relationship between two schemas is modified in a SchemaAgent Design, that modification is **immediately effected in the actual physical file as well as propagated to all schema files that are affected by the modification**. So, for instance, if `a.xsd` includes `b.xsd`, and if, in a SchemaAgent Design, you delete the `include` relationship between `a.xsd` and `b.xsd`, then the `include` declaration is immediately deleted from the file `a.xsd`.
- View the structure of the source and target schemas of a MapForce Design (MFD) file, and the relationships of these schemas with other schemas.

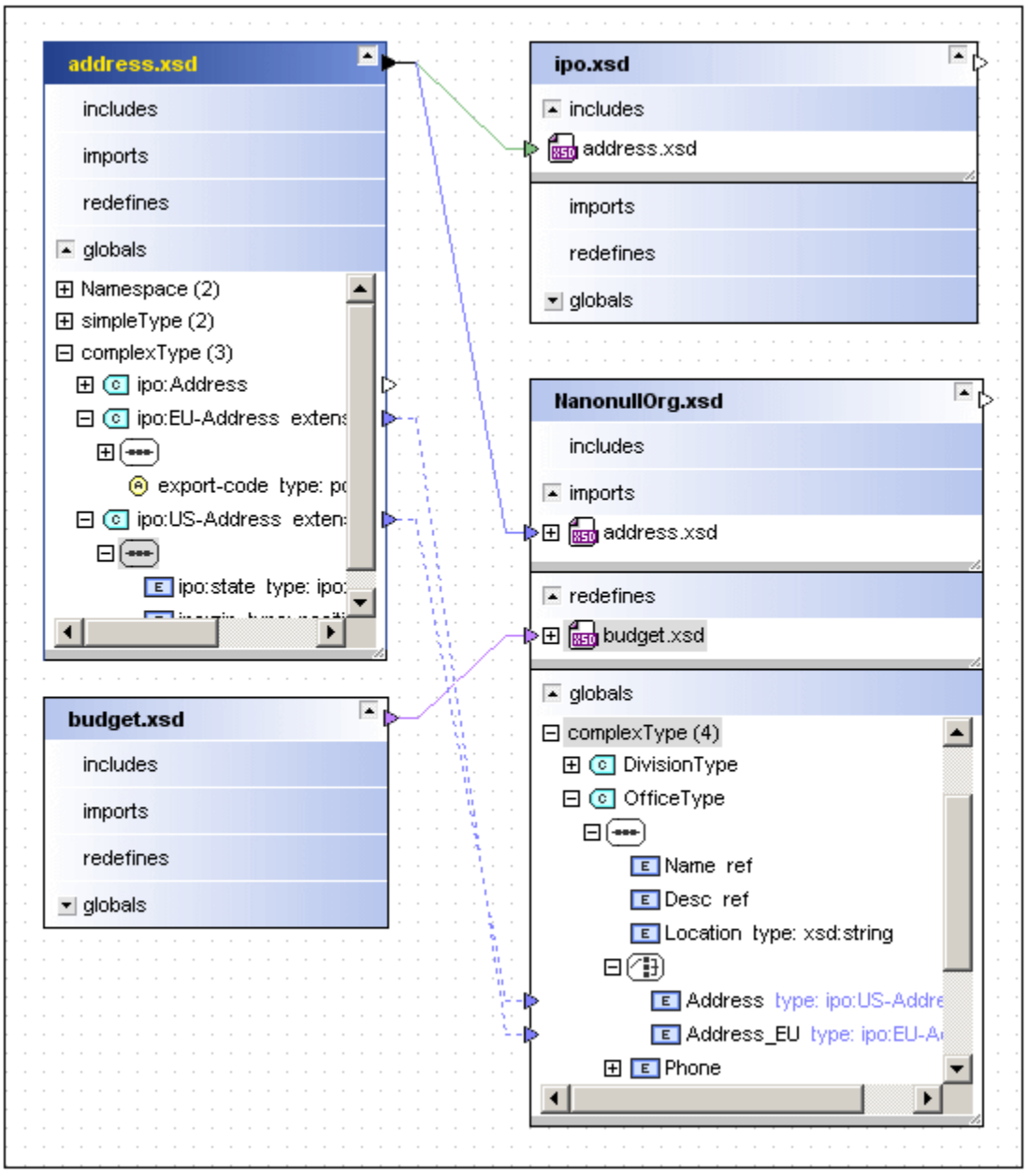
Please note: You cannot edit XML schemas directly in SchemaAgent Design.

This section contains the following information:

- an overview of the Design pane
- how to create and open designs
- how to insert XML schemas and folders into a design
- how to create includes, imports and redefines
- how to select files in a design
- a reference describing all editing commands available for designs
- how to delete files from a design
- how to reload and recreate XML schemas
- how to correct reference paths
- how to save and close design files

6.6.1 Design Pane Overview

In the Design pane, you can open multiple Design tabs. Each Design tab contains a SchemaAgent Design, in which you can graphically design and manage the relationships between an unlimited number of W3C XML Schemas, and also display the relationships between MapForce Design (MFD) files and their associated schemas. In this way you can organize schemas (and MFD files) into collections of related files. A SchemaAgent Design can be saved as a `.sad` file for editing at a later time. Any IIR relationship created in a SchemaAgent Design is immediately propagated to the respective files as soon as the relationship is created.



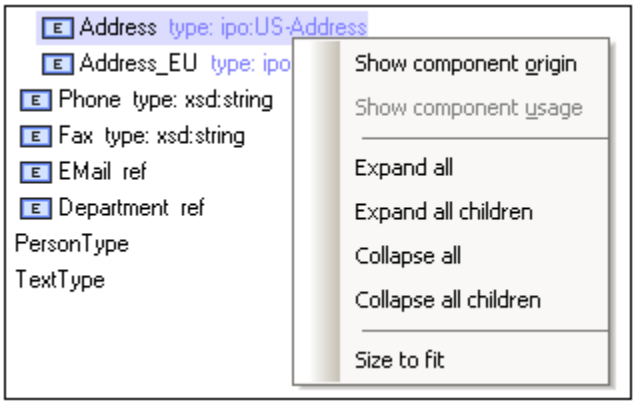
The Design tab graphically shows the structure of individual schemas and MFD files, and the relationships between such files. *Existing relationships* between schemas, that is IIRs (Includes, Imports, or Redefines), are represented with colored lines. *Additional IIRs* can be created in the

SchemaAgent Design. When you mouseover the title bar of a schema box in the Design pane, a Quick Info box appears which contains information about the schema's location, its namespaces, and its IIRs. When you mouseover the title bar of an MFD file box, a Quick Info box lists the locations of the source and target schemas.

You can resize schema boxes by dragging box borders; expand and minimize schema boxes by clicking the arrowheads in the title bar of schema boxes; and expand and collapse trees within schema boxes by clicking the plus and minus symbols to the left of tree entries.

Expanding and collapsing tree items

When you right-click an item in a file box, the context menu that appears (*screenshot below*) provides commands to expand or collapse tree levels, and to size file boxes to fit.



You can expand or collapse all children of the selected item, or expand or collapse the entire tree in which the selected item is. The Size to Fit command resizes file boxes to show all visible items without the file box having any scrollbar.

Navigating within the Design tab

Within a Design tab, you can navigate from one schema to the next using the cursor keys (Up, Down, Left, Right).

6.6.2 Creating and Opening Designs

Creating a new design
To create a new SchemaAgent Design (.sad) file:

- Select **File** | **New**. A new design pane appears.

Opening design files
To open an existing SchemaAgent Design (.sad) file:

1. Select **File** | **Open**. The Open dialog appears.
2. Select the desired file and click **Open**.

Opening recently opened design files
The **File** menu displays a list of recently opened SchemaAgent Designs. To open one of these files, click on the file name.

6.6.3 Inserting XML Schemas and Folders into a Design

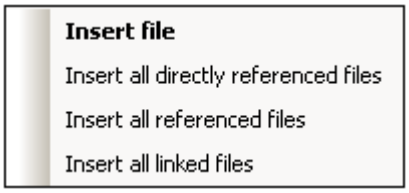
Inserting files into a design from the Explorer Pane
To insert XML schemas, MFD files or folders into a design:

- Select the files or folders and drag them using the left mouse button into the desired design. The files or the files contained in the dragged folders appear in the design.

Inserting related files into a design
For a description of the types of related files that can be inserted, see **Related files**.

To insert files related to a schema or MFD file:

- Select the file and drag using the right mouse button (right-drag). A context menu (*see screenshot*) appears asking whether you wish to insert only the selected file, or folder files, or whether related files should also be inserted.



Inserting files related to a selection in the Design
To insert files related to a selection:

1. Select one or more files (XML schema or MFD) in a design.
2. Right-click and select the desired item from the context menu.

Related files
An XML Schema or MapForce Design (MFD) file can have three types of related schemas:

- **Directly referenced files:** These are schemas that are directly referenced with an IIR statement. For example, if `Schema A` has an `Include` statement that references `Schema B`, then `Schema B` is directly referenced by `Schema A`. An MFD file directly references two schemas: its source and target schemas.
- **Referenced files:** These are schemas that are directly as well as indirectly referenced. For example, if `Schema A` has an `Include` statement that references `Schema B`, and `Schema B` has an `Include` statement that references `Schema C`, then (i) `Schema B` is directly referenced by `Schema A`, (ii) `Schema C` is directly referenced by `Schema B`, and (iii) `Schema C` is indirectly referenced by `Schema A`. In the case of an MFD file, in addition to the directly referenced source and target schemas, any schema that these two schemas reference is considered to be referenced by the MFD file.
- **Linked files:** These are schemas that are directly and indirectly referenced, as well as schemas that are linked to any of the directly or indirectly referenced schemas in any way. For example, if we extend our previous example so that `Schema Z` includes `Schema B`, then `Schema Z` is linked to `Schema A` (because `Schema A` includes `Schema B`). Further, if a schema which is linked to a file `Test`, is either the target or source schema of an MFD file, then that MFD file is considered to be linked to the file `Test`.

6.6.4 Creating Includes, Imports and Redefines

XML Schemas provide three main methods of modularizing your schemas: Imports, Includes, and Redefines, which we collectively call IIRs for short. Each of these methods has specific namespace requirements, which are automatically checked by SchemaAgent when you create IIRs in SchemaAgent Client. This section describes how you can work with IIRs in SchemaAgent.

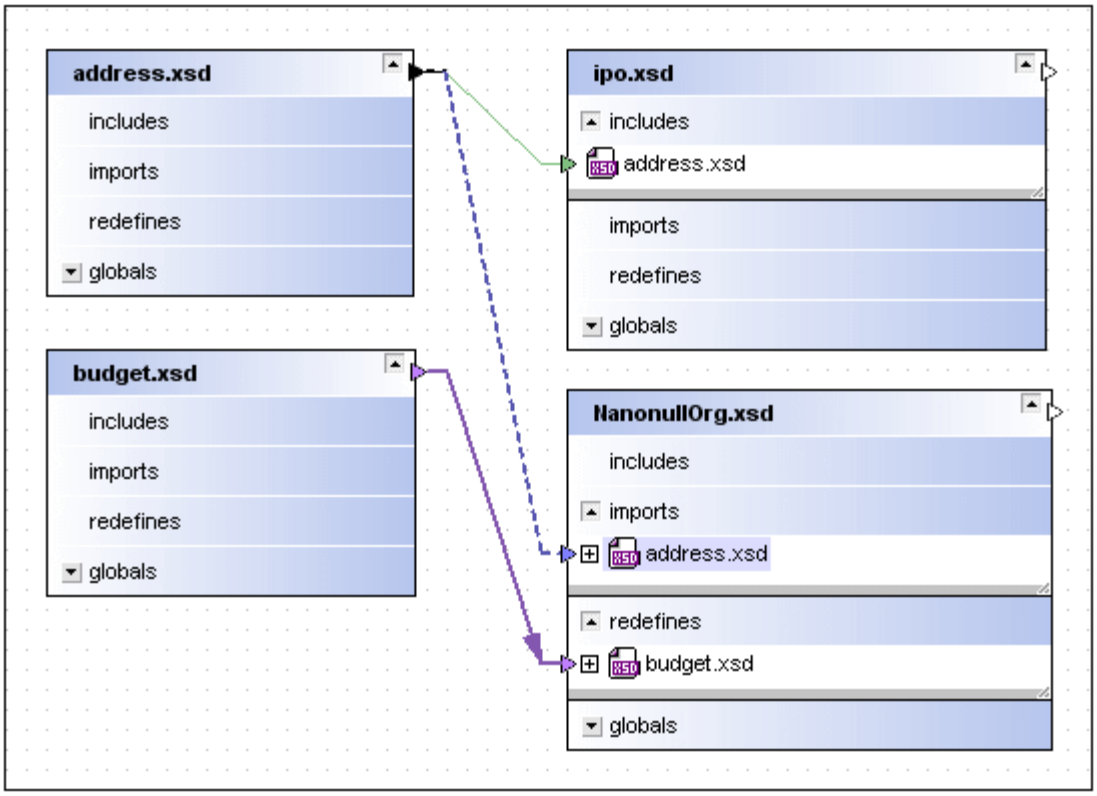
Overview of IIRs
IIRs are used as follows:

- **Includes** are used to incorporate schema components that belong to the same target namespace or that do not have a target namespace.
- **Imports** are used when combining schema components that belong to different namespaces. Using Import defines the schema location, as well as the namespace for the schema. This allows the document instance to contain both namespaces.
- **Redefines** are used to combine and modify schema components of the same target namespace or that do not have a target namespace. Using Redefines allows you to incorporate external schema definitions and declarations, such as `complexTypes`, and change them in the redefining schema.

Appearance of IIRs
In the Design tab, IIR relationships between schemas are shown, by default, with lines that are color-coded as follows:

- Includes = green
- Imports = blue
- Redefines = purple-violet

When you place the cursor over a connector line, the connector line is *highlighted* and an arrowhead appears that indicates the "direction" of the relationship; the appearance of a highlighted connector line can be customized in the **Connectors** tab of the Options dialog (**Tools | Options**). When you click on a connector line, the connector line is *selected*; the appearance of a *selected* connector line can also be customized in the Connectors tab of the Options dialog (**Tools | Options**).



In the above screenshot, `address.xsd` is included in `ipo.xsd` and imported into `NanonullOrg.xsd`., while `budget.xsd` is redefined in `NanonullOrg.xsd`. The Imports connector line between `address.xsd` and `NanonullOrg.xsd` is selected (by clicking it) and the appearance it has is the default setting for a selected Import connector line. The Redefines connector line between `budget.xsd` and `NanonullOrg.xsd` is highlighted (by placing the cursor over it), and the arrowhead indicates that `budget.xsd` is redefined in `NanonullOrg.xsd`.

Please note: Connectors appear as soon as a schema is inserted into the Design if the inserted schema has existing IIR relationships with other schemas present in the Design.

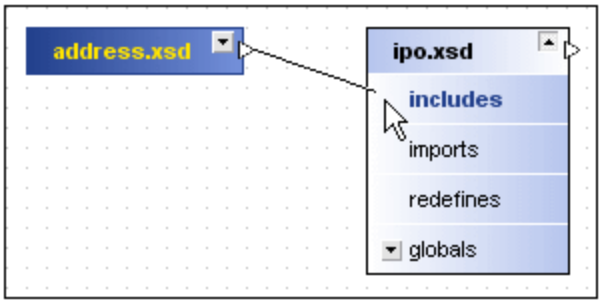
Creating IIRs in the Design Tab

You can create IIRs between schemas in the Design using drag-and-drop.

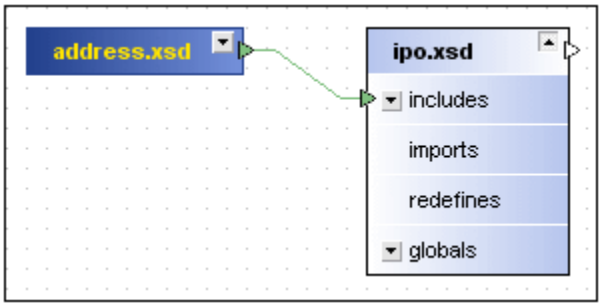
To create an IIR:

1. Place the mouse cursor over the schema box handle (located at the right border of the title bar) of the schema from which you wish to create the IIR. For the purpose of this description, let's call this schema the source schema.

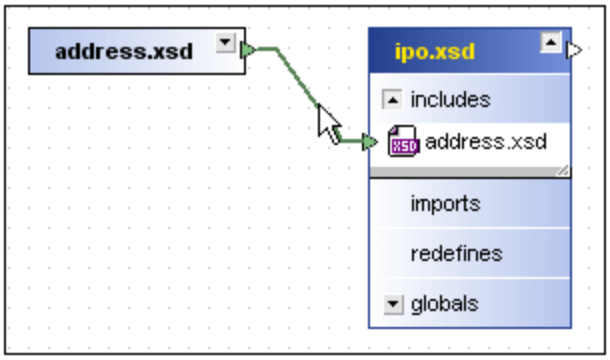
2. Click the handle and drag the cursor to the schema in which the IIR statement is to appear (the target schema for our purposes). If minimized, the target schema box expands, allowing you to drop the connector onto one of the IIR entries.



3. When the selected IIR entry becomes bold, drop the connector. The IIR command has now been inserted in the schema, and a drop-down symbol appears next to the IIR entry (in this case, `includes`).

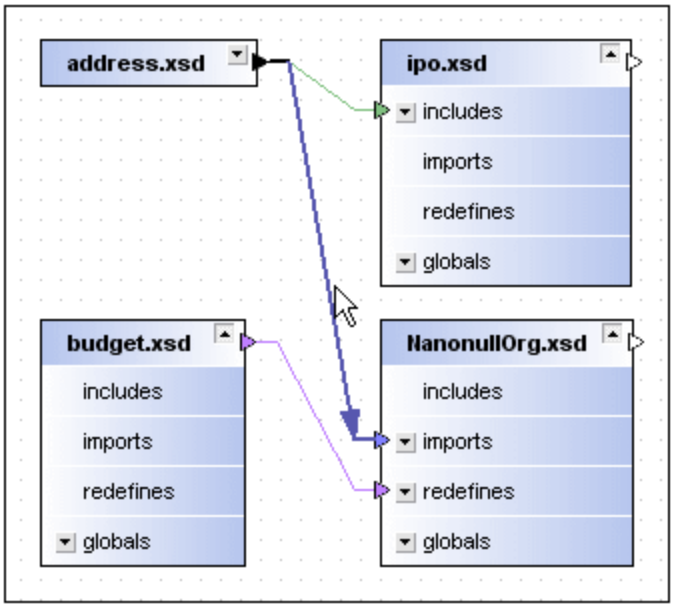


Clicking the drop-down arrow expands the IIR entry (in this case, `includes`).



If you drop the connector on an entry that does not turn bold, an error message appears, explaining why the selected IIR relationship is not allowed.

4. You can create additional IIR relationships that are allowed between schemas. So after including `address.xsd` in `ipo.xsd`, you could import `address.xsd` into `NanonullOrg.xsd` and redefine `budget.xsd` in `NanonullOrg.xsd` (*screenshot below*).



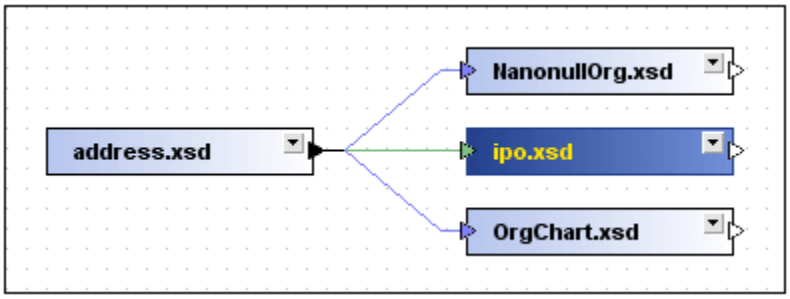
Please note: SchemaAgent automatically checks namespaces. This ensures that no invalid IIR statement is created in the target schema.

6.6.5 Selecting Files in a Design

In a Design tab one or more schemas or MFD files can be selected at a time. However, only one of the selected files has the focus. It is important to set the focus correctly for some actions, such as aligning, because the selected files are aligned on the file that has the focus. For other actions, such as sorting, the focus is irrelevant. In the description below, the selection mechanism is explained with reference to schemas; note that the same mechanism also applies to MFD files.

Selecting a single schema

To select a schema in a Design tab, click anywhere inside the schema box. The title bar of the selected schema becomes a darker blue (default setting; appearances can be configured in the **Colors** tab of the Options dialog (**Tools | Options**)).



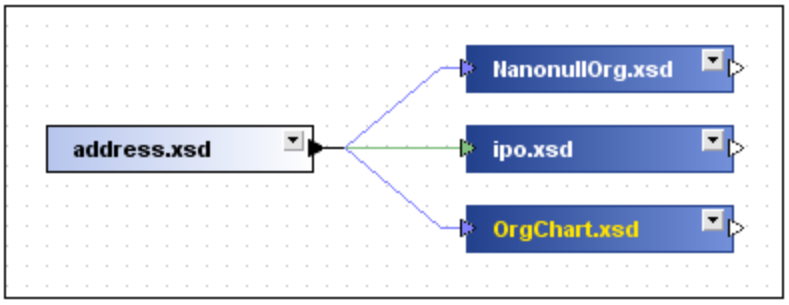
Since a single schema is selected, this schema also has the focus, which is indicated by the title being displayed in yellow (default setting).

Selecting multiple schemas

To select multiple schemas in a Design tab, do one of the following:

- Click the schema boxes of the schemas you wish to select while keeping the **Ctrl** key pressed.
- Use the marquee selection technique on the schema boxes of the schemas you wish to select (that is, click and drag the marquee rectangle around the required schema boxes).

The title bars of the selected schema boxes will become a darker blue (default setting; *see screenshot*).



If you use the **Ctrl+click** method to select multiple schemas, the last schema to be selected will receive the focus. If you use the marquee selection method, the last schema box over which the cursor passes will receive the focus. (If you drag the marquee in such a way that the cursor passes over no schema box, then no schema will receive the focus.)

Changing the focus
To change the focus in a selection of multiple schemas, press **Ctrl** and click twice on the schema box of the schema to which you want to give the focus.

Selecting with paths
Schema boxes are also selected when the Show Component Origin, Show Component Usage, and Show Relation Path commands are used.

Copying and pasting a selection
Selections can be copied and pasted across designs. When used with paths, this is a convenient way to create new designs containing closely related schemas.

6.6.6 Editing Designs: Reference

Align
The Align commands are layout commands that enable selected file boxes to be aligned according to a variety of criteria. For a detailed description, see Customizing the Layout of the Design.

Copy (Ctrl+C)
Please note: You can copy files from one Design tab to another.

To copy the selected schema or MFD file to the clipboard:
- In a Design tab, select a file and press **Ctrl+C**.

Correct reference paths (Ctrl+I)
When an IIR statement in a schema or a schema reference in an MFD file points to a file that cannot be found at the specified location, this command causes SchemaAgent to look for a file with a name matching that of the referenced file at other locations in the search path. If it finds one or more matches, a message box opens asking whether the IIR path should be corrected, and, in the case of multiple matches, which of the matches should be used. If no match is found, this is reported.

To correct reference paths:
- In a Design tab, right-click on a file and select **Correct reference paths**.

Cut (Shift+Delete)
To cut the selected schema or MFD file to the clipboard:
- In a Design tab, select a file and press **Shift+Delete**.

Delete (Delete key**)**
To delete a file from a design:
- In a Design tab, select a file and press the **Delete** key.

Drag-and-drop
To move a file within a Design tab:
- Drag and drop the file.

To copy a file to another Design tab:
- Drag the file from the first Design tab to the other Design tab.

Insert
To insert schemas or MFD files that are related to selected schemas or MFD files:
1. In a Design tab, select one or more schemas or MFD files.
2. Right-click anywhere in the Design tab and select **Insert**. A submenu appears. Select how you want the inserted files to be related.

These relationships and the use of the Insert command are described in more detail in Inserting XML Schemas and Folders into a Design.

Please note: Related files are inserted only in the active Design tab.

Paste (Ctrl+V)
To paste from the clipboard to the selected Design tab:

- In a Design tab, select a file and press **Ctrl+V**.

Recreate
A schema may contain an IIR statement (that is, an Import, Include, or Redefine declaration) that references a schema which cannot be found at the location specified in the IIR statement. We call such a schema a **ghost schema**. This command recreates a rudimentary schema of the same name as the ghost schema at the location specified for it in the IIR statement. A rudimentary schema is one that contains only the `xs:schema` declaration.

To recreate a ghost schema:

- In a Design tab, right-click on a ghost schema and select **Recreate**.

Reload
To reload a file:

- In a Design tab, right-click on the file and select **Reload**.

Select
To select schemas or MFD files that are related to the schemas or MFD files that are already selected:

1. In a Design tab, select one or more schemas or MFD files.
2. Right-click anywhere in the Design tab and select **Select**. A submenu appears. Select how you want the selected files to be related.

These relationships and the use of the Select command are described in more detail in Inserting XML Schemas and Folders into a Design.

Please note: Related files are selected only in the active Design tab.

Sort
The Sort commands are layout commands that enable selected file boxes to be sorted according to a variety of criteria, including alphabetically. For a detailed description, see Customizing the Layout of the Design.

Synchronize Selection
This command is most useful when a Design tab is active because it is not possible to rename, delete, or move a file in a design tab. So, if you synchronize the selection in the Design tab, then the currently selected file in the Design tab is also selected in the **Hierarchical** and **Flat** tabs of the Explorer pane, enabling you to switch to the Explorer pane and take the required action.

To synchronize a selection:

- Double-click on a file in the **Hierarchical** tab or the **Flat** tab of the Explorer pane, or in a Design tab. The file is then selected in the other two tabs as well.

Please note: Synchronized selection only applies to the currently selected Design tab and not to all open Design tabs.

6.6.7 Deleting Files from a Design

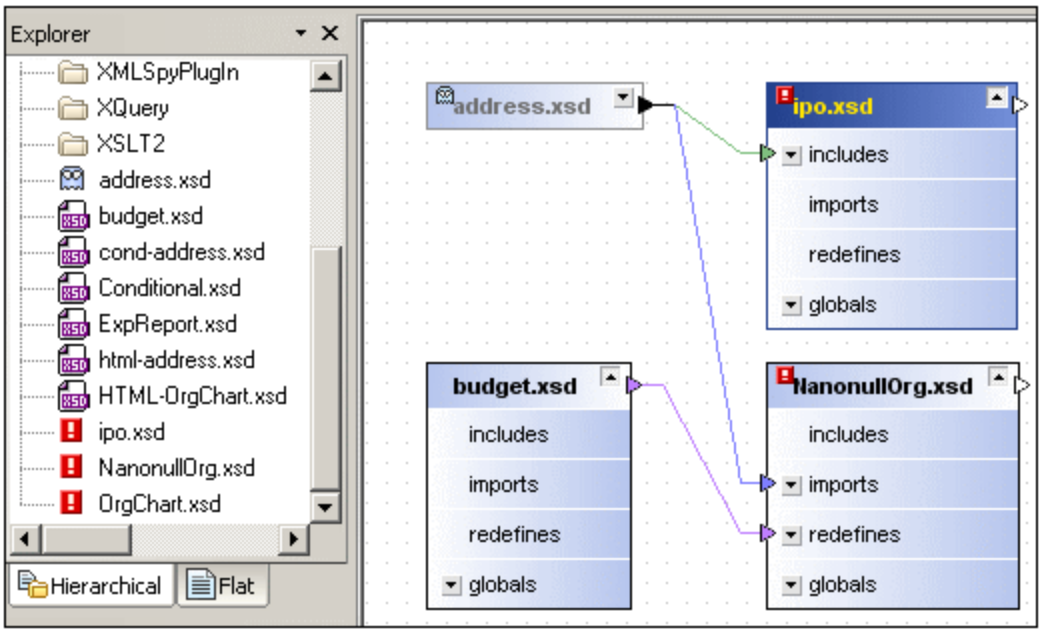
To delete an XML schema or MapForce Design (MFD) file from a design:

- Right-click on a file in a Design tab. Select **Delete** from the context menu. The file is removed from the design.

Unknown files
If a file (schema or MFD file) that is deleted from the Explorer pane is present in a Design, then that file in the Design becomes an **unknown** file (because SchemaAgent Server no longer has any knowledge about a file with that name in any of its search paths). Such a file is represented in Design tabs with a yellow exclamation mark (*screenshot below*).

The only way to bring a deleted file back into use (thus making the yellow exclamation mark disappear) is to have the file physically re-created or copied from a backup to its correct location.

Incorrect references and ghost schemas:
If a schema or MFD file contains a reference to a schema that cannot be found at the specified location, an error icon appears in the top left of its title bar (*screenshot below*). The schema that cannot be found at the specified location is called a **ghost schema** (*screenshot below*). In the screenshot below, `ipo.xsd` has an `include` statement that points to the schema `address.xsd`, which cannot be located at the location specified in the Import statement. In this case, `address.xsd` is the ghost schema file and is indicated by the icon . All files that reference `address.xsd` in an IIR statement are marked with the error icon, both in their schema boxes as well as in the Explorer pane.



A schema can be a ghost schema for any of several reasons. The most common are:

- The schema is not physically present at the specified location for any of several reasons. For example, it might have been moved.

- The schema cannot be loaded because the web server or network node is unavailable.

Note that ghost schemas are displayed in the Explorer and Design panes (even though they are not at the location specified in the reference). In the Design, the connector line between the ghost schema and its target schema is also displayed.

If you encounter incorrect references and ghost schemas, there are two possible ways to deal with the problem:

- SchemaAgent Client offers the **Correct reference paths** command when you right-click the file with the incorrect reference. This action causes SchemaAgent Client to look for schemas of the same name in the search path. This is the ideal solution if the ghost schema has been moved to another location within the search path. In such cases, SchemaAgent Client lists all the schemas with the ghost schema's name that it finds in the search paths. You can then select the correct path, and this path will be inserted as the reference to the schema.
- From within SchemaAgent Client, you can recreate the ghost schema as a rudimentary schema at the location specified in the reference. You can do this by right-clicking the ghost schema, and selecting **Recreate** from the context menu that appears. (Note that if the folder specified at the location specified in the reference statement does not exist or is not within the search path, then the `Recreate` command is not available.) This solution ensures that the IIR path correctly points to the specified schema. However, you still have to add appropriate content to the recreated rudimentary schema.

6.6.8 Reloading XML Schemas

If a schema is edited in an XML editor program (for example, XMLSpy), the changes are not automatically reflected in SchemaAgent Client. In order to view the structure of the modified schema in SchemaAgent Client, you have to reload the schema in SchemaAgent Client.

To reload a schema:

- Right-click the required folder or file in the Explorer pane and select **Reload**.

6.6.9 Recreating XML Schemas

A schema may contain an IIR statement that references a schema which cannot be found at the location specified in the IIR statement. We call such a schema a **ghost schema**.

To recreate a schema:

- In the Explorer Pane, right-click a ghost schema and select **Recreate**. This creates a rudimentary schema of the same name at the location specified for it in the IIR statement. (A rudimentary schema is one that contains only the `xs:schema` declaration.) If the folder specified at that location does not exist or is not within the search path, then the **Recreate** command is disabled.

6.6.10 Correcting Reference Paths

When a reference in a file (that is, either an IIR statement in a schema or a schema specification in an MFD file) points to a file that cannot be found at the location specified, you can use the **Correct reference paths** command to make SchemaAgent look for a file with a name matching that of the referenced file at other locations in the search path. If it finds one or more matches, a message box appears asking whether the IIR path should be corrected, and, in the case of multiple matches, which of the matches should be used. If no match is found, this is reported.

Correcting one reference path

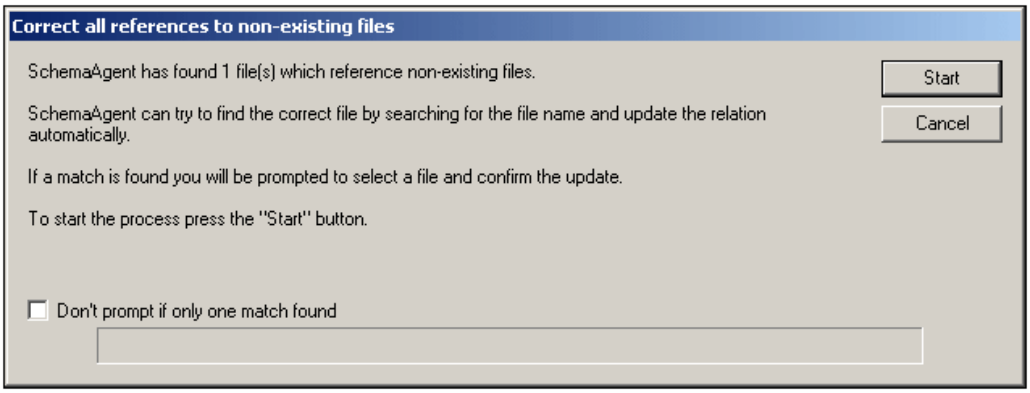
To correct a reference path:

- In the Explorer Pane or in the Design Tab, right-click on a file and select **Correct reference paths** or press **Ctrl + I**.

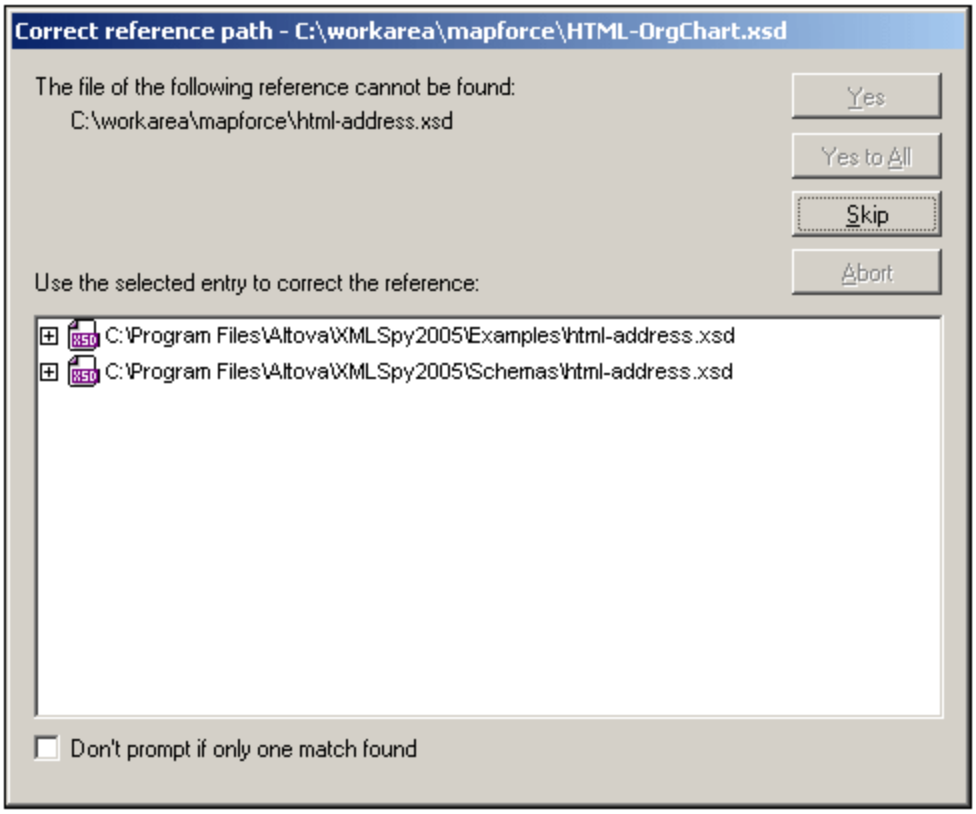
Correcting all reference paths

To correct all reference paths:

1. Select **Extras** | **Correct all reference paths**. The following dialog opens.



2. Click **Start**. If one match is found, you will be prompted to confirm the correction. If more than one match is found, you will be prompted to select the correct path from a list of schemas (*see screenshot*).



3. To confirm a correction, select an entry and click **Yes**. The correction is made. Clicking **Skip** does not make the correction. If there is more than one incorrect reference, a new Correct Reference Path dialog will pop up for each incorrect reference.

6.6.11 Saving and Closing Design Files

Saving a SchemaAgent Design
A SchemaAgent Design can be saved as a SchemaAgent Design (.sad) file. This is useful if you wish to modify relationships in the SchemaAgent Design at a later time. Note that a set of schemas (and, therefore, their relationships) can be contained in multiple SchemaAgent Design s.

To save a design file:
1. Select the design pane for the design file you want to save.
2. Select **File** | **Save**. The design is saved in a .sad file.

Saving a copy of a SchemaAgent Design file (Save As)
To save a copy of a file:
1. Select the design you want to save a copy of.
2. Select **File** | **Save As**. The Save As dialog opens. SchemaAgent Design (.sad) file.
3. Select the location where the copied file should be saved.
4. Change the file name, if desired.
5. Click **Save**. The original file is closed and the new copy of the file is opened in a design pane.

Closing design files
To close the currently active SchemaAgent Design (.sad) file.
1. Select the SchemaAgent design pane for the .sad file you want to close.
2. Select **File** | **Close**.

6.7 Customizing, Exporting and Printing Designs

This section describes the following:

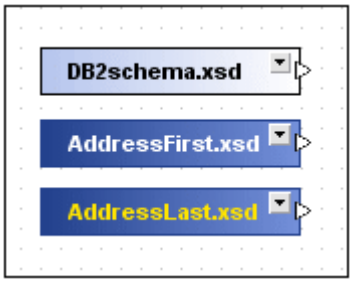
- how to customize the layout of a Design tab
- how to export design files as images
- how to print design files

6.7.1 Customizing the Layout of the Design

This section explains how to customize the layout and viewing options of the SchemaAgent Design document.

To use most of these layout commands, you must first select one or more file boxes. See Selecting Files in a Design.

Note on selection and focus: To use the alignment and layout features of SchemaAgent Client, it is important to understand the difference between selecting a file box and giving a (selected) file box the focus. In the screenshot below, `AddressFirst.xsd` and `AddressLast.xsd` are selected (indicated by deep blue background of title bar). `AddressLast.xsd` has the focus (indicated by yellow color of title bar text).



File boxes can be selected and given the focus in two ways:

- By drawing a **marquee** around the boxes to select. The last box over which the mouse cursor passes when drawing the marquee receives the focus; if the mouse cursor does not pass over any boxes, then no box receives the focus.
- By **clicking** individual boxes. The clicked box is selected and also has the focus. To select multiple boxes, press the Ctrl key while clicking a box. The last box to be selected receives the focus.

Show Grid

To toggle the grid on and off in the SchemaAgent Design document:

- Select **Layout** | **Show Grid**.

Align on Grid

This command aligns the top and left edges of schema boxes on the grid.

To align file boxes on the grid:

1. If the grid is not currently displayed, select **Layout** | **Show Grid** to display it.
2. Select the file boxes you want to align.
3. Select **Layout** | **Align on Grid**.

Zoom

To change the zoom factor:

- Select **Layout** | **Zoom** | **Zoom**. A slider appears that lets you adjust the zoom factor in the Design Pane.

To make all file boxes fit in the Design Pane:

- Select **Layout** | **Zoom** | **Zoom to fit**. The zoom factor is adjusted so that all file boxes in the Design Pane become visible.

To zoom to a selection:
1. Select one or more file boxes.
2. Select **Layout** | **Zoom** | **Zoom to selection**

Layout
The submenu items of this command become enabled when more than one file box is selected. Layout options are **Force Directed** and **Hierarchical**.

Align Edges
To align the edges of file boxes:
1. Select the file boxes you want to align, giving the focus to the file box you want to align the others with.
2. Select **Layout** | **Align Edges**. A submenu appears. Select from this submenu how you want the edges aligned.

Line Up
To line up file boxes:
1. Select the file boxes you want to line up.
2. Select **Layout** | **Line Up** | **Vertically** or **Horizontally**.

When **Horizontally** is selected, lines up the top edges of the selected file boxes with the top edge of the file box that has the focus. When **Vertically** is selected, lines up the left edges of the selected file boxes with the left edge of the file box that has the focus.

Order
To bring a file box to the top or bottom of a stack of file boxes, if it is part of such a stack:
- Select the file box you want to change the stack position of and select **Layout** | **Order** | **Bring to top** or **Bring to bottom**.

Resize
Please note: Resizing height might require that components in a file box be collapsed in order to attain the height of the file box that has the focus.

To resize file boxes:
1. Select the file boxes you want to resize, giving focus to the file box whose size you want the others to be changed to.
2. Select **Layout** | **Resize** | **Make same width** or **Make same height** or **Make same size** .

Space Evenly
To space file boxes evenly:
1. Select three or more file boxes in a design.
2. Select **Layout** | **Space Evenly** | **Vertically** or **Horizontally**.

Sort
Sorts file boxes in alphabetical order or according to their widths.

Please note: Alphabetical sorting is case-sensitive.

To sort files boxes:

1. Select the file boxes you want to sort.
2. Select **Layout** | **Sort** | **By Name** or **By Width** | **Ascending** or **Descending**.

6.7.2 Exporting Design Files as Images

To export a design to a PNG image file:

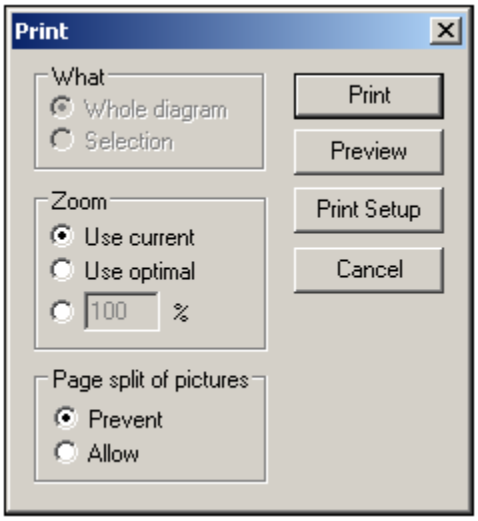
1. Select the design you want to save as an image file.
2. Select **File** | **Export to image**. The Save As dialog appears.
3. Select the folder where you want to save the image.
4. Enter the file name for the image.
5. Click **Save**.

6.7.3 Printing Design Files

Print
The Design diagram in the active Design tab can be printed together with a header and footer that provides meta information about the user environment and SchemaAgent application information.

To print a `.sad` file:

1. Select the design you want to print.
2. Click **File** | **Print**. The Print dialog opens (*see screenshot*).



3. In the Print dialog, select whether the whole diagram or only a selection is printed; what zoom factor is used; and whether schema boxes are split across page breaks.
4. Click **Print**.

Print Preview
To display a preview of a design as it will be printed:

1. Select the design you want to preview.
2. Select **File** | **Print Preview**. The Print dialog opens.
3. Click **Preview**.

Print Setup

1. Select **File** | **Print Setup**. The Print Setup dialog opens.
2. Adjust settings as desired and click **OK**.

6.8 Customizing SchemaAgent Client

Several aspects of SchemaAgent Client can be customized. See the following:

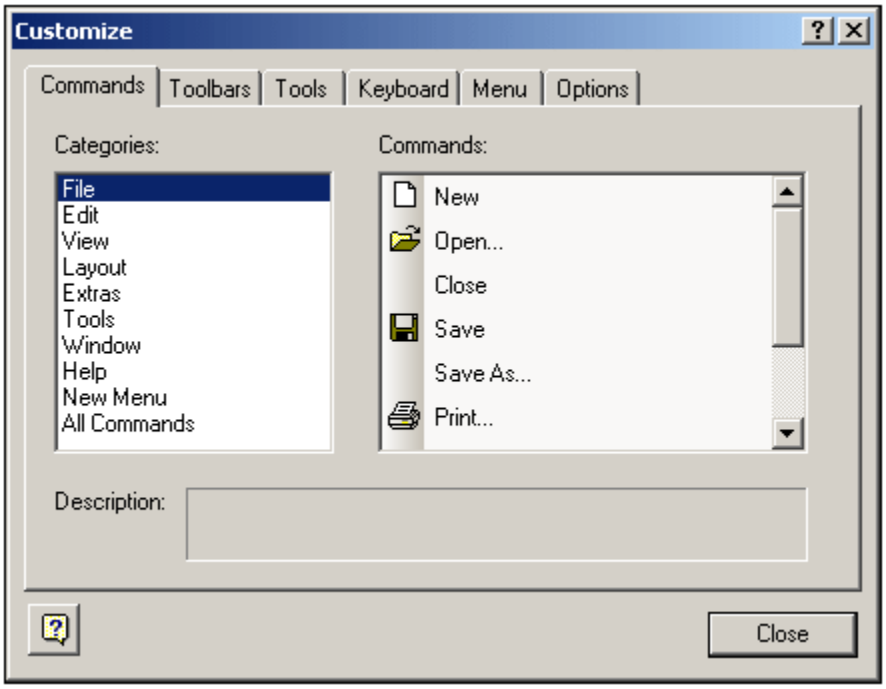
- Customizing SchemaAgent Client
- Configuring GUI Appearance
- Configuring the View
- Arranging Windows

6.8.1 Customizing SchemaAgent Client

In the Customize dialog, you can specify what toolbars should be displayed, set shortcut keys for menu commands, etc.

To customize SchemaAgent Client:

- Select **Tools | Customize**. The Customize dialog opens *(see screenshot)*.



6.8.2 Configuring GUI Appearance

To configure the appearance of the GUI:

- Select **Tools | Options**. The Options dialog appears. This dialog allows you to set e.g., the general design of the GUI layout, the colors of the schema boxes, the appearance of IIR connectors, and memory caching.

Most of these options are self-explanatory. The following options may need explanation:

- In the **Design tab**, the Threshold Items (in the Move and Resize pane) is the number of file boxes selected, over which limit, the selected file boxes are shown in outline while being dragged; if the number of file boxes selected is below the threshold, then the contents of the boxes are shown while the boxes are being dragged. The Default Insert Action sets how a schema should be inserted into a design when it is dragged into the Design Pane (that is, with or without related schemas). The Default Expand Height is the height of a file box when it is expanded.
- In the **Colors tab**, you can set colors for components of XML Schema file boxes separately from those for components of MFD files.
- In the **Relations tab**, the width and style of lines indicating relationships between schemas and between schema components can be customized.
- In the **Miscellaneous tab**, you can set whether LocalServer should be started on user login and whether it should be shut down when the last client is closed. If data is cached by a SchemaAgent server, more memory is used, but communication frequency is lower. You can set whether data should be cached.

6.8.3 Configuring the View

Toolbars
To switch the display of toolbars on or off:

- Select **View | Toolbars**. Select the name of the toolbar you want to switch on or off.

The Status Bar
The left-hand side of the Status Bar displays tool tips for commands when commands are moused over.

To switch the display of the Status Bar on or off:

- Select **View | Status bar**.

6.8.4 Arranging Windows

The **Window** menu has commands that let you specify how SchemaAgent Design windows should be displayed in the GUI (cascaded, tiled horizontally, or tiled vertically).

Additionally, all open windows are listed on this menu, with the active window being checked. To make another window active, click the name of the window you wish to make active.

6.9 Getting Help

The **Help** menu provides the following:

- access to the Help files (with either Contents, Index, or Search pane active)
- a registration input form
- links to Support sources at the Altova website
- information about SchemaAgent

Chapter 7

XMLSpy and SchemaAgent

7 XMLSpy and SchemaAgent

Altova's XMLSpy product (Enterprise or Professional edition) can use SchemaAgent technology to provide powerful schema editing functionality. When XMLSpy has been set up to work with SchemaAgent, schemas can be directly edited in XMLSpy using components from other schemas on the network. You can view the content model of a component belonging to another schema and reuse this component with or without modifications. You can also build relationships between schemas, thereby enabling you to modularize and manage complex schemas directly from within XMLSpy.

See also the SchemaAgent Tutorial.

In order for XMLSpy to work as a SchemaAgent client, you must do the following:

- Download Altova's SchemaAgent 2006 product from the SchemaAgent download page at the Altova website and install it on the same machine as XMLSpy. SchemaAgent Client requires a license that must be purchased from Altova. Altova's Enterprise XML Suite and Professional XML Suite products each includes the SchemaAgent Client product and a license key for it. (The SchemaAgent Server application, however, is not included in the XML Suite packages.) You can get to work directly, using the LocalServer that is included in the SchemaAgent package and installed when you install SchemaAgent.
- Optionally download SchemaAgent Server from the SchemaAgent download page at the Altova website and install it anywhere on your network. SchemaAgent Server is available free of charge.
- Define the search path/s for a SchemaAgent server (either LocalServer or SchemaAgent Server). A detailed description of how to do this is given in the SchemaAgent Server documentation.
- Start a connection from within XMLSpy to a SchemaAgent server (either LocalServer or SchemaAgent Server).

A detailed description of how to use SchemaAgent functionality in XMLSpy is given in the XMLSpy documentation.

Chapter 8

License Information

8 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

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- 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 Registration 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.

8.2 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.

8.3 Copyright

8.4 Altova End User License Agreement

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If you are located in the United States or are using the Software in the United States then this Software License Agreement will be governed by and construed in accordance with the laws of the Commonwealth of Massachusetts, USA (excluding its conflict of laws principles and the U.N. Convention on Contracts for the International Sale of Goods) and you expressly agree that exclusive jurisdiction for any claim or dispute with Altova or relating in any way to your use of the Software resides in the federal or state courts of Massachusetts and you further agree and expressly consent to the exercise of personal jurisdiction in the federal or state courts of Massachusetts in connection with any such dispute or claim.

If you are located outside of the European Union or the United States and are not using the Software in the United States, then this Software License Agreement will be governed by and construed in accordance with the laws of the Republic of Austria (excluding its conflict of laws principles and the U.N. Convention on Contracts for the International Sale of Goods) and you expressly agree that exclusive jurisdiction for any claim or dispute with Altova or relating in any way to your use of the Software resides in the Handelsgericht, Wien (Commercial Court, Vienna) and you further agree and expressly consent to the exercise of personal jurisdiction in the Handelsgericht Wien (Commercial Court, Vienna) in connection with any such dispute or claim. This Software License Agreement will not be governed by the conflict of law rules of any jurisdiction or the United Nations Convention on Contracts for the International Sale of Goods, the application of which is expressly excluded.

This Software License Agreement contains the entire agreement and understanding of the parties with respect to the subject matter hereof, and supersedes all prior written and oral understandings of the parties with respect to the subject matter hereof. Any notice or other communication given under this Software License Agreement shall be in writing and shall have been properly given by either of us to the other if sent by certified or registered mail, return receipt requested, or by overnight courier to the address shown on Altova's Web site for Altova and the address shown in Altova's records for you, or such other address as the parties may designate by notice given in the manner set forth above. This Software License Agreement will bind and inure to the benefit of the parties and our respective heirs, personal and legal representatives, affiliates, successors and permitted assigns. The failure of either of us at any time to require performance of any provision hereof shall in no manner affect such party's right at a later time to enforce the same or any other term of this Software License Agreement. This Software License Agreement may be amended only by a document in writing signed by both of us. In the event of a breach or threatened breach of this Software License Agreement by either party, the other shall have all applicable equitable as well as legal remedies. Each party is duly authorized and empowered to enter into and perform this Software License Agreement. If, for any reason, any provision of this Software License Agreement is held invalid or otherwise unenforceable, such invalidity or unenforceability shall not affect the remainder of this Software License Agreement, and this Software License Agreement shall continue in full force and effect to the fullest extent allowed by law. The parties knowingly and expressly consent to the foregoing terms and conditions.

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