Siemens OPC UA Modeling Editor
Functional description

SiOME / OPC UA / TIA V15

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1 Introduction

1.1 Overview

The OPC UA communication protocol enables companies and organizations to create their own standards for an OPC UA information model. You can generate a standardized server interface with these functions. For communication to your system or system parts, the OPC UA clients only have to know the defined standard without taking into account detailed information on the system and its devices.

The platform-independent OPC UA protocol with the companion specifications extension greatly facilitates standardized cross-manufacturer communication and reduces implementation effort.

Many organizations and associations already have standardized OPC UA information models for your industry-specific systems and solutions. These include the following organizations, for example:

- Euromap
- AIM
- VDMA
- AutomationML e.V.
- OMAC
- VDW

With the free "Siemens OPC UA Modelling Editor" (SiOME) tool, we have created an editor for defining your own OPC UA information models or mapping existing companion specifications on your SIMATIC PLC / SINUMERIK. Using this tool, you can import and edit information models as XML files or generate and export individualized models.
1.2 Highlights

The Siemens OPC UA Modelling Editor offers the following functions which facilitate the generation of information models:

- Import of prefabricated OPC UA companion specifications.
- Saving of the work status (project) in XML format and re-import.
- Modeling of own types, objects and methods.
- Importing a TIA portal project directly into the tool via the TIA Openness interface.
- Quick linking of OPC UA objects from the OPC UA information model with control variables and methods via drag & drop.
- Comprehensive access monitoring by setting the access rights.
- Freely selectable description of the OPC UA nodes including localization.
- Basic diagnosis of a connected OPC UA Server

New in V2.0:

- New Layout and User interface
- New Editing options with TIA Portal (Change Access Level for Variables or Data blocks)
- Support of Software Units with TIA Portal
- New Context options (Move to Namespace, Edit Access Level for Types)
- New Hotkeys
- Support of up to 140,000 Nodes

Note

The following system requirements apply to SiOME:

- .NET Framework 4.5 or higher
- Windows 7 (x64)
- Windows 10 (x64)

The following system requirements also apply for the use of the TIA Openness function of SiOME:

- Windows 7/10 (x64)
- TIA Portal openness installation
2 Handling and functions of SiOME

In this chapter you will learn how to integrate the library into your user project.

2.1 Description of the user interface

The following figure explains the interface of the Siemens OPC UA Modelling Editor (SiOME):

<table>
<thead>
<tr>
<th>Nr.</th>
<th>Objekt</th>
<th>Funktion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>“Hamburger” menu</td>
<td>In the dialog &quot;About&quot;, the user will find version information and the link to this SIOS contribution. The &quot;Settings&quot; entry provides additional information model options. The dialog &quot;Shortcuts&quot; contains a list of the available shortcuts in SiOME.</td>
</tr>
<tr>
<td>2.</td>
<td>“New” button</td>
<td>Resets the current information model. All unsaved changes will be lost.</td>
</tr>
<tr>
<td>3.</td>
<td>“Open” button</td>
<td>Opens a SiOME project. A list of recently opened projects is displayed.</td>
</tr>
<tr>
<td>4.</td>
<td>“Save as” button</td>
<td>Saves the current SiOME project as XML file.</td>
</tr>
<tr>
<td>5.</td>
<td>&quot;Mapping&quot; slider</td>
<td>Activates the mapping in the program to link variables by Drag &amp; Drop (&quot;TIA Openness&quot;) or manually by text input.</td>
</tr>
<tr>
<td>6.</td>
<td>&quot;Import XML&quot; button</td>
<td>Imports a pre-defined NodeSet or a saved XML project.</td>
</tr>
<tr>
<td>7.</td>
<td>&quot;Export XML&quot; button</td>
<td>Exports a modeled NodeSet. In addition to &quot;Save as&quot; button, the user has the option of exporting only individually selected namespaces.</td>
</tr>
<tr>
<td>8.</td>
<td>&quot;Filter for mapping&quot; dropdown menu</td>
<td>If &quot;Mapping&quot; slider is activated, the user can...</td>
</tr>
</tbody>
</table>
# Handling and functions of SiOME

<table>
<thead>
<tr>
<th>Nr.</th>
<th>Objekt</th>
<th>Funktion</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.</td>
<td>“Highlighted Namespace” dropdown menu</td>
<td>Highlights the selected namespace</td>
</tr>
<tr>
<td>10.</td>
<td>“Namespace” dropdown menu</td>
<td>Lists all namespaces currently used in the tool. By selecting a namespace from the list, the user can unlock this specific namespace. Additionally, the user can create his own namespaces by clicking “Add New Namespace”.</td>
</tr>
<tr>
<td>11.</td>
<td>“Namespace settings” button</td>
<td>Opens the “Namespaces” window for editing. The user can delete a certain namespace, by right-clicking on it.</td>
</tr>
<tr>
<td>12.</td>
<td>“Validate information model” button</td>
<td>Validates the linking of OPC UA variables with PLC variables. Displays unresolved conflicts.</td>
</tr>
<tr>
<td>13.</td>
<td>“Show number of nodes” button</td>
<td>Shows the number nodes in each namespace and the total number of nodes in the project.</td>
</tr>
<tr>
<td>14.</td>
<td>“OPC UA Attributes” area</td>
<td>This section displays the attributes of the OPC UA nodes. The user can add a description of the nodes here.</td>
</tr>
<tr>
<td>15.</td>
<td>“Additional OPC UA Attributes” area</td>
<td>This section displays additional attributes of the OPC UA nodes. The user can change their value or access level here. Additionally, the data type of the value is also displayed.</td>
</tr>
<tr>
<td>16.</td>
<td>Tabs area</td>
<td>In this area different tabs depending on the Layout can be found. If for instance “Namespace settings” button is clicked, then “Namespaces” tab becomes automatically the current tab.</td>
</tr>
<tr>
<td>17.</td>
<td>“Layout” dropdown menu</td>
<td>Lists all available layouts. Additionally, the user can create a custom layout.</td>
</tr>
<tr>
<td>18.</td>
<td>“Information model” area</td>
<td>This section shows the information model and offers all functions for modifying it.</td>
</tr>
<tr>
<td>19.</td>
<td>“Information model online” dialog</td>
<td>Opens dialog for online connection to an OPC UA server, for browsing the namespace.</td>
</tr>
<tr>
<td>20.</td>
<td>“References” area</td>
<td>This section contains an overview of the referencing level and the modelling rules of the OPC UA nodes.</td>
</tr>
<tr>
<td>21.</td>
<td>“Log” area</td>
<td>A log is created in the SiOME directory. The log is used to collect debug information and readjust user input.</td>
</tr>
<tr>
<td>22.</td>
<td>“Logging” slider</td>
<td>Enables or disables logging.</td>
</tr>
<tr>
<td>23.</td>
<td>“Clear log window” button</td>
<td>Clears the log window.</td>
</tr>
<tr>
<td>24.</td>
<td>“Filter for log message display” dropdown menu</td>
<td>This section gives the user the possibility to filter the log messages.</td>
</tr>
</tbody>
</table>

**Note**
If logging is activated, SiOME creates the "Log" folder in the same directory as the SiOME EXE. In this folder you will find the logs in CSV format.
The import windows for generic server interfaces are different between SIMATIC and SINUMERIK:

### 2.1.1 Description of the import window for SIMATIC

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&quot;Open TIA Portal project&quot; button</td>
</tr>
<tr>
<td>2</td>
<td>&quot;Close TIA Portal project&quot; button</td>
</tr>
<tr>
<td>3</td>
<td>&quot;Refresh TIA Portal project&quot; button</td>
</tr>
<tr>
<td>4</td>
<td>&quot;Compile TIA Portal project&quot; button</td>
</tr>
<tr>
<td>5</td>
<td>&quot;Change external TIA Portal options&quot; button</td>
</tr>
</tbody>
</table>

### 2.1.2 Description of the import window for SINUMERIK

1. Button „Load Sinumerik XML-File“ Imports a Server-Interface from a SINUMERIK XML. The SINUMERIK XML is an export of the SINUMERIK object model of an individual machine, which can be produced using Access MyMachine /P2P.

### 2.1.3 Switching between SIMATIC and SINUMERIK import windows

The user can find the import windows for SIMATIC and for SINUMERIK under “Layout” dropdown menu.

Left click on the drop-down menu, the select either “TIA Portal mapping” for SIMATIC import, or “Sinumerik” for SINUMERIK import.
2.2 Functional description for address space modelling

This chapter describes the individual functions and options of SiOME.

2.2.1 Import of OPC UA models

To import a NodeSet file into SiOME, proceed as follows:

1. Click on the "Import XML" button:

2. In the dialog that appears, select the file that you want to import. SiOME also offers you the possibility to select and import several NodeSets. Click Open in the dialog.

   Note
   Alternatively, you can drag and drop a NodeSet XML file into the "Information model" area.

2.2.2 Creating new OPC UA namespaces

To create a new OPC UA address space, proceed as follows:

1. In the "Namespaces" dropdown menu, click on the dropdown menu and select "Add New Namespace".

2. A new dialog box will appear. Assign a name. Then confirm with "Ok".

   Add Namespace

   Namespace URI *
   http://myNewNamespace

   Version
   1.00

   Publication date
   2019-11-08T00:00:00Z
2.2.3 Select or lock the current namespace

You have the option of selecting the currently active namespace or locking an existing namespace to prevent unwanted modifications.

Selecting the current namespace

Each type and object in the information model must be assigned to a namespace. You can preselect the currently active namespace. When you select a namespace, the corresponding objects are highlighted. Proceed as follows:

1. Import an information model or create several namespaces of your own.
2. Left-click on "Namespace settings" button.

3. The “Namespaces” window will appear. Right-click on a desired namespace and then click on "Unlock and Current Namespace" to select the namespace. In case the namespace has been previously unlocked, then “Current Namespace” will be active and “Unlock and Current Namespace” option will be greyed out.

4. All objects created from now on are automatically assigned to the selected namespace. You can change the assignment subsequently.

Alternatively, you can click on the “Namespaces” dropdown menu and select the namespace you would like to unlock and/or edit.
2 Handling and functions of SiOME

Locking a namespace

For example, if you have created all objects of a namespace and want to protect them against further modifications, you can lock the namespace. Proceed as follows.

1. Import an information model or create your own namespace.
2. Right-click on the desired namespace and then click "Lock Namespace" to select the namespace.

3. A lock symbol indicates that the namespace is locked. From now on, you cannot create new objects for this namespace. To unlock, use the "Unlock and Current Namespace" button on the context menu.

Change namespace sequence

The sequence of the created namespaces can be changed afterwards. Proceed as follows:

1. In the "Namespaces" area, select the "Change order" button.
2. You can use the arrows to change the sequence of the namespaces created in the dialog that appears. Confirm with "Ok".
2 Handling and functions of SiOME

Namespaces

http://opcfoundation.org/UA/
http://opcfoundation.org/UA/DA/
http://www.euromap.org/euromap03/
http://www.euromap.org/euromap77/
http://www.OEM.com/siemens/Euromapinterface

Check dependencies of namespaces

Via the button "Check dependencies" you have the possibility to check the dependencies of the created namespaces.

After you have clicked the button, you can expand the individual namespaces to check their dependencies.

Current number of nodes in the project

In order to find out the current number of nodes in the project, as well as the number of nodes in each namespace, select “Show number of nodes”. The total number of nodes excluding “0:http://opcfoundation.org/UA/” is displayed next to “Namespaces” folder.
2.2.4 Displaying the Data Types in the Current Model

If you want to display the data types for all variables in the information model, proceed as follows:
1. Click on the “Hamburger” button in the upper left corner to open the menu.
2. Select the item “Settings”.
3. Select the checkbox “Show dataTypes for variables and variableTypes in information model”.
4. Select “Ok”.

Additional information model options:
- Show dataTypes for variables and variableTypes
- Sort nodes alphabetically
- Check cycles on Import

Default Value Rank of BaseData/VariableType: Scalar

Choose the direction how states in the state machine should be sorted:
- Top to Bottom (default)
- Bottom to Top
- Left to Right
- Right to Left
2 Handling and functions of SiOME

2.2.5  Sort nodes alphabetically

When defining your own information model, the nodes you create are sorted alphabetically by default. If you want the nodes to appear in the order created, uncheck the box “Sort nodes alphabetically” under “Hamburger” menu > “Settings”.

Settings

- Additional information model options:
  - Show dataTypes for variables and variableTypes
  - Sort nodes alphabetically
  - Check cycles on Import

Default ValueRank of baseClasses/variableTypes: Scalar

Choose the direction how states in the state machine should be sorted:

- Top to Bottom (default)
- Bottom to Top
- Left to Right
- Right to Left

Ok

2.2.6  Delete the current object model

To discard the entire project or object model, proceed as follows:

1. Select “New” button.

2. Select "Save changes".

Create a new project

Do you really want to create a new project and close the existing project? All unsaved changes will be lost.

Cancel  Discard changes  Save changes

NOTICE  Permanent!

If you select "Discard changes", all changes are lost. Save your project/information model beforehand selecting "Save changes" or by exporting it via the “Export XML” button. This allows you to import it again later and process it further.

2.2.7  Creating a new object type

To define a new object type, proceed as follows:
1. Create an object type to instantiate it later as an object. In the "Information model" area, navigate to "Types > ObjectTypes", right-click "BaseObjectType" and select "Add New ObjectType".

2. In the dialog that appears, enter a name for the object type and confirm with "Ok".

Creating a child object

To fill an object with children, proceed as follows:

1. Right-click on the object just generated and select "Add Child".
2. Enter a name for the child in the appearing dialog and select the class "Variable" as "NodeClass". Then select a suitable data type (in the example: "Int32") and confirm with "Ok".

Define modelling rules for object children

Select the previously created object type by left-clicking on it. You will then find the modeling rules in the "Hierarchical References" area.

To change the modeling rule, proceed as follows:

- You can change the modeling rule from "optional" to "mandatory" using the "ModellingRule" checkbox. The "ModellingRule" determines which references of the object type must be created during instantiation.
• Right-click on the "ModellingRule" selection box to select between "Mandatory", "Mandatory placeholder" or "No modelling rule".

Derived object type references

If you derive an object type from another, it inherits the attributes and nodes of its parent object.

An example:

The object type "FiniteStateMachineType" is derived from the parent object "StateMachineType". This has given him so-called inherited attributes ("Derived members").

The node "CurrentState" was inherited as "Mandatory". The variable "LastTransition" is optional but can still be given the modeling rule "Mandatory" for instantiation afterwards.

In addition, in the "Hierarchical References" and "Non-Hierarchical References" areas you can see whether a reference is directed forward ("Forward" = "true") or backward ("Forward" = "false").

2.2.8 Creating a new data type

To create a data type, proceed as follows. A new structure is defined as an example:

1. Navigate to "Types > DataTypes > BaseDataTypes", right-click on "Structure" and select "Add New Structured Data Type".
2. Enter a name for the structure in the dialog that appears and confirm with "Ok". The active namespace is automatically selected as the namespace in which the structure definition is to be stored.

3. Fill the structure with items. Right-click on the structure you just created and select "Add New Structure Item".

4. In the tree view, select the created item with the left mouse button, assign a name in the "Structure Item Definition" area and select the desired data type. Decide whether it is an array of the desired data type and whether this item is optional.
5. Repeat steps 3 and 4 for each required item within your structure.

### 2.2.9 Create/derive a new variable type

Once you have created a structure type, you can also create the variable type from it. The advantage is that when you create an instance of the structure using the variable type, the structure elements are displayed in the OPC UA model. These can then be processed as individual elements in the structure by OPC UA clients.

The disadvantage is that the OPC UA information model contains significantly more nodes.

Procedure:

1. Right-click on your structure type and then left-click “Create Variable Type” in the context menu.

2. Enter a name for the variable type and confirm with “Ok”.

Then you can find your variable type in the directory VariableTypes > BaseVariableType > BaseDataVariableType:
Note

SIOME offers the possibility to delete the derived variable type if you delete the corresponding data type.

2.2.10 Creating a StateMachine Type and Opening the StateMachine Editor

SIOME offers you the possibility to create StateMachines via an editor. Proceed as follows to create a StateMachine:

1. For StateMachine Editor, navigate to the FiniteStateMachineType type, right-click the type, and then click Add New ObjectType on the shortcut menu.

2. Enter a name for your StateMachine type in the "Add New ObjectType" dialog and confirm with "Ok".
2. Handling and functions of SiOME

Add New ObjectType

<table>
<thead>
<tr>
<th>Name</th>
<th>myMachineFiniteStateMachineType</th>
</tr>
</thead>
<tbody>
<tr>
<td>NodeClass</td>
<td>ObjectType</td>
</tr>
<tr>
<td>Namespace</td>
<td><a href="http://www.OEM.com/siemens/Eu">http://www.OEM.com/siemens/Eu</a>...</td>
</tr>
<tr>
<td>ReferenceType</td>
<td>HasSubtype</td>
</tr>
</tbody>
</table>

3. Navigate to the created StateMachine type and right-click on it. Click on “Show State Machine” in the context menu to open the StateMachine Editor and configure the StateMachine.

2.2.11 Defining references and attributes

In addition to the basic generation of an individualized information model, SiOME offers additional options for specifying the information model in more detail.

Defining attributes of variables and objects

In addition to the name and data type of the variables, you have the option of specifying other attributes. The following figure and table explain all available attributes. You can adjust the attributes by selecting the desired node in the "Information model" area and then changing the attributes in the "Attributes" area.

<table>
<thead>
<tr>
<th>OPC UA Attributes</th>
<th>Additional OPC UA Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>NodeId</td>
<td>Value</td>
</tr>
<tr>
<td>NodeClass</td>
<td>DataType</td>
</tr>
<tr>
<td>BrowseName</td>
<td>ValueRank</td>
</tr>
<tr>
<td>DisplayName</td>
<td>ArrayDimensions</td>
</tr>
<tr>
<td>Description</td>
<td>AccessLevel</td>
</tr>
<tr>
<td>WriteMask</td>
<td>UserAccessLevel</td>
</tr>
<tr>
<td>UserWriteMask</td>
<td>historians</td>
</tr>
<tr>
<td>RolePermissions</td>
<td>MinimumSamplingInterval</td>
</tr>
</tbody>
</table>
### Attribute name

<table>
<thead>
<tr>
<th>Attribute name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NodeId</td>
<td>The unique node address with name space</td>
</tr>
<tr>
<td>NodeClass</td>
<td>The class of the node (object, variable, data type)</td>
</tr>
<tr>
<td>BrowseName</td>
<td>The name of the node displayed when browsing</td>
</tr>
<tr>
<td>DisplayName</td>
<td>The display name of the node</td>
</tr>
<tr>
<td>Description</td>
<td>Brief description of the node</td>
</tr>
<tr>
<td>WriteMask</td>
<td>Write permissions (0=no, 1=yes) without taking user groups into account</td>
</tr>
<tr>
<td>UserWriteMask</td>
<td>Write permissions (0=no, 1=yes) while taking the current user into account</td>
</tr>
<tr>
<td>Value</td>
<td>Value of the node</td>
</tr>
<tr>
<td>DataType</td>
<td>Data type of the variable</td>
</tr>
<tr>
<td>ValueRank</td>
<td>Value type of the variable (any, scalar, vector, array). In SiOME set to &quot;Scalar&quot; by default.</td>
</tr>
<tr>
<td>ArrayDimensions</td>
<td>Number or array dimensions</td>
</tr>
<tr>
<td>AccessLevel</td>
<td>Access authorization (read, write, read/write) on the nodes without taking user groups into account</td>
</tr>
<tr>
<td>UserAccessLevel</td>
<td>Access authorization (read, write, read/write) on the nodes while taking user groups into account</td>
</tr>
<tr>
<td>MinimumSamplingInterval</td>
<td>The smallest possible sampling interval of the variable on the server side</td>
</tr>
<tr>
<td>Historizing</td>
<td>Course of time of the variable available on the server (yes, no)</td>
</tr>
</tbody>
</table>

### Note

The availability of the attributes depends on the "NodeClass" of the object.

In order to change the default ValueRank of BaseDataVariableType, go to “Burger” menu > “Settings” > Default ValueRank dropdown menu.

### Defining references

In the "References" area, you can define references for the selected node of the information model. If you have generated a child of an object type in the "Information model" area, SiOME automatically generates the necessary "Hierarchical" references for you. Under "References", you can manually enter the references of a node or change existing references. Also important is the "ModellingRule" option, which you can use to decide whether a reference is necessary ("Mandatory") or not when instantiating the type.

```
- MyObject
  - MyObjString
  - MyObjStruct
- NamespaceMetaDataType
```
In addition to hierarchical references, you can generate “Non-hierarchical” references to refer to type definitions or descriptions.

### 2.2.12 “Mouseover” Functions

SiOME offers a “mouseover” function for various elements. The elements are explained below.

#### Displaying the Data Type and Type Definition Path

If you move the mouse over a type, the path to this type is displayed.

The same applies to the data type:
2.2.13 Moving and Renaming Nodes

Moving nodes

1. Right-click a node in the address space that you want to move:

![Image showing the process of moving a node]

2. In the dialog that appears, select the object to which you want to move the selected node and confirm with "Ok":

![Image showing the dialog for moving a node]

Renaming nodes

Select a node in the "Information model" section and edit its name in the "References" section:
2.2.14 Navigating in the Address Space Model

To navigate in the address space, you can search for nodes and jump directly to them. You can also add a new bookmark.

Find a node and jump directly to the node

1. If you right-click on the "Information model" label field or use the key combination "<STRG> + <F>"; you can jump directly to a node using the "Find Node" button:

2. In the dialog that appears, enter either the BrowseName or the Node Id with namespace and click on a proposed node to jump to it:

Bookmark

To navigate quickly in an object model, you can bookmark nodes. To add a bookmark, use the key combination "<STRG> + <K>". This allows you to delete the bookmark again.
Jumping to a data type definition

Right-click on the desired data type in the "References" area and then click on "Jump To" in the context menu to jump to its node:

You can then right-click anywhere in the context menu to return to the previous screen:
2.2.15 Validation of the address space

You can validate the address space that you have created or imported. The following rules are checked during validation:

- Duplicates of the BrowseNames
- Maximum length of the BrowseName
- Namespace loops
- Data type loops
- State machines (OPC UA StateMachine)
- Array dimensions and value ranks
- References
- Mandatory members
- Validate extended OPC UA rules (companion specifications)
- Validate mapping rules

Proceed as follows to check the address space:

1. Select “Validate information model” button

2. In the "Choose the validation settings" dialog that appears, decide which rules you want to check your address space for and then confirm with "Validate".

Choose the validation settings

- [ ] Validate common OPC UA rules
  - [ ] Duplicate BrowseName
  - [ ] Maximal BrowseName length
  - [ ] Namespace cycles
  - [ ] DataType cycles
  - [ ] State machines
  - [ ] ArrayDimensions and ValueRank
  - [ ] Reference targets
  - [ ] Mandatory members

- [ ] Validate extended OPC UA rules
  - [ ] Missing Types
  - [ ] Optional as mandatory

- [ ] Validate mapping rules
  - [ ] Validate mappings

[Cancel] [Validate]
Optionally, you can also validate mapping rules and/or have your address space checked against a companion specification by activating the checkbox "Validate extended OPC UA rules". But before doing so, you need to import a corresponding NodeSet by clicking the "Validate settings" button under "Validation" Tab and then selecting "Browse Companion Specification" in the dialog that appears.

3. After validation, the rule violations are displayed in the "Validation" area.

2.2.16 Select different layouts

The above-mentioned functionalities are relevant for OPC UA modeling and therefore are to be found in the “OPC UA modeling” Layout. In order to switch to another layout, click on the dropdown menu and select one of the standard layouts.
Additionally, you can create your custom layout by selecting “Edit layout”.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&quot;Remove current layout&quot; button</td>
<td>Deletes the current layer. This option is not available for the standard layouts.</td>
</tr>
<tr>
<td>2</td>
<td>&quot;Clone current layout&quot; button</td>
<td>Duplicates the current layer, allowing the user to add extra tabs to the layout.</td>
</tr>
<tr>
<td>3</td>
<td>&quot;Create new layout&quot; button</td>
<td>Creates a new layer from scratch.</td>
</tr>
<tr>
<td>4</td>
<td>&quot;Rename current layout&quot; button</td>
<td>Renames the current layout. This option is not available for the standard layouts.</td>
</tr>
</tbody>
</table>

### 2.3 Online browsing on an OPC UA Server

With SiOME you have the possibility to establish an online connection to an OPC UA server. This allows you to browse through the address space on an OPC UA server.

In the "Information model" area, open the "Information model online" dialog at the bottom. In the dialog box that appeared, click on “Connect to OPC UA Server”.

In the new window that appears, enter the server address, select “Find selected server” and then click “Connect”.

**Connect to OPC UA server**

OPC UA server address
opc.tcp://

Session name
SiOME.InformationModel.Session

Find selected server
Cancel  Connect
Note: It is not possible to model your address space during the online connection. As soon as the online connection is deactivated, SiOME returns to the previous state.

**Validation during the online connection**

During the online connection, you can also open the validation window. This allows you to check the OPC UA Server for a valid OPC UA NodeSet. It is also possible to import a NodeSet XML file in the validation window and compare this file with the information model of the OPC UA Server. You can use this function to check Companion specifications at runtime.

**Validation of StateMachines during the online connection**

During the online connection to the OPC UA Server you can check running StateMachines.

Navigate to a StateMachine in the address space and open the StateMachine-Editor by right-clicking on the StateMachine.

Additionally, you can use the validation window to check the StateMachine against the OPC UA rules. Deviations and errors are displayed in SiOME.

Note: It is not possible to test the function of the StateMachine within the machine. Only the correct function or representation in the OPC UA Server is checked.

**2.4 Server diagnostics**

For the diagnosis of an OPC UA Server SiOME offers you an integrated OPC UA Client, which automatically reads the most important diagnostic data of a Server and displays it in the area "Server Diagnostic".

The client supports all common security modes and authentication via username and password.

To view the server diagnostic information, follow these steps:

1. Click on “Layout” dropdown menu and select “Edit layout”

2. In the window that appeared select “Clone current layout”.

   ![Edit layout window](image)
3. Enter a name for your custom layout, create a new tab by clicking on "+" and name it "ServerDiagnostic". Drag and drop the "ServerDiagnostic" template and then "Save and close" the layout.

4. In the “Information model online” dialog, click on the "Connect to OPC UA server" button as explained.

5. Enter the server address into the field "OPC UA server address" and click on the button "Find selected server".

6. Select an endpoint of the OPC UA Server and enter a username and password for authentication on the server into the fields "User authentication", in case needed.
Select OPC UA server endpoint:

- [ ] SIMATIC.S7-1500.OPC-UA_SERVER:PLC_1
  - http://opcfoundation.org/UA/SecurityPolicy#None - NONE
  - http://opcfoundation.org/UA/SecurityPolicy#Basic256 - SIGN
  - http://opcfoundation.org/UA/SecurityPolicy#Basic256Sha256 - SIGN

User authentication:

User name
Password

Note
SiOME offers you the possibility to import your own client certificate or to create a self-signed certificate if you have selected a secure endpoint of the OPC UA server.

7. After SiOME is connected to the OPC UA Server, you will find 5 categories for server diagnostics in the section "Server diagnostics". Click on the categories to get more information.
## Explanation of the categories:

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Information</td>
<td>General overview of the server. Contains server name, status, start time, etc.</td>
</tr>
<tr>
<td>Server Endpoints</td>
<td>Overview of available server endpoints. Contains server URLs, discovery URLs, available endpoints, and so on.</td>
</tr>
<tr>
<td>Server Redundancy</td>
<td>Information on server redundancy.</td>
</tr>
<tr>
<td>Server Capabilities</td>
<td>Information about the performance of the server.</td>
</tr>
<tr>
<td>Server Diagnostics</td>
<td>Contains information about the current client. Shows active sessions, subscriptions, monitor items, etc.</td>
</tr>
</tbody>
</table>
3 Creating information models for SIMATIC

3.1 Create information model from TIA Portal project

SiOME offers you the possibility to create an information model directly from TIA Portal. You can derive and map objects directly from an (instance) data module.

Issuing authorization for TIA Openness

In order to issue SiOME the authorization to use TIA Openness, you must assign your currently registered user to the "TIA Openness" user group. Proceed as follows:

1. Click "Start", enter "lusrmgr.msc" and confirm with the Enter button.
2. In the tree view on the left side, click on "Groups".
3. In the working area, double-click on "Siemens TIA Openness".
4. Click "Add...".
5. Enter the name of your current user, e.g. "User", in the text box. Confirm with "Ok".
6. Log out from the current Windows session and then log back in.

Open TIA project:

To create an information model or object from a TIA Portal project, select the “TIA Portal mapping” layout and open the TIA Portal project by clicking the "Open TIA Portal project" button:

If TIA Portal is already started and a project is open in TIA Portal, the dialog "Attach to already opened TIA Portal project" opens. Select the open project and then click on "Attach to selected project":

Attach to already opened TIA Portal project
If you have configured more than one SIMATIC S7-1500 CPU, select the suitable CPU from the appearing list and confirm with "Ok". Then confirm the dialog that opens from TIA Portal.

Create Objects from TIA Portal Datablocks or variables in the information model

To create objects in the information model from the TIA Portal project, proceed as follows:

1. In the project tree, navigate to data block you want to use and select it. On the right side under the “TIA Portal-Details” you will notice the variables defined in the data block.

2. Select the data block under “TIA Portal-Details” from which you want to create an object in the OPC UA information model.

3. Hold down CTRL + left click and use Drag & Drop to store the data block in the information model.

4. Then you can choose whether arrays, structures or UDTs contained in the block should be created as variable types and whether the node IDs to be created should be of the type “String”.

Create OPC UA instance

You can also perform the same procedure for OPC UA methods:

1. Select an instance data block of an OPC UA method programmed in the TIA Portal project from which you want to create a method in the OPC UA information model.
3 Creating information models for SIMATIC

2. Hold down CTRL + left click and use Drag & Drop to store the method in the information model.

3.2 Create Objects from SiOME in a TIA Portal Project

With this function you can create the data blocks and variables in a TIA Portal project from objects of the OPC UA information model.

1. Open an OPC UA NodeSet file in SiOME.
2. Open a TIA Portal project in SiOME.
3. Activate the details of the TIA Portal project in SiOME.
4. CTRL+left-click an object in the SiOME instance system.
5. Drag and drop the object into the TIA Portal window in SiOME.
6. A data block containing all variables of the OPC UA object is then automatically created from the object.
7. The variables are automatically mapped correctly.

Note: The Drag & Drop function also works with individual variables from the OPC UA information model directly into a data block in the TIA portal.

3.3 Import a server interface from an open TIA Portal project

You have the possibility to directly import into SiOME a server interface from an attached TIA Portal project.

Under “OPC UA communication/Server interfaces” folder, right-click on the server interface you would like to import and then select “Import”.

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3.4 Export a server interface to an open TIA Portal project

Additionally, you have the possibility to directly export from SiOME a server interface to an attached TIA Portal project.

Under “OPC UA communication/Server interfaces” folder, left-click on “Add new server interface…”

In the dialog box that appears, select the namespace you want to export and then confirm by selecting “Ok.”

Export XML

Select namespace
- http://opcfoundation.org/UA/
- http://opcfoundation.org/UA/DI/
- http://opcfoundation.org/UA/PROFINET/
- http://siemens.com/myProfinetIO_System

Include mappings
Include Type Dictionary
Include Values
4 Creating information models for SINUMERIK

4.1 Creating an information model for SINUMERIK OPC UA Server

SiOME makes it possible to create an OPC UA information model. However, for this to work on the SINUMERIK, it must be linked to the SINUMERIK OPC UA objects. To make this as simple as possible, SiOME allows to engineer the link via drag & drop. However, the SINUMERIK object model must be imported for this purpose.

Since the namespace of the SINUMERIK depends very much on the individual parameterization (e.g. number of R parameters, GUDs, etc.), it makes sense to read the namespace of a parameterized machine.

This requires using the SINUMERIK tool Access MyMachine /P2P. SINUMERIK AMM /P2P reads the namespace of the individual OPC UA server and creates a SINUMERIK XML that can then be imported into SiOME.

For this purpose, AMM /P2P must be connected to the OPC UA of the respective SINUMERIK.

Note

In order for the SINUMERIK namespace to be imported, it must be created beforehand with the Access MyMachine /P2P tool.

Export the OPC UA namespace out of the SINUMERIK OPC UA Server

1. Open the program "SINUMERIK Access MyMachine /P2P".
2. Click on "Tools > Sinumerik Model Export". A Pop-up Windows appears.
3. Provide the following information from the attached OPC UA server:
   “Server IP”, “Server Port”, “Username”, “Password”.
4. Define the path, where the XML file should be saved, under “Output File”.
5. Click “Start” to create the XML file. The XML file is stored in the specified path. The stored XML can now be read into SiOME.

Import SINUMERIK XML in SiOME

After having created a SINUMERIK XML from the OPC UA Server, this can be imported into SiOME.

In the “Layout” dropdown menu, select “Sinumerik”.
For import of the SINUMERIK XMLs please click on “Load SINUMERIK XML-File” and choose the corresponding SINUMERIK XML.
4 Creating information models for SINUMERIK

The SINUMERIK OPC UA XML also provides the SINUMERIK namespaces. They are necessary for proper function and must not be deleted or changed.

For the own object model a new namespace must be created.

Modelling rules with SINUMERIK OPC UA Server

The following configuration rules must be adhered to for the SINUMERIK OPC UA server to function correctly:

- The SINUMERIK XML must not be read in the "Information Model" window.
- No new nodes may be created in the SINUMERIK namespaces (namespace 0, 1 and 2).
- Namespaces 0, 1 and 2 must not be changed, deleted or changed in order.
- Own namespaces must have an index of 3 or higher.
Map own object model with SINUMERIK objects

The SINUMERIK namespace has many variables organized in arrays. The arrays are not resolved in the SINUMERIK OPC UA namespace. Therefore, after mapping the central object, you still need to manually add the desired element. The exact description for addressing can be found in the manual of the SINUMERIK OPC UA server.

Example R parameters:
For the R parameters, there is only one object in the SINUMERIK namespace. When linking to a variable, the specific parameters must be added.

![Information model](image)

For parameter R1 from Channel 1 "[u1,1]" must be added.
5 Appendix

5.1 Service and support

Industry Online Support
Do you have any questions or need assistance?
Siemens Industry Online Support offers round the clock access to our entire service and support know-how and portfolio.
The Industry Online Support is the central address for information about our products, solutions and services.
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- Spare parts services
- Repair services
- On-site and maintenance services
- Retrofitting and modernization services
- Service programs and contracts
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https://support.industry.siemens.com/cs/ww/en/sc/2067
6 Links and literature

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<td>Siemens Industry Online Support</td>
<td><a href="https://support.industry.siemens.com">https://support.industry.siemens.com</a></td>
</tr>
<tr>
<td>2</td>
<td>Download page of this entry</td>
<td><a href="https://support.industry.siemens.com/cs/ww/en/view/109755133">https://support.industry.siemens.com/cs/ww/en/view/109755133</a></td>
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7 Change documentation

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<th>Modifications</th>
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</thead>
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<tr>
<td>V1.0</td>
<td>07/2018</td>
<td>First version</td>
</tr>
<tr>
<td>V1.9</td>
<td>03/2019</td>
<td>Update to version 1.9 with functional enhancements</td>
</tr>
<tr>
<td>V1.9.6</td>
<td>09/2019</td>
<td>Update to version 1.9.6 with SINUMERIK Support</td>
</tr>
<tr>
<td>V2.0</td>
<td>11/2019</td>
<td>Update to Version 2.0 with new Graphical User Interface</td>
</tr>
</tbody>
</table>