

X4 Data Model



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1 Introduction

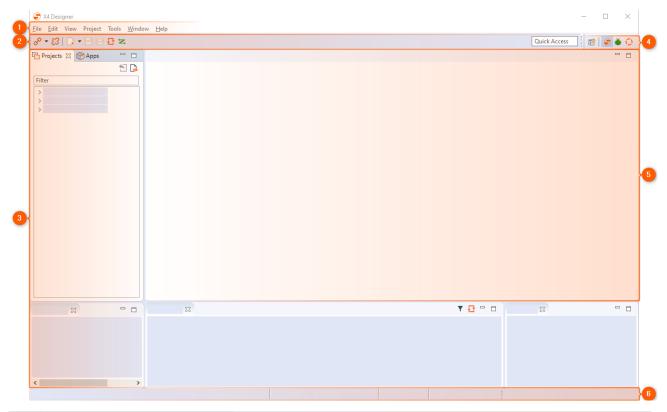
1.1 What is a Data Model Project?

A Data Model Project is a type of project within X4 BPMS that allows you to define complex data models and integrate them into ESB processes and X4 Web Apps.

1.2 How can I use Data Model Projects?

In a Data Model Project, you can map complex data structures, such as a purchase order with addresses and positions, which you reuse in other places. This offers the great advantage that data models can be reused, e.g. in X4 Web Apps, and do not have to be defined multiple times.

2 Interface



1	Menu bar	The menu bar allows to open various functions and editors of the X4 Designer.
2	Toolbar	The toolbar offers different functions and display options. Some symbols are only active, if the corresponding function is available for the selected or opened element, see also Toolbar.
3	Views	Views can be arranged individually via drag-and-drop.
4	Perspectives	Switch between X4 Designer and BPMN Designer perspective.
5	Editors and workspace	Processes and files are opened here for editing in tabs.
6	Status bar	The status bar displays the connected server, the logged-in user and the version.

2.1 Toolbar

Various functions and display options can be called up via the toolbar. Some icons are only active if the relevant function is available for the selected or opened element.

P	Connect	Connect to the server
??	Disconnect	Disconnect from the server
	New	Add new element The insert option varies depending on where you are in the tree structure in the Repository Navigator.
	Save	Save changes in the currently opened window
B	Save all	Save all changes
₽	Repository Refresh	Perform server-side update
X / X	Attach/Detach Debug	Attach debugger to server instance / Detach debugger from server instance
*	Start Debugging	Start Debugger
Ð	Undo	Undo last editing step
T.	Redo	Restore undone step
%	Cut	Cut selection
	Сору	Copy selection
	Paste	Paste selection
>.	Start Debugging	 Call up options for process execution Start Debugging: debug process (show and fix errors) Start Without Debugging: Execute process directly Debug/Run Options: Open Run/Debug settings in X4 Designer
II	Suspend	Stop debugging process
Þ	Resume	Continue debugging process
	Stop Debugging	Terminate debugging

1 .	Step Into	Execute process step (display steps of the subprocess)
<u>r</u>	Step Over	Execute process step (without displaying steps of the subprocess)
_Ľ	Step Return	Jump out of subprocess
	Toggle Breakpoint	Set or remove breakpoint for marked element
*	Clear all Breakpoints	Delete all breakpoints in this process
68	Quick Watch	Open Quick Watch view to view placeholders, dynamic parameters and context variables with their values during debugging.
(Output	Open Output view to view the result of each process step during debugging.
Q	Zoom Out	Zoom out view
100%	- Zoom	Select zoom level
Q	Zoom In	Zoom view
#	Snap to grid	Display grid and align elements to grid
	Show Process Quality Index	Display Process Quality Index

2.2 Context Menu

Context menu for process components

When you right-click a process component in the X4 Designer's editor area, you have access to different features – depending on the component type and the:

Add Component

Layout	 Align selected process components Align Horizontal: Align the process components horizontally Align Vertical: Align the process components vertically Distribute Horizontal: Distribute the process components horizontally Distribute Vertical: Distribute the process components
	vertically
Select All	Select all process components
Copy Process Diagram to Clipboard	Copy the process diagram
Edit Label	Edit the process component's label
Undo	Undo the last editor action
Redo	Redo a previously undone editor action
Сору	Copy a selected process action
Cut	Cut selected process action
Set document	Replace a marked process component with another repository element
Edit	Edit a selected process component (module components and documents only)
Toggle Breakpoint	Set a debug breakpoint for the selected process action
Delete	Delete a selected process component from the process diagram
Validate	Check the subprocess' validity (subprocesses only)
Preview	Open process component in a separate editor tab (Module components and documents only)
Show input schema	Display input schema assigned to the sub-process, if available
Show output schema	Display output schema assigned to the sub-process, if available
Select in Repository Navigator	Show process component in the Repository Navigator
View Call Hierarchy	Display the processes using the selected process component
Refresh	Reload a selected process component from the repository (Module components and documents only)
Bring to Front	Bring a selected symbol to the foreground of the diagram
-	

Bring Forward	Bring a selected symbol one level up towards foreground
Send Backward	Bring a selected symbol one level down towards background
Send to Back	Bring a selected symbol to the background of the diagram
Properties	Display process component properties in the Properties view
Schema Declaration	Specify schema declaration for the process

Context menu in the Projects view

You can open the context menu by right-clicking on an element within the **Projects** view.

New	Create new elements (processes, directories, adapters, etc.) in the repository
Open / Open with	Open the selected element (process, folder, adapter etc.) with the default editor or a specific editor
Save As Template	Saves the selected element as template
Copy full path to Clipboard undCopy XStore URL to Clipboard	Copy the path of the selected element to the clipboard (as relative folder path or as xstore: // URL)
Cut, Copy and Paste	Cut, copy, or pastes the selected element(s)
Delete	Delete selected element from the repository (irreversible)
Refactor/Rename	Rename an element (and change references, if desired)
Exclude from Project	Exclude the resource from the project
	 The file will remain in the file system, but is no longer part of the project and is grayed out. The usual operations such as opening, editing, copying, deleting, etc. of excluded files are disabled.
Include to Project	Include an excluded resource to the project
Repair References	Repair incorrect repository resource paths in process diagrams
Validate	Check the selected process's validity
View Call Hierarchy	Display the processes that use the selected elements
Start Without Debugging	Run process directly
Import	Import resource to the repository
Export	Export project or resource
Clean-Up Project	Select and delete unused files from the repository

2.3 Perspectives

A perspective is a defined arrangement of views and the editor area. The arrangement of the views can be defined by drag-and-drop.

S X4 Designer	The X4 Designer perspective is the default perspective.
☀ Debug	The Debug perspective is an optimized perspective to debug business and technical processes.
• BPMN Designer	The BPMN Designer perspective is an optimized perspective to model business processes.

2.3.1 Switching perspectives

In X4 Designer, you can switch between perspectives. The arrangement of the views is kept.

• To change the perspective, click on the icon of the desired perspective in the upper right corner.

2.3.2 Reseting perspectives

- 1. To reset a perspective, switch to the perspective.
- 2. Select **Window > Reset Window Layout** in the menu bar.

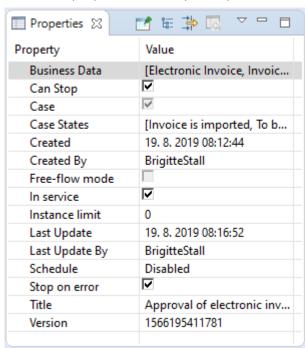
2.4 Views

□ Projects	The Projects view displays a tree structure of the connected repository with various elements such as projects, folders, and files. The context menu can be opened by right-clicking on an element in the Projects view. The available options change depending on where in the tree structure the context menu is called. The Filter text field above the project tree can be used to search for files within the connected repository. Placeholders like * or ? are not possible. The following actions can be performed using various buttons: * **Jump from active Editor to Repository Navigator*: Highlight opened file in the editor within the Projects view. * **Show or hide all files*: Show and hide contents of the file system. Files excluded from the project are grayed out.
♠ Apps	The Apps view displays all X4 Apps that are used to bundle projects.

■ Properties

In the **Properties** view, the properties of selected process modules and of opened processes can be displayed and edited:

- The left column displays the property name, the right column contains the corresponding values.
- A title and a description can be stored for each process. These are displayed in the generated documentation.
- To edit properties of an opened process, click on an empty area on the workplace.



The most common properties are displayed by default, however, additional settings can be made using the **Properties** view toolbar:

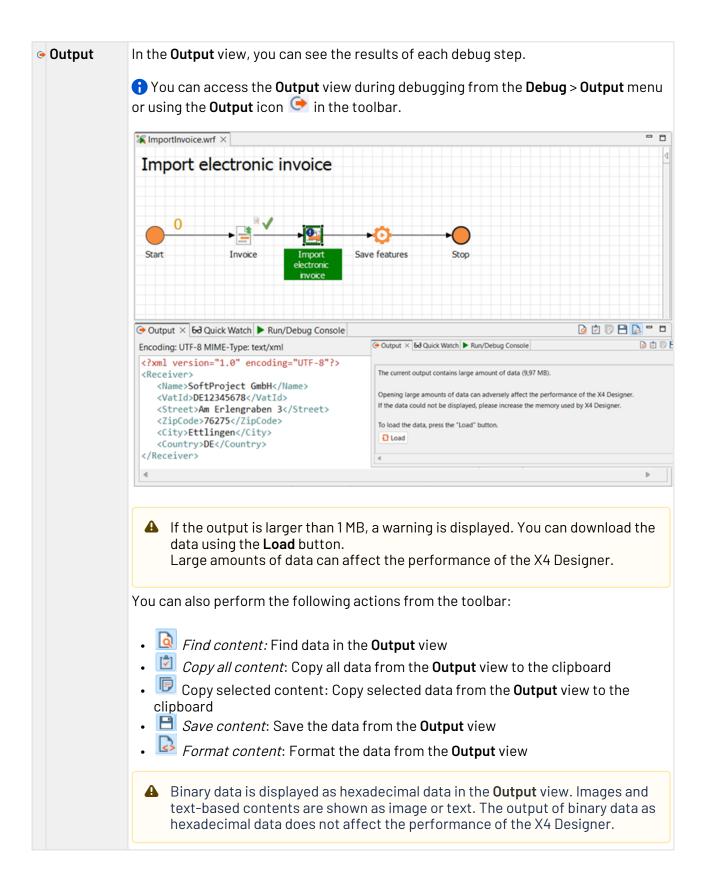
- In to Selection: Pin displayed properties in the **Properties** view
- Show Categories: Show properties sorted by categories
- Show Advanced Properties: Show advanced properties
- Restore Default Value: Restore to default value
- View Menu: Open additional options

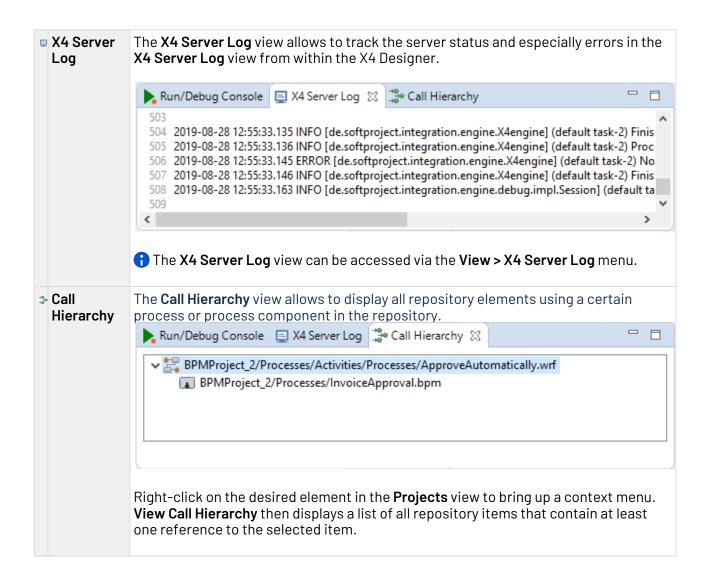
Run/Debug Console

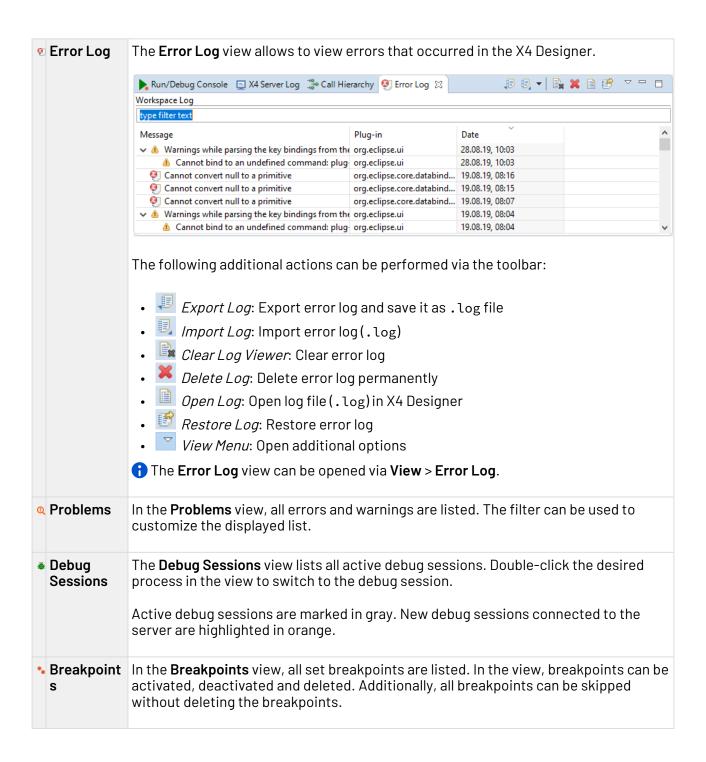
If a process is checked for errors or simulated, debug information is displayed in the **Run/Debug Console** view for each executed process step. Error messages are highlighted in red, successful status messages are green.

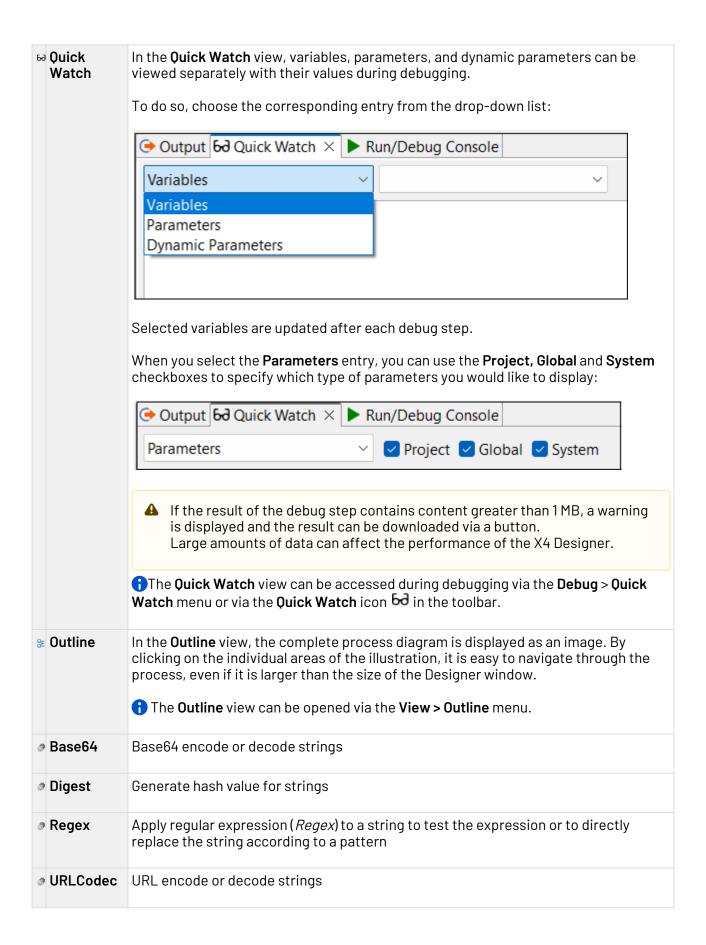
When a process step outputs an intermediate result, it is stored in a temporary file during debugging, which you can view using the corresponding reference (e.g., file: //1376054979039/).

The Run/Debug Console view can be accessed from the View > Run/Debug Console menu.









2.4.1 Open views



⚠ No other views can be opened in the **BPMN Designer** perspective, all relevant views are open by default.

• Select the desired view from the **View** menu in the menu bar.

3 Working with Data Model Projects

Using the **Data Model Project** project type you can define complex data models and integrate them in ESB processes and X4 Web Apps. You can represent complex data structures in a Data Model Project, such as a purchase order with addresses and items you re-use in other locations. The major advantage of this approach is the ability to re-use data models, e.g. in web apps, without having to define them multiple times.

3.1 Creating a Data Model Project

To create a new Data Model Project:

- 1. In the X4 Designer, right-click in the **Projects** view and choose **New** from the context menu.
- 2. Select Data Model Project.
 - Alternatively, you can click on **New** in the **File** menu and select **Data Model Project**.
- 3. Enter a name for your project in the **Project Creation Wizard** dialog.
- 4. Select Finish.

Data Model Projects have a predefined folder structure which is automatically created when you create a new Data Model Project.

Entities	This folder is empty when creating a project. You can add 1 to n entities. The Entities folder cannot be deleted, moved, or renamed.
<pre><project> .datamodel</project></pre>	Project-related file containing the data model definition. You set the relationships between the entities created by you in this file. All relationships you set here result in a hierarchy. For information on creating entities, see the Creating Entities section.

3.1.1 Setting entity relationships in the Design view

You can set relationships between entities using the graphical editor in the .datamodel file. To open the editor, select the **Design** tab at the bottom of the **Entity Relationships** window.

To set entity relationships in the **Design** view:

1. Select **Add** to add a new entity relationship.

2. Select the desired values for the From Entity, the To Entity, and the Cardinality from the dropdown lists.

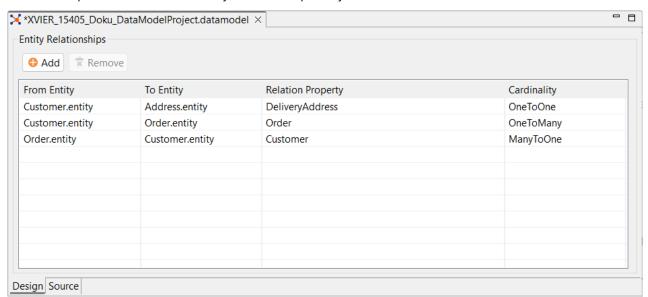


① The From Entity and To Entity drop-down lists contain all entities that are available in your project. When you create or delete entities in your project, the values in both dropdown lists are refreshed automatically. You do not have to close and re-open the editor to refresh the values.

In the Cardinality drop-down list, you can choose between OneToOne, OneToMany, and ManyToOne.

3. In the Relation Property field, specify the desired property for the relationship between the entities. This field is a free text field.

As an example, a structure of entity relationships may look like shown here:





Note

Note the following when setting the entity relationships:

- The values for From Entity and To Entity must not be identical.
- The combination of From Entity, To Entity, and Relation Property must be unique. It is not allowed to create duplicate relationships.

If you use the same combination of source entity and target entity, you must specify a different relationship property in the Relation Property field for each entity pair.

If you set an incorrect relationship, an error message is displayed and you cannot save your data model.

3.1.2 Setting entity relationships in the Source view

When creating a new Data Model Project, the *Project>*.datamodel file in the XML view that is opened from the **Source** tab at the bottom of the **Entity Relationships** window looks as follows:

The EntityRelationships element is used to set the relationships between the entities created by you which are represented in the data model. Any relationship you specify will result in a hierarchy. For more information on creating entities, see the Creating entities section.

The EntityRelationships element can contain the following elements:

- OneToOne
- OneToMany
- ManytoOne

These three elements provide of the following attributes for the definition of the relationships between the entities:

Attribute	Description
entity	You can use this attribute to specify the from entity of the relationship.
toEntity	You can use this attribute to specify the target entity of the relationship.
property	You can use this attribute to specify the name which is used to reference the entity specified in toEntity for the entity with respect to the further usage of the data model.
	You can, for example, specify a delivery address as the property for a one-to-one relationship between a customer and an address, as shown in the following example.

Example:

3.2 Creating Entities

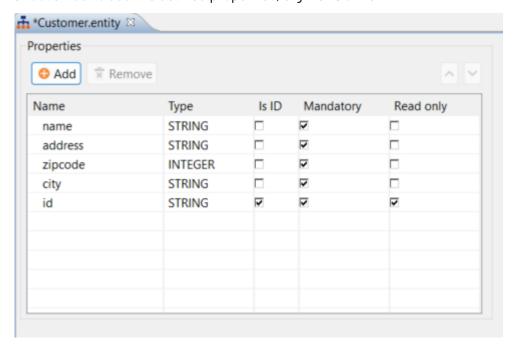
Each entity corresponds to an object in your application, e.g. "order" or "customer". The relationship between two or more entities is represented via associations. Each entity (object) contains fields (properties) and is labeled with a unique technical ID field which is needed for associations.

To create a new entity:

- 1. Right-click on the **Entities** folder.
- 2. Choose **New > Entity**.
- 3. Enter an entity name in the File Creation Wizard dialog.
- 4. Choose Finish.

In the next step, you can add properties to your entity. To do so, double-click on the .entity file in the **Projects** view to open it in the Entity Editor.

Choose **Add** to add the desired properties, e.g. name or id:





Please observe the applicable naming conventions for XML elements when making entries in the Name column. Otherwise, an error message will be displayed in the Problems view, and the .entity file cannot be used.

① You can sort the entries by selecting an entry and move it up or down using the arrows on the top right. This way you can arrange the entries as desired.

The table in the .entity file contains the following fields:

Field	Description
Name	You enter the desired name for your property in this field.
	Use the Add button to add a new property.
	Use the Remove button to remove properties you do not need anymore.
Туре	You use this drop-down to set the type of the property.
	Possible values:
	• STRING
	• INTEGER • DECIMAL
	• BOOLEAN
	• DATE • DATETIME
Is ID	Use this checkbox to define whether the property is a defined ID.
Mandat ory	Use this checkbox to define whether the property is mandatory or optional.
Read only	Use this checkbox to define whether the property is read-only.

in addition to the **Design** view shown above you can also open the .entity file in the **Source** view and define the properties as XML elements and the corresponding attributes.

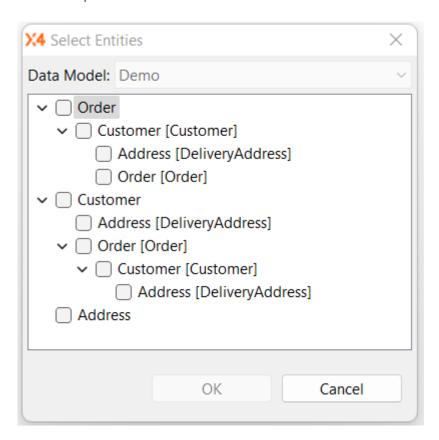
3.3 Using a Data Model in an ESB Project

To use a data model in an ESB Project:

- 1. Create a new ESB project or open an existing ESB project.
- 2. Right-click on the **Transformations** folder and choose **New > XSL Stylesheet**.
- 3. Choose **Empty** in the **File Creation Wizard** to create an empty transformation.
- 4. Enter a name for the mapping file and choose **Finish**.
- 5. Move the .datamodel file via drag-and-drop from the Data Model Project into the empty space on the left side of your mapping side.

6. The **Select Entities** dialog is opened where you select which entities from your data model are to be included in the mapping file.

The dialog box contains the following options for the example shown in the Creating a Data Model Project section in which the **Customer**, **Address**, and **Order** entities with different relationships were created:



7. Once the structure has been generated and is displayed you can start with the mapping. For more information see Mapping.

3.4 Using a Data Model in an X4 Web App

How to create a data model in an X4 Web App

- 1. Create a new Web App Project or open an existing Web App Project.
- 2. Right-click on the ViewModels folder and choose **New** > **View Model**.
- 3. Enter a view model name in the **File Creation Wizard** dialog and select **Finish**.
- 4. Move the .datamodel file via drag-and-drop from the Data Model Project into the Properties element in the .viewmodel file.
- 5. The **Select Entities** dialog opens. In this dialog, you select which entities from your data model are to be referenced in the .viewmodel file.

The entities and their properties are referenced in the .viewmodel file. You can edit the properties with additional attributes (displayName, readOnly).

Example:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ViewModel xmlns="http://softproject.de/viewmodel/1.0">
    <Properties>
        <Model path="Demo/Entities/Customer.entity">
            <ModelProperty name="Name" displayName="Name" readOnly="false"/>
            <ModelProperty name="Firstname" readOnly="false"/>
            <ModelObject name="DeliveryAddress" path="Demo/Entities/Address.entity">
                <ModelProperty name="City" readOnly="false"/>
                <ModelProperty name="Zip" readOnly="false"/>
                <ModelProperty name="Street" readOnly="false"/>
            </ModelObject>
            <ModelList name="Order" path="Demo/Entities/Order.entity">
                <ModelProperty name="Product" readOnly="false"/>
                <ModelProperty name="Quantity" readOnly="false"/>
                <ModelObject name="Customer" path="Demo/Entities/Customer.entity">
                    <ModelProperty name="Name" readOnly="false"/>
                    <ModelProperty name="Firstname" readOnly="false"/>
                    <ModelObject name="DeliveryAddress" path="Demo/Entities/
Address.entity">
                        <ModelProperty name="City" readOnly="false"/>
                        <ModelProperty name="Zip" readOnly="false"/>
                        <ModelProperty name="Street" readOnly="false"/>
                    </ModelObject>
                </ModelObject>
            </ModelList>
        </Model>
   </Properties>
</ViewModel>
```

Example for embedding a .viewmodel file in a component:

```
<?xml version="1.0" encoding="UTF-8"?>
<DetailComponent xmlns="http://softproject.de/webapp/1.0"
viewmodel="ViewModel.viewmodel">
<Properties>
</Properties>
</Properties>
<FlowLayout>
<Header value="Welcome to my new Web App!" />
<TextBox value="#Customer.Name" />
</FlowLayout>
</DetailComponent>
```