Altova SchemaAgent 2025

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SchemaAgent®

User & Reference Manual

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1   Introduction

[Altova SchemaAgent 2025](#) is an Altova technology that enables you to manage multiple schemas and build relationships between W3C XML schemas from within a graphical user interface. SchemaAgent also provides a display of relationships between Altova MapForce design (.mfd) files and their associated XML schemas or instances. You can also view and modify relationships and dependencies for XSLT stylesheets and WSDL files.

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Altova's SchemaAgent technology consists of two components:

- A [SchemaAgent](#) ⁴⁹ server serves supported files to one or more SchemaAgent Clients on the network. The server can be installed as a local server together with SchemaAgent Client, as an independent Altova SchemaAgent Server installation, or run as a service.
- The [SchemaAgent Client](#) ⁶² is an application with a graphical user interface that provides access to the files served by a SchemaAgent server. Using standard GUI mechanisms, such as copy-and-paste and drag-and-drop, you can easily build relationships between the served files and make large-scale changes—such as in path references—across multiple files.

SchemaAgent technology can also be used in Altova **XMLSpy® Editor**. XMLSpy communicates via SchemaAgent Client with either LocalServer or SchemaAgent Server.

SchemaAgent in the Altova product range

Both SchemaAgent Server and SchemaAgent Client are to be downloaded separately from the [SchemaAgent download page](#) at the Altova website and installed separately. SchemaAgent Server is available free of charge, whereas SchemaAgent Client requires a license that must be purchased from Altova.

The Altova® MissionKit™ 2025 Enterprise Edition includes the SchemaAgent product and a license key for it. The SchemaAgent Server application, however, is not included as part of the Altova® MissionKit™ 2025 packages, and must be downloaded from the [SchemaAgent download page](#) at the Altova website.

In order to use SchemaAgent with XMLSpy, SchemaAgent Client must be installed on the same machine as XMLSpy. SchemaAgent Server can be installed anywhere on the network. XMLSpy Enterprise Edition and XMLSpy Professional Edition (when purchased independently of Altova® MissionKit™ 2025 applications) can both use SchemaAgent.

Note: 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.

Last updated: 17 March 2025

1.1   About this Documentation

This documentation provides an overview of how SchemaAgent technology works, and describes how to use the SchemaAgent server and SchemaAgent Client. 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 documentation is divided into the following parts:

- An [introduction](7) [7] to SchemaAgent and its mechanism.
- An overview of SchemaAgent's [main features](10) [10].
- A description of how to [configure the search paths](12) [12] for SchemaAgent.
- A SchemaAgent [tutorial](20) [20].
- A description of the installation, configuration, and use of [SchemaAgent Server](49) [49].
- A description of the installation, configuration, and use of [SchemaAgent Client](62) [62].

File Paths

File paths given in this documentation are not the same for all operating systems. Note the following correspondences:

- *Documents folder*: Example files are located in the folder **C:\Users\<username>\Documents\Altova**.
- *Application folder*: The Application folder is the folder where your Altova application is located (by default, **C:\Program Files\Altova**). When Schema Agent 32-bit is installed on a 64-bit operating system, the path is **C:\Program Files (x86)\Altova**.

1.2   System Requirements

Altova SchemaAgent Client and SchemaAgent Server run on the following operating systems:

- Windows 10, Windows 11
- Windows Server 2016 or newer

Both the 32-bit and 64-bit platforms are supported.

1.3   SchemaAgent's Main Features

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.

Installation options

SchemaAgent Server can be installed as a standalone application with a graphical user interface, or as a service.

Graphical user interface

SchemaAgent Server's graphical user interface (GUI) provides full environment information, including lists of currently connected clients and all defined search paths. An Environment window displays all defined search paths as hierarchical tree structures as well as all file extensions defined for schemas, MFD, XML, XSL/XSLT, and WSDL files, and provides easy-to-use search path selection using Explorer-type browse functionality. The main window in the right area of SchemaAgent Server displays all files with the defined file extensions that have been found in the search paths.

Logging functionality

The user interface provides a Log window that displays detailed communications activity. The log reports can be configured and written to CSV files.

Access to schemas on the web

SchemaAgent Server enables access to schemas located in WebDAV folders on (secure) WebDAV servers with UNC paths and drive letters.

SchemaAgent Client provides a graphical user interface where you can view and build schema relationships and manage large numbers of schemas. You can also view relationships between MapForce design files and their associated schemas.

SchemaAgent designs

Schema designs help you to manage and organize schema collections intuitively. These designs can be saved as SchemaAgent design files for subsequent editing. You can create, update, or delete IIRs (Includes, Imports, and Redefines) between schemas by direct manipulation in a SchemaAgent design using drag-and-drop. Once an IIR 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.

For XSLT stylesheets, SchemaAgent Client allows you to create imports and includes as well as import schemas or create new or display existing inline schemas.

The Design window also shows WSDL files where you can explore the content of the WSDL file and view its internal schemas as well as all of its messages, port types, bindings, and services. The import of XML schemas or different WSDL files is also possible.

File administration

If a file is renamed or moved, the change is passed to all other files in the workspace that reference the changed file. The advantage is that multiple files can be managed from within the SchemaAgent Client GUI, thus obviating the need to edit individual files separately.

Viewing structures and relations

In the Design window, you can obtain a graphical view of the relationships between the source and target schemas of MapForce design files, and all related schemas. IIRs can be viewed immediately and in greater detail in the schema component itself and the detailed structure of schema components, such as elements and complex types, can be displayed.

This applies also to XML instances, XSLT stylesheets and WSDL files. For each of these files, SchemaAgent Client displays a file box in the Design window. These file boxes contain all the relevant information for a particular file, structured in collapsed sections which can be expanded to view some of the data in detail.

Selecting or inserting related files

SchemaAgent Client offers several options to select file boxes or insert files that reference other files in the workspace.

Integration with XMLSpy

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.

1.4   Configuring Search Paths

Search paths are the paths or folders that are scanned for XML Schemas, MapForce Design (.mfd) files, and XML files. Depending on your SchemaAgent installation, you can configure (i.e., add, edit, or delete) search paths in the Configure Paths tab of either SchemaAgent Client or SchemaAgent Server.

If you are working with a **LocalServer**, the Configure Paths tab is displayed as an additional tab in the Explorer window of the SchemaAgent Client application.
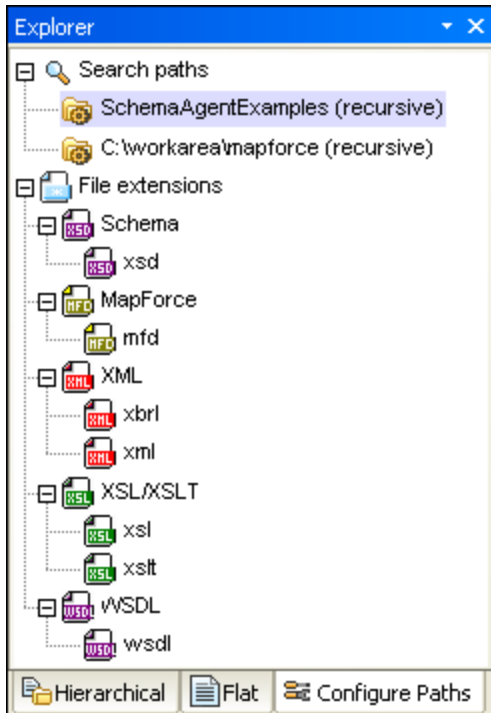
If you have installed a **SchemaAgent Server** locally or in a network, the Configure Paths tab is displayed in the Environment window of SchemaAgent Server. The Explorer window in SchemaAgent Client has no Configure Paths tab if you are connected to SchemaAgent Server.
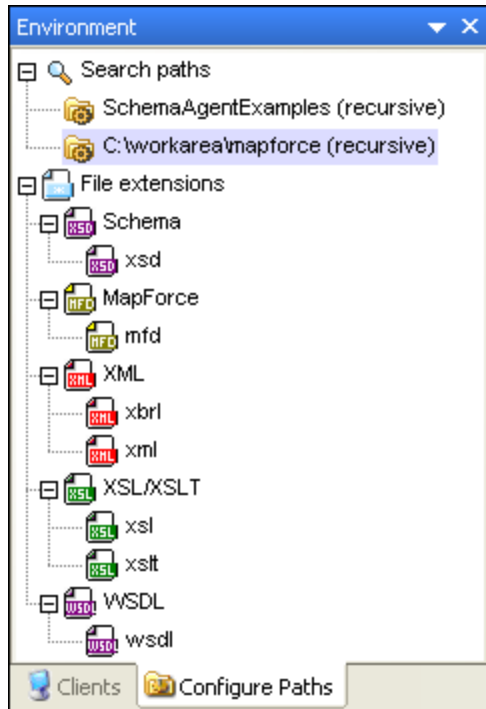
Apart from its location, the Configure Paths tab is identical in both of the above-mentioned cases.

Search Path considerations

Depending on the installation location of SchemaAgent, certain file access and path restrictions may apply. If you access schemas on a network share, make sure that the SchemaAgent 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.

1.4.1   Adding or Editing Search Paths

Before you can work with a file in SchemaAgent Client, it must be contained in one of the search paths that are displayed in the Hierarchical and Flat tabs of the Explorer window. You cannot open files from outside SchemaAgent Client or drag them into the Design window.

Note: The procedure described below applies to the **Configure Paths** tab in both the Explorer window in SchemaAgent Client and the Environment window in SchemaAgent Server. The type of your SchemaAgent installation and the server you are connected to, respectively, determines in which window the Configure Paths tab is displayed.

Relative paths

In SchemaAgent, you can define to display search paths relative to the location of the [configuration file](#) [18]. This allows you to have shorter search paths, if your folder structure is very extensive. Note that, with SchemaAgent LocalServer, each user has a separate configuration file in **..\Documents\Altova\SchemaAgent LocalServer2025**.

To add or edit a search path:

1. In the **Configure Paths** tab of your respective SchemaAgent application, do one of the following:

    *   To add a search path, right-click the Search paths folder and select **Add search path** from the context menu, or click the folder and press the **Insert** key.
    *   To edit a search path, right-click one of the existing search paths and select **Edit search path** from the context menu.

    The Add/Edit search path dialog box opens.
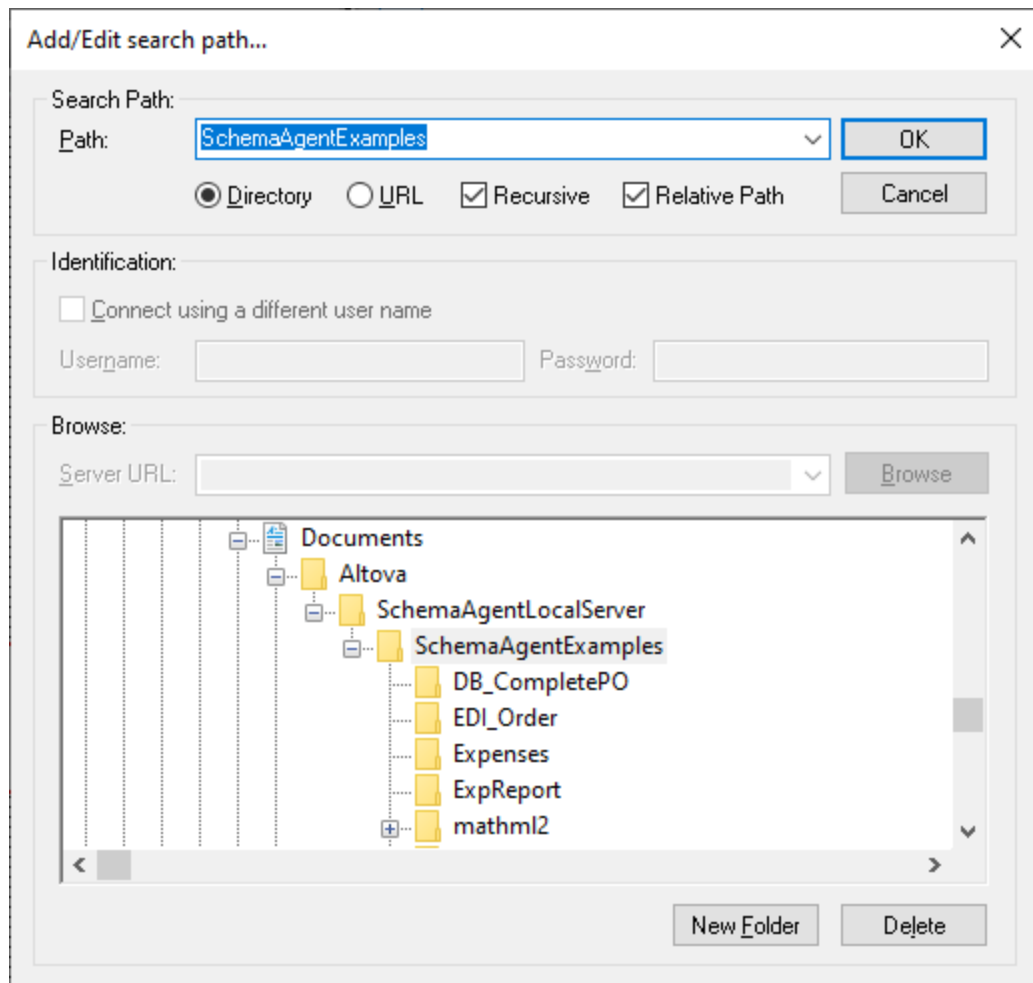
2.   If the search path is a directory, do the following:

   a) Select the **Directory** option and enter the search path in the **Path** text box. Alternatively, click
       Browse to select the required directory; the selected directory is entered in the **Path** text box.
   b) Select the **Relative Path** check box to make the search path entry relative; leave the check box
       unchecked to use an absolute path.

   If the search path is a URL, do the following:

   a) Select the **URL** option and enter the server URL in the **Server URL** text box.
   b) If authorization is required, select the **Connect using a different user name** check box and enter
       the username and password.
   c) If applicable, click **Browse** to select the required directory on the server.

3. 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.
4. Click **OK**.

To delete a search path:

1. In the **Configure Paths** tab of your respective SchemaAgent application, select the path you want to delete and do one of the following:

    - Right-click and choose **Delete search path** from the context menu.
    - Press the **Delete** key.

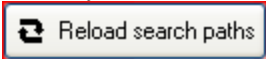2. Click **Yes** in the message box that pops up.

1.4.2   Configuring File Extensions

By default, SchemaAgent Client displays the following file types in the Hierarchical and Flat tabs of the Explorer window:

- W3C XML Schema
- MapForce Design files
- XML files
- XSL and XSLT stylesheets
- Web Service Description Language (WSDL) files

The "File extensions" folder in the **Configure Paths** tab, therefore, has five sub-folders: Schema, MapForce, XML, XSL/XSLT, and WSDL. Each of the sub-folders contains typical extensions for the respective format. You can, however, define additional file extensions for any of the supported files.
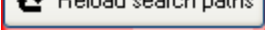
To add a file extension:

1. In the **Configure Paths** tab of your respective SchemaAgent application, select a folder or a file extension under the File extensions folder and do one of the following:

    - Right-click and choose **Add file extension** from the context menu.
    - Press the **Insert** key.

2. An entry named "newextension" is added to the respective folder and selected for editing. The

    ![Reload search paths] button appears flashing red.
3. Enter the desired file extension and press **Enter**.
4. Click the **Reload search paths** button to display files with the newly added file extension in the Explorer window.

To edit a file extension:

1. In the **Configure Paths** tab of your respective SchemaAgent application, select a file extension under one of the sub-folders of the File extensions folder and do one of the following:

    - Right-click and choose **Edit file extension** from the context menu.
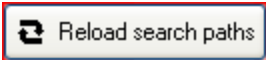   - Press **F2**.

The file extension name is selected for editing.

2. Edit the file extension name as required and press **Enter**. The [↻ Reload search paths] button appears flashing red.
3. Click the **Reload search paths** button to display files with the changed file extension in the Explorer window.

To delete a file extension:

1. In the **Configure Paths** tab of your respective SchemaAgent application, select a file extension under one of the sub-folders of the File extensions folder and do one of the following:

   • Right-click and choose **Delete file extension** from the context menu.
   • Press **Delete**.

2. Click **Yes** in the message box that pops up. The [↻ Reload search paths] button appears flashing red.
3. Click the **Reload search paths** button to remove files with the deleted file extension from the Explorer window.

1.4.3   Reloading Search Paths

The **Reload search paths** command updates and saves the currently defined search paths. It is necessary to run this command if files have been changed outside SchemaAgent, or if the search path configuration has changed (for example, when a new search path has been added). After a search path or file extension has been added, edited, or deleted, an asterisk appears at the right of that search path or file extension and the **Reload Search Paths** button is displayed at the bottom of the Configure Paths tab. This indicates that the search paths need to be reloaded.

To reload search paths, do one of the following:

• In the Explorer window, click the **Configure Paths** tab, and then click **Reload search paths**.
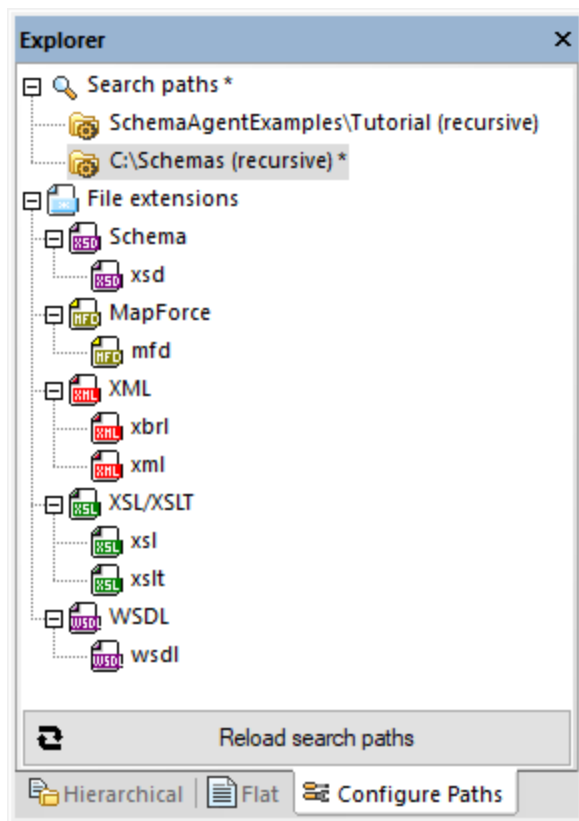
- Click the **Reload search paths** [icon] toolbar button.
- On the **Extras** menu, click **Reload search paths**.

1.4.4   Resetting Search Paths

The **Reset Search Paths** command resets search paths to the settings with which they were last saved. This is typically useful when you have made changes to the search path configuration (without reloading the search paths yet) and would like to revert your changes for whatever reason.

To reset search paths:

1. In the Explorer window, click the **Configure Paths** tab.
2. Right-click anywhere inside window and select **Reset search paths** from the context menu.

1.4.5   Viewing the Configuration File

The set of supported files managed by LocalServer or SchemaAgent Server, respectively, is defined in an XML file called **SchemaAgentServerCfg.xml**, which is by default stored in the [Documents](#)[8] 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
<?xml version="1.0" encoding="UTF-8"?>
<SearchPaths XMLSchema=".xsd" MapForce=".mfd" XML=".xbrl,.xml" XSL=".xsl,.xslt"
WSDL=".wsdl">
   <Path recursive="1" user="" auth="000000">s:\schemas-mydir\</Path>
   <Path recursive="0" user="" auth="000000">X:\schemas\</Path>
   <Path recursive="1" user="" auth="000000">http://test.webdav.org/dav</Path>
   <Path recursive="1" user="" auth="000000">\\Server1\Share1\Dir1\Schemadata</Path>
   <Path recursive="1" user="jsmith" auth="k04EKS">ftp://myftpserver</Path>
</SearchPaths>
```

Note that any number of search paths can be defined, and search paths can 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 or SchemaAgent Server, respectively, retrieves all files with defined file extensions in individual search paths and builds an internal map of the relationships between the supported files in a search path. It is this mapping of relationships that enables SchemaAgent clients to present data about 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.

2   SchemaAgent Tutorial

This tutorial gives a short overview of W3C XML schemas and takes you through several tasks which provide an overview of how to use SchemaAgent to its fullest. You will learn how to:

- Set up [21] SchemaAgent Client
- Create Include [26], Import [29], and Redefine [28] relationships between XML schemas
- Include [32], redefine [34], and import [39] a type
- Import a type using only XMLSpy [41]
- View updated relationships [45]
- View MapForce design [47] (.mfd) files

Installation and configuration

This tutorial assumes that you have successfully installed SchemaAgent on your computer and received a free evaluation key-code, or are a registered user. The evaluation version of SchemaAgent is fully functional but limited to a 30-day period. You can request a regular license from our secure web server or through any one of our resellers.

Tutorial example files

The tutorial files are available in the **Documents\Altova\SchemaAgentLocalServer2025\SchemaAgentExamples\Tutorial** folder. The parent **Examples** folder contains various XML schemas for you to experiment with, while the **Tutorial** folder contains all the files used in this tutorial. For each Windows user account, a separate **Examples** folder as well as a configuration file [18] is created when the user runs SchemaAgent for the first time. This allows each user on the computer to have separate SchemaAgent search paths and example files.

2.1   Setting Up SchemaAgent Client

In this tutorial, we will work with the LocalServer that is automatically installed with SchemaAgent Client. You must connect SchemaAgent Client to the LocalServer before you can use it to create relationships between XML schemas.

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.

Objective

In this section of the tutorial, you will learn how to connect to a server and define a search path. Specifically, you will learn how to do the following:

- Start SchemaAgent Client and connect [21] to the LocalServer
- Configure a search path [22] to the folder that contains the examples for this tutorial

Commands used in this section

In this section of the tutorial, you will use the Explorer window exclusively. The following commands are used:

| Icon	Command name	Description
	Connect to Server	This icon is located in the Extras toolbar. Click this icon to open the Connect to SchemaAgent Server dialog box where you can choose a server to connect to.
	Add search path	This command is included in the context menu that opens when you right-click anywhere in the Configure Paths tab of the Explorer window. Choose this command to add a new search path to the current SchemaAgent server.
	Reload search paths	This icon is located in the Extras toolbar and also appears as a **Reload search paths** button at the bottom of the Explorer window after changes occurred in the search paths.

2.1.1   Connecting to the LocalServer

When you install SchemaAgent Client, both the client and the LocalServer are installed. For the scope of this tutorial, you will establish a connection to the LocalServer (as opposed to a server on the local network).

To connect to the LocalServer:

1.   Do one of the following:

- Double-click the SchemaAgent icon on your desktop.
- Click **Start** ⊞ and start typing "SchemaAgent" to access the program's shortcut.
- If the program is already running, select the menu option **Extras | Connect to server** or click the

  Connect to Server 🖲 toolbar button from the Extras toolbar. The Connect to SchemaAgent
 Server dialog box appears.
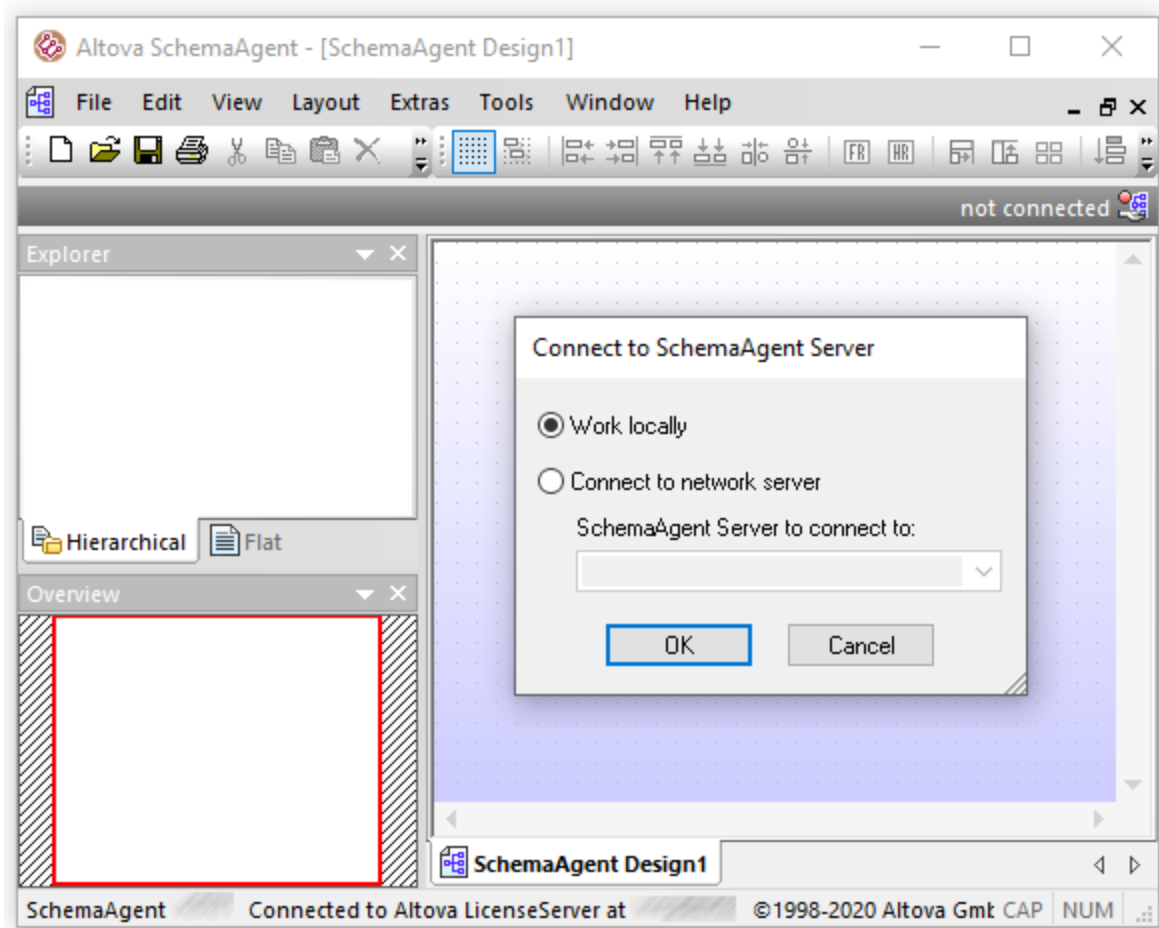
2. Choose **Work locally** and click **OK**.

2.1.2   Configuring a Search Path

In this section, you will configure a path to the folder that contains the files used in this tutorial. SchemaAgent Client displays the search paths in the **Hierarchical** and **Flat** tabs of the Explorer window.

To configure a search path to the Tutorial folder:

1. In the Explorer window of SchemaAgent Client, click the **Configure Paths** tab.
2. Right-click any existing search paths added by default during installation, and select **Delete Search Path** from the context menu.
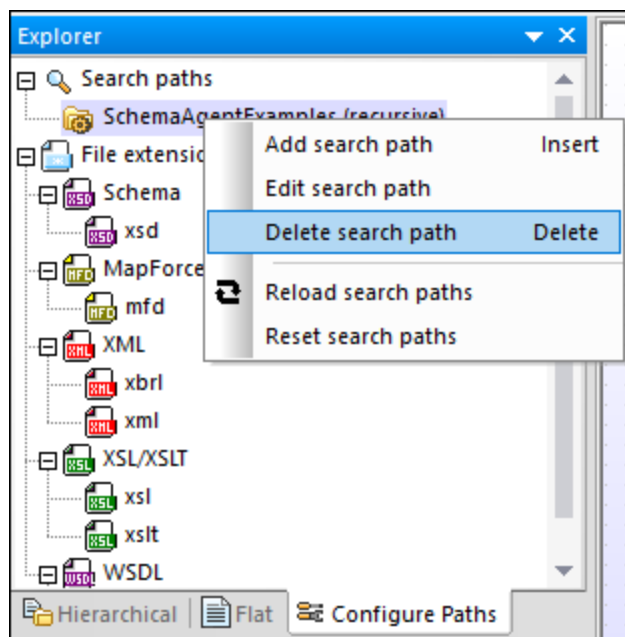
3. Right-click anywhere in the Explorer window and select **Add search path** from the context menu. Alternatively, select the Search paths entry in the Explorer window and press the **Insert** key. The Add/Edit search path dialog box opens.
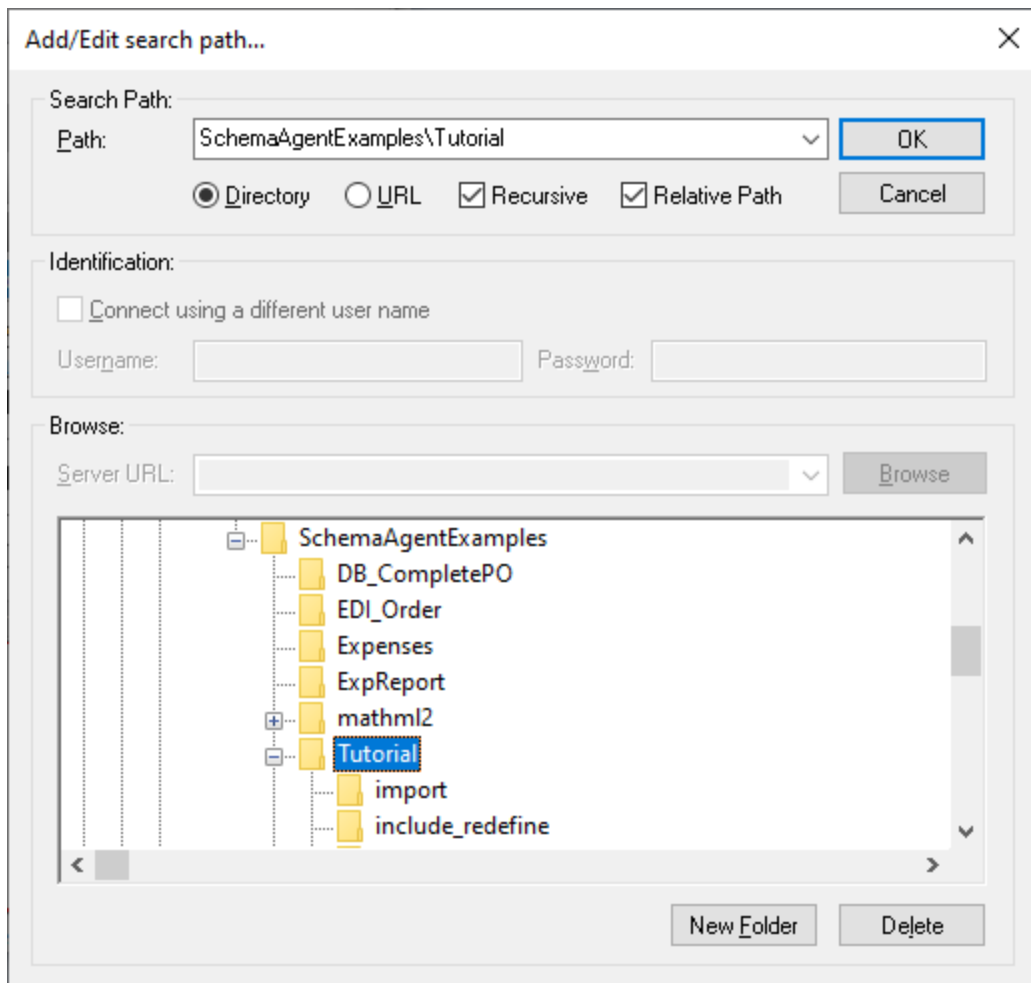
4. Choose **Directory** and select the **Recursive** check box to have the sub-folders displayed as well.
5. Using the directory tree from the lower part of the dialog box, navigate to the following directory:
    Documents\Altova\SchemaAgent LocalServer2025\SchemaAgentExamples\Tutorial.
6. Optionally, if your paths are very long, select the **Relative Path** check box.
7. Click **OK**. The search path appears in the Explorer window.
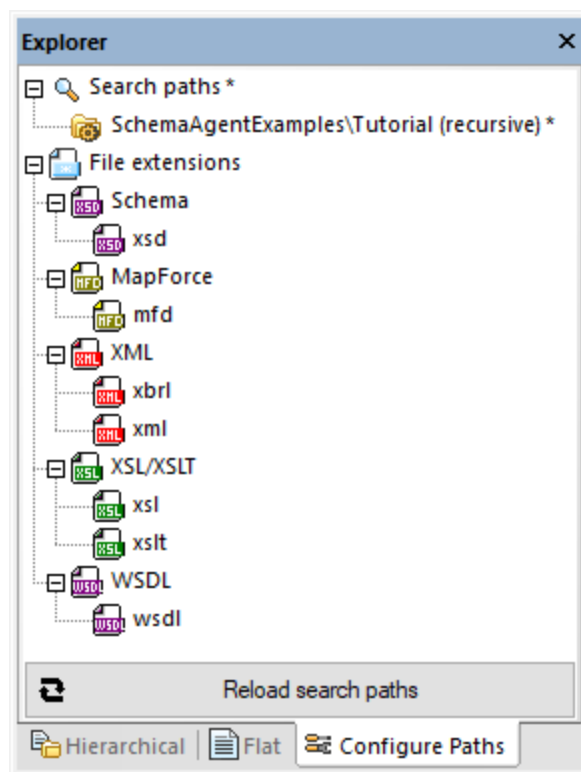
8. Click the **Reload search paths** button. When the operation completes, the asterisk next to "Search paths" disappears, which indicates that the new search path is now saved.

2.2   Creating Relationships Between XML Schemas

In this tutorial section, you will use SchemaAgent Client to create include, redefine, and import relationships between schemas. Specifically, you will learn how to do the following:

- <u>Show schemas</u> [26] in the Design view of SchemaAgent Client
- <u>Create an include relationship</u> [27] between two schemas
- <u>Create a redefine relationship</u> [28] between two schemas
- <u>Create an import relationship</u> [29] between two schemas using different namespaces

Commands used in this section

In this section of the tutorial, you will use the Design window exclusively. The following commands are used:

| Icon	Command name	Description
	New (Ctrl+N)	This icon is located in the Standard toolbar and it is also available as an option in the **File** menu. Use this command to open a new Design window.

2.2.1   Creating an Include Relationship

In this section, you will create an include relationship between the following schemas from the **SchemaAgentExamples\Tutorial\include_redefine** folder:

- **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.

The goal is to have **dvd_order.xsd** include types from **event_registration.xsd**, specifically those that store customer and credit card data.

To display schemas in a Design window:

1. Select the menu option **File | New**, or click the **New** icon, or press **Ctrl+N** to open a new Design window.
2. In the Explorer window, click the **Hierarchical** tab.
3. Select **event_registration.xsd** and **dvd_order.xsd** from the "include_redefine" folder and drag them into the Design window.
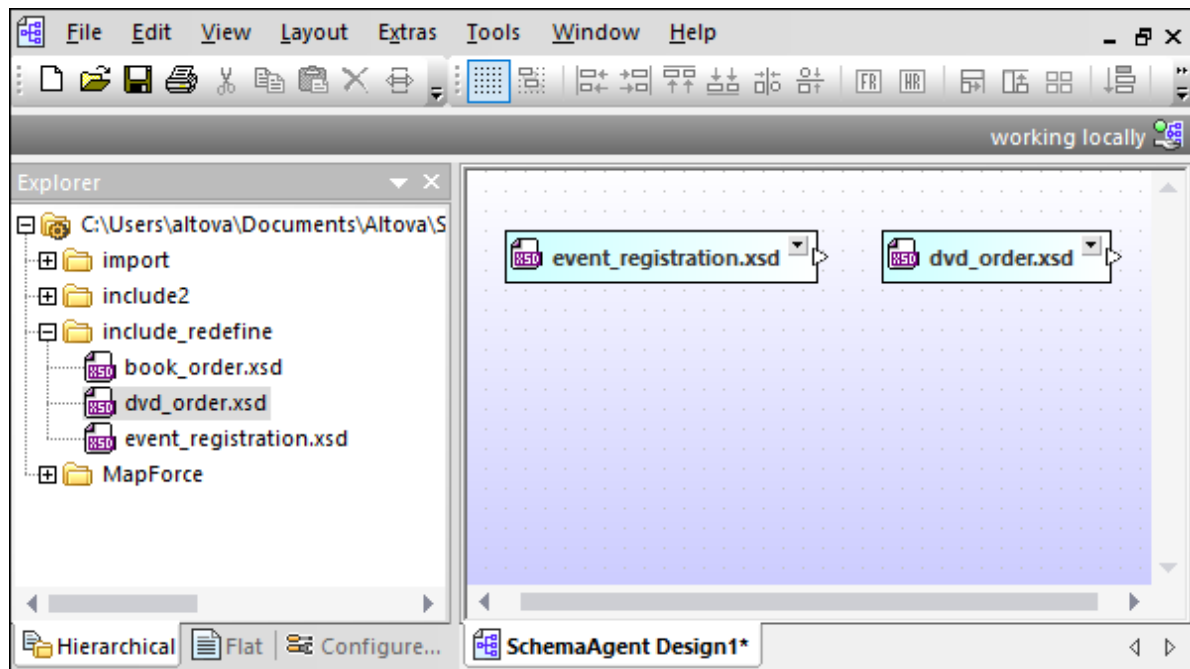
Note: To drag and drop more than one file at the same time, click the files while holding down the **Ctrl** key. Drag and drop a folder to put all the files it contains in the Design window.

To create an include relationship:

1. Click the small white triangle on the right side of **event_registration.xsd** and drag the connector line to **dvd_order.xsd**.
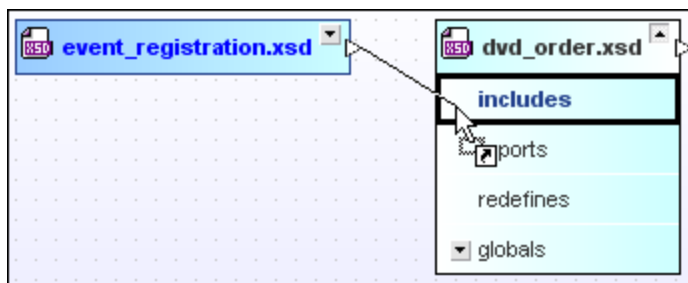
2. Release the mouse button over the word "includes". A green arrow that points from **event_registration.xsd** to **dvd_order.xsd** appears.
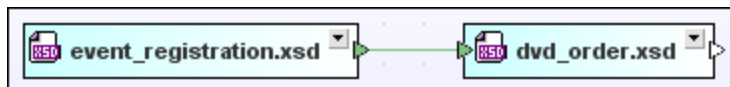
This arrow shows that an include relationship has been made between these schemas.

2.2.2   Creating a Redefine Relationship

In this section, you will create a redefine relationship between the following schemas from the
SchemaAgentExamples\Tutorial\include_redefine folder:

- **event_registration.xsd**
- **book_order.xsd**: This schema is structured to contain order details for mail order books.

The goal is to have **book_order.xsd** include and redefine types from **event_registration.xsd**, specifically the
types for storing customer and credit card data.

Redefinition of schemas 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) the individual
components of the referenced schema.

Note: In SchemaAgent Client, only the redefine relationship is created between the schemas. The actual
redefinition of individual components [34] can be done in XMLSpy.

To create a redefine relationship:

1. In the Explorer window, select **book_order.xsd** from the **include_redefine** folder and drag it into the
    Design window that already contains the files **event_registration.xsd** and **dvd_order.xsd**.
2. Click the small green triangle on the right side of **event_registration.xsd** and drag the connector line
    to **book_order.xsd**.
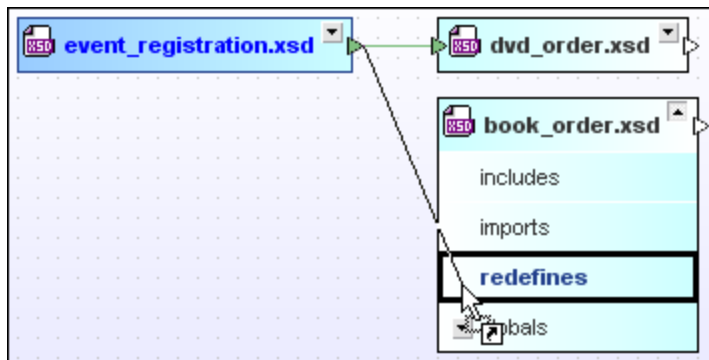
3. Release the mouse button over the word "redefines". A purple arrow that points from
    event_registration.xsd to **book_order.xsd** appears.
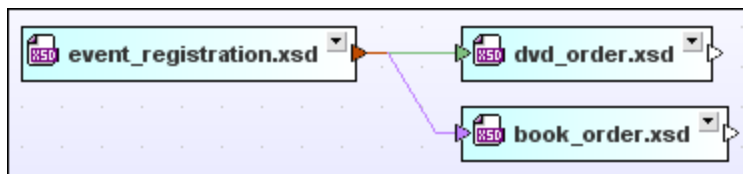
This arrow shows that a redefine relationship has been made between these schemas. Note that the
color of the triangle in the **event_registration.xsd** file box changed to indicate that relationships of
different types are existing with this file box.

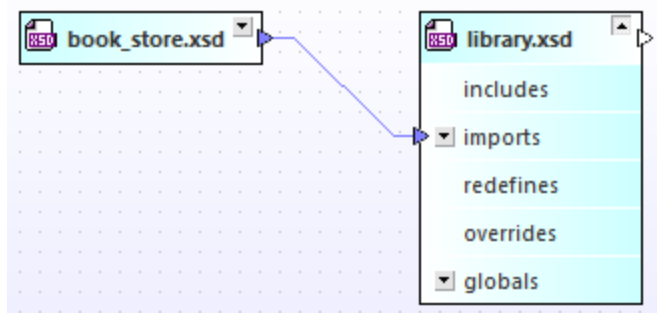## 2.2.3   Creating an Import Relationship

The import relationship is used when you want to reuse components from one schema in a schema with a different namespace. In this section, you will create an import relationship between the following schemas from the **SchemaAgentExamples\Tutorial\import** folder:

- **book_store.xsd**: This schema is structured to contain the address of the book store, and details for each book in the inventory.
- **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.

The goal is to have **library.xsd** import a type containing book information from **book_store.xsd**.

To create an import relationship:

1. Select the menu option **File | New**, or click the **New** [icon] icon, or press **Ctrl+N** to open a new Design window.
2. In the Explorer window, click the **Hierarchical** tab.
3. Select **book_store.xsd** and **library.xsd** from the "import" folder and drag them into the new Design window.
4. Click the small white triangle on the right side of **book_store.xsd** and drag the connector line to **library.xsd**.
5. Release the mouse button 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.

2.3   Using XMLSpy as a SchemaAgent Client

In the previous sections of the tutorial, you have created include [26], import [29] and redefine [28] relationships between schemas. When you create a relationship using SchemaAgent Client, the corresponding include, import or redefine statement is automatically added to the XML schema.

In this section of this tutorial, you will learn how to use XMLSpy to do the actual including, importing and redefining of individual components of the schemas. Specifically, you will learn how to do the following:

- Connect XMLSpy [31] to a SchemaAgent server
- Make elements of a content model into global complex types [31]
- Include complex types [32] in a different schema
- Redefine types [34] in XMLSpy
- Import complex types [39] from schemas using different namespaces
- Include complex types directly in XMLSpy [41]

Prerequisites

- Make sure that XMLSpy is installed.

Commands used in this section

In this section of the tutorial, you will use the Schema/WSDL View of XMLSpy exclusively. The following commands are used:

Icon	Command name	Description
	Connect to SchemaAgent Server	This icon is located in the Schema design toolbar. Click this icon to open the Connect to SchemaAgent Server dialog box where you can choose a server to connect to.
	Display Diagram (or Display Content Model View)	This icon is located to the left of all global components in Schema Overview. Click this icon to display the content model of the associated global component.
	Make Global	This command is included in the context menu that opens when you right-click an element in the Content Model View. Use this command to make this element into a new global element.
	**Add Child	Element**	This command is included in the context menu that opens when you right-click a sequence element in the Content Model View. Use this command to add a new child element to the content model.
	Insert	This icon is located at the top left-hand corner of the Schema Overview. Clicking the icon enables you to insert a global component before the selected element.
	Display All Globals	This icon is located at the top left-hand corner of the Content Model View. Clicking the icon switches the view to Schema Overview, which displays all global components.

2.3.1   Connecting XMLSpy to the LocalServer

The steps below illustrate how to connect XMLSpy as a client to the LocalServer. The SchemaAgent Client application does not necessarily need to be open for this.

To open XMLSpy and connect to the SchemaAgent LocalServer:

1. Run SchemaAgent Client and click the **Hierarchical** tab in the Explorer window.
2. In the "include_redefine" folder, right-click **event_registration.xsd** and select **Edit in XMLSpy (Ctrl+Y)** from the context menu.
3. In XMLSpy, select the menu option **Schema design | Connect to SchemaAgent Server** or click the **Connect to SchemaAgent Server** icon in the Schema design toolbar.
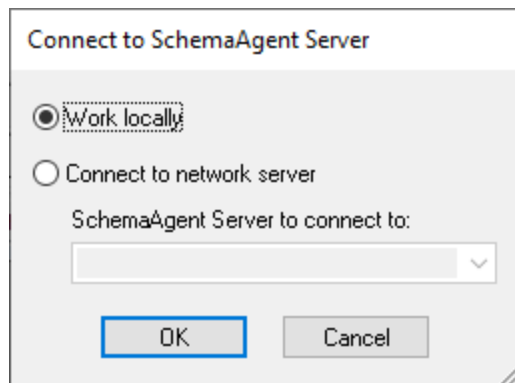
4. Select **Work locally** and click **OK**.
5. Click **OK** in the information window that pops up.

On successful connection, the message "Connected to local SchemaAgent Server" appears at the top of the Schema Design window.
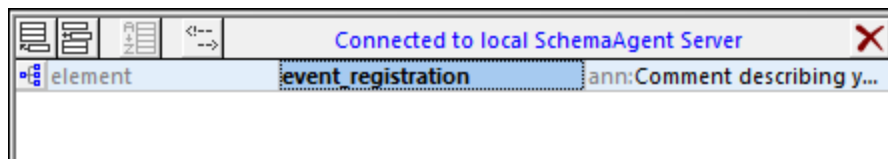

## 2.3.2   Making Elements into Global Complex Types

Creating IIR relationships makes the element of a schema available to other schemas. However, only global elements can be used in other schemas. In this section of the tutorial, you will learn how to use XMLSpy to make an element into a global complex type that can be included in different schemas.

To make elements to be included global:

1. In SchemaAgent Client, right-click **event_registration.xsd** and select **Edit in XMLSpy (Ctrl+Y)** from the context menu.
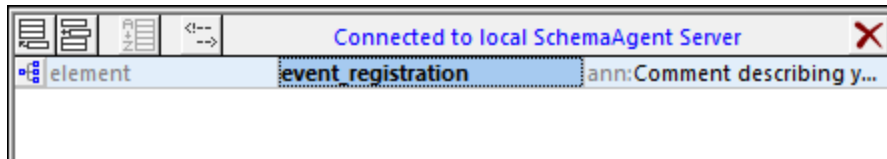
2. In XMLSpy, click the **Display Diagram** icon for the element **event_registration** to display its content model.
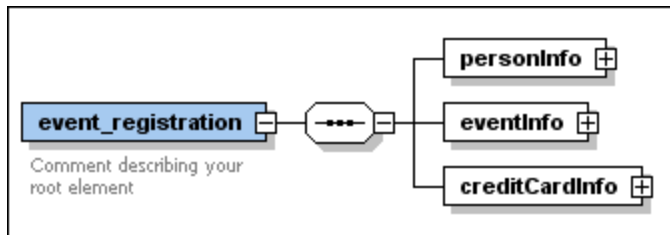
3. Right-click the **personInfo** element and select **Make Global | Complex type** from the context menu. A new global complex type called **personInfoType** is created.
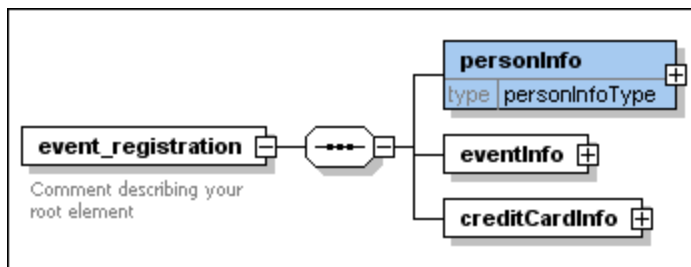
   To display the "type" as shown in the screenshot above, proceed as follows:

   a. Select the menu option **Schema design | Configure View**.
   b. Click **Predefined**.
   c. Click **OK** to confirm.

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

2.3.3   Including Types

In this section, you will learn how add types from an included schema to a target schema. To this aim, you have to open and edit the target schema, for example **dvd_order.xsd**, in XMLSpy.

To include types into dvd_order.xsd:

1. In SchemaAgent Client, right-click **dvd_order.xsd** and select **Edit in XMLSpy (Ctrl+Y)** from the context menu. Notice that the schema already contains an include statement, which was automatically added when you connected the two schemas in the <u>Include section</u> [26] discussed previously. The global complex types that you have created in the previous section of the tutorial are now available in **dvd_order.xsd**.
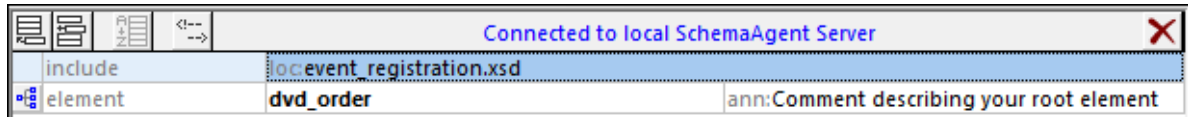
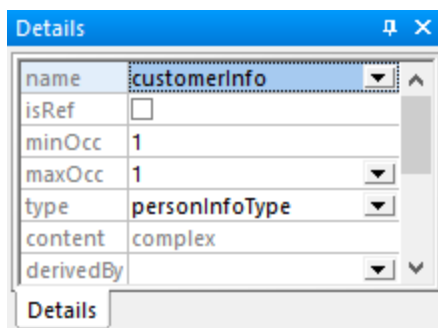
2. In XMLSpy, click the **Display Diagram** icon for the element **dvd_order** to display its content model.
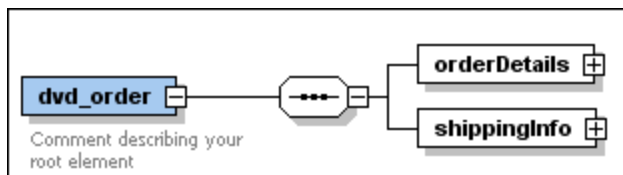
3. Right-click the sequence element and select **Add child | Element**.
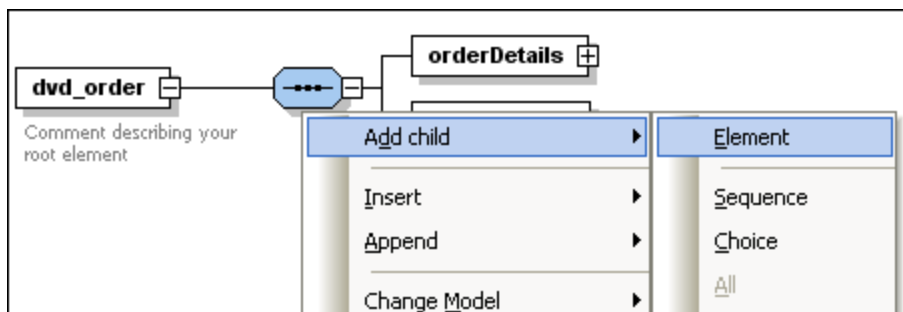
4. Enter "customerInfo" as the name for this element.
5. With this element still selected, in the Details entry helper, select `personInfoType` from the "type" drop-down list.

Note: The "type" list may contain items in black and blue color. Types in black are those available in the current namespace. Types in blue are those available on the SchemaAgent's search path. If you cannot see any items in blue, double-check that XMLSpy is connected to the SchemaAgent's LocalServer, as described in Connecting XMLSpy to the LocalServer [31].

6. Using the same procedure, add a new element called "creditCardInfo" of type `creditCardInfoType` to the sequence. The Schema view should now look as follows:
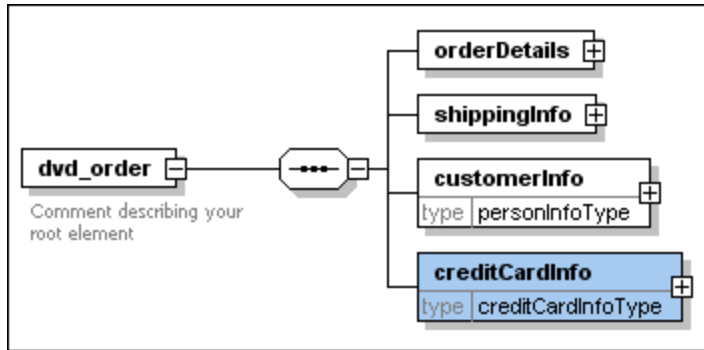

7. Save the file.

You have now included two types from the schema **event_registration.xsd** in the schema **dvd_order.xsd**.

2.3.4   Redefining Types

In this section, you will learn how to redefine a type from one schema in another schema. You will also learn how to add a new element to a redefined type. This is also done in XMLSpy. For the purpose of this tutorial, we will use the schema **book_order.xsd** as an example.

To redefine the type PersonInfoType:

1. In SchemaAgent Client, right-click **book_order.xsd** and select **Edit in XMLSpy (Ctrl+Y)** from the context menu.
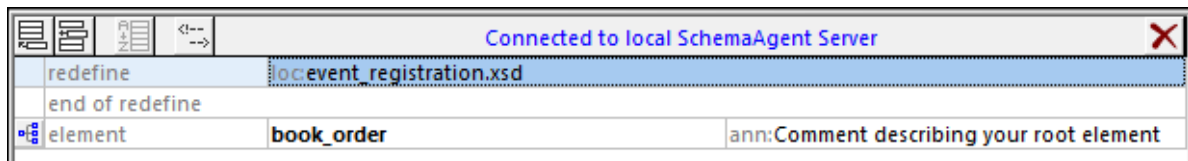
Notice that the schema contains a redefine statement, which was automatically added when you connected the two schemas in the Redefine section [28] discussed previously.

2. Select the line that says "end of redefine" and click **Insert** 📑.
3. Select **ComplexType** from the menu that pops up and enter "personInfoType" as the name for this type.

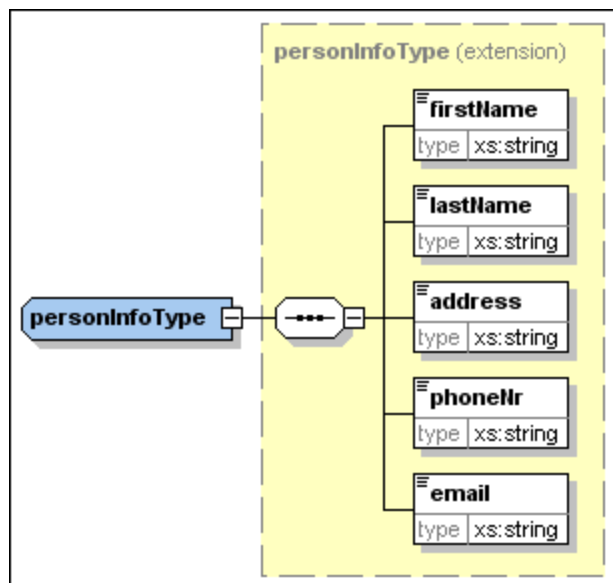|		
	Connected to local SchemaAgent Server	✕
redefine	loc:event_registration.xsd	
complexType	**personInfoType**	ann:
end of redefine		
element	**book_order**	ann:Comment describing your root element
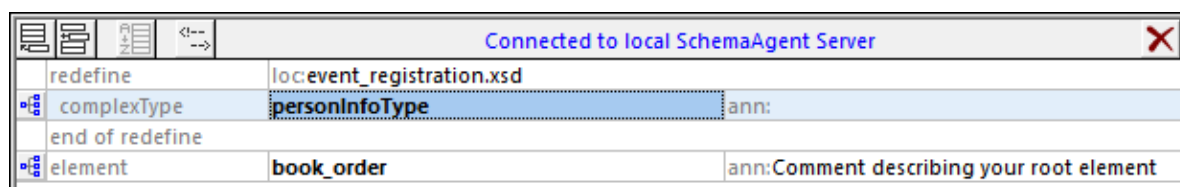
4. Click the **Display Diagram** 🔲 icon for **personInfoType**. The content model of **personInfoType**, as defined in **event_registration.xsd**, appears.

5. Right-click the [personInfoType] complexType, and select **Add child | Sequence** from the context menu.
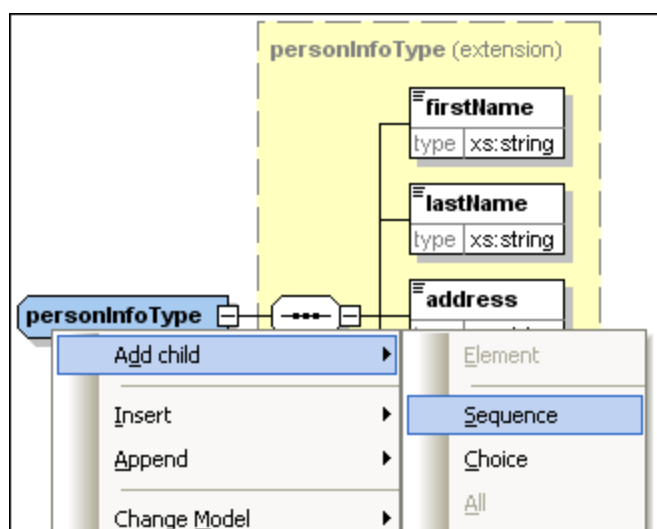
6. Right-click the new sequence icon and select **Add Child | Element** from the context menu.
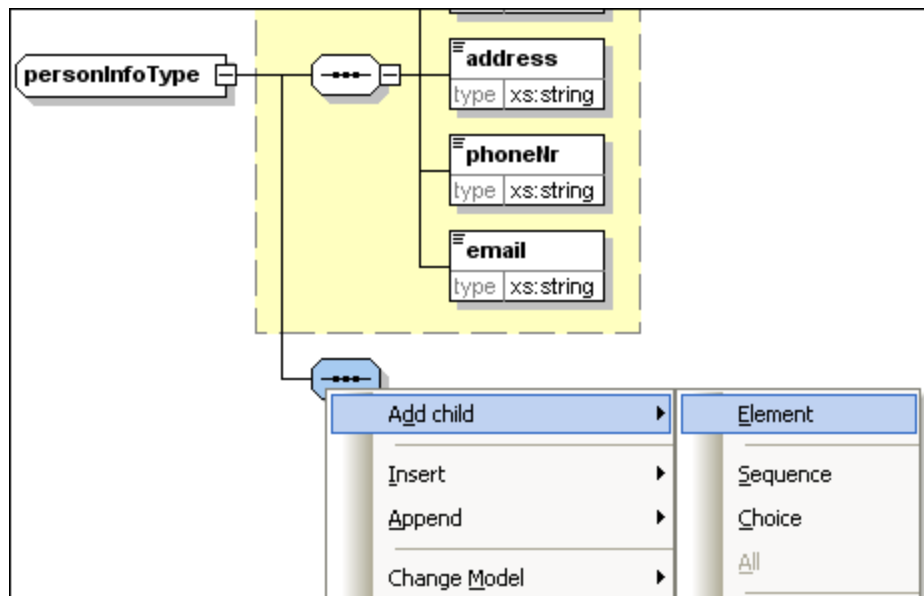
7. Enter "customerNumber" as the name for this element.
8. In the Details entry helper, select **xs:string** from the type drop-down list.
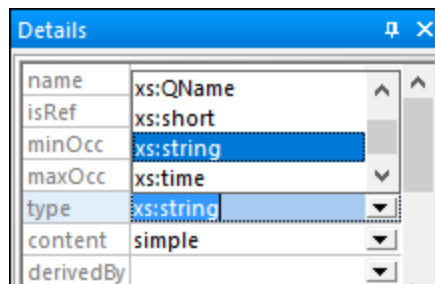
9. Save the file.

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

2.3.5   Using Redefined Types

In the previous section, you redefined schema **event_registration.xsd** in schema **book_order.xsd** by adding a customer number to the complex t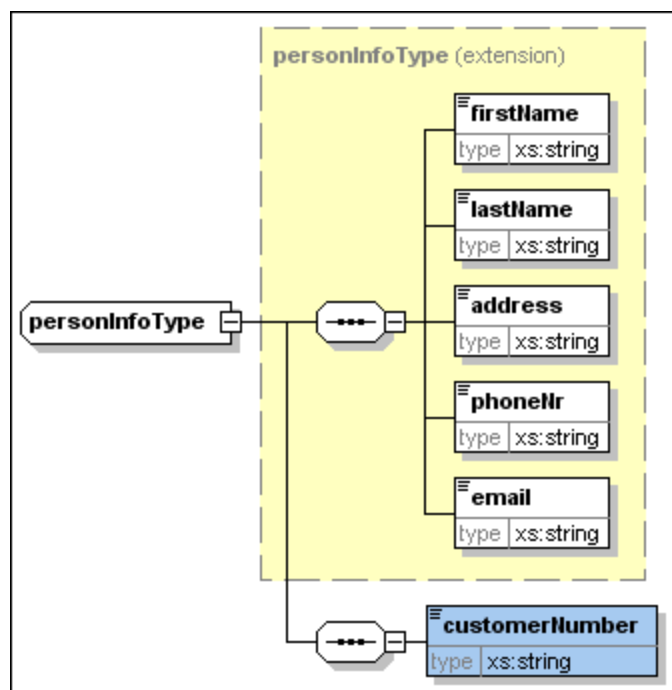ype **personInfoType**. In this section, you will learn how to use this redefined complex type in schema **book_order.xsd**.

To use a redefined type in the target schema:

1. In the schema overview for **book_order.xsd**, click the **Display Diagram** 🔲 icon of the root element **book_order**.
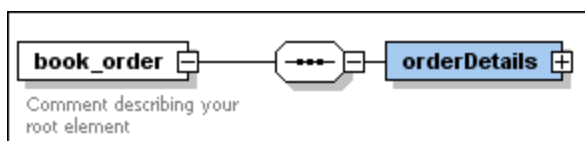
2. Right-click the sequence element and select **Add child | Element** from the context menu.
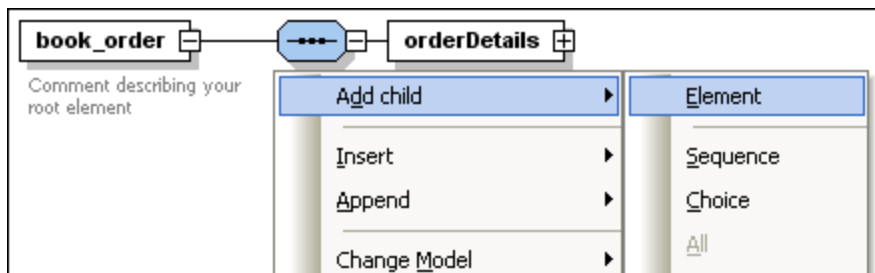
3. Enter "customerInfo" as the name for this element.

4.   With this element still selected, in the Details entry helper, select `personInfoType` from the type drop-
      down list.

The redefined type is now being used as the type of an element in **book_order.xsd**.
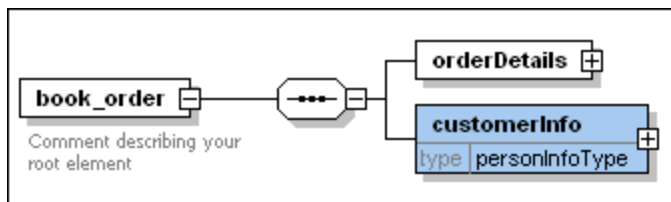
Using types without redefinition

Within a redefine relationship, you can also use types from the source schema without redefining them in the
target schema.

To use a type in the target schema as is:

1.   In the display diagram for the element **book_order**, right-click the sequence element and select **Add
      child | Element** from the context menu.
2.   Enter "creditCardInfo" as the name for this element.
3.   With this element still selected, in the Details entry helper, select `creditCardInfoType` from the type
      drop-down list.
4.   Save the file. The type `creditCardInfoType` is now being used as the type of an element in
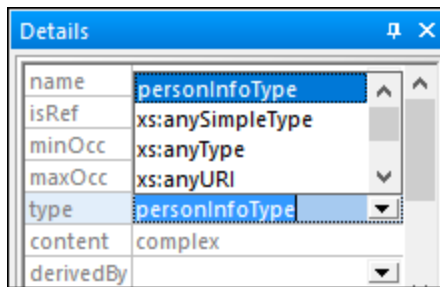   **book_order.xsd**.
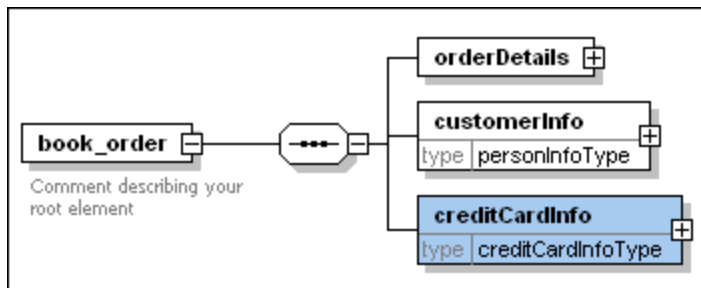
2.3.6   Importing Types

The tutorial schemas **book_store.xsd** and **library.xsd** have different target namespaces. You can easily view this if you drag both schemas from the "import" folder into the main SchemaAgent window and expand their namespaces:
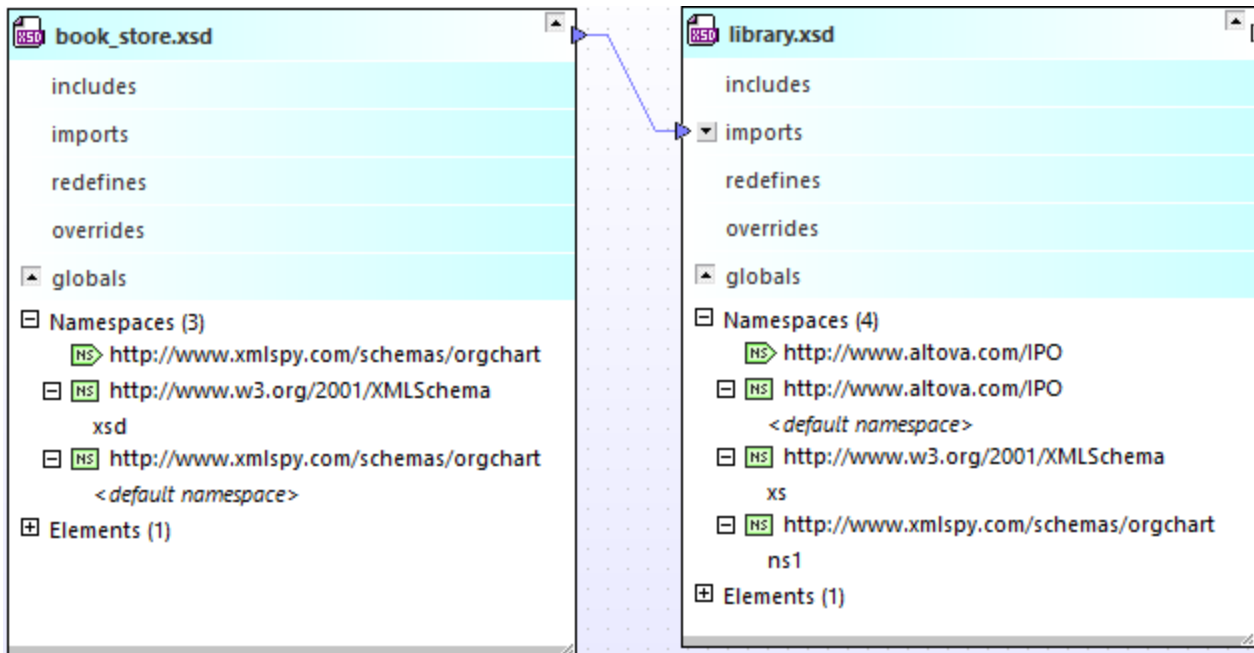
According to the diagram above:

- The schema **book_store.xsd** has the target namespace
  `http://www.xmlspy.com/schemas/orgchart`. This is also the default namespace. The prefix **xsd** is mapped to the namespace `http://www.w3.org/2001/XMLSchema`.
- The schema **library.xsd** has the target namespace `http://www.altova.com/IPO`. This is also the default namespace. The prefix **xs** is mapped to the namespace `http://www.w3.org/2001/XMLSchema`. The prefix **ns1** is mapped to the namespace `http://www.xmlspy.com/schemas/orgchart`.

Let's suppose that, while working with the **library.xsd** schema, you need the type `bookType` from the namespace `http://www.xmlspy.com/schemas/orgchart` (which is the target namespace of **book_store.xsd**). To combine schema documents that have different target namespaces like in this case, an import relationship must be used. The import relationship between the two schemas has already been added in a previous step of the tutorial, see [Creating an Import Relationship](#) [29] . In this part of the tutorial, you will be using a type from the imported namespace. First, you will turn the local type `bookType` into a global complex type. Once this is done, you will be able to declare a new element of this type in the **library.xsd** schema.

To turn the "book" component into a global complex type:

1. In SchemaAgent Client, right-click **book_store.xsd** and select **Edit in XMLSpy (Ctrl+Y)** from the context menu.

2. In XMLSpy, click the **Display Diagram** icon for the element **book_store** to display its content model.
3. Click the "+" icon to expand the **bookInfo** element.
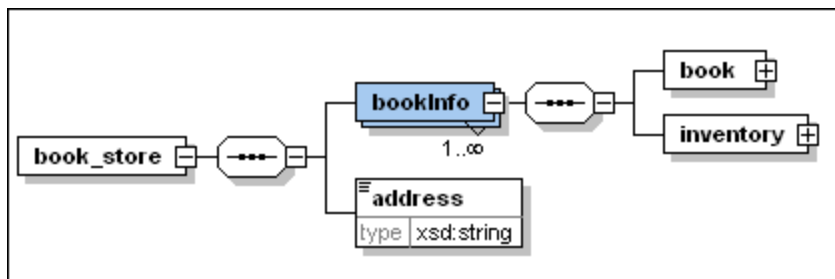
4. Right-click the **book** element and select **Make Global | Complex type** from the context menu.
5. Save the file.

To import bookType to library.xsd:

1. In SchemaAgent Client, right-click **library.xsd** and select **Edit in XMLSpy (Ctrl+Y)** from the context menu.
2. In XMLSpy, click the **Display Diagram** icon for the element **library** to show its content model.
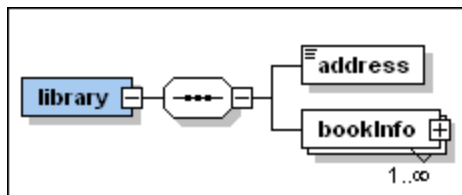
3. Click the "+" icon to expand the **bookInfo** element.
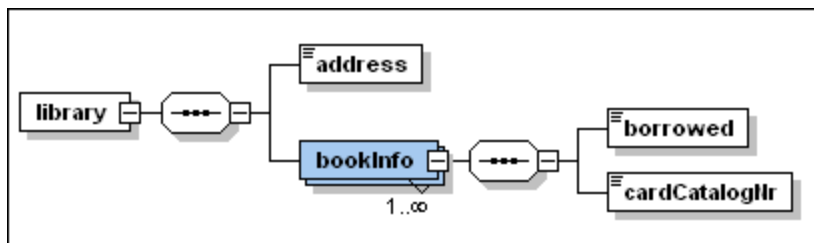
4. Right-click the sequence icon after the **bookInfo** element and select **Add child | Element** from the context menu.
5. Enter "bookDetails" as the name for the element.
6. With this element still selected, in the Details entry helper, select `ns1:bookType` from the type drop-down list.
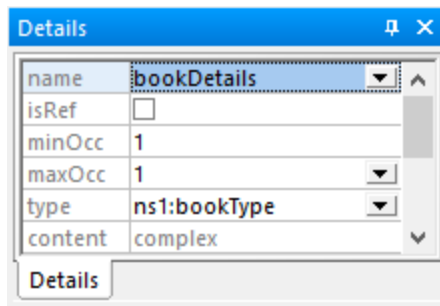
7.   Save and close the file.

You have now imported a type from the schema **book_store.xsd** into the schema **library.xsd**.
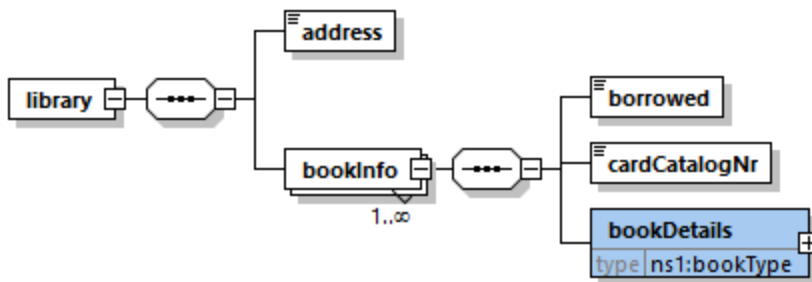
2.3.7   Including Types Using Only XMLSpy

In the previous sections, you have created include, import and redefine relationships in SchemaAgent, and then worked with the included, imported or redefined types in XMLSpy. In this section, you will create include relationships using only XMLSpy, as a client to SchemaAgent LocalServer.

The following schema examples will be used:

- **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.

The goal is to include the address and employee components from **company1.xsd** in **company2.xsd**. Both schemas are in the **SchemaAgentExamples\Tutorial\include2** folder.

To make the components to be included into global complex types:

1.   Open **company1.xsd** in XMLSpy.
2.   Make sure that you are connected [31] to the SchemaAgent LocalServer.
3.   In XMLSpy, click the **Display Diagram** icon for the root element **company1** to display its content model.
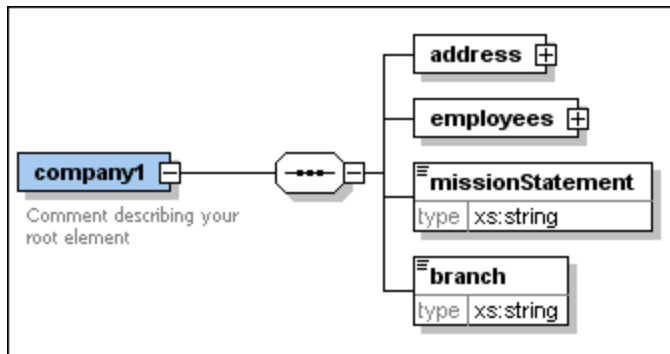
4. Right-click the **address** element and select **Make Global | Complex type** from the context menu. A
    new global complex type called `addressType` is created.
5. Click the "+" icon to expand the **employees** element.
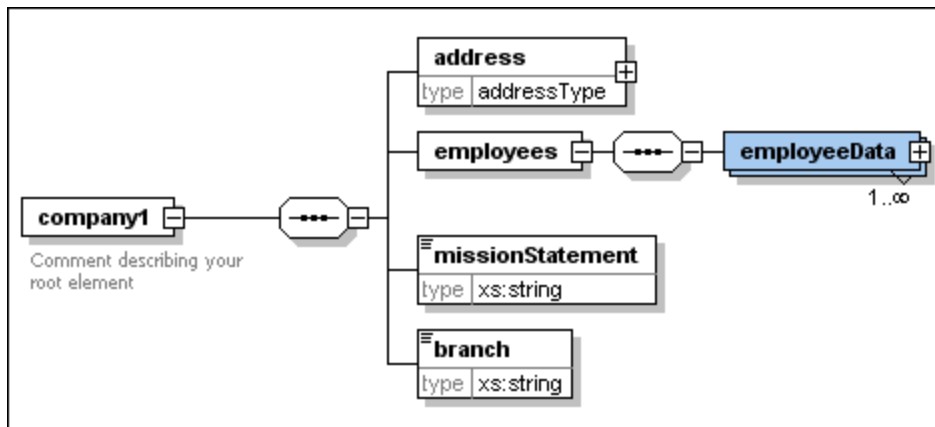
6. In the same way, make the **employeeData** element into a global complex type. This results in a type
    called `employeeDataType`.
7. Save the file.

To include global complex types in schemas using XMLSpy:

1. Open the target schema **company2.xsd** in XMLSpy.
2. Make sure that you are [connected](31) to the SchemaAgent LocalServer.
3. In XMLSpy, click the **Display Diagram** icon for the root element **company2** to display its content
    model.
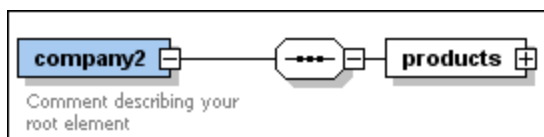
4. Right-click the **sequence** element and select **Add child | Element** from the context menu.
5. Enter "companyAddress" as the name for this element.
6. With this element still selected, in the Details entry helper, select **addressType** from the type drop-
    down list. The type "addressType" is in blue because it is on the SchemaAgent search path.
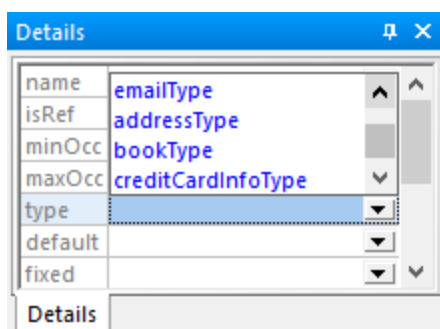
7. A dialog box opens where you can select which type of relationship you want to have between the two schemas.
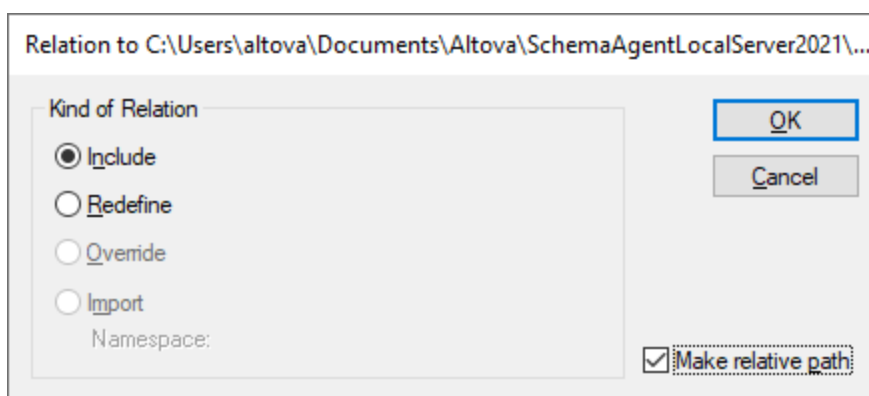
8. Select Include and confirm with **OK**. This inserts an include statement into the **company2.xsd** schema.
9. Repeat steps 4 to 65 to create a further element with the name "employee" and of type `employeeDataType`. Notice that, when you select `employeeDataType` from the type drop-down list in the Details entry helper, it is in black, because there is now an include relationship between the schemas.
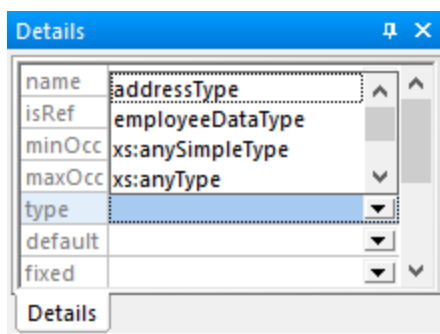
10. Save the file.

You have now included two types from the schema **company1.xsd** in the schema **company2.xsd**.
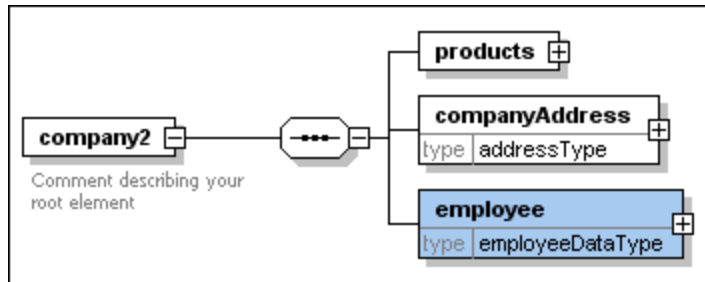
To view the include statement that has been inserted:

- Click the **Display All Globals** icon.
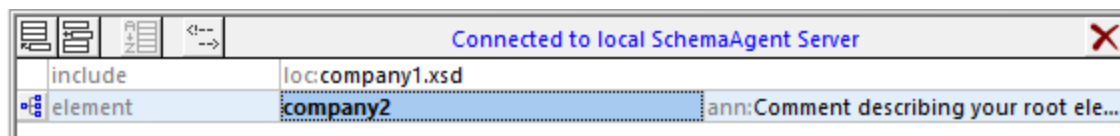
2.4   Viewing the Updated Relationships

You can now view the include and redefine relationships that you created between schemas in the course of this tutorial, for example:

1. In SchemaAgent Client, select the **File | New** menu command, or click the **New** toolbar button, or press **Ctrl+N**, to open a new Design window.
2. In the Explorer window, click the **Hierarchical** tab.
3. Drag the following files from the **include_redefine** folder into the Design window: **event_registration.xsd**, **dvd_order.xsd**, and **book_order.xsd**.
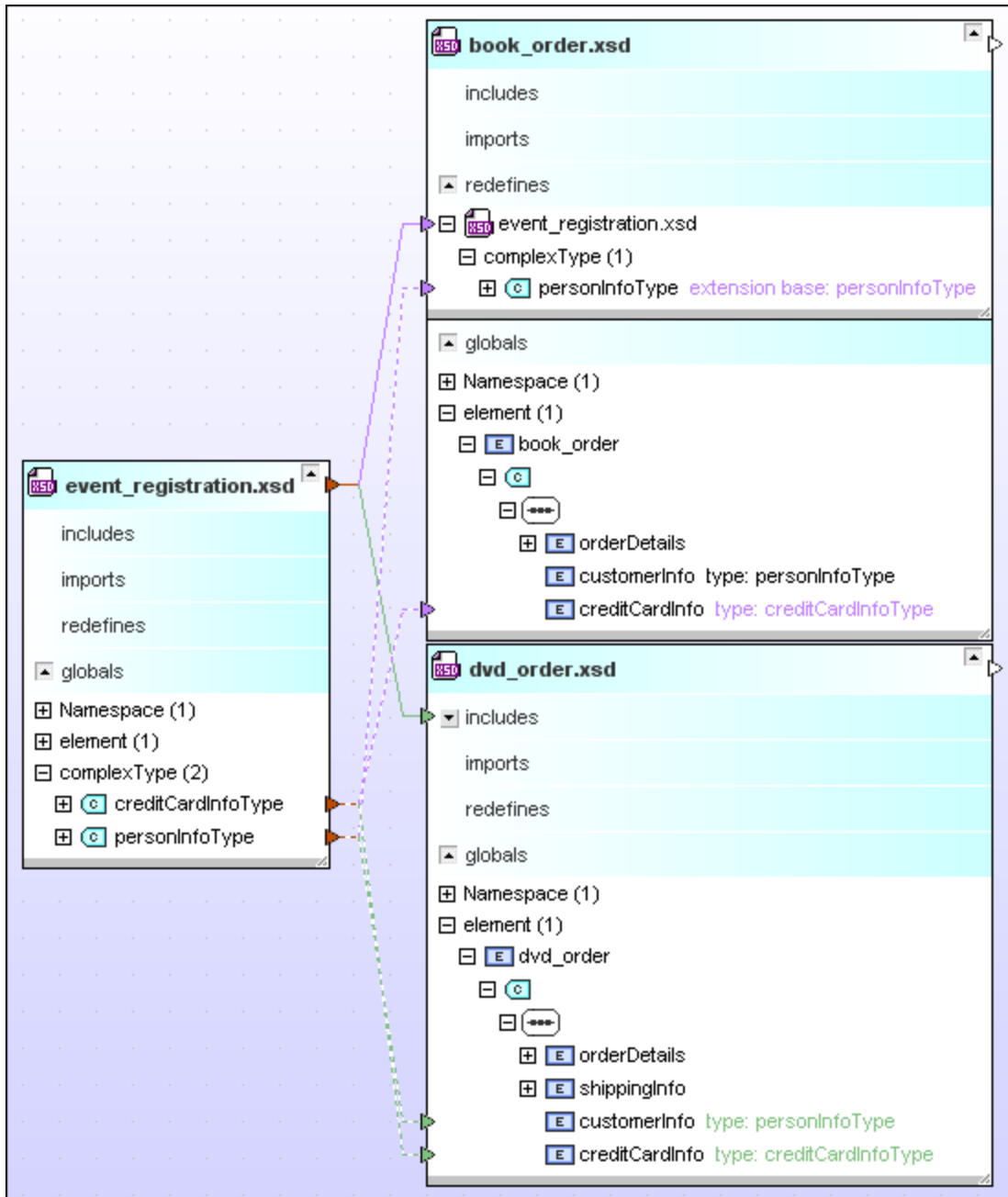
To view details about a specific section in each schema, click the **expand** 🔽 icon. To move a schema, click its title bar and drag the mouse to a new position. To resize the component, drag its lower-right corner ◢ , or right-click anywhere inside the component and select **Size to fit** from the context menu.

To display information about a specific file on the Design window, position the cursor over the title bar. A Quick Info box displays information about that file.

2.5   Viewing MapForce Design Files

MapForce (https://www.altova.com/mapforce) is a data mapping tool that lets you convert data to or from multiple formats, including but not limited to XML. The data mappings designed with MapForce are known as MapForce design files (.mfd), or simply mappings. This tutorial section shows you how to use SchemaAgent Client in order to examine MapForce design files.

To view MapForce design files in SchemaAgent:

1. In SchemaAgent Client, select the **File | New** menu command, or click the **New** [icon] toolbar button, or press **Ctrl+N**, to open a new Design window.
2. In the Explorer window, select **ExpenseLimit.mfd**, **HasMarketingExpenses.mfd**, **MarketingAndDailyExpenses.mfd**, and **MarketingExpenses.mfd** from the MapForce folder and drag them into the Design window.
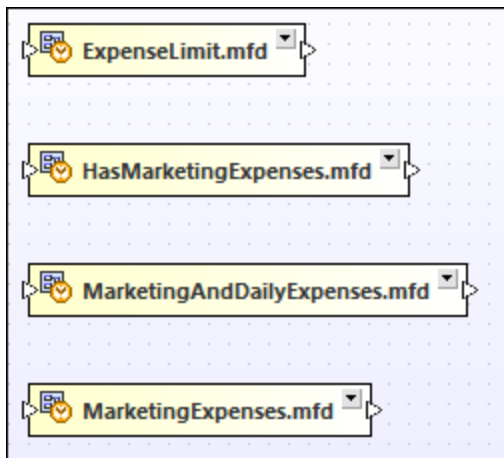
3. Right-click each of the files and select **Insert | All directly referenced | Files** from the context menu. The related XML schemas and their relationships appear in the Design window.
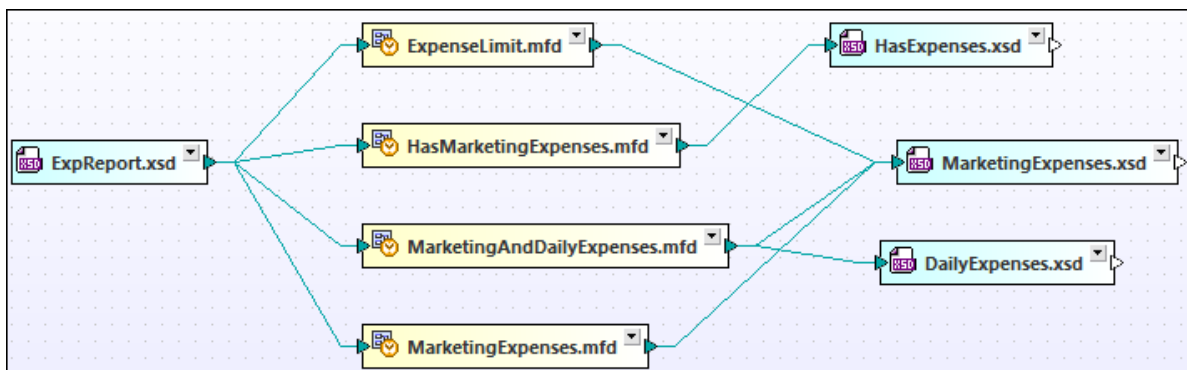
4. Click the **expand** [icon] icon of each of the .mfd files. Now you can see the inputs and outputs of each mapping design file. You can further expand the input or output schemas and explore the structure.
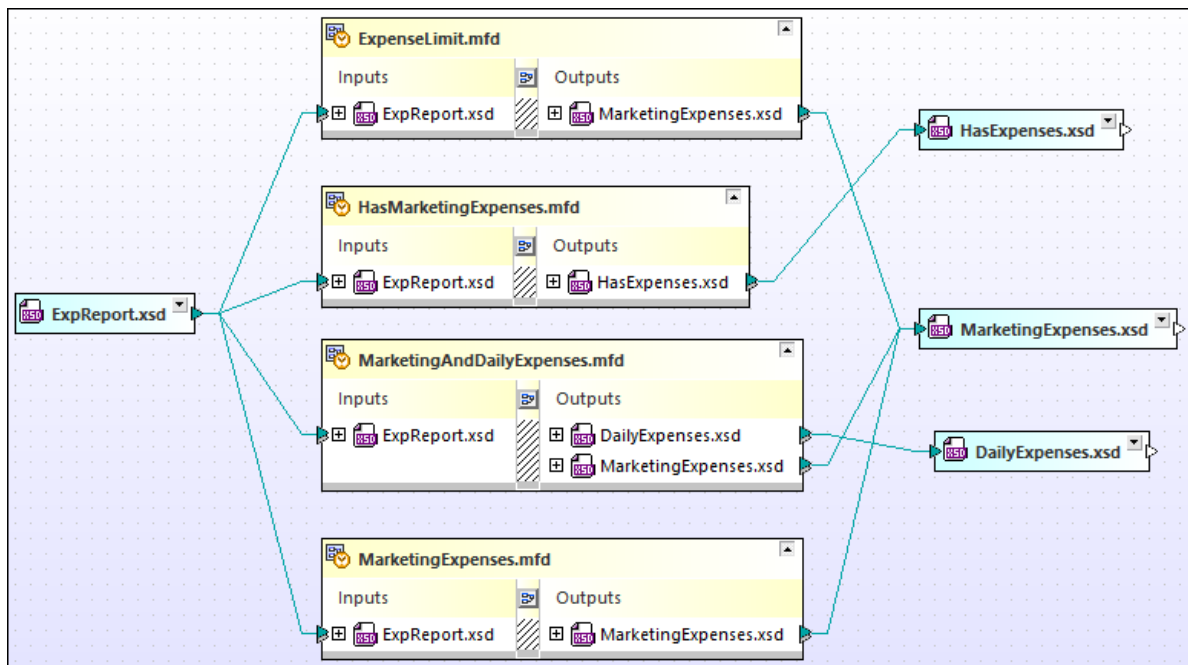
5. To resize a component, drag its lower-right corner ◢ , or right-click anywhere inside the component and select **Size to fit** from the context menu.

3   SchemaAgent Server

SchemaAgent Server processes client requests to create, update, or delete schema IIRs (Includes, Imports, and Redefines) and references between schemas and supported files, and manages the communication between SchemaAgent Server and its clients.

SchemaAgent Server reads information about the supported files in a folder you identify (and optionally in that folder's subfolders)—the search path. You can define multiple search paths; the configuration instructions are identical on the server and client, see Adding or Editing Search Paths [13]. SchemaAgent Server determines the relationships between files on the search path and creates an internal map of these files and their components.

Once the search paths are defined on the server, you can view and administer the relationships between files in the defined search paths from within the graphical user interface of any connected client.

> If a folder that is in a search path has its structure modified outside SchemaAgent Server (for example, if a folder is deleted from Windows Explorer), then this information is not updated in SchemaAgent Server until search paths are reloaded [17].

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

3.1   Installing SchemaAgent Server

The SchemaAgent Server installation package can be downloaded free of charge from the SchemaAgent download page (https://www.altova.com/schemaagent/download).

To install SchemaAgent Server:

1. Double-click the SchemaAgent Server installer file.
2. Follow the on-screen instructions. During installation, a dialog box prompts you to choose whether SchemaAgent Server should be installed as a standalone server, or a service. Each of these options is described below.
3. If necessary, start the server (see Starting SchemaAgent Server [53]).

Installing SchemaAgent Server as standalone server

When installed as a standalone server, SchemaAgent Server can be started as a standard Windows application, from the Start ⊞ menu. When the server is started, an application icon 🐞 appears in the system tray. In this approach, the application has a graphical user interface from where you can configure the search paths [13] and other settings. This kind of installation is well suited if you need to access the graphical user interface frequently (for example, in order to change the search paths).
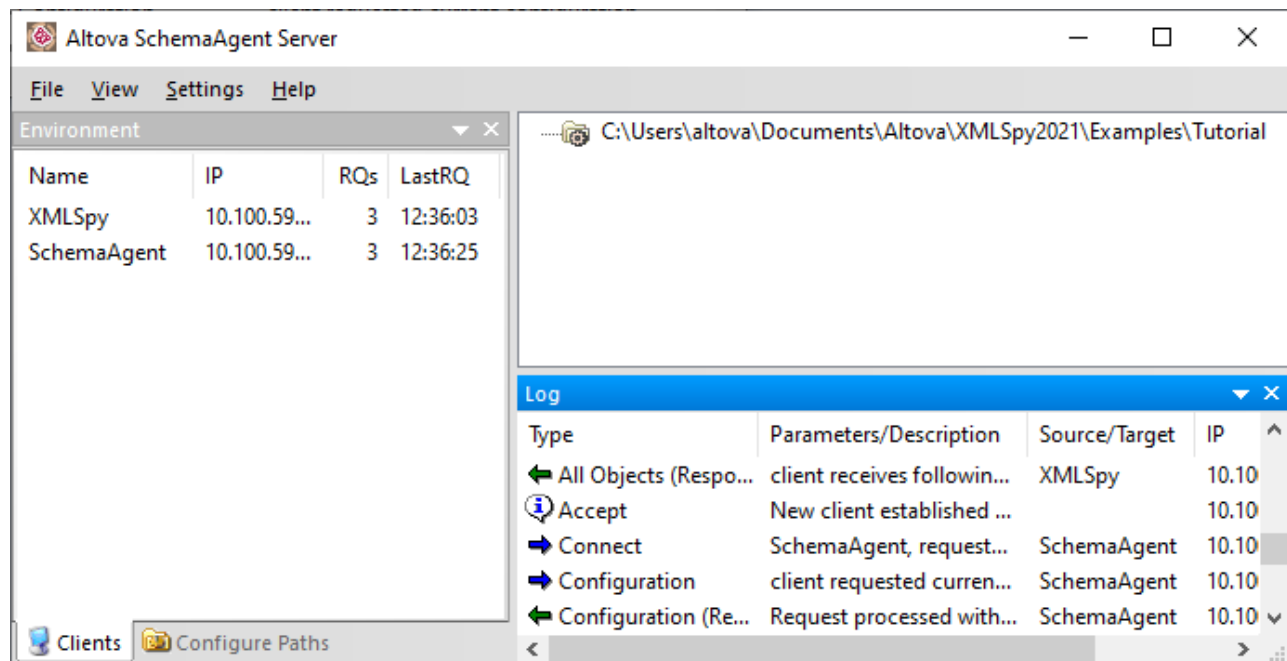
Installing SchemaAgent Server as a service

When installed as a service, SchemaAgent Server is available as a service in **Control Panel | Administrative Tools | Services**, and can be managed in the same way as other Windows services. The advantage is that it can be configured to start automatically when the system starts (this option is also available on the installation

wizard). Installing SchemaAgent Server as a service is suitable when it must act as a network server for multiple clients.

Note that, in this scenario, SchemaAgent Server does not have a graphical user interface and cannot be started from the **Start** ▓ menu or from a desktop shortcut. Also, no system tray icon is available. In order to configure SchemaAgent Server (that is, define search paths), you must first install SchemaAgent Server as a standalone server, configure it, and then change the installation method from the command line (see instructions below).

Changing the installation type

If you want to change the installation model (from standalone to service, or vice versa) after you have installed the program, you can do so by calling **SchemaAgentServer.exe** using the command line. Otherwise, you would have to uninstall SchemaAgent Server and reinstall it choosing a different installation method.

The commands listed below are available when calling **SchemaAgentServer.exe** from the command line. The executable 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.

No command line parameters	Start as standalone application.
/install or -install	Install as a service.
/remove or -remove	Uninstalls the service.
/quiet or -quiet	Suppresses message boxes that appear when an error occurs using the Install or Remove commands.

To change the installation type from "standalone" to "service":

1. Ensure that SchemaAgent Server is not running. To exit a running SchemaAgent Server, right-click the **Altova SchemaAgent Server** ⊛ application icon in the system tray and select **Shutdown** from the context menu.
2. Open a Command Prompt window (as administrator), and change the current directory to the installation folder of SchemaAgent Server (**C:\Program Files\Altova\SchemaAgentServer2025** by default).
3. At the command prompt, enter `SchemaAgentServer.exe /install` to install SchemaAgent Server as a service.
4. Start SchemaAgent Server as a service (see <u>Starting SchemaAgent Server</u> [53]).

To change the installation type from "service" to "standalone":

1. Ensure that SchemaAgent Server is not running. To exit a running SchemaAgent Server service, open **Control Panel | Administrative Tools | Services**, right-click the **SchemaAgent Server Service** and choose **Stop** from the context menu.
2. Open a Command Prompt window (as administrator), and change the current directory to the installation folder of SchemaAgent Server (**C:\Program Files\Altova\SchemaAgentServer2025** by default).
3. At the command prompt, enter `SchemaAgentServer.exe /remove` to uninstall the existing SchemaAgent Server service.

4.   At the command prompt, enter `SchemaAgentServer.exe` to start the standalone installation.

3.2   Starting SchemaAgent Server

If you have installed SchemaAgent Server as a standalone server, you must start the server application before SchemaAgent Client can connect to it. If you have installed SchemaAgent Server as a service, it may already be running, depending on the option you specified during installation. See also Installing SchemaAgent Server [50].

Note: Only one instance of SchemaAgent Server can be started at a time. If you try to start SchemaAgent Server when it is already running, an error message appears.
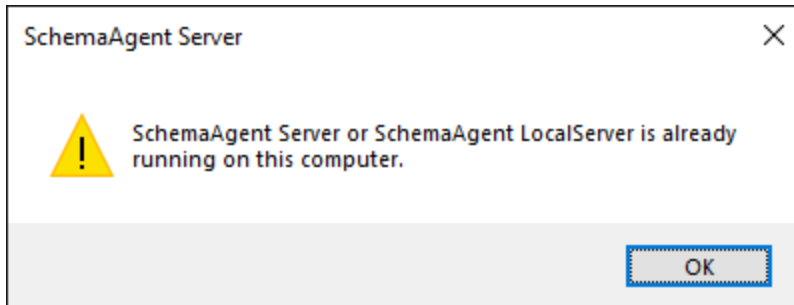
To check whether SchemaAgent Server **is already running as a service:**

1. Open **Control Panel | Administrative Tools | Services**.
2. Locate the **SchemaAgent Server Service** in the list and check its status.

To start SchemaAgent Server as standalone server:

*   Click **Start** ⊞, and then select **Altova SchemaAgent Server 2025 | Altova SchemaAgent Server**.

To start SchemaAgent Server as a service:

1. Open **Control Panel | Administrative Tools | Services**.
2. Right-click the **SchemaAgent Server Service** and select **Start**.

3.3   Hiding SchemaAgent Server

After you have configured the [search paths](#) [13] and the [file extensions](#) [16] of a standalone SchemaAgent Server, you can either reconfigure it to run as a service and thus make it completely unavailable to the users, or hide the application in the system tray.

To hide SchemaAgent Server in the system tray:

- Right-click the **Altova SchemaAgent Server** application icon in the system tray and select **Hide** from the context menu.

To show SchemaAgent Server when hidden in the system tray, do one of the following:

- Right-click the Altova SchemaAgent Server application icon in the system tray and click to clear the **Hide** option.
- Double-click the application icon in the system tray.

3.4   Exiting SchemaAgent Server

If SchemaAgent Server runs as a standalone server, you can exit it using the instructions below. If SchemaAgent Server runs as a service, you can stop it from **Control Panel | Administrative Tools | Services** instead.

Please note that if you exit SchemaAgent Server while clients are still connected, these clients will lose their connection to SchemaAgent Server and thus will not be able to process commands that depend on a connection to SchemaAgent Server (e.g., commands such as creating or modifying an IIR relationship in a SchemaAgent design). Therefore, a dialog box appears in this case, displaying the number of currently connected clients and asking whether shutdown should be continued.

To exit SchemaAgent Server, do one of the following:

- In the SchemaAgent Server GUI, select the menu option **File | Shutdown**.
- Right-click the **Altova SchemaAgent Server** application icon in the system tray and select **Shutdown** from the context menu.

3.5   The SchemaAgent Server User Interface

The graphical user interface is available if you have installed SchemaAgent Server as a standalone server, see
Installing SchemaAgent Server [50]. If you have installed and started SchemaAgent Server as a service, no
graphical user interface is available. The user interface is organized as follows:

- The Environment window provides you with information about search paths and files available herein.
- The Main window shows the currently defined search paths.
- The Log window shows client requests, server responses, and other server-related data.
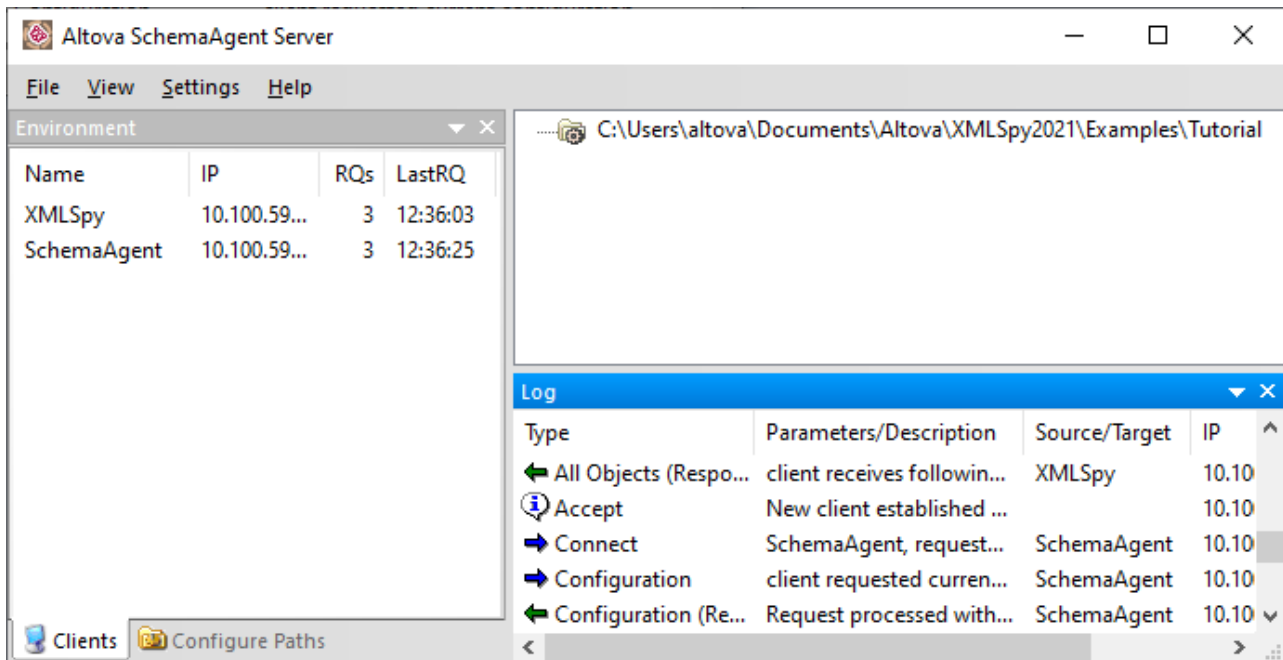
You can dock or undock the Environment and the Log windows to a new position, as follows:

1. Click the window's title bar and drag the mouse. Several docking helpers appear.

2. Drag the window over a top, right, left, or bottom handle to dock it to the new position.

To show or hide a window, select the respective option from the **View** menu.

Environment window

The **Clients** tab 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 above shows that two clients, SchemaAgent Client and XMLSpy, are currently connected to 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.

The **Configure Paths** tab displays the search paths as well as the file extensions of the files the paths are searched for. For more information, see Configuring Search Paths [12].

Log window

The Log window 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.

The following symbols may appear in the Log window:

➡ Requests from the client (blue, right-pointing arrow)

⬅ Responses from the server (green, left-pointing arrow)

ⓘ Information regarding connection or disconnection of a client

The source client (of requests) and target client (for responses) are indicated in the **Source/Target** column. The **Parameters/Description** column shows the kind of action, while the **Time** column gives the time of the action.

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 folder is deleted from Windows Explorer), then this information is not updated in SchemaAgent Server until search paths are reloaded [17].

The message "Failed to read <file type> file" appears when a file includes or imports other files which cannot be found at the location specified.

3.6   Configuring the Server

The SchemaAgent Server options you can configure are as follows:

1. The search paths and extensions of monitored files. The instructions are the same as for the SchemaAgent Client, see Configuring Search Paths [12].
2. The logging options.

Setting the logging options

You can optionally configure whether the information displayed in the Log window should be written to a log file.

To configure the logging options:

1. On the **Settings** menu, click **Logging Options**. The Logging Options dialog box opens.

2. Optionally, click **Select All** or **Clear All** to select, or clear, respectively, all check boxes.

The available options are listed below.

Log window active	Select this check box if SchemaAgent Server actions should be displayed in the Log window.
Max. lines	Specifies the maximum number of lines visible in the Log window.
Log input	Enables or disables the display of incoming requests.
Log output	Enables or disables the display of outgoing responses.
Log internals	Enables or disables the display of internal SchemaAgent Server information.
Logfile active	Select this check box if SchemaAgent Server actions should be written to a log file. The log file is a Comma Separated Values (CSV) file named **SchemaAgentServerLog.csv** and is created in the same folder as SchemaAgent Server each time you start a SchemaAgent Server session.

	The **Log input**, **Log output**, and **Log internals** check boxes let you specify whether these categories of data are written to the log file.

3.7 Menu Reference

This chapter provides reference to all SchemaAgent Server menu commands.

3.7.1 File Menu

The **File | Shutdown** command exits SchemaAgent Server, see [Exiting SchemaAgent Server](#) ⁵⁵ .

3.7.2 View Menu

The **View | Environment** command shows or hides the Environment window.

The **View | Log** command shows or hides the Log window.

3.7.3 Settings Menu

The **Settings | Logging Options...** command opens the SchemaAgent Server Logging Options dialog box, see [Setting the Logging Options](#) ⁵⁸ .

3.7.4 Help Menu

The **Help** menu contains commands required to get help or more information on SchemaAgent, as well as links to information and support pages on our web server.

Help

The **Help (F1)** command opens the application's Help documentation (its user manual). By default, the Online Help in HTML format at the Altova website will be opened.

If you do not have Internet access or do not want, for some other reason, to access the Online Help, you can use the locally stored version of the user manual. The local version is a PDF file named `Application.pdf` that is stored in the application folder (in the Program Files folder).

If you want to change the default format to open (Online Help or local PDF), do this in the Help section of the Options dialog (menu command **Tools | Options**).

Support Center

This command provides links to the FAQs, online documentation, and the support form for contacting Altova support.

FAQ on the Web

Same as above.

SchemaAgent Server on the Internet

This command opens the Altova website in a browser window, where you can find out about news, product updates and additional offers from the Altova team.

About SchemaAgent Server

This command displays copyright information and the version of SchemaAgent Server. If you are using the 64-bit version of SchemaAgent, this is indicated with the suffix (x64) after the application name. There is no suffix for the 32-bit version.

4   SchemaAgent Client

SchemaAgent Client enables you to create or modify IIR relationships (Imports, Includes, and Redefines) between schemas as well as relations between any of the supported file types.

In a SchemaAgent design, you can also view relationships [90] between schemas and between a schema-based MapForce design file (.mfd) and its associated schemas. Furthermore, you can display XSLT stylesheets and WSDL files and view the relations these files have with schema files, XML instances, and .mfd files. SchemaAgent designs can be saved to the disk for later editing.

Additionally, SchemaAgent Client enables you to manage schemas and their associated files (rename [74], move, delete [75], and so on) so that references to files 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 and any of the other supported files that are linked to them in any form.

SchemaAgent Client connects to a SchemaAgent server [70]. It can either connect to the LocalServer [71] that is installed in the same executable, or connect to a standalone SchemaAgent Server [71]. 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 monitored files in the respective server's search paths [12], and displays the folders in the search paths as a tree structure (hierarchical and flat) in the Explorer window [66] of SchemaAgent Client. In SchemaAgent Client, you then drag files from the tree [79] and drop them into the SchemaAgent design in the Design window [68].

In the Design window, you can view the composition of schemas and their associated files, and build relationships between supported files. 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.

4.1   Installing SchemaAgent Client

You can download the SchemaAgent installation package from the SchemaAgent download page (https://www.altova.com/schemaagent/download). If you have purchased Altova® MissionKit™, the SchemaAgent Client is included in the package.

To install SchemaAgent Client, double-click the installer file to run the installation process, and then follow the wizard steps. During the installation process, you will be asked whether you wish to use SchemaAgent locally (by connecting to the LocalServer installed on the current computer together with the client) or connect to an existing SchemaAgent Server.
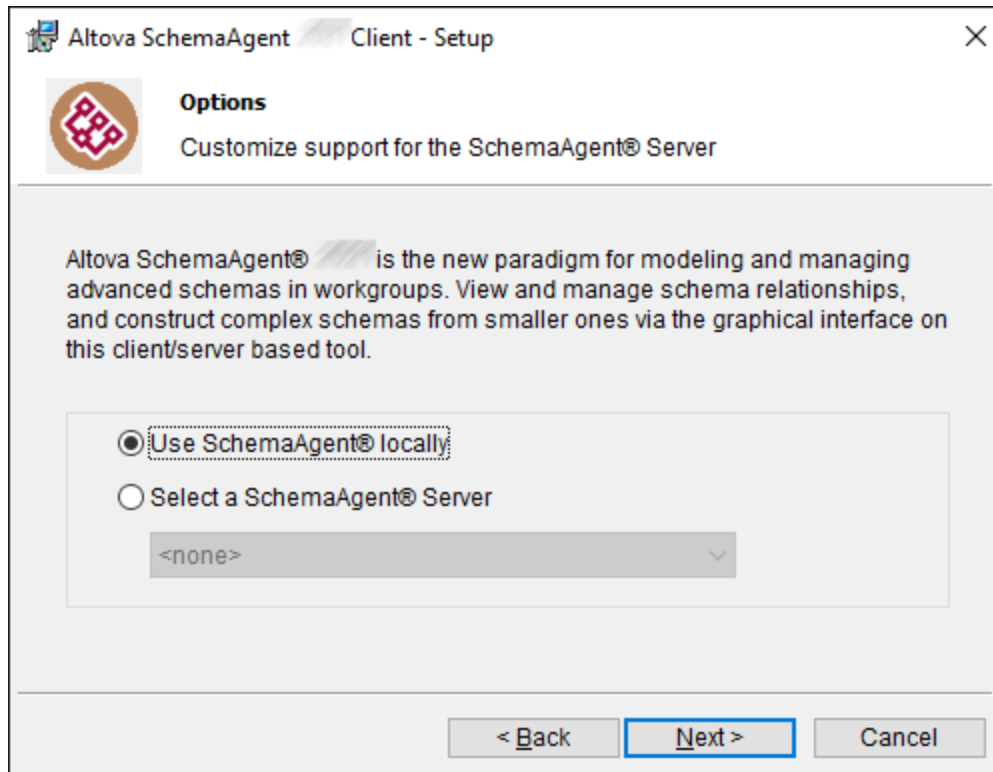
If you choose **Select a ShemaAgent Server**, you can select from the list any instances of SchemaAgent Server that were previously installed on computers on the local network, see Installing SchemaAgent Server [50] . You can change your preference at any time later, by running the menu command **Extras | Connect to Server**.

4.2   Starting SchemaAgent Client

To start SchemaAgent Client, do one of the following:

- Double-click the SchemaAgent icon on your desktop.
- Click **Start** ⊞ and start typing "SchemaAgent" to access the program's shortcut.
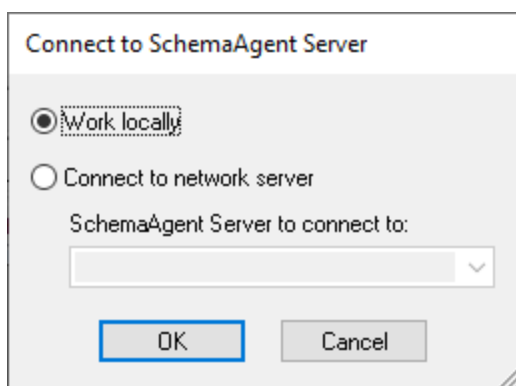
When prompted to connect to a server, you have the following options:

- **Work Locally**. Choose this option to start a local server and connect to it. In this approach, you can start configuring the search paths immediately, from the Explorer window. Note that, since the server runs locally, no other SchemaAgent clients can connect to it.
- **Connect to a network server**. Choose this option to connect to a previously installed SchemaAgent Server on the local network. The SchemaAgent Server must be running in order to appear in the list. In this approach, you must configure the search paths on the server. Any clients connected to the server are able to view and manage files on the search path.

See also Connecting to a Server [70].

4.3   The SchemaAgent Client User Interface

The graphical interface of SchemaAgent Client is organized into the following broad parts:

- Explorer window [66], which provides you with information about search paths and files available herein.
- Overview window [67], which shows what part of the active design is currently in view in the main window.
- Design window [68], which graphically displays the structure of the supported file types, and shows existing Includes, Imports, Redefines (IIRs) between schemas, or relationships between any of the supported files, respectively.
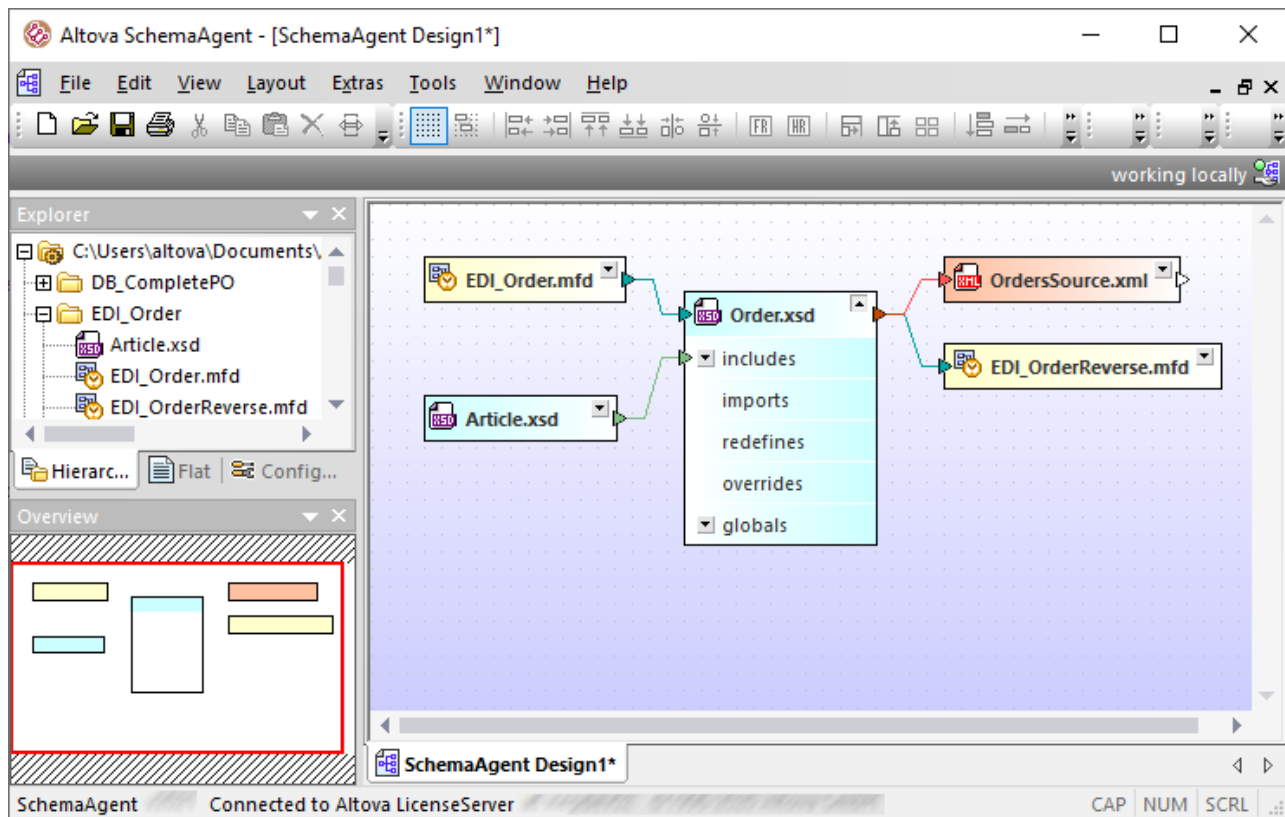
**To dock or undock a window, do one of the following:**

- Right-click the window's title bar, and select **Docking** (or **Floating**, respectively) from the context menu.
- Click the arrowhead 🔽 button in the upper-right corner of the window and select **Docking** (or **Floating**, respectively) from the context menu.
- Double-click the title bar of a window to toggle it between its docked and floating positions.

To dock a window to a new position:

1. Click the window's title bar and drag to a new position. Several docking helpers appear.
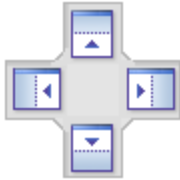
2. Drag the window over a top, right, left, or bottom handle to dock it to the new position.

**To restore toolbars and windows to their default state:**

- Run the menu command **Tools | Restore Toolbars and Windows**.

4.3.1   Explorer Window

The Explorer window displays all search paths defined for the selected SchemaAgent Server as well as the relevant files contained herein. Depending on your installation, these search paths can be configured directly in the **Configure Paths** tab (if you are connected to a LocalServer) or in SchemaAgent Server (if you are connected to a network-based server). Consequently, the **Configure Paths** tab is visible only if you are connected to a LocalServer.

Hierarchical Tab

The **Hierarchical** tab shows all the defined search paths and their contents. Folders that contain supported file types [16] have the standard Windows appearance. Folders that contain no such files are slightly opaque, like the **Import** folder in the image below.
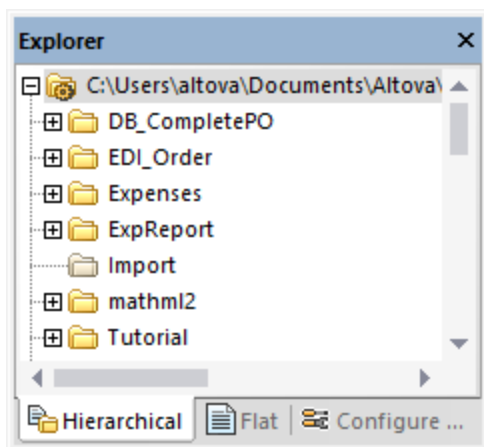
To hide folders that contain no supported files, right-click inside the window and select **Show Empty Folders** from the context menu.

Flat Tab

The **Flat** tab displays a flat list of all monitored files in all search paths, as well as all schemas from the **External files** folder (that is, schemas referenced by schemas in the search paths, but which are not themselves in any search path), if such schemas exist. Each file entry is displayed with its location and its status.
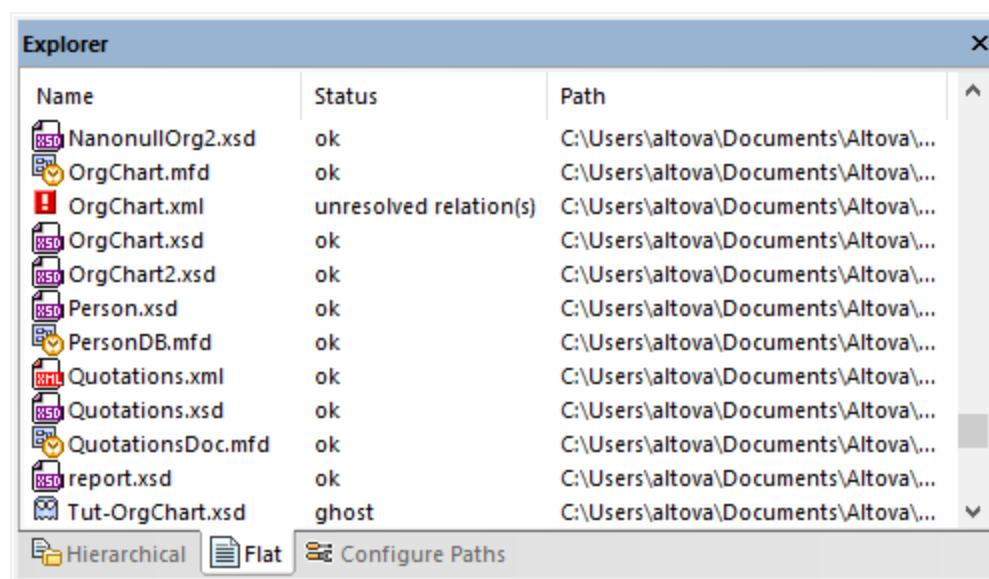
In the screenshot above, note the different icons used to indicate ghost files [114] and files with unresolved relations [112] .

4.3.2   Overview Window

The Overview window serves as a navigator for big design files that occupy more space than is available in the Design window. The Overview window shows the currently displayed area in the design and you can move the focus by clicking into the rectangle and moving it to the desired location in the design file.

4.3.3   Design Window

The Design window is where you view and edit the files for which you have defined the relevant file
extensions [16].

You can drag files from the Explorer window and drop it onto the Design window to get a graphical
representation of the files and their existing Includes, Imports, and Redefines (IIRs). The files can be aligned [120]
and sorted [123] according to your needs, or removed [111] from the design again. It is possible to recreate a
deleted file [114] and to correct reference paths [112] to files that are not existing on the specified location.
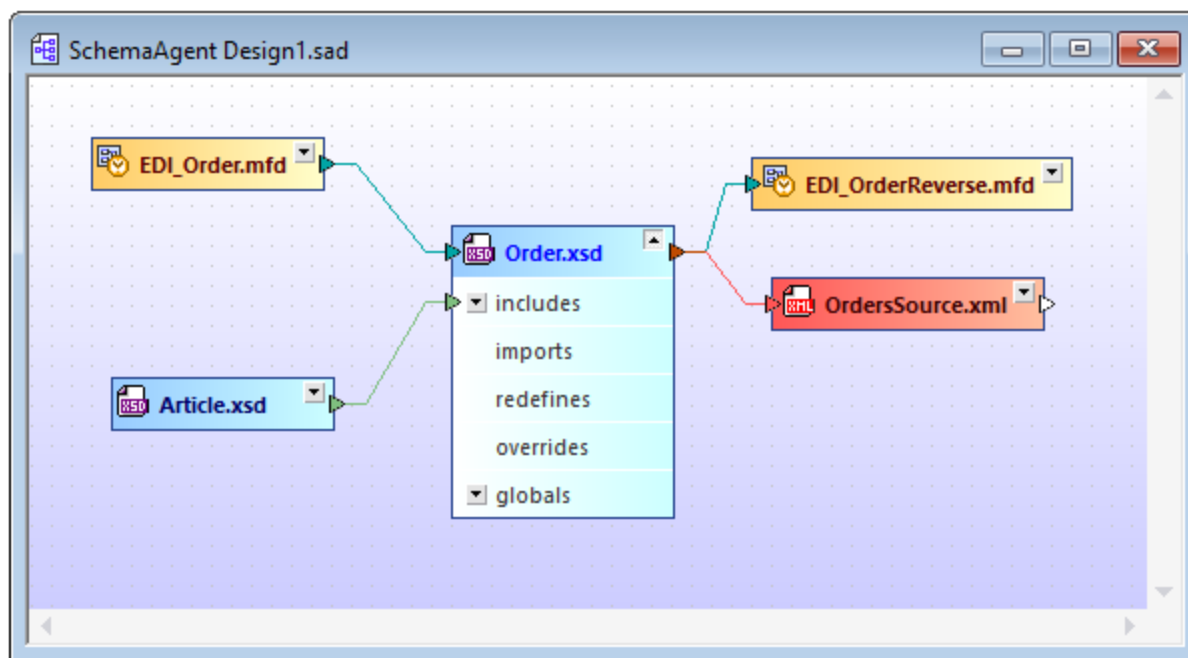
Includes, Imports, and Redefines between schemas or schemas and .mfd files, respectively, are illustrated with
customizable colored lines. IIRs can be edited [128] and added [127] using drag-and-drop and you can save [78]
each design for later use.

You can create or open multiple Design windows. Use the commands in the **Window** menu to arrange the
windows or bring a specific window in foreground.

4.3.4   Menu Bar, Toolbars, and Status Bar

The menu bar contains the various application menus. The following conventions apply:

- If commands in a menu are not applicable, they are unavailable (grayed out).
- Some menu commands pop up a sub-menu with a list of additional options. Menu commands with
  sub-menus are indicated with a right-pointing arrowhead to the right of the command name.
- Some menu commands pop up a dialog that prompts you for further information required to carry out
  the selected command. Such commands are indicated with an ellipsis (...) after the name of the
  command.

- To access a menu command, click the menu name and then the command. If a sub-menu is indicated for a menu item, the submenu opens when you move the mouse pointer over the menu item. Click the required sub-menu item.
- A menu can be opened from the keyboard by pressing the appropriate key combination. The key combination for each menu is **Alt+KEY**, where **KEY** is the underlined letter in the menu name. For example, the key combination for the **File** menu is **Alt+F**.
- A menu command (that is, a command in a menu) can be selected by sequentially selecting (i) the menu with its key combination (see previous point), and then (ii) the key for the specific command (where **KEY** is the underlined letter in the command name). For example, to open a file (**File | Open**), press **Alt+F** and then **O**.
- Some menu commands can be selected directly by pressing a special shortcut key or key combination (**Ctrl+KEY**). Commands which have shortcuts associated with them are indicated with the shortcut key or key combination listed to the right of the command. For example, you can use the shortcut key combination **Ctrl+N** to create a new file; the shortcut key **F2** to rename a file or folder in the Explorer window.

Toolbars

The toolbars contain buttons that are shortcuts for commands found in the menus. The name of the command appears when you place your mouse pointer over the button. To execute the command, click the button.
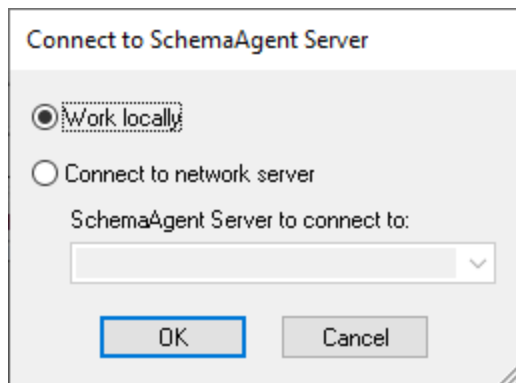
Toolbar buttons are arranged in groups. In the [Tools | Customize | Toolbars](#) ¹³⁹ dialog, or when right-clicking into the toolbar and selecting **Customize**, you can specify which toolbar groups are to be displayed. In the GUI, you can also drag toolbar groups by their handles (or title bars) to alternative locations on the screen. Double-clicking the handle causes the toolbar to undock and to float; double-clicking its title bar causes the toolbar to dock at its previous location.

Status Bar

The Status Bar is located at the bottom of the application window and displays (i) status information (application version, license status, copyright year), and (ii) information about menu commands and command shortcuts in the toolbars when the mouse cursor is placed over these. If you are using the 64-bit version of SchemaAgent, this is indicated in the status bar with the suffix (x64) after the application name. There is no suffix for the 32-bit version.

4.4   Connecting to a Server

In order to use SchemaAgent Client, you must connect the application to a server first. When you start SchemaAgent Client, the not connected 🔧 icon is displayed in the upper right corner of the application and the Connect to SchemaAgent Server dialog box pops up.

```
Connect to SchemaAgent Server

  ⦿ Work locally

  ○ Connect to network server

     SchemaAgent Server to connect to:

     [                          ∨]

          [   OK   ]     [  Cancel  ]
```

You have two options to use SchemaAgent Client:

- Work locally [71]: This will start a standalone LocalServer on your PC which you can configure from within SchemaAgent Client
- Connect to network server [71]: This will connect to a network-based SchemaAgent Server which must already be running and allows for several users being connected. To configure SchemaAgent Server, you have to open the server application and this configuration is available to all connected clients.

If a SchemaAgent server connection already exists, you have to close this connection before making a new connection.

To connect to a server:

1. Select the menu option **Tools | Connect to Server** or click the **Connect to Server** 🔧 toolbar button. The Connect to SchemaAgent Server dialog box opens.
2. Do one of the following:

   - Select **Work locally** to start and connect to the standalone LocalServer. Once the local server starts, you can configure search paths from the **Configure Paths** tab in the Explorer window.
   - Select **Connect to network server** and choose a SchemaAgent Server to connect to from the drop-down list. After a successful connection is made, the search paths defined on the server are displayed in the Explorer window.

3. Click **OK**.

To close a connection:

- Click the SchemaAgent server icon in the system tray (at the bottom right of your screen) and select the **Shutdown** command.

4.4.1   Working Locally

If you choose to connect to your local standalone server, the LocalServer starts automatically and the

Configure Paths tab is added to the Explorer window. The icon is displayed in the upper-right

corner of the application and the system tray shows the LocalServer icon.

You can configure LocalServer to start automatically each time you log into Windows, as follows:

1. On the **Tools** menu, click **Options**.
2. Click the **Miscellaneous** tab.
3. Select the **Startup during user login (Add to Startup folder)** check box.
4. Click **OK**.

To shut down the LocalServer:

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

4.4.2   Connecting to a Network Server

If you have set up a network server you wish to connect to, select the **Connect to network server** option and choose the appropriate server from the drop-down list. Note that the server must already be running in order for SchemaAgent Client to be able to connect to, see <u>Starting SchemaAgent Server</u> ⁵³ .

On successful connection, the icon is displayed in the upper-right corner of the application and indicates the name of the server you are connected to. The search paths can be configured directly in SchemaAgent Server and are valid for all connected clients. Therefore, no **Configure Paths** tab is available in the Explorer window.

4.5   Managing Files and Folders

The **Hierarchical** and **Flat** tabs of the Explorer window show all the defined search paths [13] as well as the files with the defined file extensions [16] . In the **Hierarchical** tab, you can create [73] , rename [74] or delete [75] files or folders. Also, you can move files and folders to other positions under each path entry and recreate ghost files [114] .

All of the actions in the Explorer window are performed by means of the context menu or by using drag-and-drop. The content of the context menu depends on the file, folder, or area from where it is called. The following context menu commands appear if you right-click anywhere into the blank area within the Explorer window:

- **Show Empty Folders**: This command toggles on and off the display of folders that do not contain any files with file extensions defined in the **Configure Paths** tab.
- **Add search path**: This command is only available if you are connected to the LocalServer. It changes to the **Configure Paths** tab and opens a dialog box where you can define the settings for a new search path.

If you right-click a file or folder, the following context menu commands may appear:

- **Rename (F2)**: Renames [74] the selected file or folder.
- **Delete (Delete)**: Deletes [75] the selected file or folder from the file system.
- **New**: This command is available for folders. It opens a sub-menu from where you can choose to create a new file or folder [73] .
- **Reload**: Reloads the selected file from the disk. You can also select several files and run the **Reload** command to reload the files in one single step.
- **Recreate**: This command is available only if you have selected at least one ghost file. It creates a new rudimentary file [114] with the name of the ghost file.
- **Correct reference paths (Ctrl+R)**: This command is available only if you have selected at least one file with a reference to a ghost file. It opens a dialog box where you can search for the ghost file in different locations.
- **Synchronize Selection**: If you have a design open in the Design window, this command selects the same files in the Design window that are selected in the Explorer window.
- **Edit files in MapForce (Ctrl+M)**: Opens the selected .mfd file in MapForce for editing (provided that you have installed MapForce).
- **Edit files in XMLSpy (Ctrl+Y)**: Opens the selected file in XMLSpy for editing (provided that you have installed XMLSpy).
- **Insert files into clipboard (Ctrl+C)**: Copies the selected files to the clipboard so that you can paste them into a Design window.
- **Insert files into current design (Insert)**: Adds the selected files to the design that is currently open in the Design window.

Any change made in the **Hierarchical** and **Flat** tabs (such as renaming or deleting files, or changing the include, import, or redefine relationships) automatically affects any file referencing the changed file. 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.

4.5.1   Creating Files and Folders

To create a new file or folder in the Explorer window:

1. In the **Hierarchical** tab, select the folder where you want to create the file or folder.
2. Right-click and select one of the following commands from the context menu, as applicable:

    - **New | Schema**
    - **New | XML file**
    - **New | XSL file**
    - **New | WSDL 1.1 file**
    - **New | WSDL 2.0 file**
    - **New | MapForce design**
    - **New | Folder**

    If you chose to create a new file, a rudimentary "untitled" file having the respective file extension is created. If you chose to create a folder, a new empty folder called "new folder" is created.

3. Enter a descriptive name and press **Enter**.

If you open a new schema in XMLSpy, it will look like this:

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

A new XML file has the following content:

```xml
<?xml version="1.0" encoding="UTF-8" ?>
<root />
```

A new XSLT file will look like this:

```xml
<?xml version="1.0" encoding="UTF-8" ?>
<xsl:stylesheet version="2.0"
  xmlns:xsl="http://www.w3.org/1999/XSL/Transform"
  xmlns:fo="http://www.w3.org/1999/XSL/Format"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  xmlns:fn="http://www.w3.org/2005/xpath-functions" />
```

A file with the following content is created if you choose to add a new WSDL 1.1 file:

```
<?xml version="1.0" encoding="UTF-8" ?>
<wsdl:definitions
  xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
  xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/"
  xmlns:http="http://schemas.xmlsoap.org/wsdl/http/"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  xmlns:soapenc="http://schemas.xmlsoap.org/soap/encoding/"
  xmlns:mime="http://schemas.xmlsoap.org/wsdl/mime/"
  xmlns:tns="http://new.webservice.namespace"
  targetNamespace="http://new.webservice.namespace" />
```

A file with the following content is created if you choose to add a new WSDL 2.0 file:

```
<?xml version="1.0" encoding="UTF-8" ?>
<wsdl:description
  targetNamespace="http://new.webservice.namespace"
  xmlns:wsdl="http://www.w3.org/ns/wsdl"
  xmlns:wsoap="http://www.w3.org/ns/wsdl/soap"
  xmlns:whttp="http://www.w3.org/ns/wsdl/http"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  xmlns:tns="http://new.webservice.namespace" />
```

4.5.2   Renaming Files and Folders

When you rename a file in the Explorer window, SchemaAgent automatically corrects any references to the changed name and updates the display in the Design window if the renamed item is contained in the currently open design.

Note: Although you can change the file extension when renaming files, this will not change the file type and the file may become unusable. SchemaAgent displays a warning if you are about to change the file extension.

To rename a file or folder:

1. In the Explorer window, select the file or folder and do one of the following:

    *   Right-click and select **Rename** from the context menu.
    *   Press **F2**.

2. Change the name as desired. Any references to the changed name are automatically updated.

4.5.3   Deleting Files and Folders

You can delete files or folders on the disk from the Explorer window.

Note: Deleted files are not placed in the Windows Recycle Bin, and this step cannot be undone.

If the deleted file is present in a **Design** window, it is represented as an unknown file and receives a yellow alert icon.
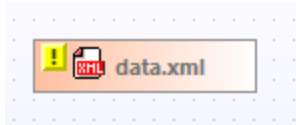
To delete a file or folder:

1. In the Explorer window, select a file or folder and do one of the following:

    -   Right-click and select **Delete** from the context menu.
    -   Press the **Delete** key.

2. Click **Yes** in the message box to confirm the deletion.

4.5.4   Editing Files

Apart from the definition of Includes, Imports, and Redefines, files cannot be directly edited in SchemaAgent. However, the context menus of the Explorer window and the Design window provide options to edit the selected files in XMLSpy or MapForce. These options are available only if the respective programs are installed on your computer.

To edit a file in XMLSpy:

-   In the Design window or in the Explorer window, select the file you want to edit and do one of the following:

    -   Right-click and select **Edit in XMLSpy** from the context menu.
    -   Press **Ctrl+Y**.

To edit an .mfd file in MapForce:

-   In the Design window or in the Explorer window, select the MFD file you want to edit and do one of the following:

    -   Right-click and select **Edit in MapForce** from the context menu.
    -   Press **Ctrl+M**.

4.6   Viewing Files in the Design Window

The Design window offers several grid and zoom options that can be configured to facilitate an optimal display of XML schemas [84], MapForce Design files [101], XML files [86], XSL/XSLT stylesheets [87], WSDL files [88], and IIR relations [90].

Showing or hiding the grid

Displaying the grid in the design window can serve as an aide for properly aligning the file boxes. You can toggle the grid display on and off separately for each individual Design window.

To toggle the grid in a SchemaAgent Design window on and off:

Do one of the following:

- Select the menu command **Layout | Show Grid**.
- Right-click an empty area in the Design window and select **Show Grid** from the context menu.
- Press **Alt+G**.
- Click the **Enable/Disable grid** toolbar button.

To enable or disable the grid globally at application level:

1. On the **Tools** menu, click **Options**.
2. Select or clear the **Enable grid by default** option.

Aligning file boxes on grid

When the grid is displayed, you can align the top and left edges of file boxes on the grid.

To align file boxes on the grid:

1. Turn the grid display on if it is not currently displayed (see above).
2. Select the file boxes you want to align.
3. Do one of the following:

   - Select the menu command **Layout | Align on Grid**.

   - Click the **Align on Grid** toolbar button.

To align a specific file box only, right-click the title bar and select **Align | On Grid** from the context menu.

Zooming in and out

The zoom of a design can be adjusted individually for each Design window. SchemaAgent provides the Layouts | **Zoom** menu command as well as the Zoom toolbar to this aim. In addition, you can zoom in and out of a design view by scrolling (with the scroll-wheel of the mouse) while keeping the **Ctrl** key pressed.

To zoom in or out of a design view:

1. Do one of the following:

    - Select the menu command **Layout | Zoom** and then select **Zoom**.
    - Click the **Show Zoom dialog** [🔍] toolbar button.

    The Zoom dialog box appears.
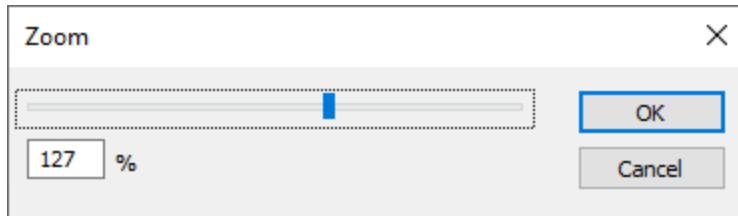
Zoom	✕
[———————|——————]	OK
127 %	Cancel

2. Do one of the following:

    - Adjust the zoom factor using the slider.
    - Enter a specific zoom factor in the box below the slider.

3. Click **OK**.

Alternatively, you can also select a zoom factor from, or enter it in, the drop-down list in the Zoom toolbar.

To make all file boxes fit in a Design window:

- Do one of the following:

    - Select the menu command **Layout | Zoom** and choose **Zoom to fit** from the sub-menu.
    - Click the **Zoom to Fit** [⬡] toolbar button.

    The zoom factor is adjusted so that all file boxes in the Design window become visible.

To zoom to a selection:

1. Select one or more file boxes.
2. Do one of the following:

    - Select the menu command **Layout | Zoom** and then select **Zoom to selection**.
    - Click the **Zoom to Selection** [▢] toolbar button.

    The zoom factor is adjusted so that the selected file boxes in the Design window become visible.

4.6.1   Creating and Saving Designs

A Design window is where you can view and graphically [design and manage the relationships](#) [127], that is IIRs (Includes, Imports, or Redefines), between an unlimited number of W3C XML schemas, and also display the relationships between XSLT stylesheets, Web Services Description (WSDL) files, MapForce Design (.mfd) files or XML files and their associated schemas. In this way, you can organize schemas (and .mfd or XML files) into collections of related files.

A SchemaAgent design can be saved as an .sad file for editing at a later time. Note that a set of files (and, therefore, their relationships) can be contained in multiple SchemaAgent designs. Any IIR relationship created in a SchemaAgent design is immediately propagated to the respective files as soon as the relationship is created.

To open a new SchemaAgent design window:

- Select the menu command **File | New (Ctrl+N)** or click the **New** toolbar button.

To open an existing SchemaAgent design (file):

1. Select the menu command **File | Open (Ctrl+O)** or click the **Open** toolbar button. The Open dialog box appears.
2. Select the desired file and click **Open**.

To open a recently used design file:

- On the **File** menu, click one of the recently opened files.

To save a design:

1. Select the menu command **File | Save (Ctrl+S)** or click the **Save** button in the Standard toolbar. Alternatively, select the menu command **File | Save As...** if you want to save the file under a different file name or path.
2. If the design has not been saved before, choose a path and enter a file name in the Save As dialog box.

To close the currently active design file:

1. Select the SchemaAgent design window for the design file you want to close.
2. Select the menu command **File | Close**.

4.6.2   Inserting Files and Folders

Files with supported extensions are added to a design either using the context menu in the Explorer window or by dragging them from the Explorer window into a Design window. Each file is displayed as a file box. Existing relationships between files are represented with colored lines.

To insert files or folders into a design:

In the Explorer window, do one of the following:

- To insert one or several individual files, select the desired files and drag them into a Design window using the left mouse button.
- To insert all files contained in a folder, drag the folder into a Design window.

The files or the files contained in the dragged folders, respectively, appear in the Design window. Alternatively, you can also select one or several files or folders and choose **Insert into current design** from the context menu or press **Insert**.

To insert the file(s) as well as all directly or indirectly referenced files:

- Select one or more files, drag them into a Design window *using the right mouse button* and select the desired option from the context menu that appears. The selected file(s) as well as the respective referenced files appear in the Design window.

4.6.3   Inserting Related Files

Once you have added a schema, a mapping design file, or an XML file to a Design window, you can add all the related files to the design.

To insert related underlying files into the design:

- Right-click the title bar of a file box and select one of the following options from the **Insert** menu:

  - All directly referenced
  - All directly referencing
  - All directly related
  - All referenced
  - All referencing
  - All related
  - All linked

Each of these menu options opens a sub-menu, from where you can choose **Files**, **Schema files**, **XML files**, **XSLT files**, **WSDL files**, or **MapForce designs**. The **Files** option will insert all files that meet the requirements; the remaining options will restrict the inserted files to the chosen file type.

Note that the options above are also available when you insert a file into a Design window by dragging it from the Explorer window *using the right mouse button*.

4.6.3.1 Directly Related Files

Files that are directly related are displayed with an uninterrupted connector line between them in a Design window.

Directly referenced files

These are files that are directly referenced with an include, import, or redefine (IIR) statement. For example, if Schema A has an Include statement that references Schema B, then Schema B is directly referenced by Schema A.
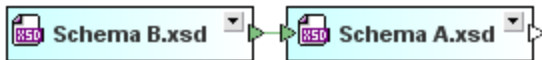
An XML file can reference one or several XML schemas or XSLT stylesheets.
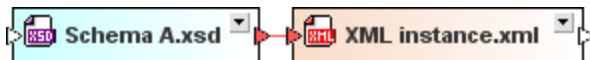
An XSLT file can import XML schemas, and import or include other XSLT files. Moreover, it can also have one or more inline schemas defined. All these relations are direct references.
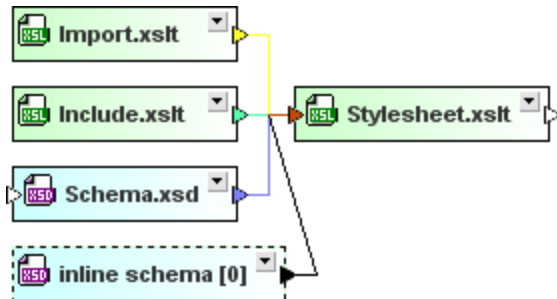
Other imported WSDL files and XML schemas as well as any inline schemas that may exist are directly referenced by WSDL files.
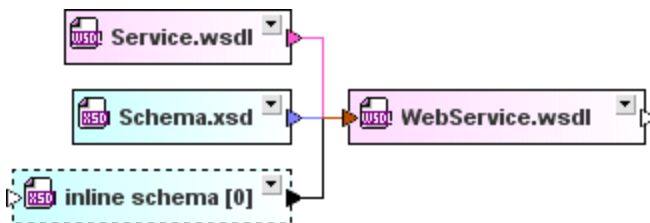
An .mfd file directly references its source and target schemas as well as XML instances.
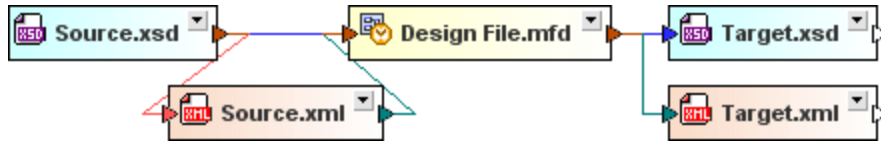
Directly referencing files

In this case, the file to be inserted references the selected file with an IIR statement, that is, the selected file is referenced by the file to be inserted. In our example above, **Schema A** is directly referencing **Schema B** and **Target.xsd** is directly referencing **Design File.mfd**.

All directly related

This option applies to both directly referenced and directly referencing files.

4.6.3.2 Indirectly Related Files

When files are indirectly related to each other, no direct connection is visible between the file boxes. The relation is established via a third file box with a direct relation to these files.

Referenced files

These are files 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 (since Schema A references Schema B, which in turn references Schema C).
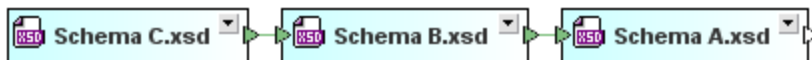
If a schema that is directly referenced by an **XML file** references another schema (e.g. Schema B is imported by Schema A), this schema (Schema B in our example) is said to be indirectly referenced by the XML file.
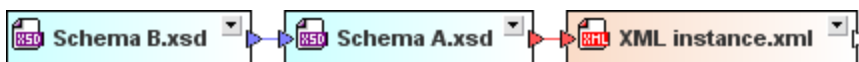
Any schemas and XSLT files that are included or imported in files directly referenced by **XSLT stylesheets** are said to be indirectly referenced by these stylesheets. So, in the example below, **Catalog.xsd** is indirectly referenced by **Stylesheet.xslt** because it is imported in **Import.xslt** which is included in **Stylesheet.xslt**.
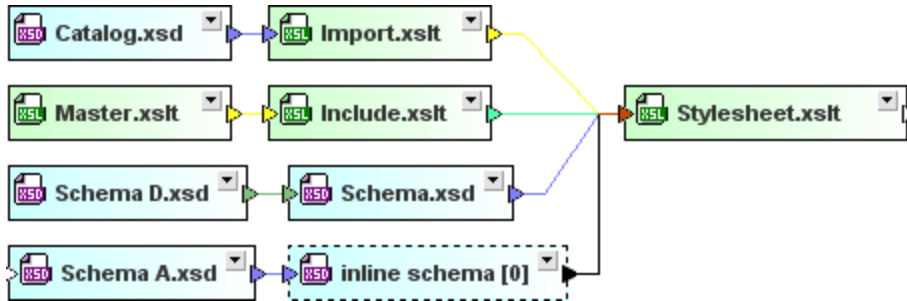
WSDL files can contain (inline) schemas or and these (inline) schemas can include, import, or redefine other schemas. Any schema that is included, imported, or redefined in such a schema (like Schemas Import, D, and Catalog in the example below), is indirectly referenced by the WSDL file.
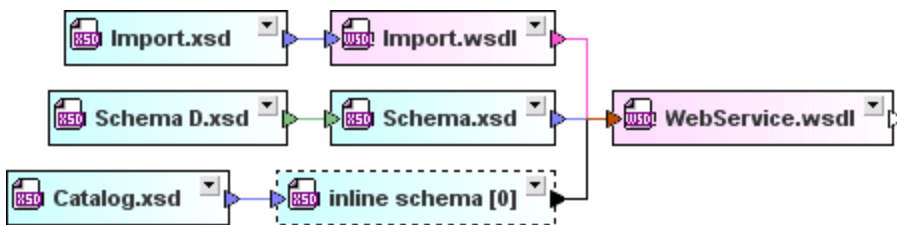
In the case of an **.mfd file**, in addition to the directly referenced source and target schemas, any schema that the source schema references or the target schema is referenced by (Schema Z in our example) is considered to be referenced by the .mfd file.
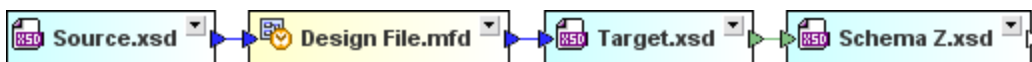
Referencing files

Files that are directly as well as indirectly referencing the selected file.

All related

This option applies to both referenced and referencing files with a direct as well as indirect reference.

4.6.3.3 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 **Schema Z**, which is linked to **Schema A**, is either the target or source schema of an .mfd file, then that .mfd file is considered to be linked to **Schema A**.

The file **Web Service.wsdl** is also linked to **Schema A** because it uses **Schema Z** which includes **Schema B** and **Schema A** includes **Schema B**.

The file **Stylesheet.xslt** is linked to **Schema A** because it is referenced by **instance.xml**, which in turn references **Schema A**.
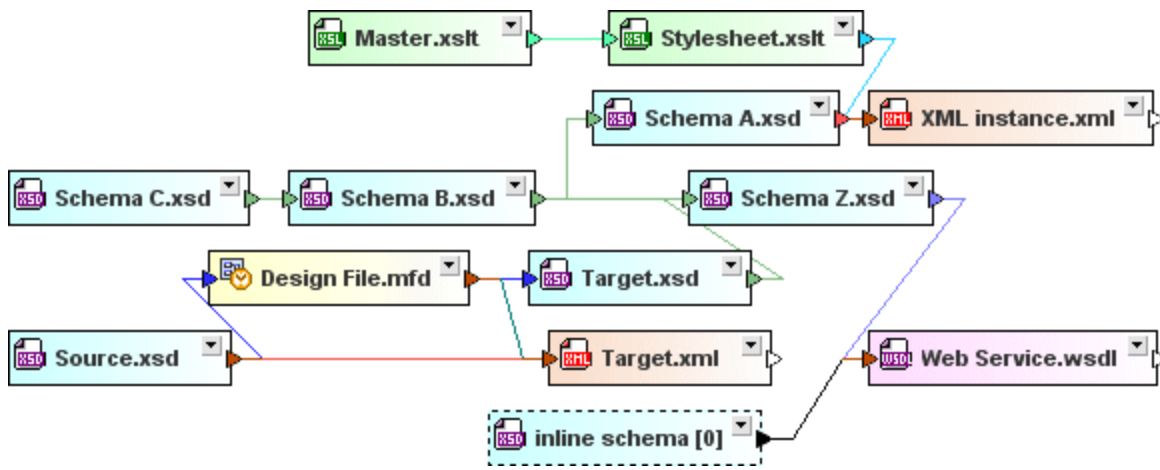
4.6.4   Arranging Files in Designs

After you have inserted files into a Design window, you can arrange the file boxes on the design pane by dragging them to the desired location with the mouse. For designs containing a large number of files, the Overview window [67] provides an overview so that you can see at a glance where in the design the visible part is located.

You can resize boxes by dragging box borders as well as expand or collapse them by clicking the expand ▣ button in the title bar of boxes.

Within a Design window, you can navigate from one file box to the next using the cursor keys (**Up**, **Down**, **Left**, **Right**).

To expand or collapse a file box:

- Click the expand ▣ button in the title bar or a file box.

To expand or collapse the tree structure in a file box:

Do one of the following:

- To expand or collapse individual items, click the plus or minus icons to the left of the item.
- To expand or collapse an individual item and its children, right-click the item and select **Expand all children** or **Collapse all children** from the context menu.
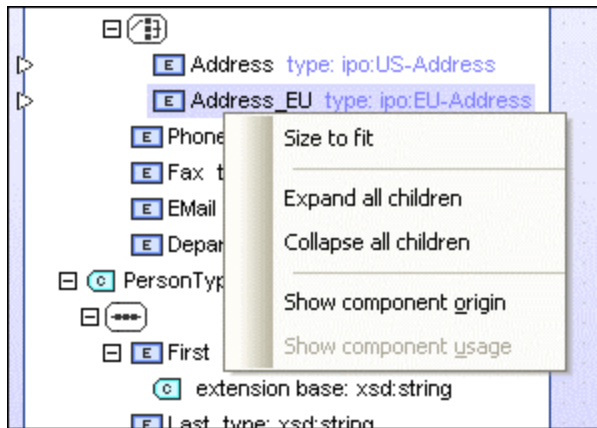
- To expand or collapse all items in a file box, right-click any item in the box and select **Expand all** or **Collapse all** from the context menu.

To show all expanded items in a file box:

- Right-click anywhere in an expanded section of the file box and select **Size to fit** from the context menu.

4.6.5   Viewing Schemas

In the Design window, each schema is displayed as a box which can be expanded and collapsed. When schemas are inserted into a design, they appear as collapsed schema boxes.

In the above schema, note that—apart from the arrowhead in the expand 🔽 button—there are two more arrowheads. The arrowhead on the left indicates that this schema either includes, imports, or redefines other schemas or schema components. By expanding the schema box, you can determine exactly which other schemas or schema components are included, imported, or redefined. The arrowhead on the right is used to create an IIR [127] that includes, imports, or redefines this schema or its schema components in other schemas.

Minimized schema boxes can be expanded 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 redefines 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 (indicated by the expand
button in the upper-right corner of the schema box), and this sub-structure is displayed as a freely
expandable tree structure of IIRs and global components.
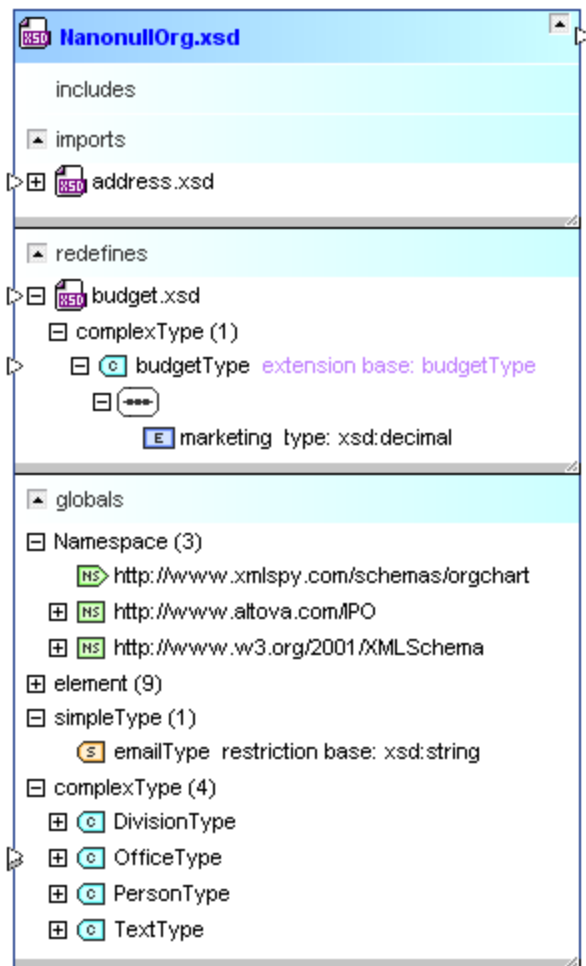
The arrowheads move depending on the level of detail that you display by expanding the individual sections.
Note the double arrowhead next to the **OfficeType** complex type indicating that two relationships are contained
in this section.

To view a schema:

1. Drag and drop the schema you want to view from the Explorer window onto a Design window or use the context menu to add the file to the current design.
2. Optionally, expand the sub-sections to view detailed information on IIRs or components.

4.6.6   Viewing XML instance files

XML files that are inserted into a design are displayed as collapsed XML boxes.
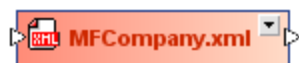
The design of an XML box is basically identical to the design of a [schema box](#) ⁸⁴. The box can be expanded and then shows three sub-sections. In the screenshot below, the arrowhead at the left of the Schema section indicates that this XML instance has an XML schema defined.

You can further expand the Schema and the Root sections of the XML box to see which XML schema and which namespaces are defined for the XML file.
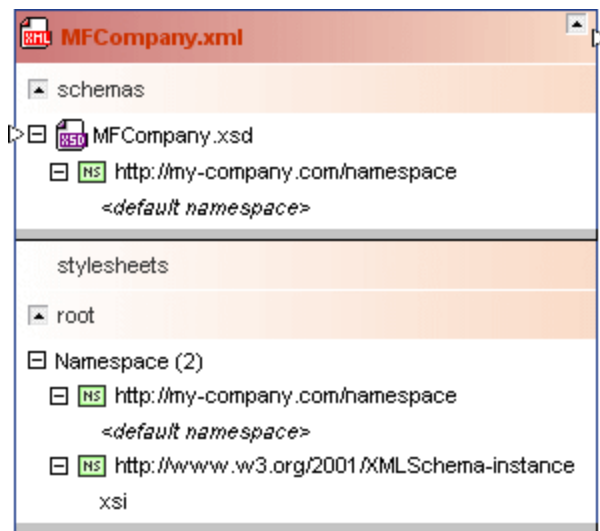
If the XML instance has also an XSLT stylesheet defined, you can expand the stylesheets section and view information on the XSLT file.
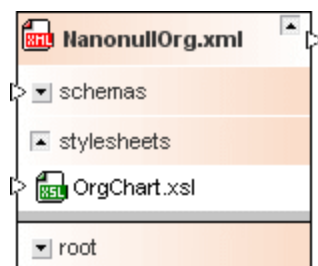
To view an XML file:

1. Drag-and-drop the XML file you want to view from the Explorer window onto a Design window or use the context menu to add the file to the current design.
2. Optionally, expand the sub-sections to view detailed information about schemas, stylesheets, or namespaces.

4.6.7   Viewing XSL/XSLT stylesheets

An XSLT stylesheet appears as a collapsed XSLT box when it is inserted into a Design window.
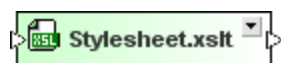
The expanded box shows five sub-sections for imported or included XSLT files, imported schemas, inline schemas, and stylesheets.
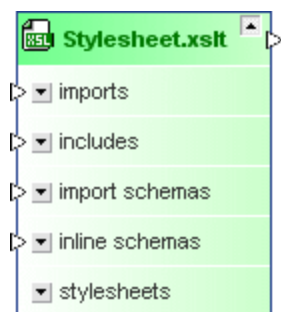
Expanding the sub-sections displays the names of the imported or included files, and the namespaces that are defined for the stylesheet.
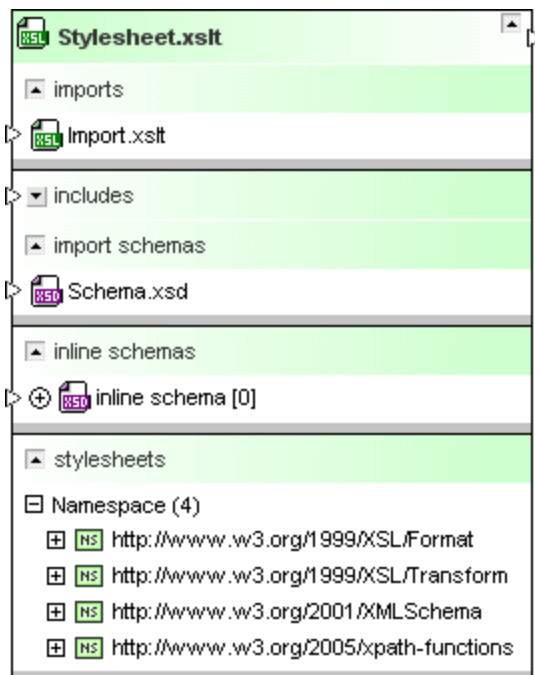
Note: Since stylesheet files of version 1.0 support neither importing schemas nor inline schema, the relevant sections are not displayed in the file boxes of these files. The version of a stylesheet file is displayed in the Quick Information[105] of a file box.

To view an XSLT file:

1. Drag-and-drop the XSLT file you want to view from the Explorer window onto a Design window or use the context menu to add the file to the current design.
2. Optionally, expand the sub-sections to view detailed information about imports or includes, imported or inline schemas, or namespaces.

4.6.8   Viewing WSDL files

When you add a WSDL file to a Design window, it appears as collapsed.

The expanded box shows four sub-sections for imported WSDL or XML schema files, inline schemas, and definitions.
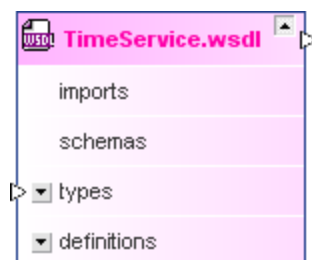
When you further expand the sub-sections, you can view details about the imported WSDL files or XML schema, the inline schemas, and the individual definitions of the web service.
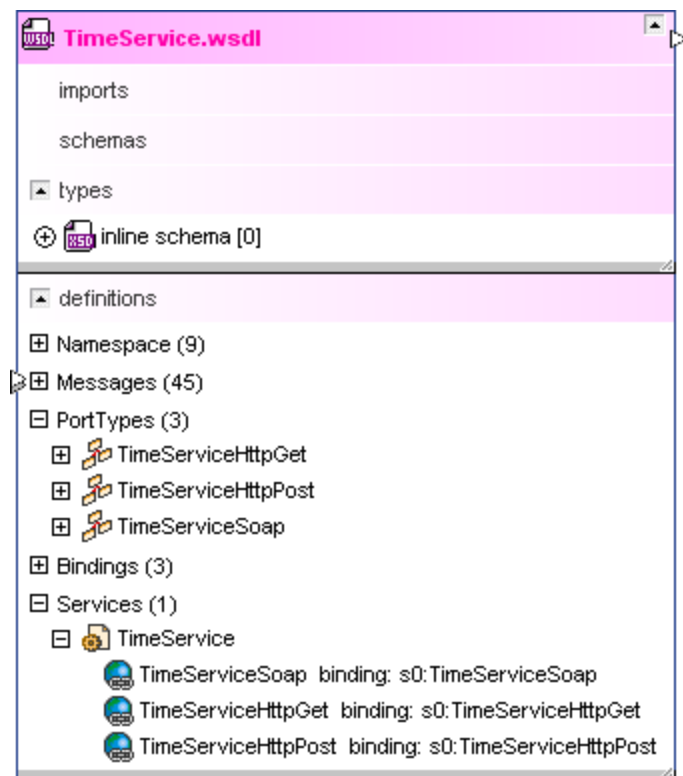
SchemaAgent also supports WSDL 2.0.
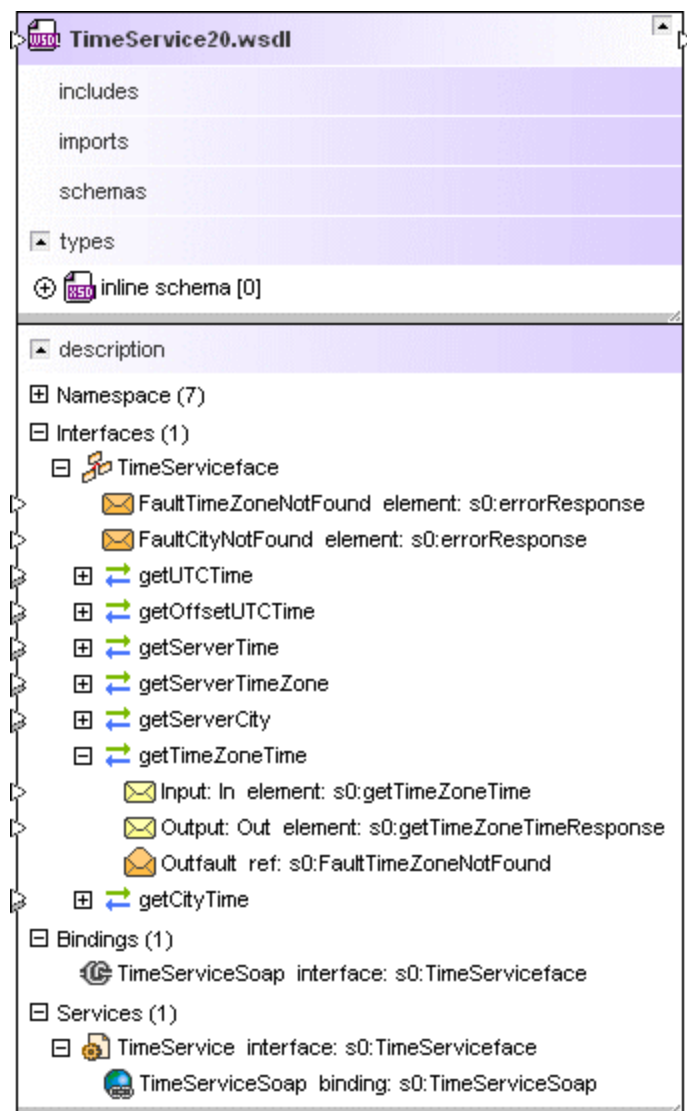
To view a WSDL file:

1. Drag and drop the WSDL file from the Explorer window onto a Design window or use the context menu to add the file to the current design.
2. Optionally, expand the sub-sections to view detailed information about imported WSDL or schema files, inline schemas, or web service definitions (WSDL 1.1) or web service descriptions (WSDL 2.0), respectively.

4.6.9   Displaying Relations

SchemaAgent can illustrate a number of different relations between the files it supports.

- IIR relations between XML schemas [93] (includes, imports, and redefines)
- Relations between XML instances [94] and XML schemas or XSLT stylesheets
- Include and import relations between XSLT stylesheets [94] as well as relations between XSLT stylesheets and XML schemas
- Import relations between WSDL files [97] as well as relations between WSDL files and XML schemas
- Relations between MapForce Design (.mfd) files [98] and XML schemas, XML instances, or WSDL files
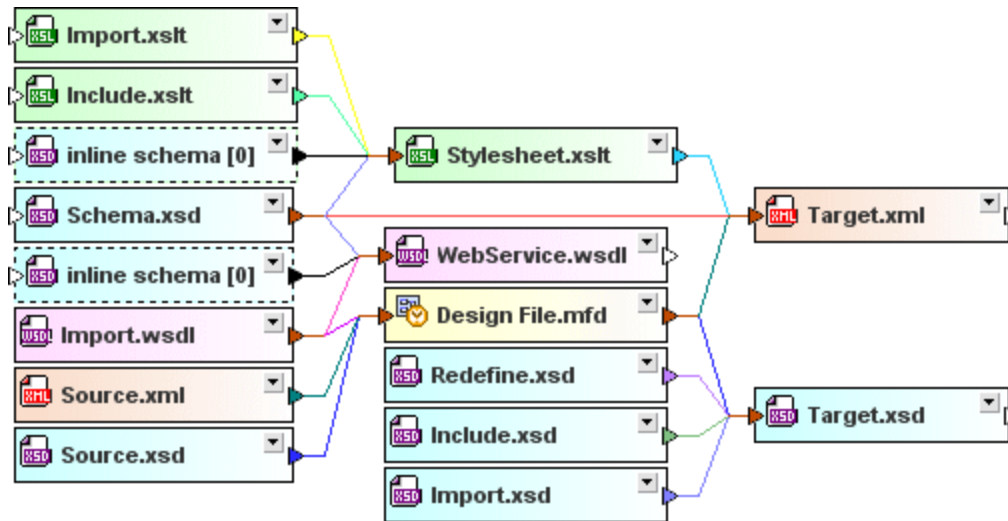
These relations are illustrated by solid lines between the individual file boxes by default. The lines have different colors indicating the kind of relations that exists between particular files. You can customize the appearance of the connector lines in the Colors [150] and Relations [152] tabs of the Options dialog (menu command **Tools | Options**).

Component relations

Lines that show relationships between global components in two schemas are dashed by default. For such relations to be visible, the Globals sections of both schemas must be expanded.
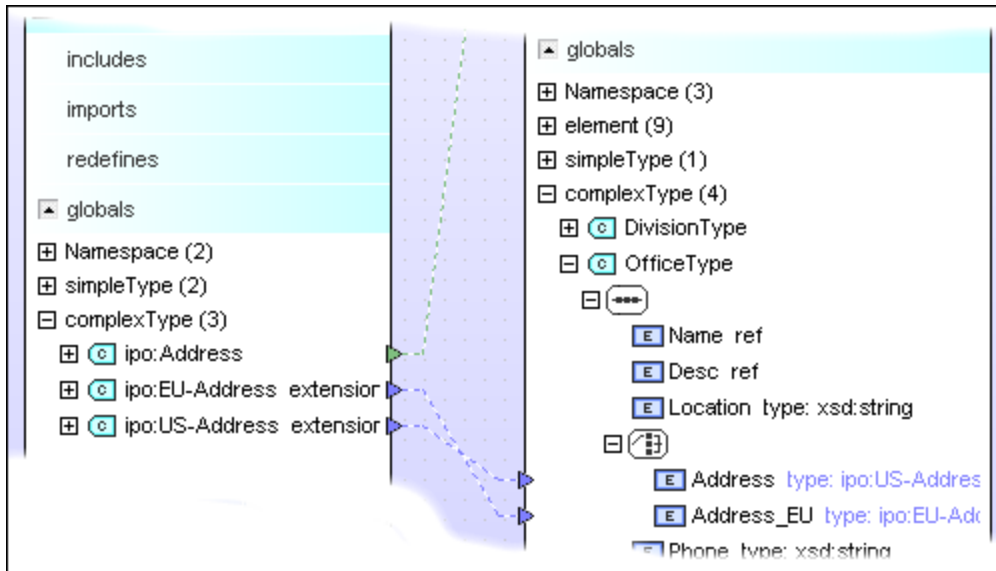
Likewise, relations between an .mfd file and global components in its source and target schemas are indicated by dashed lines. Again, for such relations to be visible, the Globals sections of the schema as well as the .mfd file's Input or Output section, respectively, must be expanded.
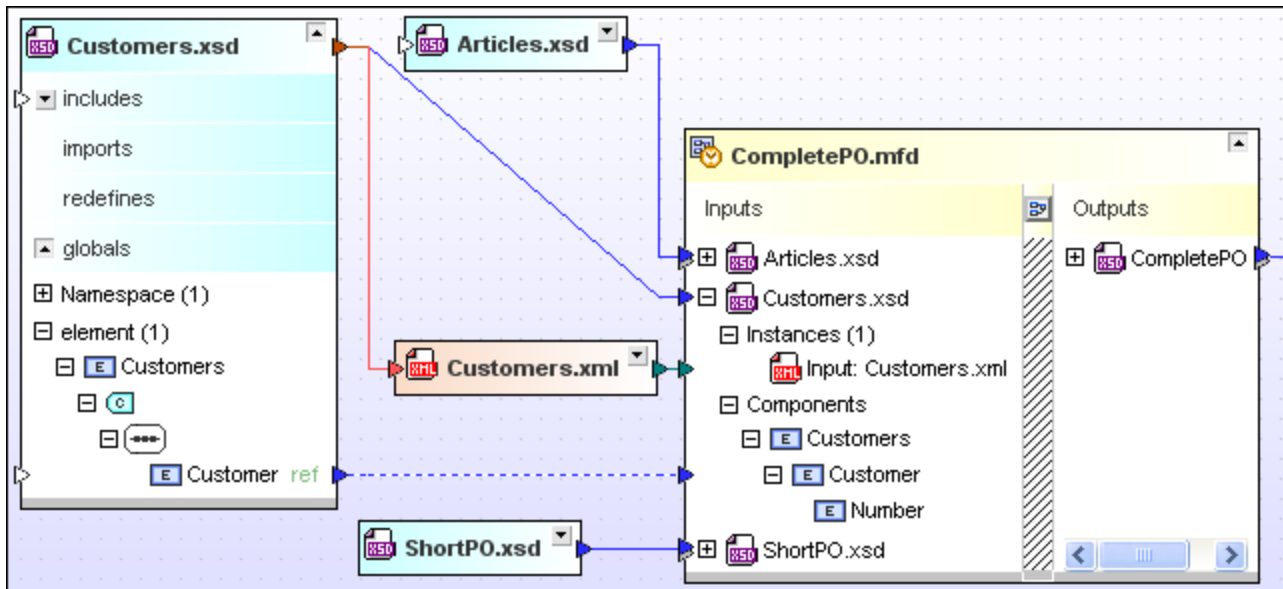
Highlighting connector lines

When you place the cursor over a connector line, the line becomes highlighted and a tooltip appears with details about the relationship. The arrowhead on the line indicates the "direction" of the relationship.
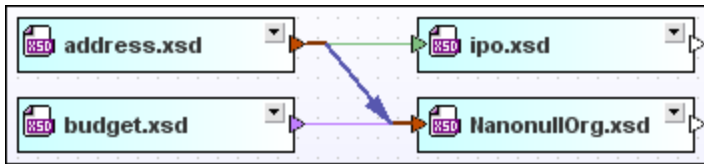
In the screenshot above, the blue import relation is highlighted and it shows that **address.xsd** is imported in **NanonullOrg.xsd**. The appearance of highlighted connector lines can be configured from **Tools | Options | Relations**.

Selecting connector lines

Click a line to select it. Right-click a line to reveal context menu options.
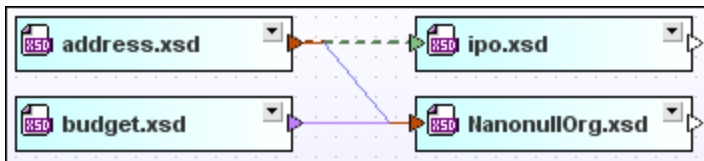
In the screenshot above, the green include relation is selected. The appearance of a selected line can be configured from **Tools | Options | Relations**. Note that a selected line can also be highlighted.

4.6.9.1 Schema Relationships

Lines that show relationships between schemas are solid by default. Different colors are used to distinguish Imports, Includes, and Redefines; the default settings show Imports in light blue, Includes in green, Redefines in purple-violet.
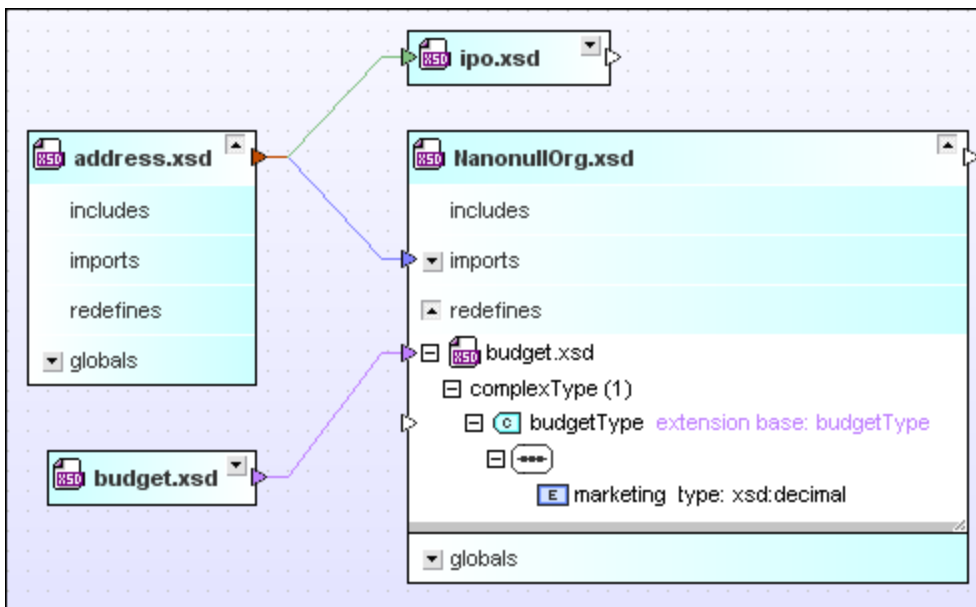
Note that the connector points directly to the referenced component if you also expand the section within the schema box.

4.6.9.2 XML Instances

Relationships that exist between XML schemas or XSLT stylesheets and their corresponding XML instances are also displayed in SchemaAgent.
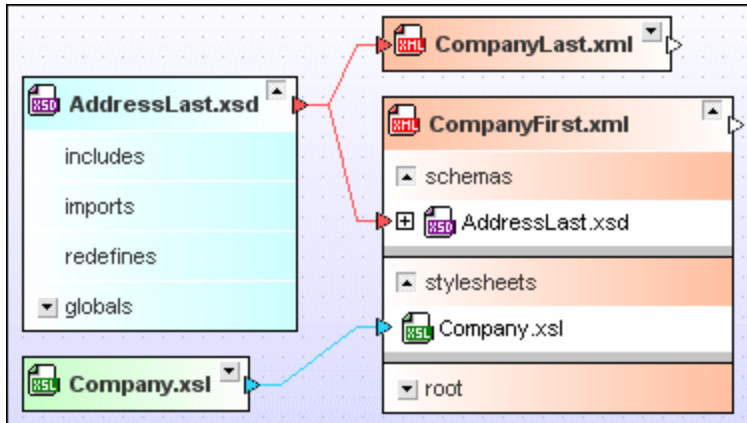
The default color for schema relations is red. The default color for stylesheet relations is cyan.

4.6.9.3 Stylesheet Relationships

XSLT stylesheet files can import or include other XSLT files or XML schemas. In addition, one or several inline schemas may be present in an XSLT file. SchemaAgent illustrates these relationships with different colors.
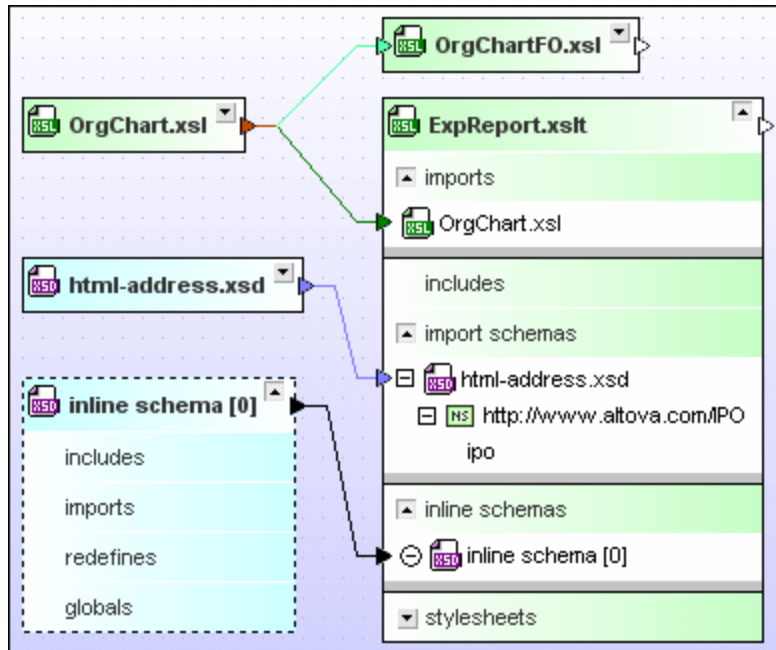
The default color for imports is dark green, for includes it is light green, and for schema relations it is light blue.

Changing the order of imported or included XSLT files

The sequence in which the imported or included stylesheets are applied is important in XSL transformations. For this reason, these files are not sorted alphabetically by default, but in the order of their insertion. You can, however, change the sorting order if necessary.

To change the order of imported or included XSLT files:

1. Expand the "imports" or "includes" section to view the related XSLT files.
2. Right-click the file whose position you want to change and select either **Move up** or **Move down** from the context menu, as applicable:
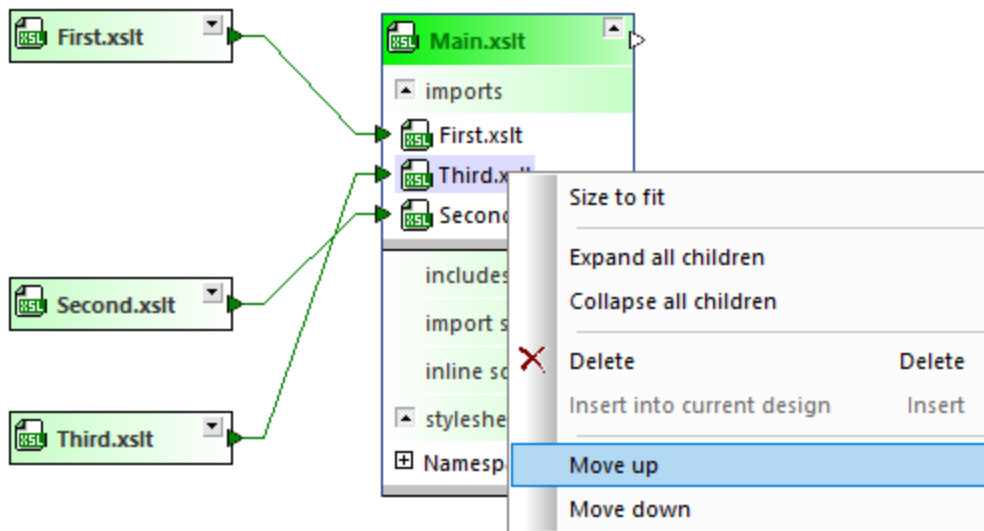
3. Optionally, repeat step 2 until the file shows up at the desired position.

Inline schemas

If the XSLT file contains inline schemas, you can show a file box for the inline schema. The file box for the inline schema has a dashed border; apart from that, you can proceed as with any other XML schema box.

To display an inline schema:

1. Expand an XSLT box until the inline schemas are listed under the "inline schemas" section.
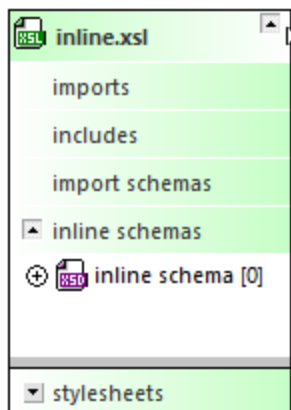
2. Do one of the following:

   o Right-click an inline schema and select the **Show inline** option from the context menu.
   o Click the ⊕ icon to the left of the **inline schema** entry.
   o Double-click the **inline schema** entry.

**To hide an inline schema:**

- Do one of the following:

    o Right-click an inline schema and clear the **Show inline** option from the context menu.
    o Click the ⊖ icon to the left of the **inline schema** entry.
    o Double-click the **inline schema** entry.

4.6.9.4 WSDL Relationships

WSDL files can import other WSDL files or XML schemas. In addition, one or several inline schemas may be present in a WSDL file. SchemaAgent illustrates these relationships with different colors.
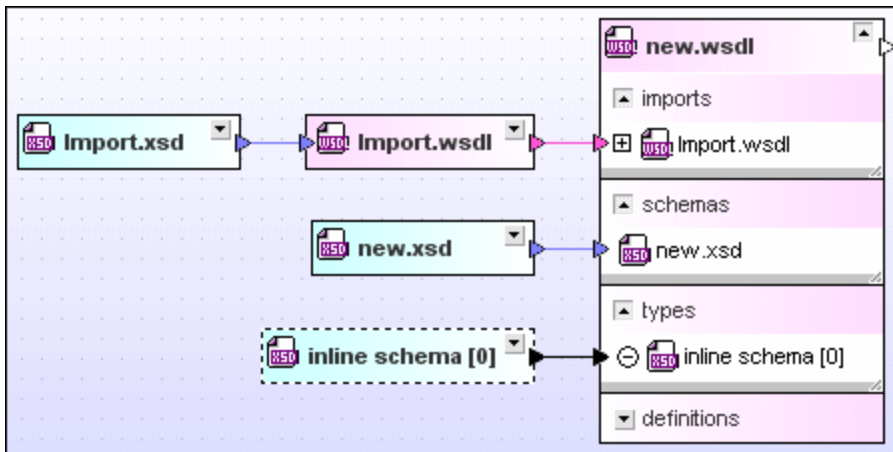
The default color for imports is magenta; for schema relations, it is light blue.

Inline schemas are displayed when you expand the "types" section in a WSDL box. You can also show a file box for the inline schema. The file box for the inline schema has a dashed border; apart from that, you can proceed as with any other XML schema box.

To display an inline schema:

1. Expand a WSDL box until the inline schemas are listed under "types".
2. Do one of the following:

    o Right-click an inline schema and select the **Show inline** option from the context menu.
    o Click the ⊕ icon to the left of the **inline schema** entry.
    o Double-click the **inline schema** entry.

To hide an inline schema:

- Do one of the following:

- o Right-click an inline schema and clear the **Show inline** option from the context menu.
- o Click the ⊖ icon to the left of the **inline schema** entry.
- o Double-click the **inline schema** entry.

4.6.9.5 MapForce Design Relationships

When a MapForce design file is concerned, solid connector lines lead from the .mfd file to the respective source and target schemas or any existing XML instances. By default, the color of relations between .mfd files and schemas is blue. The default color of relations between .mfd files and XML instances is green.
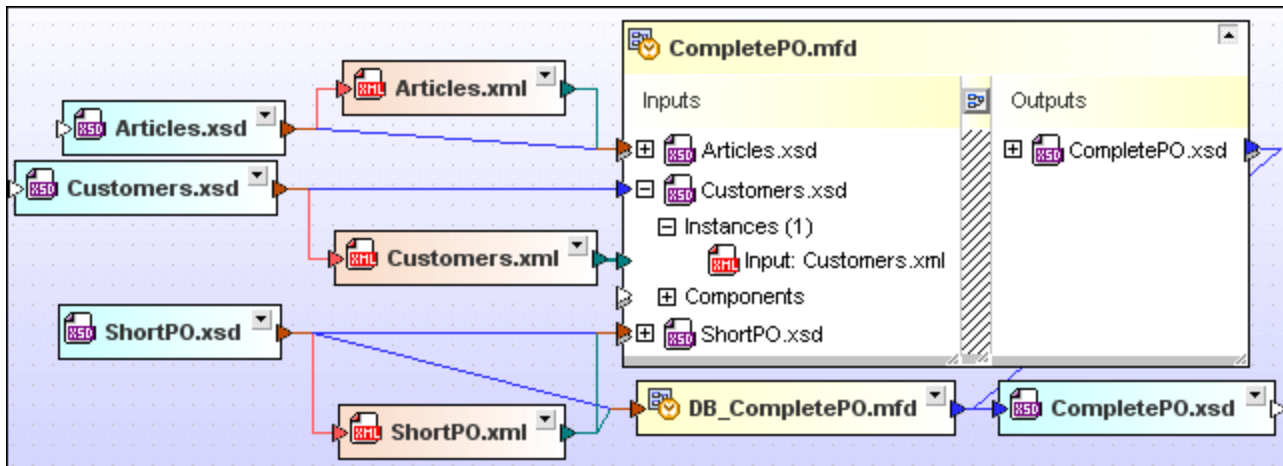
The default color of relations between .mfd files and WSDL files is magenta.
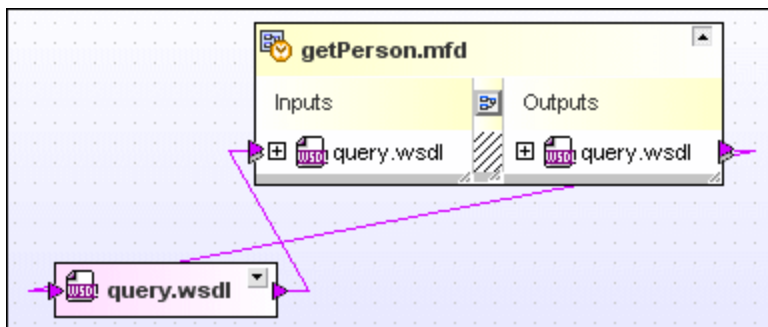
4.6.10   Showing Related Components

A schema component or its type may be defined in another schema (which is indicated by arrowheads on the left-hand side of the component) or used by another schema (indicated by arrowheads on the right-hand side of the component). For example, the complex type **ipo:US-Address** illustrated below in blue color (according to the default color scheme) denotes an import.
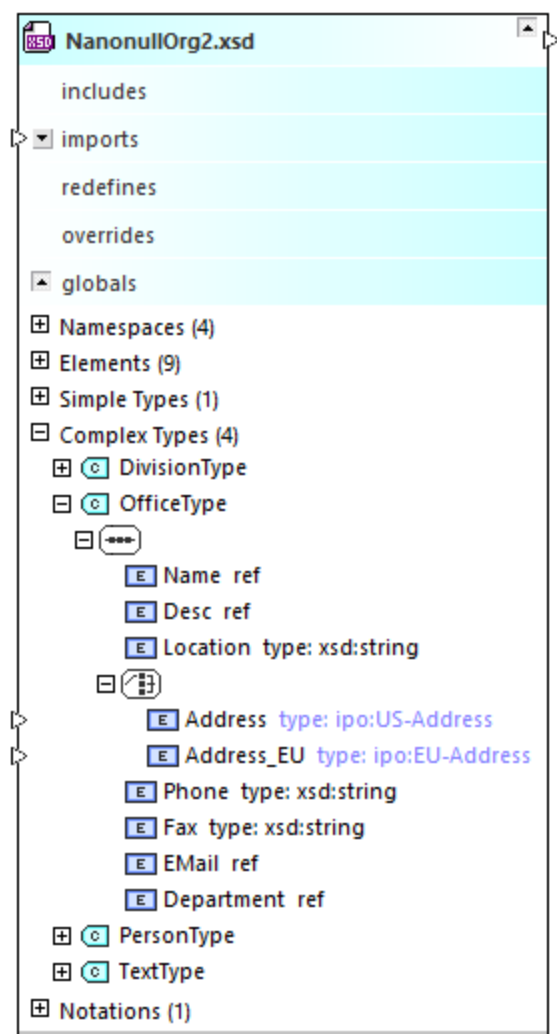
You can view the origin or usage for such components as follows:

1. Right-click a component and select **Show component origin** (or **Show component usage**, if applicable) from the context menu.
2. Optionally, click **Yes** in the message box that pops up if the schema of the source component is not present in the current design.

The instructions above are applicable for both XML schemas and .mfd files added to the Design window.

The **Show component origin** command adds the relevant definition in the source schema (in this example, **address2.xsd**) to the design.
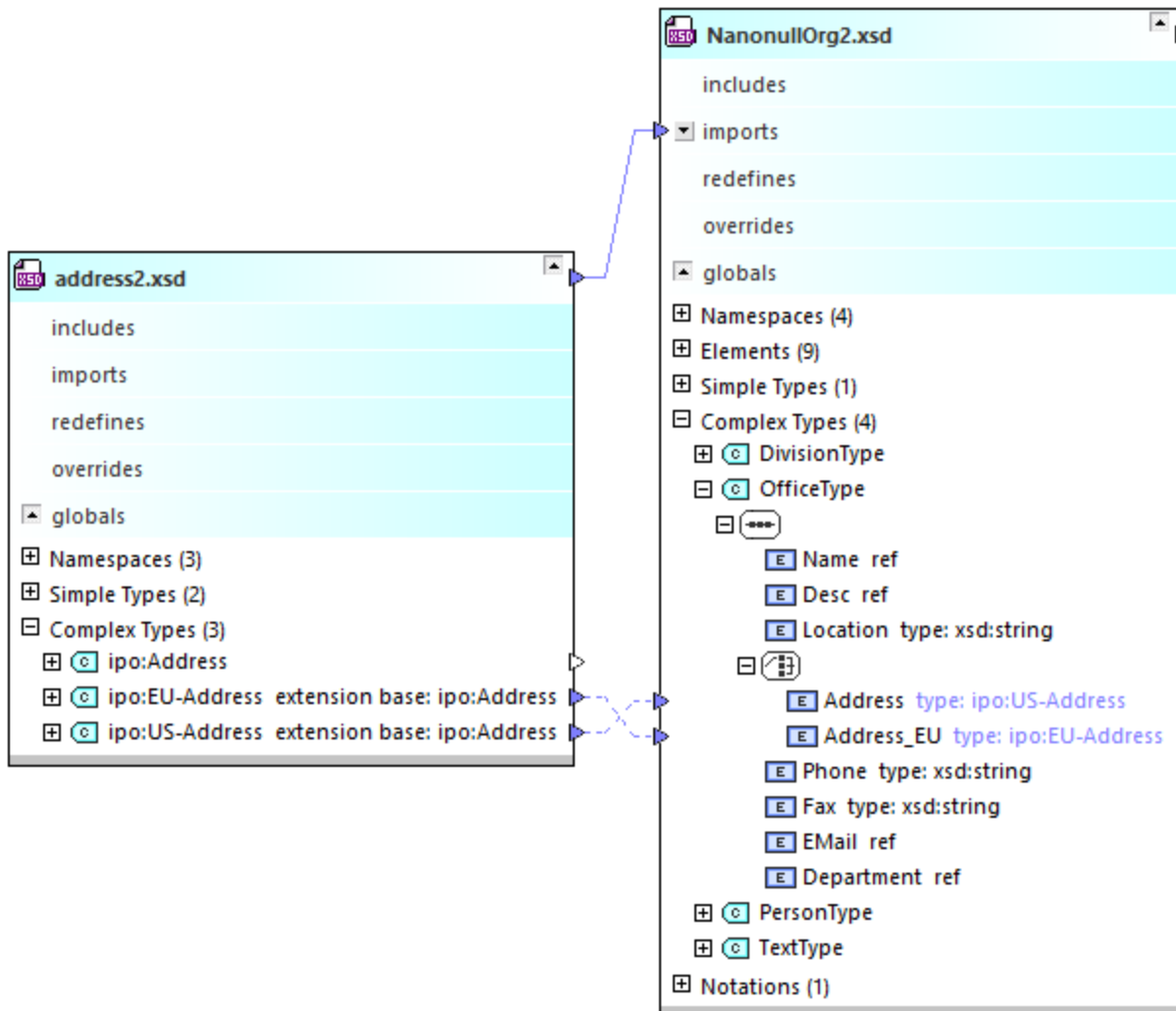
Conversely, the **Show component usage** command adds to the design the relevant definition of the schema where the type is used. In the design illustrated below, the type **ipo:Address** defined in **address2.xsd** is used in **ipo2.xsd**.
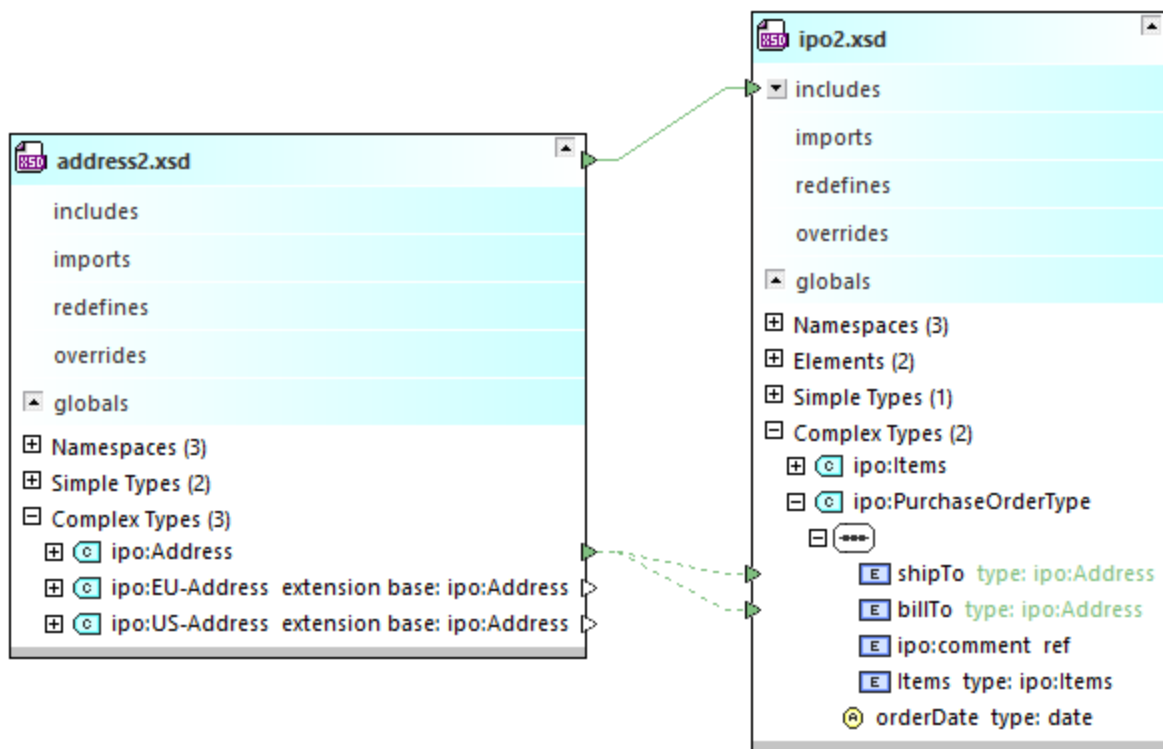
4.6.11   Viewing MapForce Design Files

When MapForce (https://www.altova.com/mapforce) and MapForce Integration Package are installed on the same computer, you can view detailed information about mapping design files (.mfd) in SchemaAgent Client, specifically:

- The source or target components that are XML based
- The XML instance files that were designated as input or output in MapForce (if any).
- Any source or target components that are calls to WSDL-style Web services
- Relations between all of the above and other files

Notes:

- While MapForce requires a license, the MapForce Integration Package is a free component available for download at https://www.altova.com/mapforce/download.
- If the .mfd file contains XML schema components, XML inputs or outputs, or calls to WSDL-style web services, the information shown has the same level of detail as if you examined a standalone XSD, XML, or WSDL component in SchemaAgent Client. If the .mfd file contains components not supported by SchemaAgent (like CSV or Excel files or databases), such inputs and outputs are not displayed.

To view information about an .mfd file in SchemaAgent, do one of the following:

- Drag and drop the .mfd file from the Explorer window onto a Design window.

- Right-click the .mfd file in the Explorer window, and select **Insert into current design** from the context menu.

The source and target components are listed when you click the expand ▾ button. Source components are shown on the left side; target components—on the right. To quickly view the full structure of the .mfd file, right-click the title bar, and select **Expand All** from the context menu.
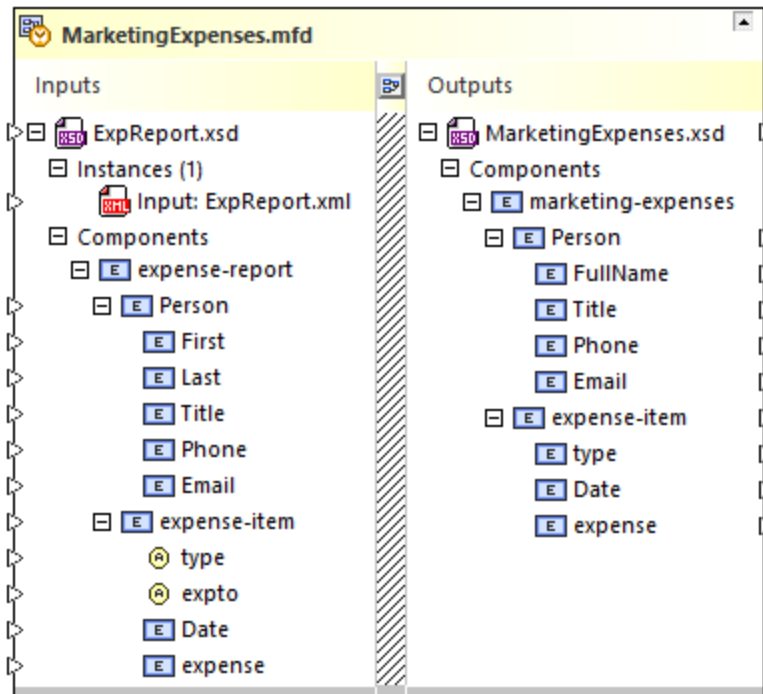
To view the mapping design as it appears in MapForce, click the **Design** ⧉ button located between the input and output files.
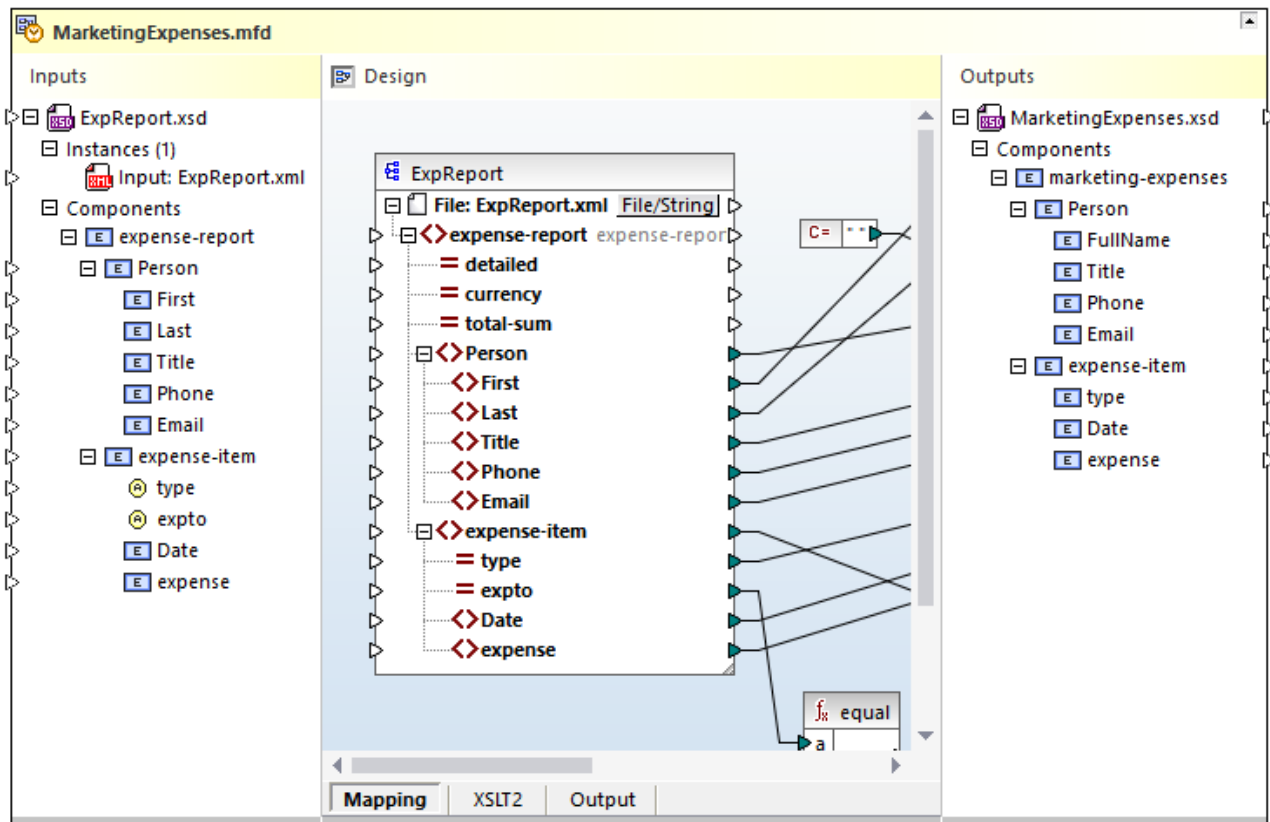
The **Mapping** tab shows the design view. The **XSLT** tab displays the MapForce-generated XSLT output. This tab appears only if the transformation language of the mapping is XSLT. The **Output** tab displays the execution result of the mapping.

To close the design pane, click the **Design** 🔳 button again.

Note: In order for the Design pane to be displayed, MapForce and MapForce Integration Package must be installed on your computer. You cannot edit an .mfd file directly in SchemaAgent., except for setting the input or output instances, as further shown below.

To open any .mfd file for editing in MapForce, use any of the following shortcut commands:

- Right-click an .mfd file in the Explorer window and select **Edit in MapForce** from the context menu.
- Right-click the title bar of an .mfd file in the Design window and select **Edit in MapForce** from the context menu.
- Select the file in Explorer window and press **Ctrl+M**.

Setting input or output

In SchemaAgent Client, you cannot directly edit .mfd files; however, you can set the input or output XML instances of XML based components.

A MapForce design file may contain one or several source XML components, and one or several target XML components. In SchemaAgent Client, the source components appear to the left of the box, while target

components appear to the right. For example, the .mfd illustrated below has one source and one target component:
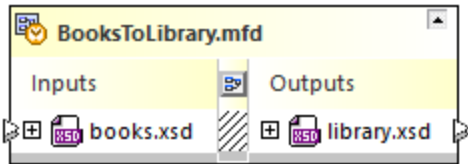
If the source component is an XML schema like in the image above, it typically has an "input" instance file—this is the XML file from where the mapping will read data when you execute it in MapForce. The target component, on the other hand, typically has an "output" instance file—this is the XML file to which data will be written. For example, the .mfd illustrated below reads data from **books.xml** and writes data to **library.xml**.
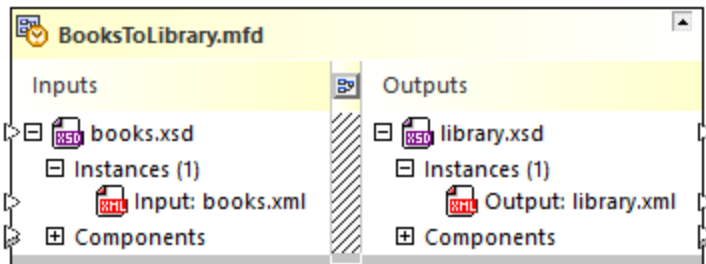
Notice the prefix "Input" before the input instance file, and the prefix "Output" before the output file.

To set the input or output file of a component:

1. Drag the required XML file from the Explorer window into the Design window.
2. Click the input or output connector (small triangle) to the left or right of the XML file box and, holding the mouse key pressed, drag it onto a source or target .xsd component. A new instance file is added and it gets either the "Input" or "Output" prefix.

Note: A MapForce component has one input and one output file at most. An error message appears if you attempt to add more.

3. If it is required to convert the input file to output, or vice versa, right-click the file and select **Toggle instances** from the context menu, see below.

To delete an existing input or output instance:

- Right-click the instance file and select **Delete** from the context menu. Alternatively, select the file and press **Delete**.

Toggling input and output instances

You can change an "Input" instance file to become the "Output" instance file, and vice versa, directly from SchemaAgent Client. Consider this operation as equivalent to switching the **Input XML File** and **Output XML File** on the mapping component settings in MapForce:
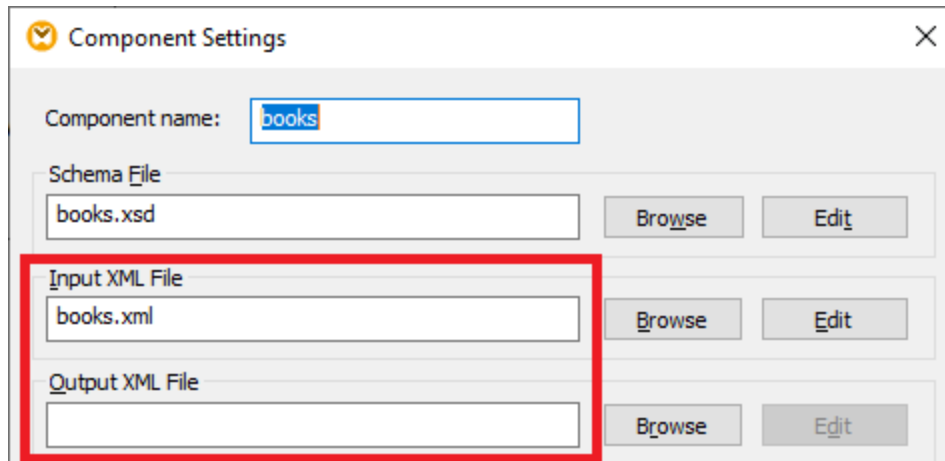
Component Settings in MapForce

To designate the input instance file as output, or vice versa:

· Right-click the parent XML schema, the **Instances** node, or either of the XML instances and choose **Toggle instances** from the context menu.

After you run the **Toggle Instances** command, the "Input" instance file of the respective schema component becomes "Output", and the "Output" becomes "Input", respectively. Note that the MapForce component settings are also updated with immediate effect.

4.6.12   Displaying Quick Information

When you move the mouse pointer over the title bar of a file or a connector line in a Design window, SchemaAgent displays a Quick Info box with details such as file location, target namespace, IIR information, and so on. The type and amount of information displayed in a Quick Info box depends on the object being under the focus of the mouse pointer.
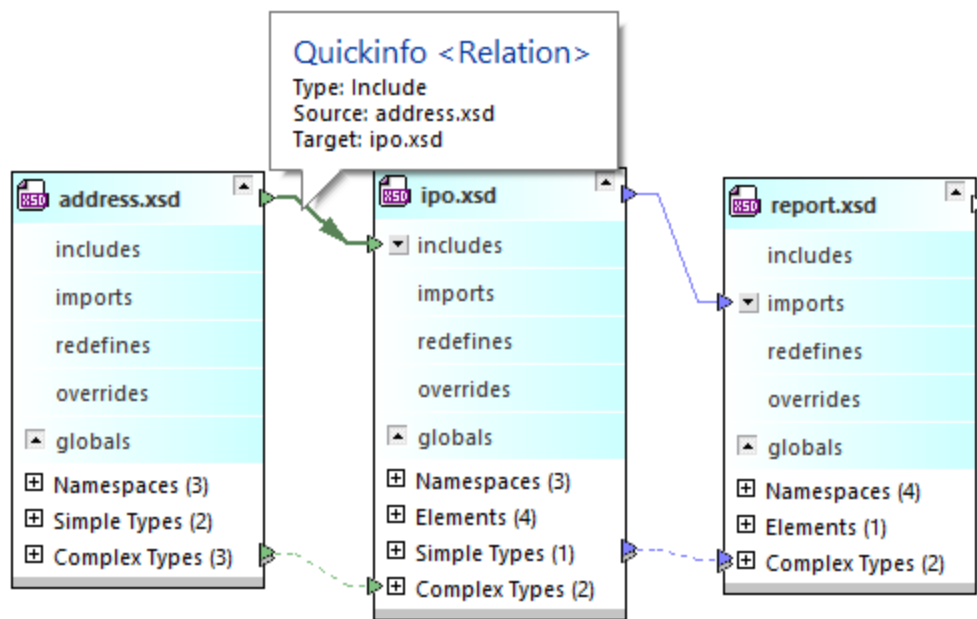
A Quick Info box is provided for the following objects:

- Schema boxes
- Schemas contained in the individual sections of other schema boxes
- MapForce design file boxes
- Schemas contained in the Input or Output section of .mfd file boxes
- XML instances
- IIR connector lines
- MapForce connector lines
- Component relation connectors
- References to XML instances

Note: The Quick Info box displays IIR information as determined in the search path.

Placing the text cursor over an **alert** icon, if visible in the file box, opens the relevant error message in the Quick Info box.

Schemas

When you move the mouse pointer over the title bar of a schema box, a Quick Info box containing the following information is displayed:

- Location of the schema
- Target namespace and prefix
- IIR information about the schema, for example, what schemas are included in that schema, and in which schemas that schema is included itself.

When you have expanded a schema box and move the mouse pointer over the file name of an included, imported, or redefined external schema, the Quick Info box displays the following information about the external schema:

- Location of the schema
- Target namespace and prefix

MapForce design files

When you move the mouse pointer over the title bar of an .mfd box, a Quick Info box containing the following information is displayed:

- Location of the file
- Source file(s)
- Target file(s)

When you move the mouse pointer over the file name of a schema contained in the .mfd file, the Quick Info box displays the following information:

- Location of the schema

XML instances

When you move the mouse pointer over the title bar of an XML instance file box, a Quick Info box containing the following information is displayed:

- Location of the XML file
- Referenced file(s)
- Files writing the XML instance, if applicable
- Files reading the XML instance, if applicable

XSLT stylesheets

When you move the mouse pointer over the title bar of an XSLT stylesheet box, a Quick Info box containing the following information is displayed:

- Location of the XSLT file
- XSL version
- Imported XSLT files
- Included XSLT files
- Imported XML schemas
- Files containing the XSLT file
- Inline schemas contained in the XSLT file

Web Service Description files

When you move the mouse pointer over the title bar of a WSDL file box, a Quick Info box containing the following information is displayed:

- Location of the WSDL file
- WSDL version
- Target namespace
- Imported WSDL files
- Imported XML schemas
- Files containing the WSDL file
- Files reading the WSDL file

- Inline schemas contained in the WSDL file

Relations

When connector lines between schemas, .mfd files, XML instances, or components and their respective source or target item are highlighted, a Quick Info box is displayed. The content of the Quick Info box differs depending on the type of the highlighted connector.

The following is displayed for relations:

- Type (Import, Include, Redefine, MapForce, or Reference)
- Source
- Target

When you move the mouse pointer over a component relation, the Quick Info box contains information regarding the input component the MapForce item reads from, or the MapForce item the output component is written by, respectively.

4.7   Working with Designs

When working with SchemaAgent designs in a Design window, you can not only select [109] file boxes, rearrange or remove [111] them, but also reload files [115] that have been changed outside SchemaAgent Client as well as print [125] and export [126] designs. Context menus are available for the design [115] itself as well as for file boxes and connector lines [123]. You can correct incorrect reference paths [112] and even recreate ghost files [114].

4.7.1   Selecting Files

When selecting a single file in a Design window, the file box changes its color and the selected box automatically receives the focus, which is indicated by the title also being displayed in a different color. You can change the color for selected files in the Options [150]. The selection mechanism is explained below with reference to schemas; note that the same mechanism applies to other supported file types.
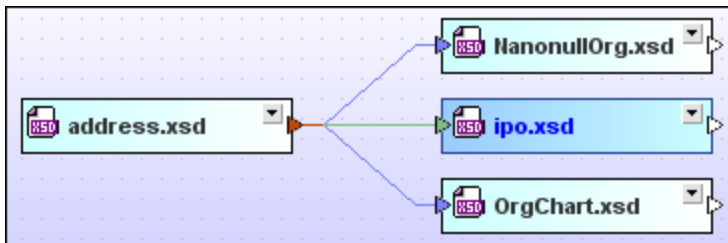
Selecting multiple files

In a Design window, several files can be selected at a time. The title bars of the selected files change their color. The way in which you select the files determines which file will get the focus:

- If you use the **Ctrl+click** method to select multiple file boxes, the last file box that is selected will receive the focus.
- If you use the marquee selection method, the last file 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 file box, then no file will receive the focus.
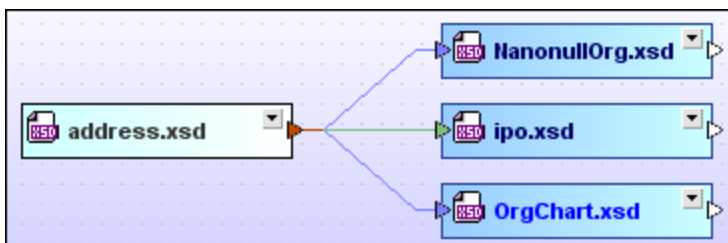
To select multiple schemas in a Design window:

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).

Changing the focus

For some actions, such as aligning, it is important to set the focus correctly because the selected files are aligned on the file that has the focus. For other actions, such as sorting, the focus is irrelevant.

To change the focus in a multiple selection:

- Press **Ctrl** and click twice on the box of the file to which you want to give the focus.

Selecting related files

Schema boxes are selected automatically when you run the [Show Component Origin](99), [Show Component Usage](100), and [Show Relation Path](124) commands.

Another way to select related files in a design is to right-click a file and choose one of the following options from the **Select** sub-menu of the context menu. Each of the options provides a sub-menu where you can further restrict your choice to certain file types, or choose **Files** to select all files.

- **All directly referenced**: Selects all files that are directly referenced by the selected file.
- **All directly referencing**: Selects all files that are directly referencing the selected file.
- **All directly related**: Selects all files that are either directly referenced by, or are directly referencing the selected file.
- **All referenced**: Selects all files that are directly as well as indirectly referenced by the selected file.
- **All referencing**: Selects all files that are directly as well as indirectly referencing the selected file.
- **All related**: Selects all files that are either referenced by, or are referencing the selected file directly as well as indirectly.
- **All linked**: Selects all files that are directly and indirectly referenced, as well as files that are linked to any of the directly or indirectly referenced files in any way.

Alternatively, you may also select a file in the Design window and choose the menu option **Edit | Select**. Use one of the options in the appropriate sub-menu to select the desired files in the Design window.

In addition to the menu, you can always use the keyboard shortcut **Ctrl+A** to select all files in the active Design window.

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.

Synchronizing Selections

The context menu of a selected file box provides an option to synchronize the selection in the Design window and the Explorer window. This command is useful when a Design window is active. Namely, if you choose the **Synchronize Selection** command in the Design window, then the currently selected file in the Design window is also selected in the Hierarchical and Flat tabs of the Explorer window, enabling you to switch to the Explorer pane and take the required action.

Note: Synchronized selection only applies to the currently selected Design window and not to all open Design windows.

To synchronize a selection:

Do one of the following:

- Double-click a file in the Hierarchical tab or the Flat tab of the Explorer window, or in a Design window. The file is then selected in the other two tabs as well.
- Choose the menu option **Edit | Synchronize Selection**.
- In a Design window, right-click a file box and choose **Synchronize Selection** from the context menu.
- Click the **Synchronize Selection** button in the standard toolbar.

4.7.2   Removing Files from a Design

In contrast to deleting a file in the Explorer [75] window, a file that is removed from a design will remain available in the file system of your computer as well as in other designs where it is contained.

Note: Be sure that the focus of the selected file is on the Design window and **not** in the Explorer window if you just want to remove the file from the design. Otherwise you will delete the file from your file system and it will not be removed from the design but will appear as a so-called **unknown file** since the relevant SchemaAgent server is not able to locate a file of the given name in any of its search paths. Such a file is represented in Design windows with a yellow exclamation mark.

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.

To remove a file from a design:

Do one of the following:

- Right-click a file in a Design window and select **Delete** from the context menu.
- Select a file in a Design window and choose the menu option **Edit | Delete** or press the **Delete** key.
- Click the **Delete** button in the Standard toolbar.

4.7.3   Ghost Schemas and Incorrect Paths

If a file contains a reference to another file that cannot be found at the specified location—a so-called ghost file —, an error icon appears in the top left of its title bar. The ghost file is indicated by the ghost icon in its title bar. 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 Include statement. In this case, **address.xsd** is the

ghost schema file. Consequently, any file that references **address.xsd** is marked with the error icon, both in the Design window and in the Explorer window.
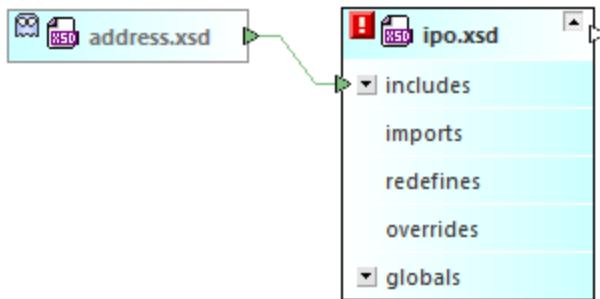
An XML instance is also marked and treated as ghost file if it cannot be found, for example:
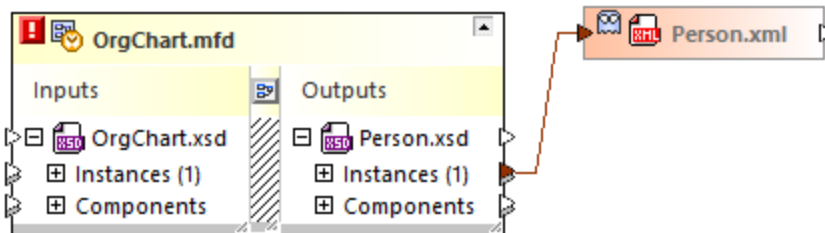
A schema can be a ghost schema for any of several reasons. The most common are:

- 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 files are displayed in the Explorer and Design windows (even though they are not at the location specified in the reference). In the design, the connector line between the ghost file and its target schema is also displayed.

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

- Correcting the path to the reference [112]
- Recreating the ghost file [114]

4.7.3.1 Correcting Reference Paths

When you right-click a file with an incorrect reference, the **Correct reference paths** command is available in the context menu. This command instructs SchemaAgent Client to look for files of the same name in all the search paths. This is the ideal solution if the ghost file has been moved to another location within the search path.

To correct a single reference path:

- In the Explorer window or in a Design window, right-click a file with an error ![error icon] icon and select **Correct reference paths** from the context menu, or select the file and press **Ctrl+R**, or click the **Correct reference paths** ![button icon] button in the Extras toolbar.
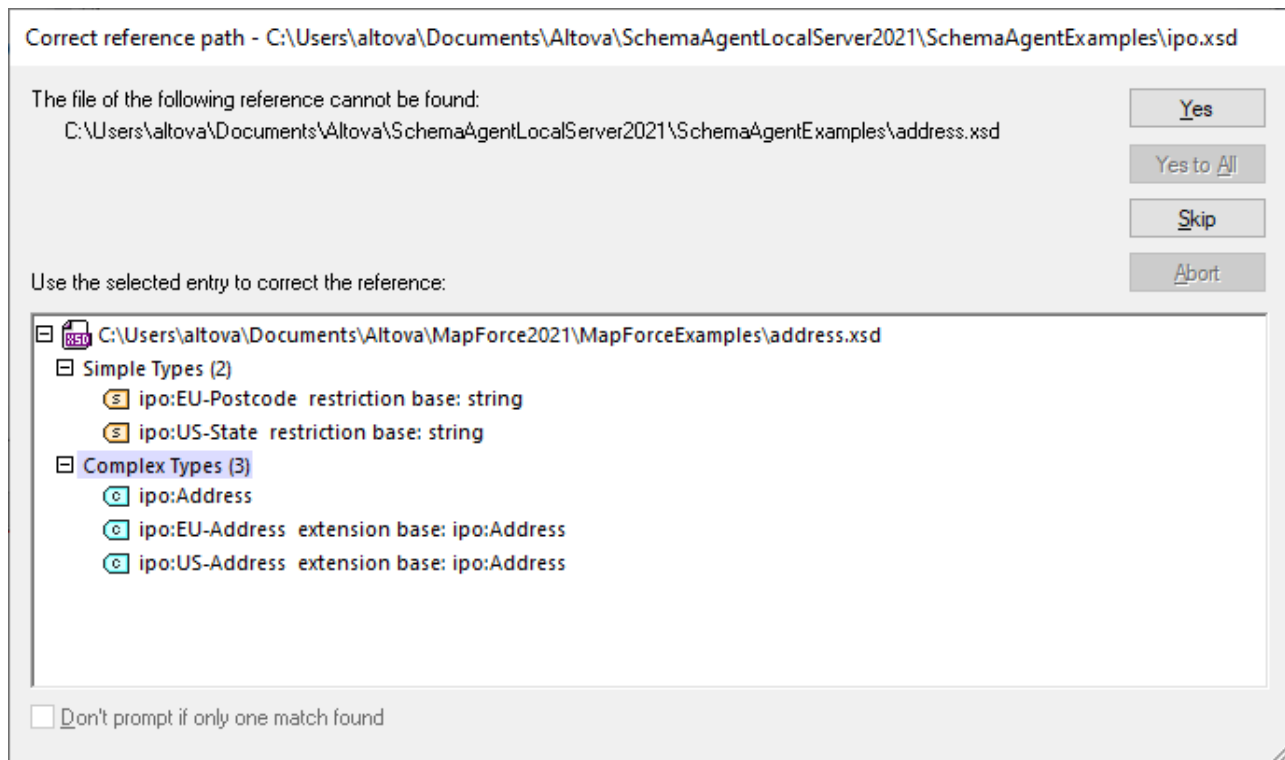
If one or more matches are found, all the available alternative paths are listed in a dialog box. You can expand the entries to check if the structure of the found file is really identical with the missing file. The dialog box is resizable so that you can display even very long paths or show complex schemas in detail without having to use the scroll bars.

Correcting multiple paths

You can also attempt to correct all incorrect paths in one single step. This will correct all paths in SchemaAgent independent of the files displayed in a Design window. You can also perform this operation with no Design window open.

To correct all reference paths:

1. Select the menu command **Extras | Correct all reference paths**.
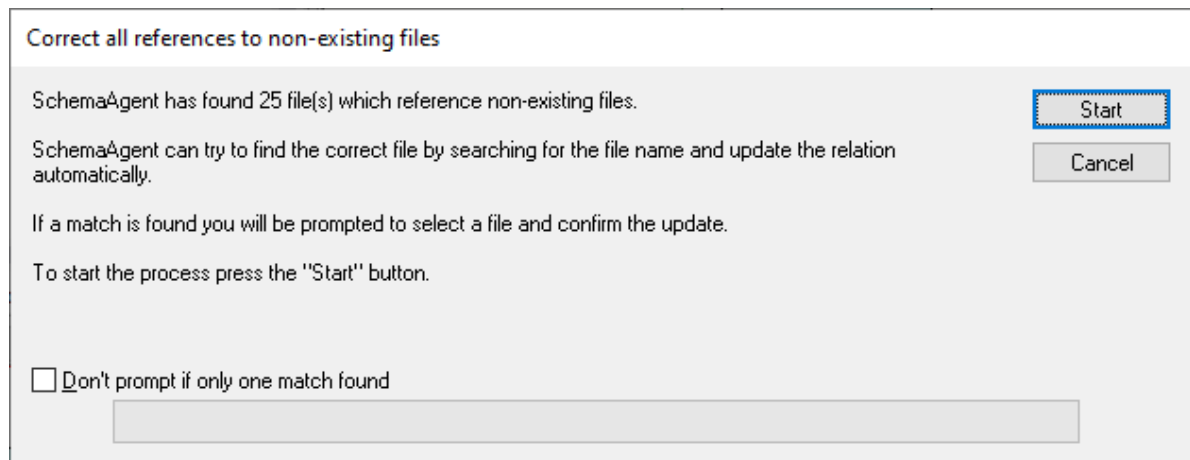
2. Optionally, select the **Don't prompt if only one match found** check box if you want paths corrected automatically when only one alternative path is found.
3. Click **Start**. The "Correct reference path" dialog box appears for the first ghost file. Be aware that a separate "Correct reference path" dialog box will be displayed for each of the ghost files found in the design. If no match is found for a particular ghost file, this is reported in a message box, for example:
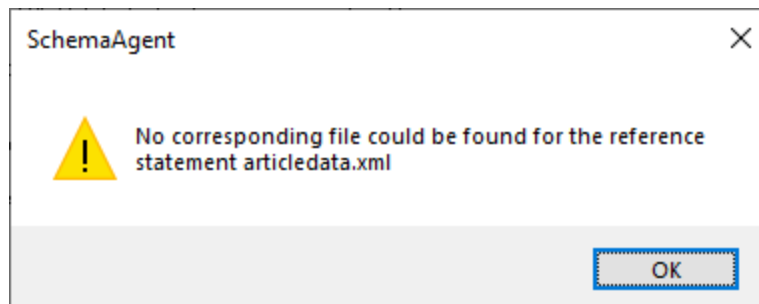
4. If at least one match is found, do one of the following:

   *   Select a matching path and click **Yes** to confirm the correction. Note that a single match will be confirmed automatically without showing a dialog box if you've selected the **Don't prompt if only one match found** check box.
   *   Click **Yes to All** to confirm all single matches without prompting.
   *   Click **Skip** to jump to the next ghost file without correcting the current path.
   *   Click **Abort** to terminate the process without correcting the remaining paths.

4.7.3.2 Recreating Ghost Files and XML Instances

From within SchemaAgent Client, you can recreate the ghost schema as a rudimentary schema at the location specified in the reference. A rudimentary schema is one that contains only the `xs:schema` declaration. A ghost XML instance is recreated as a rudimentary XML file containing only an empty `<root />` element. However, you still have to add appropriate content to the recreated rudimentary file.

Note that if the folder specified at the location defined in the reference statement does not exist or is not within the search path, then the **Recreate** command is not available. This ensures that the reference path correctly points to the specified schema or XML file, respectively.

To recreate a schema:

1. In the Explorer window or in a Design window, select a ghost schema and do one of the following:

   - Select the menu command **Edit | Recreate**.
   - Right-click and select **Recreate** from the context menu.

   A rudimentary schema of the same name is created at the location specified for it in the IIR statement.

2. Open the rudimentary schema in XMLSpy and add appropriate content.

To recreate an XML file:

1. In the Explorer window, right-click a ghost XML file and select **Recreate** from the context menu. A rudimentary XML file of the same name is created at the location specified for it in the reference.
2. Open the rudimentary XML file in XMLSpy and add appropriate content.

4.7.4   Reloading Files

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

To reload a file:

- Right-click the required folder or file in the Explorer window or in a Design window and select **Reload** from the context menu.

4.7.5   Design Options

When you right-click anywhere in the Design window, the context menu provides a series of commands that facilitate the editing and changing the layout of a SchemaAgent design. The content of the menu changes dynamically depending on where you right-click in the Design window:

- Design window background
- File box or section caption (the content also changes depending on the file type)
- Blank area in a section
- Item in a section (the content also changes depending on the item type)

Design window background

	Select Files	▶
📋	Paste	Ctrl+V
▦	Show Grid	Alt+G
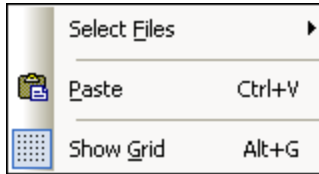
- **Select Files**: Opens a sub-menu for selecting file boxes by type.

All	Ctrl+A
Schema files	
XML files	
XSL files	
WSDL files	
MapForce designs	
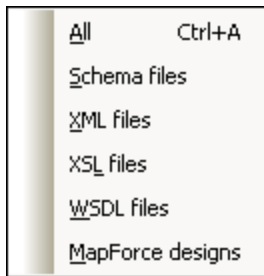
- **Paste (Ctrl+V)**: Pastes a file box that you have previously copied into the clipboard from the Explorer.
- **Show Grid (Alt+G)**: Toggles the display of the grid on and off.

File box or section caption
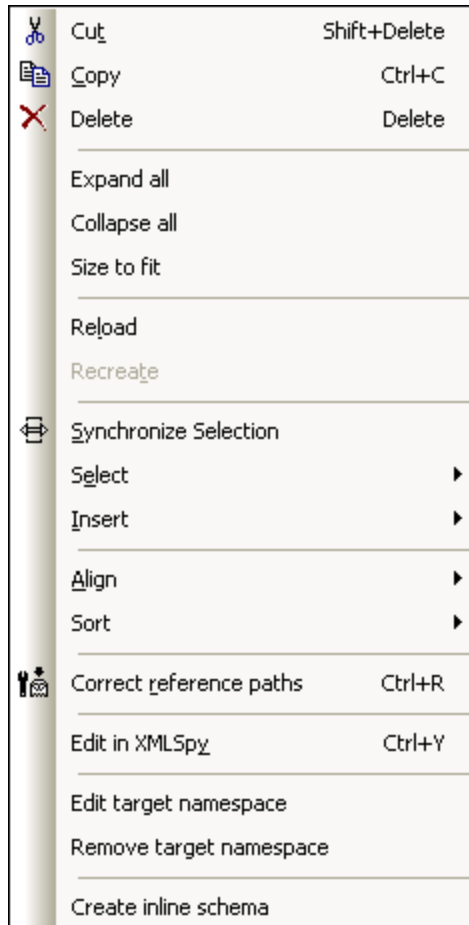
- **Cut (Shift+Delete)**: Copies the selected file(s) to the clipboard and deletes it from the design.
- **Copy (Ctrl+C)**: Copies the selected file(s) to the clipboard. You can use this command to copy files from one design window to another.
- **Paste (Ctrl+V)**: Pastes the content of the clipboard to the active design window.
- **Delete**: Removes the selected file(s) [111] from the design. Please note that the files will not be deleted from the file system.
- **Expand all**: Expands all sub-sections (includes, imports, redefines, globals, Inputs/Outputs, schemas, stylesheets, root, import schemas, inline schemas, stylesheets, types, definitions) of the selected file box.
- **Collapse all**: Collapses all expanded sub-sections of the selected file box.
- **Size to fit**: Resizes the file box so that all expanded content is visible.
- **Reload**: Updates the display [115] of the selected files. If more than one file is selected, the command reads **Reload files**.
- **Recreate**: Creates a rudimentary XML schema [114] with the name of, and at the location specified in an IIR statement for, the selected ghost schema(s). This option is only available for ghost files [111]. If more than one file is selected, the command reads **Recreate files**.
- **Synchronize Selection**: Synchronizes the selection [110] of the Explorer and the Design windows, so that the file selected in the Design window is also selected in the Explorer.

- **Select**: Opens a sub-menu providing several selection [110] options.

All directly referenced	▶
All directly referencing	▶
All directly related	▶
All referenced	▶
All referencing	▶
All related	▶
All linked	▶
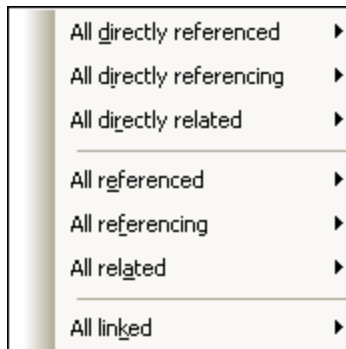
- **Insert**: Opens a sub-menu (identical to the **Select** sub-menu illustrated above) providing several options for inserting related files [79].
- **Align**: Opens a sub-menu providing several options for aligning the selected files [120] and toggles the grid display on and off.

⊞	On Grid	
	Edges	▶
	Layout	▶
	Line Up	▶
	Order	▶
	Resize	▶
	Space Evenly	▶
▦	Grid active	Alt+G
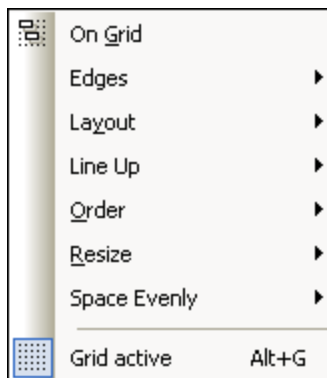
- **Sort**: Opens a sub-menu where you can sort the selected files [123] by name or by width, either ascending or descending.

By Name	▶
By Width	▶

- **Correct reference paths (Ctrl+R)**: Tries to find an identical file [112] at a different location within the defined search paths. This option is only available for files with an IIR statement defined pointing to a file that cannot be found at the specified location.
- **Edit in XMLSpy**: Opens the selected files for editing in XMLSpy. This option is not available for .mfd files. If more than one file is selected, the command reads **Edit files in XMLSpy**.
- **Edit files in MapForce**: Opens the selected files for editing in MapForce. This option is only available for .mfd files. If more than one file is selected, the command reads **Edit files in MapForce**.
- **Edit target namespace**: Allows you to add an additional namespace to the namespace definition in the Globals section of the selected schema. SchemaAgent expands the Globals section of the schema box and adds a new ns element where you can enter the definition of the target namespace. If a target namespace is already existing, it is selected for editing.

Note: In WSDL files that contain inline schemas, the target namespaces also applies to the inline schemas. You may have to consider this if you plan to edit or delete the target namespace in a WSDL file.

- **Remove target namespace**: Deletes the target namespace from the selected schema.

- **Create inline schema**: Creates an inline schema for the selected XSLT or WSDL file. This option is not available for schemas, .mfd files, and XML instances.

Blank area in a section

If you right-click into a blank area of an expanded section, the context menu provides the **Size to fit**, **Expand all**, and **Collapse all** commands. The definitions section of a WSDL file box additionally offers the **Edit target namespace** and **Remove target namespace** commands. Please note that these commands apply only to the particular section where the cursor is positioned when calling the command.

Items in a section
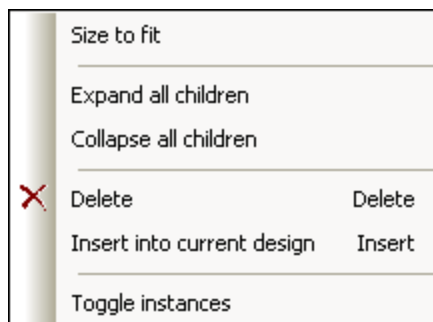
- **Size to fit**: Resizes the section so that all expanded items are visible.
- **Expand all children**: Expands any available children of the selected item.
- **Collapse all children**: Collapses any available expanded children of the selected item.
- **Show inline**: In XSLT and WSDL file boxes, shows the inline schema as a separate schema box.
- **Delete (Delete)**: Deletes the IIR relation between the item and the parent file (i.e., the file that is represented by the file box in which the item is displayed).
- **Insert into current design (Insert)**: Inserts the corresponding file box of the item into the current design. This option is grayed out if the file box is already present in the design.
- **Toggle instances**: In .mfd file boxes, toggles between input and output XML instances. You can use this option independently for the input and output schemas of the .mfd file. This option is only available for .mfd files.
- **Show component origin**: Selects and expands the file box where the component originates from or inserts that file box into the design, if desired.
- **Show component usage**: Selects and expands the file box where the component is used or inserts that file box into the design, if desired.

Drag-and-drop

In addition to the options available in the context menu, you can also use drag-and-drop to move a file within a design window or to copy a file to another design window.

To move a file within a Design window:

- Drag the file to the desired position.

To copy a file to another Design window:

- Drag the file from the first Design window to the desired Design window and drop it. If the target window is not visible, move the mouse pointer to the corresponding tab at the bottom of the Design window to activate the target window and drop the file there.

4.7.5.1 Aligning Files in Designs

SchemaAgent provides several options for automatically aligning the file boxes in a Design window. You can select these options either via the **Layout** menu, by selecting and right-clicking several file boxes in a Design window, or by clicking the appropriate toolbar icon in the Alignment toolbar.

Aligning box edges

When several file boxes are selected in a Design window, you can choose from among several aligning options provided in the sub-menu that opens when you select the menu option **Layout | Align Edges** or when you right-click the Design pane and select **Align | Edges** from the context menu.

⊟	Left	Ctrl+Left
⊟	Right	Ctrl+Right
⊟	Top	Ctrl+Up
⊟	Bottom	Ctrl+Down
⊟	Center Vertical	
⊟	Center Horizontal	
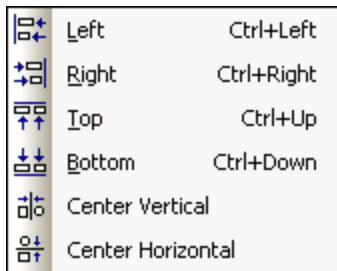
The selected file boxes will be aligned with the file box that has the focus. You can change the focus within a selection by double-clicking a file box while holding down the **Ctrl** key. If you add a file to a selection, the focus will be automatically set to the newly added file.

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 the menu command **Layout | Align Edges** or right-click and select **Align | Edges** from the context menu. A sub-menu appears.
3. Select from this sub-menu, how you want the edges aligned. Alternatively, skip step 2 and do one of the following:

   - Press **Ctrl+Left** or click the **Align Left Edges** button from the Alignment toolbar.

   - Press **Ctrl+Right** or click the **Align Right Edges** button from the Alignment toolbar.

   - Press **Ctrl+Up** or click the **Align Top Edges** button from the Alignment toolbar.

   - Press **Ctrl+Down** or click the **Align Bottom Edges** button from the Alignment toolbar.

   - Click the **Align Vertical Center** button from the Alignment toolbar.

- Click the **Align Horizontal Center** ⊞ button from the Alignment toolbar.

Changing the design layout

In SchemaAgent, you can change the layout of a Design window automatically. Two options are available in the **Layout** sub-menu to this aim when more than one file box is selected.

To automatically change a design layout:

1. Select at least two file boxes in a Design window.
2. Select the menu option **Layout | Layout** or right-click and select **Align | Layout** from the context menu. A sub-menu appears.
3. Select the appropriate layout from the sub-menu. Alternatively, skip step 2 and do one of the following:

- Click the **Layout using force-directed algorithm** ⊞ button from the Alignment toolbar.
- Click the **Layout as a hierarchy** ⊞ button from the Alignment toolbar.

Lining up file boxes

Using the options in the **Line Up** sub-menu, you can line up the top edges of the selected file boxes with the top edge of the file box that has the focus (when **Horizontally** is selected) or the left edges of the selected file boxes with the left edge of the file box that has the focus (when **Vertically** is selected).

To line up file boxes:

1. Select the file boxes you want to line up.
2. Select the menu option **Layout | Line Up** or right-click and select **Align | Line Up** from the context menu. A sub-menu appears.
3. Select from this sub-menu, how you want to line up the selected file boxes. Alternatively, skip step 2 and do one of the following:

- Press **Alt+Down** or click the **Line up vertically** ⊞ button from the Alignment toolbar.
- Press **Alt+Right** or click the **Line up horizontally** ⊞ button from the Alignment toolbar.

Changing the order of file boxes

If located in a stack of boxes you can bring a particular file box to top or bottom of this stack by selecting the corresponding option in the **Order** sub-menu.

To bring a file box to the top or bottom of a stack of file boxes:

1. Select the file box you want to change the stack position of.
2. Select the menu option **Layout | Order** or right-click and select **Align | Order** from the context menu. A sub-menu appears.
3. Select the appropriate option from the sub-menu. Alternatively, skip step 2 and do one of the following:

- Click the **Bring to Top** ⬚ button from the Alignment toolbar.
- Click the **Bring to Bottom** ⬚ button from the Alignment toolbar.

Resizing file boxes

The **Resize** sub-menu provides several options to unify the appearance of file boxes in a design. The size to be applied to all selected file boxes is taken from the file box that has the focus.

⬚	Make same <u>w</u>idth
⬚	Make same <u>h</u>eight
⬚	Make same <u>s</u>ize
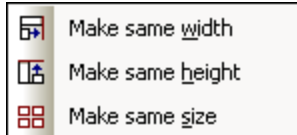
Note: Resizing height might require that components in a file box be collapsed in order to attain the height of the file box that has the focus.

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 the menu option **Layout | Resize** or right-click and select **Align | Resize** from the context menu. A sub-menu appears.
3. Select the appropriate option from the sub-menu. Alternatively, skip step 2 and do one of the following:

- Click the **Make same width** ⬚ button from the Alignment toolbar.
- Click the **Make same height** ⬚ button from the Alignment toolbar.
- Click the **Make same size** ⬚ button from the Alignment toolbar.

Distributing file boxes evenly

Within a selection of at least three file boxes, you can use the options provided in the **Space Evenly** sub-menu to arrange the files in a way that the space between them is equally distributed.

To space file boxes evenly:

1. Select three or more file boxes in a design.
2. Select the menu option **Layout | Space Evenly** or right-click and select **Align | Space Evenly** from the context menu. A sub-menu appears.
3. Select the appropriate option from the sub-menu. Alternatively, skip step 2 and do one of the following:

- Press **Ctrl+Alt+Down** or click the **Space evenly vertically** ⬚ button from the Alignment toolbar.
- Press **Ctrl+Alt+Right** or click the **Space evenly horizontally** ⬚ button from the Alignment toolbar.

4.7.5.2 Sorting Files in Designs

The **Sort** sub-menu provides options for sorting file boxes in alphabetical order or according to their widths.

Note: Alphabetical sorting is case-sensitive.

To sort file boxes by name:

1. Select the file boxes you want to sort.
2. Select the menu option **Layout | Sort** or right-click and choose **Sort | By Name** from the context menu. A sub-menu appears.
3. Select the appropriate option from the sub-menu. Alternatively, skip step 2 and do one of the following:

- Click the **Sort by Name ascending** button from the Sort toolbar.
- Click the **Sort by Name descending** button from the Sort toolbar.

To sort file boxes by width:

1. Select the file boxes you want to sort.
2. Select the menu command **Layout | Sort** or right-click and choose **Sort | By Width** from the context menu. A sub-menu appears.
3. Select the appropriate option from the sub-menu. Alternatively, skip step 2 and do one of the following:

- Click the **Sort by Width ascending** button from the Sort toolbar.
- Click the **Sort by Width descending** button from the Sort toolbar.

4.7.6   Connector Options

When you right-click a connector line in a Design window, different context menus open depending on the type of connector that has been clicked:

- When you right-click a **relation**, a context menu opens allowing you to select the source and/or target file, and to delete the relation.
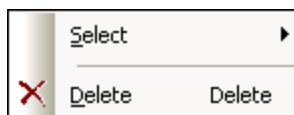
- For **component relations**, the context menu enables you to select the source and/or target file, and to show the relation path, that is, select the corresponding IIR relation as well as the respective file boxes.

Select	▶
Show relation path	
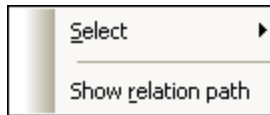
- The **Select** sub-menu is the same for both types of relation.

Source
Target
Source & Target

To select source and/or target file boxes for a relation:

- Right-click an IIR relation or a component relation and select one of the following options from the **Select** sub-menu of the context menu:

  - **Source**
  - **Target**
  - **Source & Target**

  The corresponding file boxes are selected in the Design window.

To delete an IIR relation:

1. Do one of the following:

   - Right-click an IIR connector line and select **Delete** from the context menu.
   - Select an IIR connector line and press the **Delete** button.

   - Select an IIR connector line and click the **Delete** ☒ icon in the Standard toolbar.

   A message box appears asking whether you really want to delete the selected objects.

2. To confirm the deletion, click **Yes**.

To show the relation path of a component relation:

- Right-click the connector line of a component relation and select **Show relation path** from the context menu.

SchemaAgent will select the connector lines between the related components as well as the connector line showing the type of relation between the schemas. If the schema box of the source or target component is collapsed, it will be expanded to the level required to display the relation.

4.7.7   Printing Designs

The Design diagram in the active Design window can be printed together with a header and footer that provides meta information about the user environment and SchemaAgent application information. A print preview is available for you to check the layout of the printed page before sending it to the printer.

To print a design:

1. Select the design you want to print.
2. Select the menu command **File | Print...**, or press **Ctrl+P**, or click the **Print** ![printer icon] button in the Standard toolbar. The Print dialog box appears.
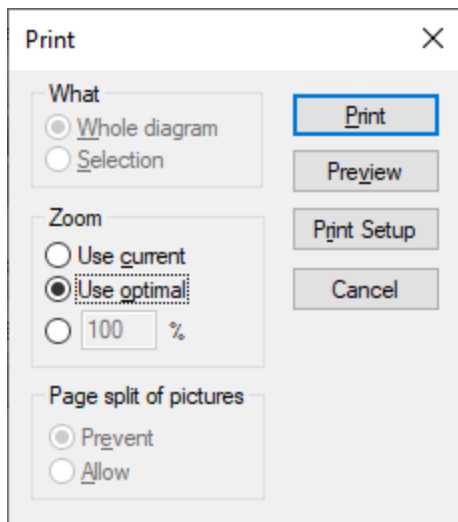
3. Choose the appropriate zoom factor in the Zoom group box. The Use optimal option ensures that the design is printed on one page.
4. Optionally, define the printer setup by clicking the **Print Setup** button.
5. Optionally, click the **Preview** button to preview the print-out before actually sending it to the printer.
6. In the Page split of pictures group box, choose whether schema boxes may be split across page breaks.
7. Click **Print**.

To preview a design before printing:

1. Select the design you want to preview.
2. Select the menu command **File | Print Preview** or **File | Print...**, or press **Ctrl+P**, or click the **Print** ![printer icon] button in the Standard toolbar. The Print dialog box appears.
3. In the Print dialog box, click **Preview**.
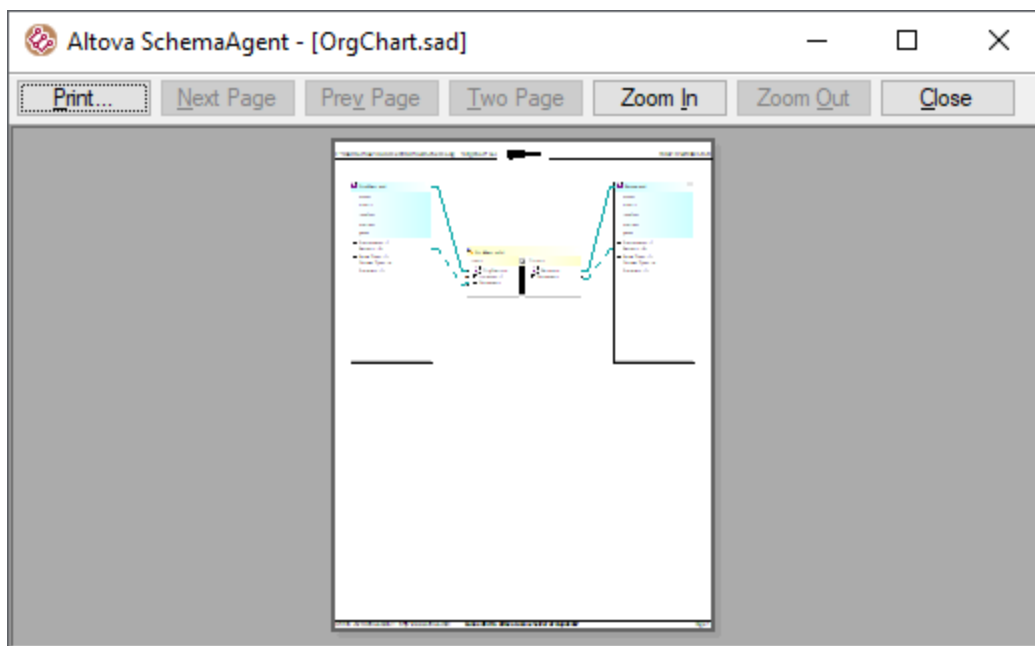
To change the printer setup:

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

4.7.8   Exporting Designs as Images

You can export SchemaAgent Client designs as images in PNG format.

To export a design to a PNG image file:

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

4.8   Designing IIR Relationships

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.

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. In the SchemaAgent default color scheme, Includes appear as green lines.
- *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. In the SchemaAgent default color scheme, Imports appear as blue lines.
- *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 complex types, and change them in the redefining schema. In the SchemaAgent default color scheme, Redefines appear as purple-violet lines.

In SchemaAgent's Design window, you can easily create [127] or modify [128] IIR relationships between schemas using drag-and-drop. Please note that you cannot create a new schema file from scratch in SchemaAgent; you can, however, add a new file in the Explorer window [73] and then use the context menu to edit the schema [75] in XMLSpy.

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.

4.8.1   Creating IIR Relations

Once you have dragged a schema [78] into a Design window, you can create includes, imports, and redefines by adding the referenced schemas to the design and using drag-and-drop. To this aim, each schema or .mfd file box has a handle located at the right border of the title bar.
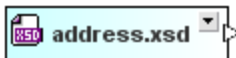
To create an IIR relation:

1. Click the schema box handle of the schema from which you wish to create the IIR and drag the cursor to the schema in which the IIR statement is to appear. If minimized, the target schema box expands, allowing you to drop the connector onto one of the IIR entries.
2. Place the cursor over the desired IIR entry.
3. When the desired IIR entry turns bold and a frame appears around it, drop the connector. The IIR command has now been inserted in the schema, and a drop-down symbol appears next to the IIR entry.
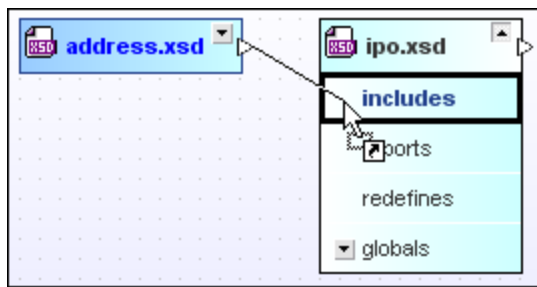
   4.   Optionally, create additional IIR relationships that are allowed between schemas.

When dropping the connector onto an entry that does not turn bold, an error message appears, explaining why the selected IIR relationship is not allowed.
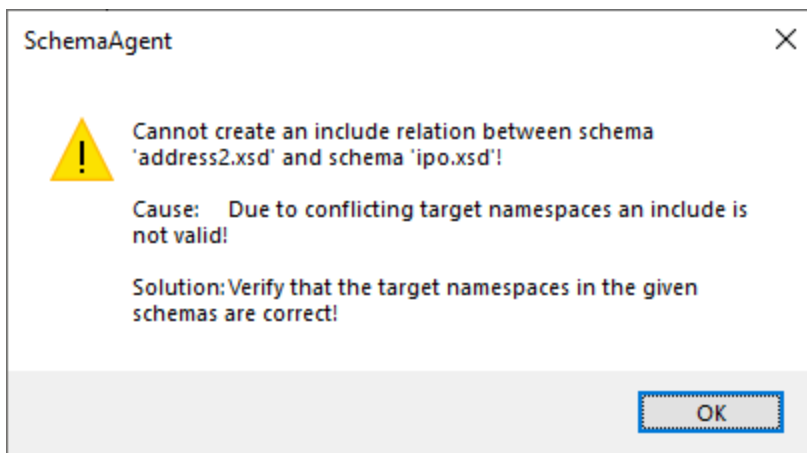
4.8.2   Moving IIR Relationships

You can move existing Includes, Imports, and Redefines from one schema box to another using drag-and-drop. If the relationship with the new schema is not valid, a message box to this effect pops up and the relation remains unchanged.

To move an existing IIR relationship:

   1.   Click the connector line of the IIR relation you wish to move and drag the cursor to the schema in which the IIR statement is to appear instead. If minimized, the target schema box expands, allowing you to drop the connector onto one of the IIR entries.
   2.   Place the cursor over the desired IIR entry.
   3.   When the desired IIR entry turns bold and a frame appears around it, drop the connector. The IIR command has now been inserted in the schema, and a drop-down symbol appears next to the IIR entry.

4.8.3   Deleting IIR Relationships

Unwanted Includes, Imports, and Redefines can be deleted in a Design window. If a given relation cannot be deleted, a message box pops up stating the reason of and offering a solution for the failure.

To delete an IIR relation:

1. Do one of the following:

    *   Right-click an IIR connector line and select **Delete** from the context menu.
    *   Select an IIR connector line and press the **Delete** key.
    *   Select an IIR connector line and click the **Delete** button in the Standard toolbar.

    A message box appears asking whether you really want to delete the selected objects.

2. To confirm the deletion, click **Yes**.

4.9   Menu Reference

This section describes available menu commands.

4.9.1   File Menu

The **File** menu contains all commands relevant to manipulating files, in the order common to most Windows software products.

New

The **New** [icon] (**Ctrl+N**) command opens a new Design window [68].

Open...

The **Open...** [icon] (**Ctrl+O**) command pops up the Windows Open dialog box and allows you to open any design file (*.sad). In the Open dialog box, you can select more than one file to open. Use the Files of Type drop-down list to restrict the kind of files displayed in the dialog box.

Close

The **Close** command closes the active window. If the file has been modified (indicated by an asterisk * after the file name in the title bar), you will be asked if you wish to save the file first.

Close All

The **Close All** command closes all open windows. If any document has been modified (indicated by an asterisk * after the file name in the title bar), you will be asked if you wish to save the file first.

Please note that the project will not be closed by the **Close All** command. A project can only be closed by opening a new project or by exiting SchemaAgent.

Save

The **Save** [icon] (**Ctrl+S**) command saves the contents of the active window to the file from which it has been opened. If there are unsaved changes in the active window, the **Save As** dialog box is opened automatically.

Save As...

The **Save As...** command pops up the Windows **Save As** dialog box, in which you enter the name and location of the file you wish to save the active file as.

Export to image...

The **Export to image...** command pops up the Windows **Save As** dialog box, in which you can export the active file as PNG image.

Print...

The **Print...** ![print icon] (**Ctrl+P**) command opens the Print dialog box, in which you can select printer options [126] and print the active file [125].

Print Preview

The **Print Preview** command opens the Print dialog box. Click the **Preview** button to display a print preview of the currently active document.

Print Setup...

The **Print Setup...** command displays the printer-specific Print Setup dialog box, in which you specify such printer settings as paper format and page orientation. These settings are applied to all subsequent print jobs.

Most Recently Used Files

The **File** menu displays a list of the four most recently used files, with the most recently opened file shown at the top of the list. You can open any of these files by clicking its name. To open a file in the list using the keyboard, press **ALT+F** to open the **File** menu, and then press the number of the file you want to open.

Exit

The **Exit** command is used to quit SchemaAgent Client. If you have any open files with unsaved changes, you are prompted to save these changes. SchemaAgent Client also saves modifications to program settings and information about the most recently used files.

4.9.2   Edit Menu

The **Edit** menu contains commands for editing file boxes in the Design window.

Cut

The **Cut** ![cut icon] (**Shift+Delete**) command copies the selected item to the clipboard and deletes it from its present location.

Copy

The **Copy** ![copy icon] (**Ctrl+C**) command copies the selected item to the clipboard. This can be used to duplicate data within SchemaAgent Client or to move data to another application.

Paste

The **Paste** ![paste icon] (**Ctrl+V**) command inserts the contents of the clipboard at the current cursor position.

Delete

The function of the **Delete** ![X icon] command depends on where the selected file is located and has the focus:

- If the focus is in a Design window, the selected file is removed from the design.
- If the focus is in the Explorer window, the selected file is deleted from the file system. You will have to confirm the command before the file is actually deleted.

Recreate

The **Recreate** commands creates a new file with the name of the ghost schema as a rudimentary schema at the location specified in the reference. This command is available only if a ghost schema[111] is selected either in the Explorer window or in a Design window.

Synchronize Selection

The **Synchronize Selection** ![icon] command synchronizes the selected files in the Explorer and the active Design window. It works from both sides, that is, you can select a file in the Explorer and use the command to select the corresponding file box in the active Design window or vice versa.

Note: The **Synchronize Selection** command works only for the active Design window. If you select a file in the Explorer that is contained in a Design window that is not currently active, choosing the **Synchronize Selection** command has no effect.

Select

The **Select** sub-menu contains options for selecting files in the active Design window. See also Selecting Files[109], Directly Related Files[80], Indirectly Related Files[81], and Linked Files[82].

4.9.3   View Menu

The **View** menu contains commands for showing and hiding the individual toolbars and the status bar.

Toolbars

The **Toolbars** sub-menu enables you to show or hide the individual toolbars by activating or deactivating the corresponding entry in the menu.

To switch the display of toolbars on or off:

1. Select the menu option **View | Toolbars**.
2. Click the name of the toolbar you want to switch on or off.

Explorer

You can choose to show or hide the **Explorer** window.

Overview

You can show or hide the **Overview** window located under the **Explorer** window.

Status bar

The **Status Bar** command toggles the display of the status bar in SchemaAgent Client on and off. To switch the display of the status bar on or off, select the menu option **View | Status Bar**.

4.9.4   Layout Menu

The **Layout** menu provides a variety of features for changing the appearance of your designs.

Show Grid

The **Show Grid** (**Alt+G**) command toggles the display of the grid on and off for the active Design window. You can show or hide the grid for each Design window individually.

Align on Grid

When the grid is displayed, you can use the **Align on Grid** command to align the top and left edges of schema or .mfd file boxes on the grid.

Zoom

The **Zoom** sub-menu provides commands for zooming in and out of a design view as well as adjusting the zoom in a way that all file boxes or the selected file boxes are displayed in the Design window. To adjust the zoom to one of the predefined values, select one of the options at the bottom of the menu.

Zoom...	Shows the Zoom dialog box, where you can use the slider to adjust the zoom or enter a specific zoom factor.
Zoom to Fit	Adjusts the zoom factor in a way that all file boxes that are present in the active design are displayed in the Design window without the need of scrolling.
Zoom to Selection	Adjusts the zoom factor in a way that all the selected file boxes are displayed in the Design window without the need of scrolling.

Layout

The **Layout** sub-menu provides commands that facilitate an automatic layout of the file boxes in a Design window.

Force Directed	Uses a force-directed algorithm to automatically layout the file boxes in a Design window. You may have to use the **Layout	Zoom to Fit** command to

	view all the file boxes.
Hierarchical [HR]	Layouts the file boxes in a hierarchical manner.
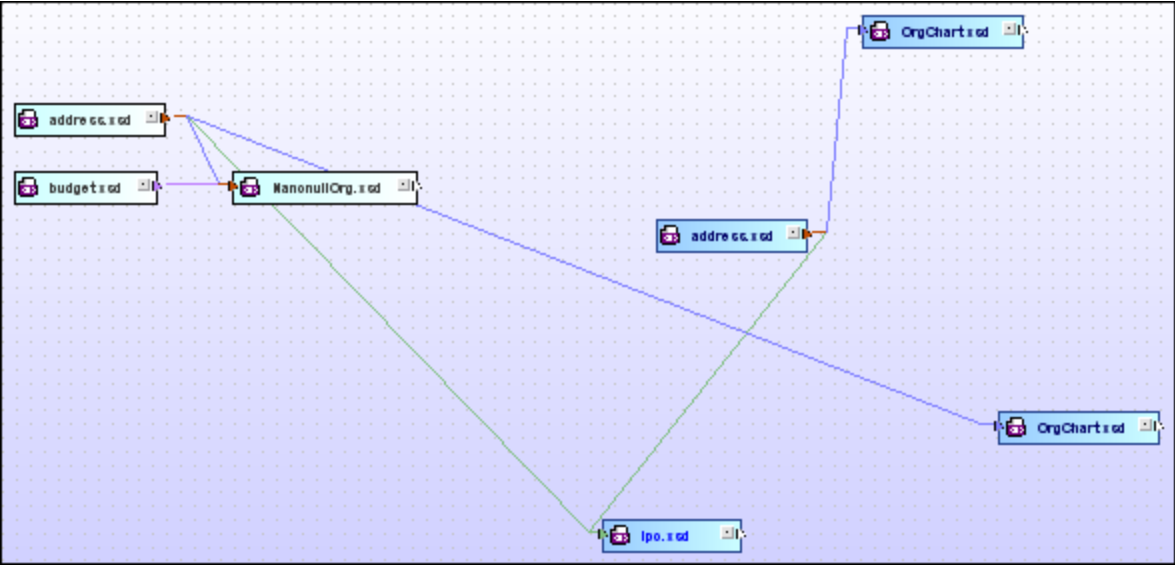
Force-directed layout
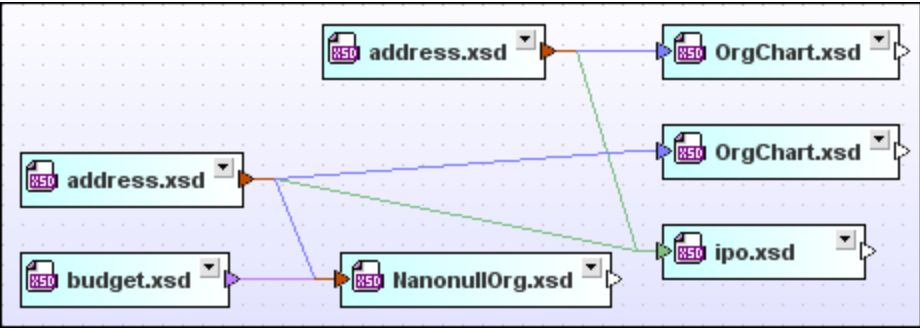
Hierarchical layout

Align Edges

The **Align Edges** sub-menu can be used to align selected file boxes on the grid of a Design window. When selecting files for aligning, make sure that the focus is set on the right file box because all the files will be aligned with the file box that has the focus.

[icon] **Left (Ctrl+Left)**	Aligns the left edges of the selected file boxes. The selected file boxes will be left-aligned at the position of the file box that has the focus.

Right (Ctrl+Right)	Aligns the right edges of the selected file boxes. The selected file boxes will be right-aligned at the position of the file box that has the focus.
Top (Ctrl+Up)	Aligns the top edges of the selected file boxes. The selected file boxes will be aligned at the position of the top edge of the file box that has the focus.
Bottom (Ctrl+Down)	Aligns the bottom edges of the selected file boxes. The selected file boxes will be aligned at the position of the bottom edge of the file box that has the focus.
Center Vertical	Aligns the vertical center of the selected file boxes. The center of the selected file boxes will be aligned vertically at the position of the file that has the focus.
Center Horizontal	Aligns the horizontal center of the selected file boxes. The center of the selected file boxes will be aligned horizontally at the position of the file that has the focus.

Line Up

The **Line Up** sub-menu enables you to line up the selected file boxes vertically or horizontally below or to the right of the focused item.

Vertically (Alt+Down)	Arranges the selected file boxes in a vertical row, left-aligned and below the file box that has the focus.
Horizontally (Alt+Right)	Arranges the selected file boxes in a horizontal row, top-aligned and to the right of the file box that has the focus.

Order

The **Order** sub-menu allows you to bring the selected file box to the top or send it to the bottom of a stack of file boxes.

Bring to top	Displays the selected file box on top of a stack of file boxes.
Bring to bottom	Sends the selected file to the bottom of a stack of file boxes.

Resize

The **Resize** sub-menu provides options allowing you to unify the graphical appearance of your design files. Be sure to choose the right file when setting the focus. All selected files inherit the dimensions of the file that has the focus.

Make same width	Applies the width of the focused file box to all selected file boxes.
Make same height	Applies the height of the focused file box to all selected file boxes.

🔲 **Make same size**	Applies the width and height of the focused item to all selected file boxes.

Space Evenly

The **Space Evenly** sub-menu enables you to distribute a series of selected file boxes evenly between the top and bottom or left and right edges of the selection, respectively. You can also use the commands subsequently to create a vertical and horizontal balance.

🔳 **Vertically (Ctrl+Alt+Down)**	Arranges the selected files to provide for an equal distance of the files located in between the topmost and the bottommost file boxes.
🔳 **Horizontally (Ctrl+Alt+Right)**	Arranges the selected files to provide for an equal distance of the files located in between the leftmost and the rightmost file boxes.

Sort

The **Sort** sub-menu allows you to sort file boxes by name or by width, in ascending or descending sort order. The positions of the selected file boxes (specifically, the top and left edges) remain unchanged when one of the **Ascending** or **Descending** commands is used.

🔳 **Ascending	By Name**	The selected file boxes are sorted alphabetically with the file name closest to letter A on top.
🔳 **Ascending	By Width**	The selected file boxes are sorted by width with the smallest file box on top and the widest file box on bottom.
🔳 **Descending	By Name**	The selected file boxes are sorted alphabetically with the file name closest to letter Z on top.
🔳 **Descending	By Width**	The selected file boxes are sorted by width with the widest file box on top and the smallest file box on bottom.

4.9.5   Extras Menu

In the **Extras** menu, you connect to a SchemaAgent Server, reload the search paths, and correct reference paths to ghost schemas for selected or all schema boxes.

Connect to Server

The **Connect to server** 🔳 command opens the Connect to SchemaAgent Server dialog box where you can [connect to a SchemaAgent server](#) [70].

Reload Search Paths

The **Reload search paths** ⟳ command enables you to update the graphical user interface of the application when any of the files on the search path (or the search paths themselves) have changed, see Reloading Search Paths [17].

Correct Reference Paths

The **Correct reference paths** 🗒 (**Ctrl+R**) command attempts to find alternative locations for referenced files that cannot be found. You have to select a schema box with an alert ❗ icon in a Design window or in the Explorer in order to enable this command in the **Extras** menu. See Ghost Schemas and Incorrect Paths [111].

Correct all Reference Paths

The **Correct all reference paths** 🗒 command attempts to find alternative locations for all referenced files that cannot be found. See Correcting multiple paths [113].

4.9.6   Tools Menu

The Tools menu lets you customize SchemaAgent Client and define the global program settings.

4.9.6.1 Customize...

The **Customize** command lets you customize SchemaAgent Client to suit your personal needs.

4.9.6.1.1   Commands

The **Commands** tab enables you to customize menus or toolbars.
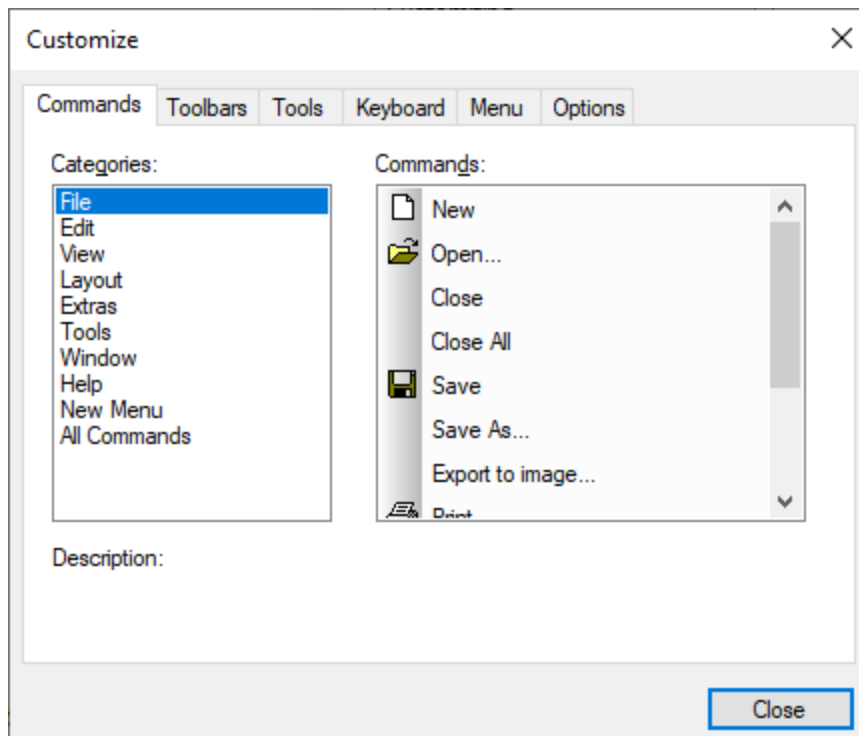
To add a command to a toolbar or menu:

1. Select the menu option **Tools | Customize**. The Customize dialog box appears.
2. Select the **All Commands** category in the Categories list box. The available commands appear in the Commands list box.
3. Click a command in the **Commands** list box and drag it to an existing menu or toolbar. An I-beam appears when you place the cursor over a valid position to drop the command.
4. Release the mouse button at the position you want to insert the command.

   - A small button appears at the tip of mouse pointer when you drag a command. The "x" below the pointer means that the command cannot be dropped at the current cursor position.
   - The "x" disappears whenever you can drop the command (over a tool bar or menu).
   - Placing the cursor over a menu when dragging opens it, allowing you to insert the command anywhere in the menu.
   - Commands can be placed in menus or toolbars. If you created you own toolbar you can populate it with your own commands/icons.

Note: You can also edit the commands in the context menus [145] (right-click anywhere to open the context menu), using the same method. Click the **Menu** tab and then select the specific context menu available in the Context Menus combo box.

4.9.6.1.2   Toolbars

The **Toolbars** tab enables you to activate or deactivate specific toolbars, as well as create your own specialized ones.

SchemaAgent Client toolbars contain symbols for the most frequently used menu commands. For each symbol you get a brief "tool tip" explanation when the mouse cursor is directly over the item and the status bar shows a more detailed description of the command.

You can drag the toolbars from their standard position to any location on the screen, where they appear as a floating window. Alternatively, you can also dock them to the left or right edge of the main window.
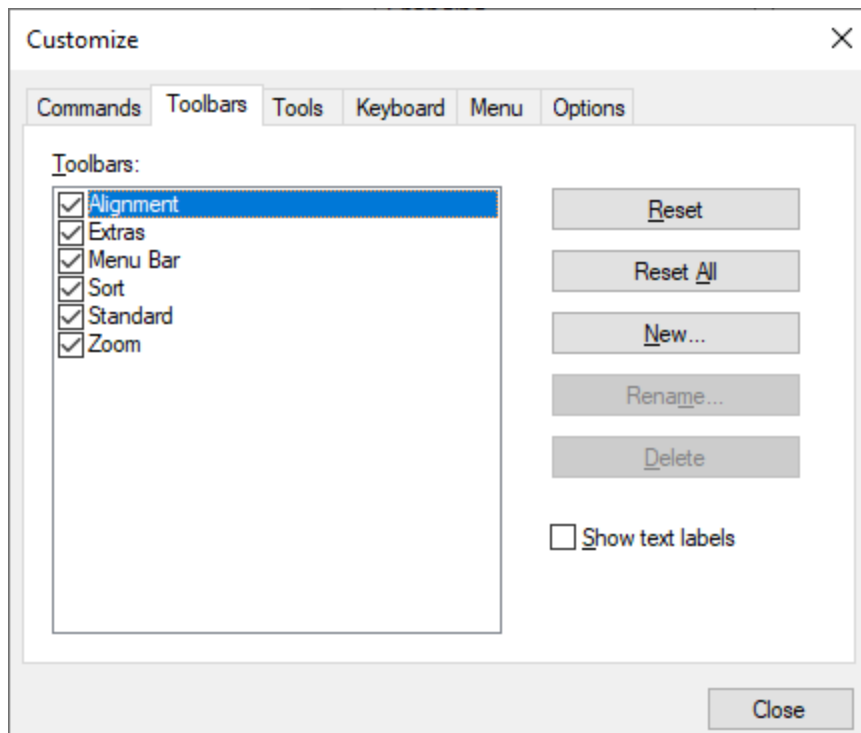
Select the **Show text labels** option to display explanatory text below toolbar icons. You can select or clear this option for each toolbar individually.

To activate or deactivate a toolbar:

- Click or clear the check box corresponding to the specific toolbar.

To create a new toolbar:

1. Click the **New...** button, and give the toolbar a name in the dialog box that appears.
2. Drag commands to the toolbar in the Commands [138] tab of the Customize dialog box.

To reset the Menu Bar:

1. Click the Menu Bar entry.
2. Click the **Reset** button, to reset the menu commands to the state they were in when SchemaAgent Client was installed.

To reset all toolbar and menu commands:

1. Click the **Reset All** button to reset all the toolbar commands to the state they were when the program was installed. A dialog box appears stating that all toolbars and menus will be reset.
2. Click **Yes** to confirm the reset.

To change a toolbar name:

- Click the **Rename...** button to edit the name of the toolbar.

This option is available only for user-defined toolbars.

To delete a toolbar:

1. Select the toolbar you want to delete in the Toolbars list box.
2. Click the **Delete** button. A message box appears, asking if you really want to delete the toolbar.
3. Click **Yes** to confirm the deletion.

This option is available only for user-defined toolbars.

4.9.6.1.3   Tools

The **Tools** tab enables you to add custom menu items, such as shortcuts to other applications, to the **Tools** menu. Any user-defined entries will appear in the **Tools** menu.
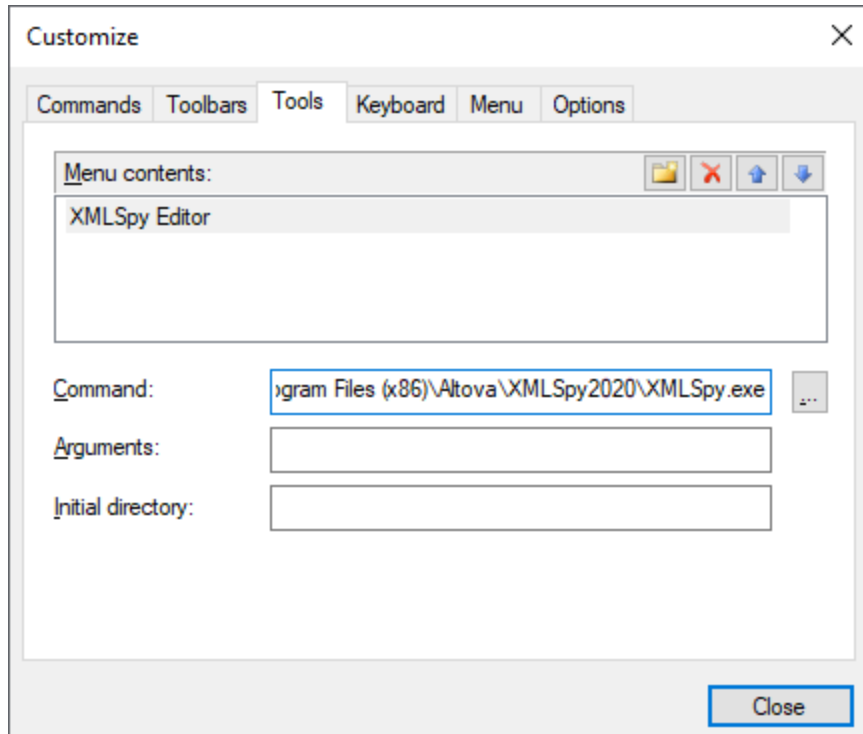
To add a user-defined tool:

1. Click the **New** icon or press the **Insert** key.
2. In the text field that appears, enter the string that is to appear as menu entry in the **Tools** menu.
3. In the Command field, enter the path to the executable file of the application or use the browse button to select the path.
4. If applicable, enter arguments needed to start the application in the Arguments field.
5. If applicable, enter the path to the directory that should be used as current (initial) directory when the tool initializes.

To change the sequence of user-defined tools:

- Select an entry and use the **Move Item Up** and **Move Item Down** buttons to move the menu item. Alternatively, you can also use the shortcut keys **Alt+Up** and **Alt+Down** to move the entry.

To rename a user-defined menu item:

- Double-click an item in the Menu contents field and edit the entry.

To remove a user-defined tool:

- Select the entry you want to remove from the Tools menu and click the **Delete** ⊠ icon in the Menu contents title bar or press the **Delete** key.

4.9.6.1.4   Keyboard

The **Keyboard** tab enables you to define (or change) keyboard shortcuts for any SchemaAgent Client command.
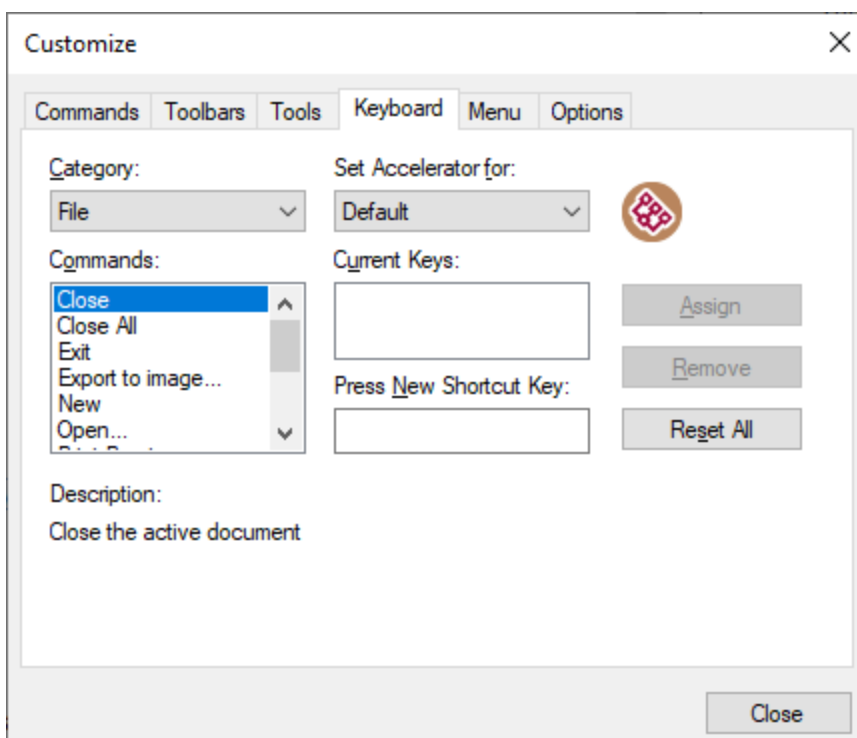
To assign a new shortcut to a command:

1. Select the **All Commands** category from the Category drop-down list.
2. In the **Set accelerator for** drop-down list, select one of the following, as applicable:

   - **Default** – this option enables the shortcut regardless of whether the Design window is open or not.
   - **SchemaAgent Design** – the shortcut will work only if the Design window is open.

3. Select the command you want to assign a new shortcut to, in the Commands list box.
4. Click in the **Press New Shortcut Key** text box, and press the shortcut keys that are to activate the command. The shortcuts appear immediately in the text box. If the shortcut was assigned previously, then that function is displayed below the text box.

5. Click the **Assign** button to assign the shortcut. The shortcut now appears in the Current Keys list box. (To clear this text box, press any of the control keys, **Ctrl**, **Alt** or **Shift**).

To de-assign or delete a shortcut:

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

To reset all shortcut keys:

1. Click the **Reset All** button to reset all the shortcut keys to the state they were when the program was installed. A prompt appears stating that all toolbars and menus will be reset.
2. Click **Yes** to confirm the reset.

The following tables list the currently assigned keyboard shortcuts by key and by function, respectively.

Hotkeys by key

Shortcut	Command name
F1	Help
Delete	Delete
Shift+Delete	Cut
Ctrl+Insert	Copy
Shift+Insert	Paste
Ctrl+Down	Align Edges Bottom
Alt+Down	Line Up Vertically
Ctrl+Alt+Down	Space Evenly Vertically
Ctrl+Left	Align Edges Left
Ctrl+Right	Align Edges Right
Alt+Right	Line Up Horizontally
Ctrl+Alt+Right	Space Evenly Horizontally
Ctrl+Up	Align Edges Top
Ctrl+A	Select All
Ctrl+C	Copy
Ctrl+N	New

Shortcut	Command name
Ctrl+O	Open
Ctrl+P	Print
Ctrl+R	Correct Reference Paths
Ctrl+S	Save
Ctrl+V	Paste
Ctrl+X	Cut
Alt+G	Show Grid

Hotkeys by function

Command name	Shortcut	Alternative shortcut
Align Edges Bottom	Ctrl+Down	
Align Edges Left	Ctrl+Left	
Align Edges Right	Ctrl+Right	
Align Edges Top	Ctrl+Up	
Copy	Ctrl+C	Ctrl+Insert
Correct Reference Paths	Ctrl+R	
Cut	Ctrl+X	Shift+Delete
Delete	Delete	
Help	F1	
Line Up Horizontally	Alt+Right	
Line Up Vertically	Alt+Down	
New	Ctrl+N	
Open	Ctrl+O	
Paste	Ctrl+V	Shift+Insert
Print	Ctrl+P	
Save	Ctrl+S	
Select All	Ctrl+A	
Show Grid	Alt+G	

Command name	Shortcut	Alternative shortcut
Space Evenly Horizontally	Ctrl+Alt+Right	
Space Evenly Vertically	Ctrl+Alt+Down	

4.9.6.1.5   Menu

The **Menu** tab enables you to customize the menu bars as well as the context menus.
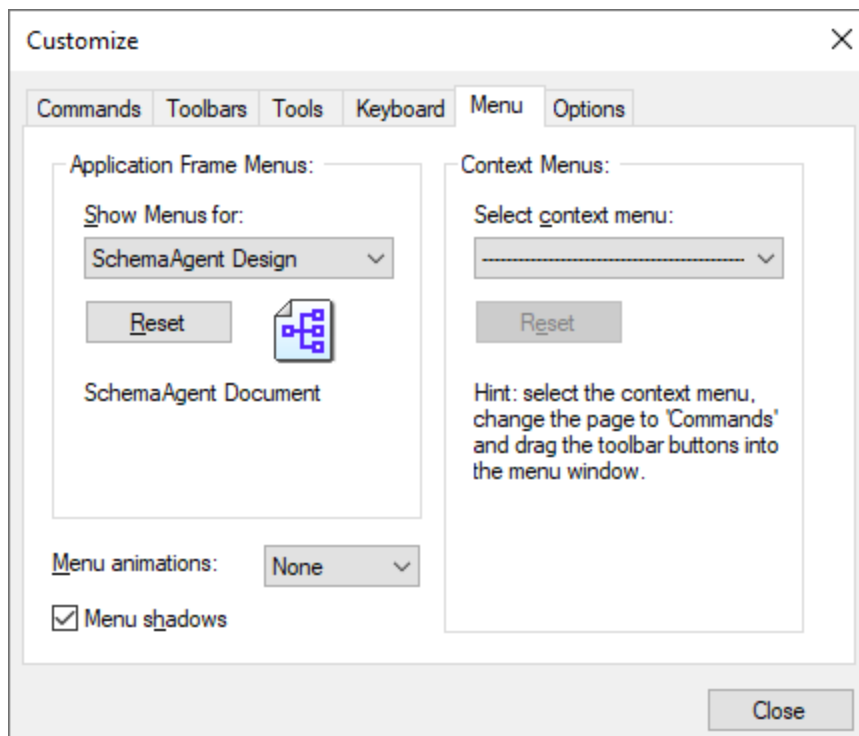
Customizing menus

The **Default Menu** bar is the menu bar that is displayed when no Design windows are open. The **Schema Agent design** menu bar is the menu bar that is displayed when at least one Design window is open. Each menu bar can be customized separately, and customization changes made to one do not affect the other.

To customize a menu bar, select it from the **Show Menus For** drop-down list. Then click the **Commands** tab and drag commands from the **Commands** list box to the menu bar or into any of the menus.

Deleting commands from menus and resetting the menu bars

To delete an entire menu or a command inside a menu, do the following:

1.   Select from the **Show Menus for** drop-down list the menu bar that is to be customized.

2. With the Customize dialog open, select (i) the menu you want to delete from the application's menu bar, or (ii) the command you want to delete from one of these menus.
3. Either (i) drag the menu from the menu bar or the menu command from the menu, or (ii) right-click the menu or menu command and select **Delete**.

You can reset any menu bar to its original installation state by selecting it from the **Show Menus For** drop-down list and then clicking the **Reset** button.

Customizing the application's context menus

Context menus are the menus that appear when you right-click certain objects in the application's interface. Each of these context menus can be customized by doing the following:

1. Select the context menu from the **Select context menu** drop-down list. This pops up the context menu.
2. Click the **Commands** tab.
3. Drag a command from the **Commands** list box into the context menu.
4. To delete a command from the context menu, right-click that command in the context menu, and select **Delete**. Alternatively, drag the command out of the context menu.

You can reset any context menu to its original installation state by selecting it in the **Select context menu** drop-down list and then clicking the **Reset** button.

Menu shadows

Select the **Menu shadows** check box to give all menus shadows.

You can choose from among several menu animations if you prefer animated menus. The **Menu animations** drop-down list provides the following options:

* None (default)
* Unfold
* Slide
* Fade

4.9.6.1.6   Options

The **Options** tab enables you to set miscellaneous environment settings.
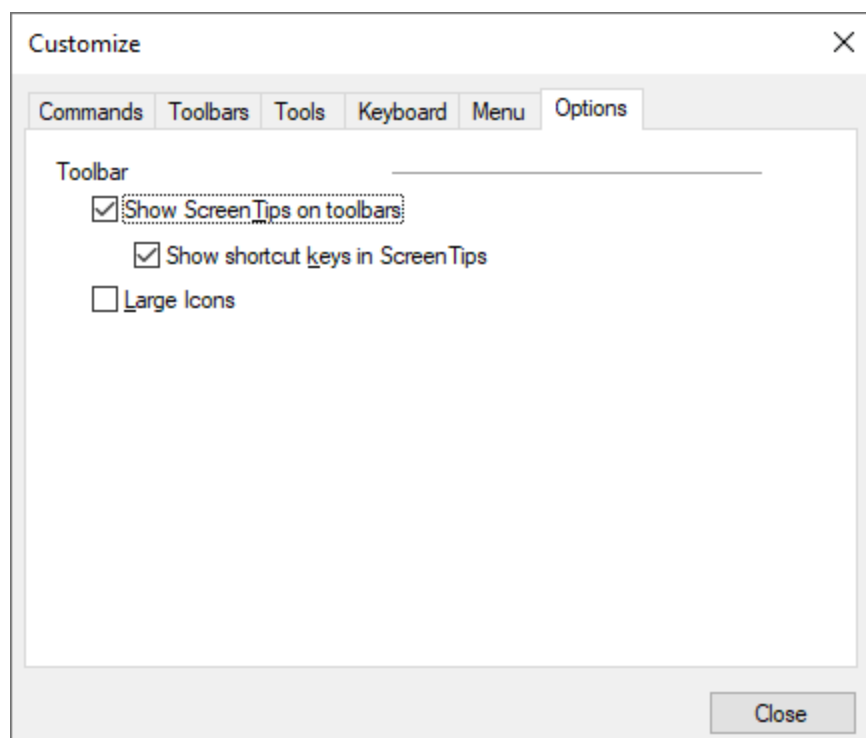
When selected, the **Show ScreenTips on toolbars** check box displays a tooltip when the mouse pointer is placed over any of the toolbar buttons. The tooltip contains a short description of the icon function, as well as the associated keyboard shortcut, if one has been assigned.

The **Show shortcut keys in ScreenTips** check box allows you to decide whether or not you want to have the shortcut displayed in the tooltip.

The **Large icons** check box switches between the standard size icons, and larger versions of the icons.

4.9.6.2 Restore Toolbars and Windows

This menu command resets the toolbars, entry helper windows, docked windows etc. to their defaults. SchemaAgent needs to be restarted for the changes to take effect.

4.9.6.3 Options...

The **Tools | Options** command enables you to define global application settings. These settings are specified in a tabbed dialog box and saved in the registry. They apply to all current and future document windows. The **Apply** button applies changes immediately in the currently open documents.

4.9.6.3.1   Design

The **Design** tab enables you to customize the way file boxes are presented in Design windows.

Move & Resize

If the **Enable real time dragging** check box is selected, the design is permanently redrawn while a file box is being dragged. If the check box is not selected, the file box remains at its original position while the file box is being dragged, and moves to the new position only when the mouse button is released. While being dragged, the new position of the file box is shown in outline.

In the **Threshold (Items)** field, you can enter the maximum number of selected file boxes that are shown with its contents while being dragged. If the number of file boxes selected is above that limit, then the selected file boxes are shown in outline while being dragged.

Grid

The **Enable grid** check box sets the default appearance of new Design windows. Use the **Grid size** field to define the width of the grid.

Note: The settings of Design windows that are already open are not updated immediately. To hide or display

the grid for an active Design window, click the **Enable/Disable grid** [⊞] toolbar button or use the shortcut key **Alt+G**.

Component Relations

If the **Auto expand** check box is selected, SchemaAgent will automatically expand the details tree to the source and target component when you click on a component relation. Note that the globals section in both source and target schema have to be expanded in order to see the component relations.

Line up and Hierarchical Layout

In the **Line up** and **Hierarchical Layout** group boxes, you can enter the default horizontal and vertical spacing for lining up file boxes or arranging them in the hierarchical layout, respectively.

Size

The default expand height is the height of a file box when it is expanded.

Default Insert Action

A "selection" is the list of files or folders that you drag from the Hierarchical or Flat tabs into the Design window. You can choose from the **Default Insert Action** drop-down box all the categories of dependent files that should be added automatically to the design in addition to the current selection. The default value is **selection only**.

Auto-layout

The following layout options are available when several files or folders are dragged into a design window:

- Default layout
- Force-directed layout [133]
- Hierarchical layout [134]

The Default layout option arranges the file boxes alphabetically in the design.
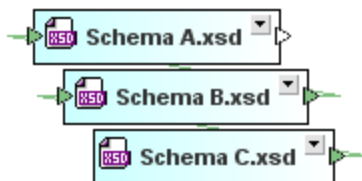
Component File Paths

Select the **Use relative file paths...** check box if components in a design should be saved with a path relative to the .sad design file.

4.9.6.3.2   Fonts

The Fonts tab enables you to customize the appearance of text in SchemaAgent designs. You can restore the default settings at any time by clicking the **Restore default values** button.
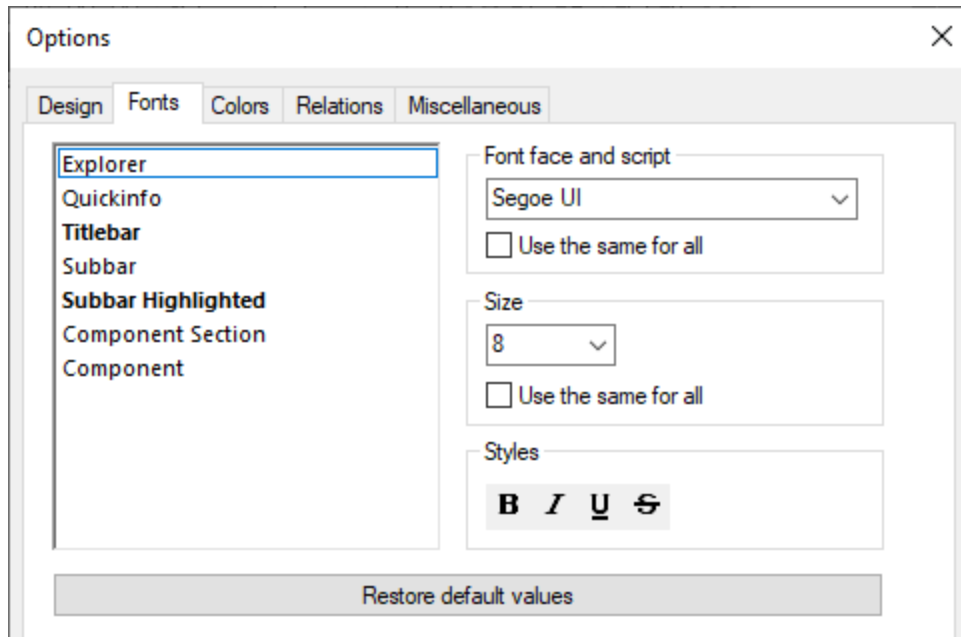
Font face and script

You can select the font face and size to be used for displaying the various items in the Design view. The same fonts are used when printing, so only TrueType fonts should be selected. If you want to use the same font for all items, select the **Use the same for all** check box.

Size

Select the required size. If you want to use the same font size for all items, select the **Use the same for all** check box.

Styles

The style and color can be set using the options in this group box. The current settings are immediately reflected in the list in the left pane, so you can preview the way your design will look.

4.9.6.3.3   Colors

The **Colors** tab enables you to customize the colors used in the Design window. You can restore the default settings at any time by clicking the **Restore default values** button.

Options

Design | Fonts | **Colors** | Relations | Miscellaneous

Background Colors

Gradient Begin:

Gradient End:

Gradient Orientation: Vertical

Font Colors

Explorer Views:

Quickinfo:

Component Section:

Component:

Connector Colors

Empty:

Various:

Color Scheme: XML Schema

Titlebar Colors

Text Color:

Ghost Text Color:

Gradient Begin:

Gradient End:

Gradient Orientation: Horizontal

Selected Titlebar Colors

Text Color:

Focused Text Color:

Gradient Begin:

Gradient End:

Gradient Orientation: Horizontal

Subbar Colors

Text Color:

Ghost Text Color:

Highlighted Text Color:

Gradient Begin:

Gradient End:

Gradient Orientation: Horizontal

Connection Colors

Include:

Import:

Redefine:

Override:

Restore default values

OK | Cancel | Apply | Help

Background Colors

This group box allows you to define the colors for a gradient background as well as the orientation of the gradient.

Connector Colors

The color in the Connection Colors group box refers to the arrowheads to the left and right of a file box. You can define different colors for empty connectors and for connectors combining several different types of connections. The color of the connector lines itself is defined in the Connection colors [152] group box.

Font Colors

Here you define the font color for the different types of text in SchemaAgent Client. The font itself as well as font size and style are defined in the Fonts [150] tab.

Color Scheme

The Color Scheme group box provides a drop-down list where you can select any of the following for editing:

- XML Schema
- XML instance
- Stylesheet Transformation
- Web Services Description
- MapForce Design

Individual group boxes are available where you can change the colors for the title bar when it is unselected or selected and the colors for the sub-bars, that is, the titles of the individual sections of a file box.

Connection Colors
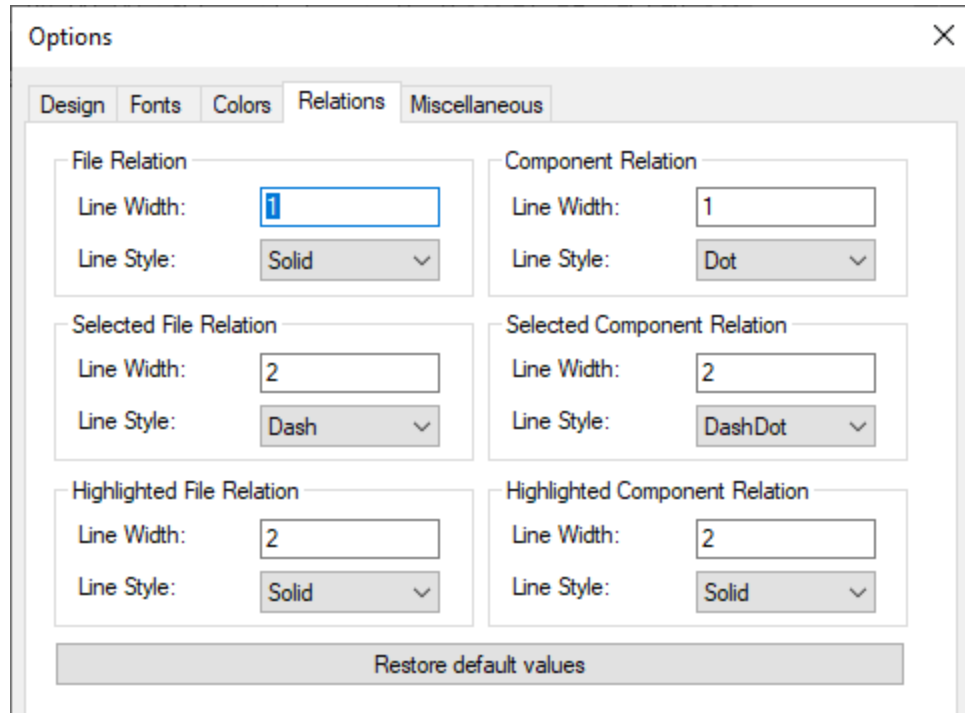
The color in the Connection Colors group box refers to the connection line itself. Depending on the selection in the Color Scheme drop-down list, different options are available:

- XML Schema: Include, Import, Redefine
- XML Instance: Schema, Stylesheet
- Stylesheet Transformation: Include Stylesheet, Import Stylesheet, Import Schema, Inline Schema
- Web Services Description: Import WSDL, Import Schema, Inline Schema
- MapForce Design: Schema, Instance, WSDL

4.9.6.3.4   Relations

The **Relations** tab enables you to customize the appearance of the connection lines between file boxes in SchemaAgent designs. You can restore the default settings at any time by clicking the **Restore default values** button.

Options   ×

Design Fonts Colors Relations Miscellaneous

File Relation
Line Width: 1
Line Style: Solid

Component Relation
Line Width: 1
Line Style: Dot

Selected File Relation
Line Width: 2
Line Style: Dash

Selected Component Relation
Line Width: 2
Line Style: DashDot

Highlighted File Relation
Line Width: 2
Line Style: Solid

Highlighted Component Relation
Line Width: 2
Line Style: Solid

Restore default values

You can define the line width as well as the line style for both file and component relations in either of the following states:

- Normal
- Selected [93]
- Highlighted [92]

For the line width, you can enter integers between 1 and 10.

4.9.6.3.5   Miscellaneous

On the **Miscellaneous** tab, you can define start-up, shutdown, and caching options.
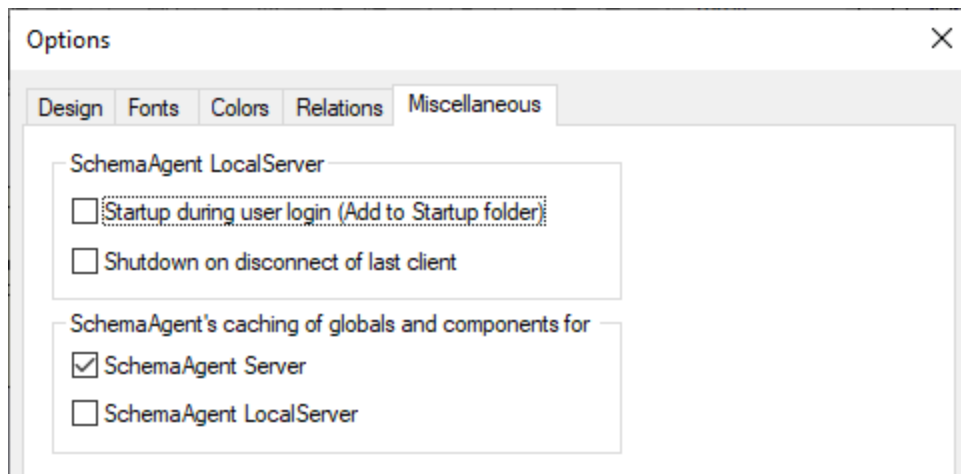
SchemaAgent LocalServer

To add SchemaAgent LocalServer to the Windows Start-up folder, select the **Startup during user login (Add to Startup folder)** check box. In this case, SchemaAgent LocalServer will be started each time a user logs in to Windows.

If you select the **Shutdown on disconnect of last client** check box, SchemaAgent LocalServer will automatically shut down as soon as the last client disconnects from SchemaAgent Client.

SchemaAgent's caching of globals and components for

For each of the available servers, you can define whether or not data should be cached. If data is cached by a SchemaAgent server, more memory is used but communication frequency is lower.

4.9.6.3.6   Help

Application provides Help (the user manual) in two formats:

- Online Help, in HTML format, which is available at the Altova website. In order to access the Online Help you will need Internet access.
- A Help file in PDF format, which is installed on your machine when you install Application. It is named `Application.pdf` and is located in the application folder (in the Program Files folder). If you do not have Internet access, you can always open this locally saved Help fie.

The Help option (*screenshot below*) enables you to select which of the two formats is opened when you click the **Help (F1)** command in the **Help** menu.

```
◉ Use Altova Online Help
○ Use help file saved locally on your disk
```
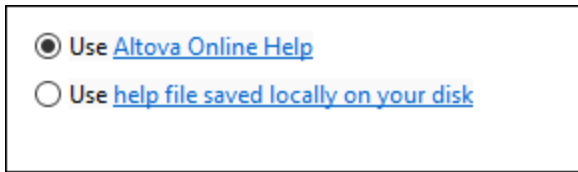
You can change this option at any time for the new selection to take effect. The links in this section (*see screenshot above*) open the respective Help format.

4.9.7   Window Menu

To organize the individual windows in a SchemaAgent Client session, the **Window** menu contains standard commands common to most Windows applications.

Cascade

The **Cascade** command rearranges all open document windows so that they are all cascaded (staggered) on top of each other.

Tile Horizontally

The **Tile horizontally** command rearranges all open document windows as *horizontal* tiles, making them all visible at the same time.

Tile Vertically

The **Tile vertically** command rearranges all open document windows as *vertical* tiles, making them all visible at the same time.

Currently Open Window List

This list shows all currently open design windows and lets you quickly switch between them. You can also use the **Ctrl+Tab** or **Ctrl+F6** keyboard shortcuts to cycle through the open windows.

4.9.8   Help Menu

This section describes all the menu commands available in the **Help** menu.

⊟ Help (F1)

The **Help (F1)** command opens the application's Help documentation (its user manual). By default, the Online Help in HTML format at the Altova website will be opened.

If you do not have Internet access or do not want, for some other reason, to access the Online Help, you

can use the locally stored version of the user manual. The local version is a PDF file named `Application.pdf` that is stored in the application folder (in the Program Files folder).

If you want to change the default format to open (Online Help or local PDF), do this in the Help section of the Options dialog (menu command **Tools | Options**).

☐ Software Activation

License your product

After you download your Altova product software, you can license—or activate—it using either a free evaluation key or a purchased permanent license key.

- *Free evaluation license.* When you first start the software after downloading and installing it, the **Software Activation** dialog will pop up. In it is a button to request a free evaluation license. Click it to get your license. When you click this button, your machine-ID will be hashed and sent to Altova via HTTPS. The license information will be sent back to the machine via an HTTP response. If the license is created successfully, a dialog to this effect will appear in your Altova application. On clicking **OK** in this dialog, the software will be activated for a period of 30 days **on this particular machine**.

- *Permanent license key.* The **Software Activation** dialog allows you to purchase a permanent license key. Clicking this button takes you to Altova's online shop, where you can purchase a permanent license key for your product. Your license will be sent to you by e-mail in the form of a license file, which contains your license-data.

  There are three types of permanent license: *installed*, *concurrent user*, and *named user*. An installed license unlocks the software on a single computer. If you buy an installed license for *N* computers, then the license allows use of the software on up to *N* computers. A concurrent-user license for *N* concurrent users allows *N* users to run the software concurrently. (The software may be installed on 10N computers.) A named-user license authorizes a specific user to use the software on up to 5 different computers. To activate your software, click **Upload a New License**, and, in the dialog that appears, enter the path to the license file, and click **OK**.

Note: For multi-user licenses, each user will be prompted to enter his or her own name.

Your license email and the different ways to license (activate) your Altova product
The license email that you receive from Altova will contain your license file as an attachment. The license file has a `.altova_licenses` file extension.

To activate your Altova product, you can do one of the following:

- Save the license file (`.altova_licenses`) to a suitable location, double-click the license file, enter any requested details in the dialog that appears, and finish by clicking **Apply Keys**.
- Save the license file (`.altova_licenses`) to a suitable location. In your Altova product, select the menu command **Help | Software Activation**, and then **Upload a New License**. Browse for or enter the path to the license file, and click **OK**.
- Save the license file (`.altova_licenses`) to any suitable location, and upload it from this location to the license pool of your Altova LicenseServer. You can then either: (i) acquire the license from your Altova product via the product's Software Activation

---

dialog (*see below*) or (ii) assign the license to the product from Altova LicenseServer.
For more information about licensing via LicenseServer, read the rest of this topic.

You can access the **Software Activation** dialog (*screenshot below*) at any time by clicking the **Help |
Software Activation** command.

Activate your software
You can activate the software by registering the license in the Software Activation dialog or by licensing via
Altova LicenseServer (*see details below*).

- *Registering the license in the Software Activation dialog*. In the dialog, click **Upload a New
  License** and browse for the license file. Click **OK** to confirm the path to the license file and to
  confirm any data you entered (your name in the case of multi-user licenses). Finish by clicking
  Save.

- *Licensing via Altova LicenseServer on your network:* To acquire a license via an Altova
  LicenseServer on your network, click **Use Altova LicenseServer**, located at the bottom of the
  Software Activation dialog. Select the machine on which the LicenseServer you want to use has
  been installed. Note that the auto-discovery of License Servers works by means of a broadcast
  sent out on the LAN. As these broadcasts are limited to a subnet, License Server must be on the
  same subnet as the client machine for auto-discovery to work. If auto-discovery does not work,
  then type in the name of the server. The Altova LicenseServer must have a license for your Altova
  product in its license pool. If a license is available in the LicenseServer pool, this is indicated in
  the **Software Activation** dialog (*see screenshot below showing the dialog in Altova XMLSpy*).
  Click **Save** to acquire the license.

After a machine-specific (aka installed) license has been acquired from LicenseServer, it cannot be returned to LicenseServer for a period of seven days. After that time, you can return the machine license to LicenseServer (click **Return License**) so that this license can be acquired from LicenseServer by another client. (A LicenseServer administrator, however, can unassign an acquired license at any time via the administrator's Web UI of LicenseServer.) Note that the returning of licenses applies only to machine-specific licenses, not to concurrent licenses.

Check out license
You can check out a license from the license pool for a period of up to 30 days so that the license is stored on the product machine. This enables you to work offline, which is useful, for example, if you wish to work in an environment where there is no access to your Altova LicenseServer (such as when your Altova product is installed on a laptop and you are traveling). While the license is checked out, LicenseServer displays the license as being in use, and the license cannot be used by any other machine. The license automatically reverts to the checked-in state when the check-out period ends. Alternatively, a checked-out license can be checked in at any time via the **Check in** button of the **Software Activation** dialog.

To check out a license, do the following: (i) In the **Software Activation** dialog, click **Check out License** (*see screenshot above*); (ii) In the **License Check-out** dialog that appears, select the check-out period you want and click **Check out**. The license will be checked out. After checking out a license, two things happen: (i) The **Software Activation** dialog will display the check-out information, including the time when the check-out period ends; (ii) The **Check out License** button in the dialog changes to a **Check In** button. You can check the license in again at any time by clicking **Check In**. Because the license automatically reverts to the checked-in status after the check-out period elapses, make sure that the check-out period you select adequately covers the period during which you will be working offline.

If the license being checked out is a Installed User license or Concurrent User license, then the license is checked out to the machine and is available to the user who checked out the license. If the license being checked out is a Named User license, then the license is checked out to the Windows account of the named user. License check-out will work for virtual machines, but not for virtual desktop (in a VDI). Note that, when a Named User license is checked out, the data to identify that license check-out is stored in the user's profile. For license check-out to work, the user's profile must be stored on the local machine that will be used for offline work. If the user's profile is stored at a non-local location (such as a file-share), then the checkout will be reported as invalid when the user tries to start the Altova application.

License check-ins must be to the same major version of the Altova product from which the license was checked out. So make sure to check in a license before you upgrade your Altova product to the next major version.

Note: For license check-outs to be possible, the check-out functionality must be enabled on LicenseServer. If this functionality has not been enabled, you will get an error message to this effect when you try to check out. In this event, contact your LicenseServer administrator.

Copy Support Code
Click **Copy Support Code** to copy license details to the clipboard. This is the data that you will need to provide when requesting support via the online support form.

Altova LicenseServer provides IT administrators with a real-time overview of all Altova licenses on a network, together with the details of each license as well as client assignments and client usage of licenses. The advantage of using LicenseServer therefore lies in administrative features it offers for large-

volume Altova license management. Altova LicenseServer is available free of cost from the Altova website. For more information about Altova LicenseServer and licensing via Altova LicenseServer, see the Altova LicenseServer documentation.

- Order Form

    When you are ready to order a licensed version of the software product, you can use either the **Purchase a Permanent License Key** button in the **Software Activation** dialog (*see previous section*) or the **Order Form** command to proceed to the secure Altova Online Shop.

- Registration

    Opens the Altova Product Registration page in a tab of your browser. Registering your Altova software will help ensure that you are always kept up to date with the latest product information.

- Check for Updates

    Checks with the Altova server whether a newer version than yours is currently available and displays a message accordingly.

- Support Center

    A link to the Altova Support Center on the Internet. The Support Center provides FAQs, discussion forums where problems are discussed, and access to Altova's technical support staff.

- Download Components and Free Tools

    A link to Altova's Component Download Center on the Internet. From here you can download a variety of companion software to use with Altova products. Such software ranges from XSLT and XSL-FO processors to Application Server Platforms. The software available at the Component Download Center is typically free of charge.

- Application on the Internet

    A link to the Altova website on the Internet. You can learn more about Application, related technologies and products on the Altova website.

- About Application

    Displays the splash window and version number of your product. If you are using the 64-bit version of Application, this is indicated with the suffix (x64) after the application name. There is no suffix for the 32-bit version.

5 License Information

This section contains information about:

- the distribution of this software product
- software activation and license metering
- the license agreement governing the use of this product

Please read this information carefully. It is binding upon you since you agreed to these terms when you installed this software product.

To view the terms of any Altova license, go to the Altova Legal Information page at the Altova website.

5.1   **Electronic Software Distribution**

This product is available through electronic software distribution, a distribution method that provides the following unique benefits:

- You can evaluate the software free-of-charge for 30 days before making a purchasing decision. *(Note: Altova MobileTogether Designer is licensed free of charge.)*
- Once you decide to buy the software, you can place your order online at the Altova website and 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 an onscreen help system that can be accessed from within the application interface. The latest version of the user manual is available at www.altova.com in (i) HTML format for online browsing, and (ii) 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 the 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 must purchase a product license, which is delivered in the form of a license file containing a key code. Unlock the product by uploading the license file in the Software Activation dialog of your product.

You can purchase product licenses at https://shop.altova.com/.

Helping Others within Your Organization to Evaluate the Software

If you wish to distribute the evaluation version within your company network, or if you plan to use it on a PC that is not connected to the Internet, you may distribute only the installer file, provided that this file is not modified in any way. Any person who accesses the software installer that you have provided must request their own 30-day evaluation license key code and after expiration of their evaluation period, must also purchase a license in order to be able to continue using the product.

5.2   Software Activation and License Metering

As part of Altova's Software Activation, the software may use your internal network and Internet connection for the purpose of transmitting license-related data at the time of installation, registration, use, or update to an Altova-operated license server and validating the authenticity of the license-related data in order to protect Altova against unlicensed or illegal use of the software and to improve customer service. Activation is based on the exchange of license related data such as operating system, IP address, date/time, software version, and computer name, along with other information between your computer and an Altova license server.

Your Altova product has a built-in license metering module that further 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, as part of the license metering process, the software 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.

Multi-user 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 help you to better determine 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.

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 the IANA Service Name Registry 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.

Note about certificates

Your Altova application contacts the Altova licensing server (`link.altova.com`) via HTTPS. For this communication, Altova uses a registered SSL certificate. If this certificate is replaced (for example, by your IT department or an external agency), then your Altova application will warn you about the connection being insecure. You could use the replacement certificate to start your Altova application, but you would be doing this at your own risk. If you see a *Non-secure connection* warning message, check the origin of the certificate and consult your IT team (who would be able to decide whether the interception and replacement of the Altova certificate should continue or not).

If your organization needs to use its own certificate (for example, to monitor communication to and from client machines), then we recommend that you install Altova's free license management software, Altova LicenseServer, on your network. Under this setup, client machines can continue to use your organization's certificates, while Altova LicenseServer can be allowed to use the Altova certificate for communication with Altova.

5.3 Altova End-User License Agreement

- The Altova End-User License Agreement is available here: https://www.altova.com/legal/eula
- Altova's Privacy Policy is available here: https://www.altova.com/privacy

5.4   **Packaging License Files with Application Installer**

If you want to perform a silent installation of Application, you may want to modify the MSI database so that it includes your license file(s). This way, the installer will not only install the product but also license it. For details about how to achieve this, download this ZIP file from the Altova website and open the PDF document in it.

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